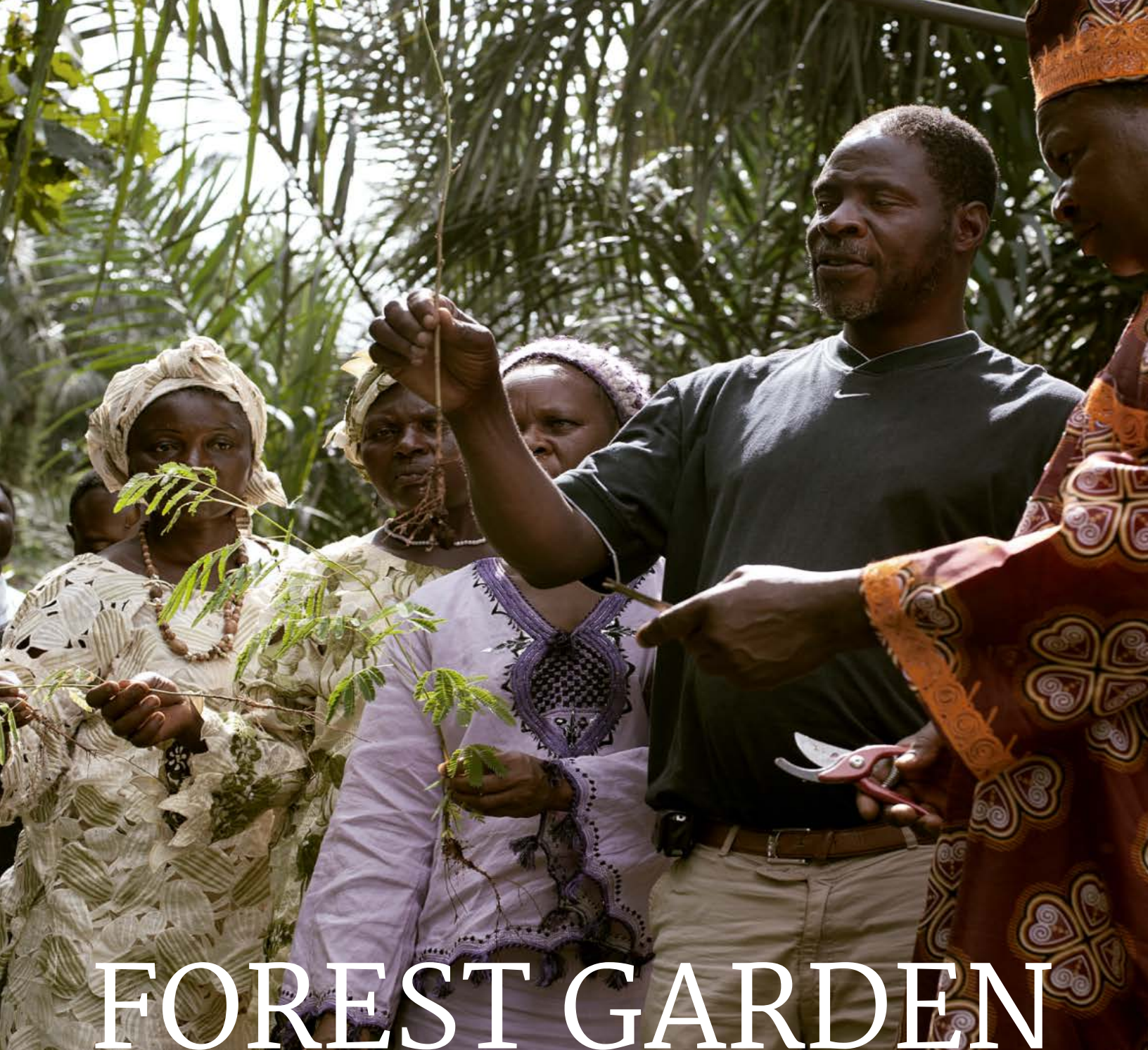




FOREST GARDEN

FACILITATOR'S GUIDE

English–Anglaise



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Acknowledgments



The Forest Garden Approach was developed by the team at Trees for the Future, drawing on 27 years of experience working at the grassroots level. The technical content referenced in this Facilitator's Guide was funded and developed by Trees for the Future staff drawing on our own training resources and the experience, knowledge and technical resources from several partners, including the United States Peace Corps, Centro Agronómico Tropical de Investigación y Enseñanza (CATIE), ACDI/VOCA, the TOPS Permagarden Technical Manual, the International Council for Research in Agroforestry (ICRAF), and the New Zealand Digital Library.

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Introduction



Trees for the Future is dedicated to ending extreme hunger and poverty across Sub-Saharan Africa by revitalizing degraded lands using the Forest Garden Approach. The Forest Garden Approach, developed by Trees for the Future, diversifies farming systems with trees and food crops that meet subsistence needs and market opportunities. While conventional agriculture programs focus on one or few crops, the Forest Garden Approach is rooted in diversifying each farm with many food crops and thousands of trees so farming families will be self-sufficient in their production of food, timber and non-timber forest products.

What is the Facilitator's Guide?

The Facilitator's Guide is designed for use in conjunction with the Technical Manual and Farmer's Workbook to provide both facilitators and farmers with the resources and guidance needed to pursue the Forest Garden Approach within a four-year curriculum.

Who should use the Facilitator's Guide?

Trainers, extension workers, specialists, and individuals interested in working with farmers to implement agroforestry techniques that increase both their income and food security in a restorative way.

Why should this Facilitator's Guide be used?

By guiding massive numbers of subsistence farmers through the phases of protecting, diversifying and optimizing their farms, we can have a permanent impact on the lives of millions of smallholder farming families across the developing tropics struggling to survive on their degraded farms.

How should this Facilitator's Guide be used?

The training modules in this Facilitator's Guide were designed to guide farmers through the three phases of the Forest Garden Approach. In the first year, the focus is largely on growing and planting trees that *protect* the land. Farmers learn to design Green Walls and plant thousands of agroforestry trees around and across their field to serve many purposes. By the second year, farmers undergo training in vegetable and fruit tree production to *diversify* the sources of income and nutrition. By the third and fourth years, farmers learn to *optimize* their field by using techniques that maximize productivity on the land in a sustainable way.

Each module in this Facilitator's Guide has a corresponding Farmer's Workbook section for farmers to keep records, take home activities and illustrations that will help them recall what they learned and need to do when returning home after workshops. This Facilitator's Guide is also accompanied by the Forest Garden Technical Manual. Each module in this guide refers to the relevant chapters within the manual and provides all the technical answers behind many of the questions asked in the facilitation exercises.

Please note that you will encounter annual planning and monitoring activities that Trees for the Future (TREES) uses but which may not be applicable to all communities or projects. We have labeled these as *(optional for non-TREES projects)*.

We look forward to hearing how this resource has helped you and how we can improve it. **Extend your learning online at trees.org/training where you can access the latest resources, interact with the community and earn your certification.**

Feel free to contact us at info@trees.org.

-The Team at Trees for the Future

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Mobilization Meeting



Goal

This first training event of the Forest Garden Training Program introduces the concept of Forest Gardens and motivates a group of farmers who have expressed interest to participate in the four-year Program. Some of the activities as well as administrative procedures (e.g. discussion of materials provided and signing of an MoU) describe the format of Trees for the Future's (TREES) projects and are left in the modules as an example. These activities and procedures are listed as 'optional for non-TREES facilitators' and can be modified or removed.

Learning Objectives

1. Understand Trees for the Future's role in international development.
2. Understand the Forest Garden concept, the phases to develop a Forest Garden, and begin thinking about designing their new Forest Gardens.
3. Have clear expectations regarding the roles and responsibilities of Trees for the Future, the farmer group leaders, and the individual farmers.

Venue and Timing

The workshop should be held wherever the farmer group will normally meet, often at the lead farmer's field.

Relevant Technical Manual Chapters

Before this training event, the facilitator should read, review, and thoroughly understand the following chapters in the Technical Manual:

- Chapter 1: Introduction to the Forest Garden
- Chapter 2: Phased Approach

Preparation

- Before the meeting, meet with contact person for the farmer group and determine his/her interest in working with Trees for the Future and planting Forest Gardens.

- Work with that contact person to select an established garden or orchard in which to have this session.
- Choose a location and time of day for the workshop that allows women to participate.
- Determine which months each module (and flexible activities where relevant) are to be facilitated using the table in Activity 4.
- Identify a song or dance to engage the group during the opener activity

Supplies

- Copies of country program activity calendar (1 per participant)
- Copies of Memorandum of Understanding (1 per participant)
- 2 blank piece of flipchart paper
- 3 markers

Total Time

Approximately 3 hours

Handouts in Farmer's Workbook

- Pictures of Farmer's Guides
- Memorandum of understanding
- Description of Farmer's Guide approach

Mobilization Meeting

Summary of Activities

Opener: Introduction

- Cultural song or dance
- Who is Trees for the Future? (optional for non-TREES facilitators)
- Mobilization Meeting Purpose

Activity 1: Dream Field

- Breathing exercise
- Visualization
- Form small groups
- Participant farmers share dream field

Activity 2: Forest Garden System Design

- Describe Forest Garden layers
- Explain the Forest Garden Approach

Activity 3: Roles and Expectations

- What are the required criteria for a Forest Garden site?
- What will Trees for the Future expect from you as a participant?
- What can you as a farmer expect from Trees for the Future?
- Site criteria checklist
- Roles and field organizational structure
- Elect lead farmer

Activity 4: Calendar of Events

- Calendar of training events/milestones
- Answer questions
- Discuss and sign MoU
- Follow-up

Opener: Introduction

Description

The facilitator will begin the meeting with a culturally appropriate way to start meetings in the local context. This may include a prayer, introducing participants one-by-one, and/or short speeches by local leaders. Then introduce Trees for the Future and state the purpose of the meeting.

Ask each question in the Site Criteria Checklist (See Activity 3.4) to the full group and write down the number of farmers who do and do not meet each criteria. Determine the percentage of farmers who pass the site assessment checklist. If fewer than 70% of the farmers meet the criteria in the site assessment checklist, kindly let them know that the group does not meet our selection criteria, thank them for their time and excuse the group.

Instructions for Farmers

1. Cultural songs, dances, or other traditions

Have group members sing a song, dance, or other cultural tradition that resonates with the group, to relax them and encourage engagement

2. Who is Trees for the Future? (optional for non-TREES facilitators)

Trees for the Future (TREES) is an international development organization founded in 1989 to combat poverty and unsustainable land use practices in the developing world.

- TREES has assisted thousands of communities in planting over 100 million trees in more than 30 countries.
- TREES' mission is: To improve livelihoods of farmers by revitalizing degraded lands.
- Over 25 years of training farmers in agroforestry and sustainable resource management, we have analyzed which methods are most successful and tailored our programs accordingly.
- TREES is focusing our collective expertise and resources on the agroforestry practice that makes the most direct, long-lasting, beneficial impact on farming households: the Forest Garden.
- TREES currently works in 5 countries in East and West Africa.
- TREES trains local facilitators who train local farmers.
- TREES offers training, knowledge, and some materials, but success and benefits come from the hard work of the participant farmers.
- TREES designed the Forest Garden Approach, which generally follows a four-year program of training events, technical support, and follow-up with participants, through which they receive basic materials and skills needed to transform their fields into Forest Gardens. By the end of the program, all participants will be self-sufficient and empowered to continue managing their Forest Gardens into the future.

3. Mobilization meeting purpose

The purpose of the meeting today is to offer you the opportunity to join a multi-year agricultural program that will require much work, but will yield great benefits. The

project will be assessed year to year to determine whether it has been successful enough to continue to the next year.

You were selected because you are eager to improve your lives by growing and planting trees in Forest Gardens. All participants should be farmers (except possibly for some of the farmer group leadership who may have non-farming roles in the group).

Activity 1: Dream Field

Description

The facilitator begins by taking the farmers through an activity where they dream about all the different types of trees and food crops that are possible to plant in their new Forest Garden. Then the facilitator explains how, through turning their fields into Forest Gardens, they can turn that dream into a reality.



Instructions for Farmers

1. **Breathing exercise**

Invite members to take in deep breaths, imagining that stressful thoughts and concerns are leaving their body with each exhale. As they breath-in and breath-out, participants should gradually and progressively relax their muscles, starting with their toes all the way to their neck, shoulders and forehead. They can tense each muscle (depending on comfort) with their inhale and relax it with the exhale.

2. **Visualization**

At this time let us form groups of three. You can go sit or stand with your group members, but stay with the larger group for now. Next I will walk us through a few exercises that will help us relax and get creative as we prepare to visualize and picture what our dream Forest Garden looks like.

Use the following sample script that walks you through the stages in the visualization process. Make sure to use a slow, calming tone and pace of voice. Provide plenty of pauses after each question to give participants room to picture their dream field.

- **Setting the scene:** let's keep our eyes closed. Imagine a morning on a beautiful day a few years from now. You are walking into your rich and thriving Forest Garden. Breathe in the fragrance of the plants and trees you are growing. Start to notice what's around you, how does the soil feel beneath your feet.
- **Focusing on outcomes:** what all do you see? What plants, trees, or crops are growing? How do you feel? What do you smell? What do you hear? Are others there? What are they doing? Are there animals or livestock?
- **Focusing on steps:** as you hold the image of this dream field in your mind, what steps do you see yourself taking to make this a reality? What all did you do to make this dream a reality? What's the biggest obstacle you faced? Now let's go back to that image, the picture of the thriving Forest Garden - how did you overcome these obstacles to accomplish this? Who helped you? What helped you persevere?
- **Closing:** continue to hold this image in your mind, make a note of what all feels important to you. Now let's take another deep breath and open our eyes.

3. **Form small groups**

Form groups of 3 people each. Discuss the following question: "If you could grow anything at all on your field, what would it be and why?" Have one person in the group record answers to the following questions.

- Would you grow one item? Would you grow many?
- Would you choose items that would make you money?
- Would you choose items that would feed your family?
- Would you choose items that would protect or support the soil on your land?
- Would you grow trees? Why?
- Would you grow garden crops? Why?
- Would you grow field crops? Why?
- Would you incorporate animals? Why? How?
- Can you feed your family all year-long with the food products from your design? (not from buying food with garden product sales revenue)

- How often throughout the year would your crops be planted and cultivated?
- When cultivating your design on the same piece of land year after year, does the quality of the land improve or degrade?
- How many times would you harvest from your design each year?
- Is it easy to protect your design? What can destroy your designed field? How would you protect your designed field?
- What is the work timeline for your design?
- Will your design produce food harvests high in vitamins and nutrients?

4. Participant farmers share dream field

I will choose 3-5 farmers to describe your dream field to the rest of the group

- What did you include in your Forest Garden? Why?

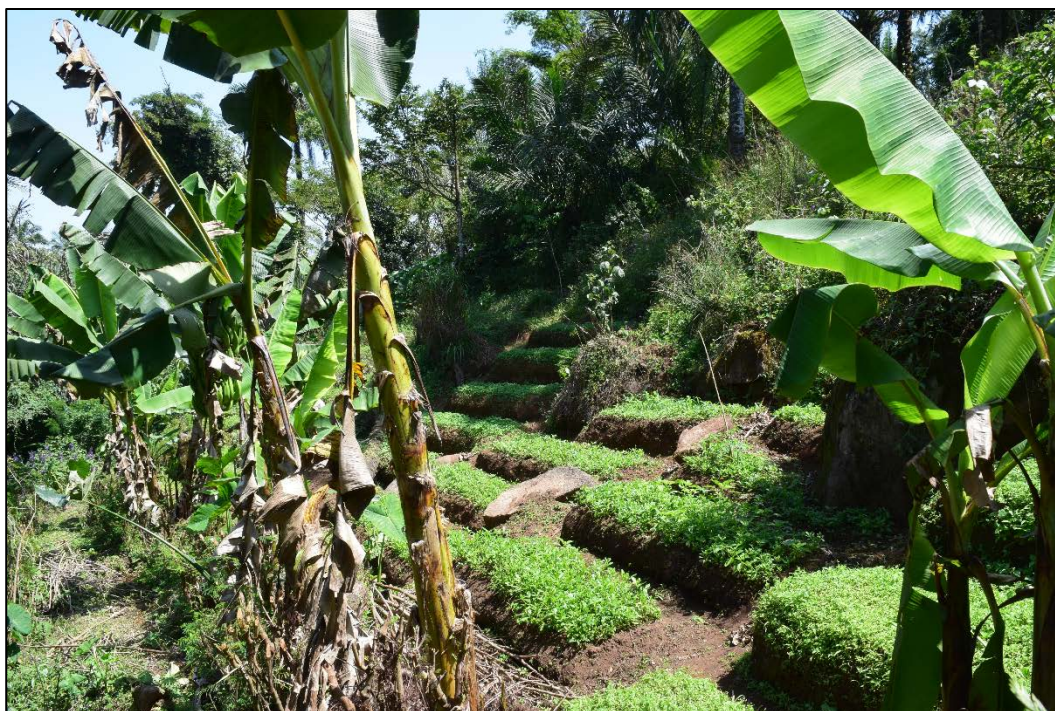
Forest Garden with green wall, fruit and fuel trees, and vegetables



Forest Garden with fig trees and cassava



Forest Garden with raised beds, earthworks, fruit trees and vegetables



Forest Gardens with fertilizer trees, fruit trees, and field crops



Activity 2: Forest Garden System Design

Description

In the first training event, which will be held soon after the project officially begins, farmers will participate in activities where they each create designs for their own Forest Gardens. Discuss these important Forest Garden concepts they will be considering in the process of their designs.

Instructions for Farmers

1. Describe Forest Garden layers

With the Forest Garden System, a farmer can produce many products to both feed his/her family and to sell on the market. When designing a Forest Garden, a farmer should start by thinking about fitting together 4 layers. On a piece of land, if you only plant short vegetable plants, there is a lot of unproductive space between the plants and the sky. If you only plant tall trees, there is a lot of unproductive space between the ground and the canopy.

- The base layer is for shorter vegetation or gardening species – Who can suggest some possible plants that can fill this layer? (**Use location-appropriate examples** – i.e. pepper, lettuce, eggplant, bitter tomato, okra, hibiscus)
- The next layer is the shrub layer for plants that are bushy and short, not usually getting much taller than a man – Who can suggest some possible plants that can fill this layer? (**Use location-appropriate examples** – i.e. Ziziphus - Gola, pomegranate, pigeon pea)
- The next tallest layer comprises your fruit trees. Fruit trees tend to be fairly tall and have large canopies – Who can suggest some possible plants that can fill this layer? (**Use location-appropriate examples** – i.e. cashew, mango, citrus)
- The final tallest layer comprises your timber trees that grow straight vertically and are very lucrative – Who can suggest some possible plants that can fill this layer? (**Use location-appropriate examples** – i.e. African Mahogany, Gmelina)
- Additionally, the Forest Garden System can incorporate animals as consumers of leaf fodder and to contribute manure – Who can suggest some possible animals to include? (**Use location-appropriate examples** – i.e. sheep, goats, cattle) – Of course all animals need to be properly managed (i.e. enclosing them or tying them up) to keep them from destroying your crops
- But to begin establishing Forest Gardens farmers need to protect their land from wind, erosion, and intruding animals. This is an essential part of any Forest Garden because it surrounds and protects everything within. Does anyone know to what I'm referring? (living fence/green wall)

2. Explain the Forest Garden Approach

The Forest Garden Approach has three phases for establishment. In the first year you will focus on Phase 1: protecting the field. In the second year of the program, you will start Phase 2: diversifying your field by planting a variety of vegetables, fruit trees and crops to feed your family and sell at market. Phase 3 will focus on techniques to increase and optimize the productivity of your Forest Garden through more efficient use

of space, time, sunlight (or shade), and water. You will continue to protect your field throughout the whole program.

By joining this project, you will actively participate in the following training events over the next four years. The skills you develop from these modules will allow you to transform your fields into sustainable and permanently productive Forest Gardens.

- Module 1: Forest Garden Design
- Module 2: Seedling Propagation
- Module 3: Outplanting Agroforestry Seedlings
- Module 4: Permagardening for the Family
- Module 5: Forest Garden Review and Planning
- Module 6: Fruit Tree Propagation
- Module 7: Planting Fruit Trees
- Module 8: Permagardening for the Market
- Module 9: Field Optimization
- Module 10: Timber Tree Propagation
- Module 11: Permagardening for the Future
- Module 12: Grafting
- Module 13: Advanced Optimization
- Module 14: Pruning and Harvesting Trees
- Module 15: Sustainability Planning
- Module 16: Graduation Planning

Do you have any questions about the Forest Garden Approach?

- Why is it important to protect your field?
- Why is it important to diversify your field?
- Why is it important to optimize your field?

Activity 3: Roles and Expectations

(optional for non-TREES projects)

Description

The facilitator explains the roles and expectations for Trees for the Future staff and the participant farmers.

Instructions for Farmers

1. What are the required criteria for a Forest Garden site?

In order to use a parcel of land for your Forest Garden:

- Parcel shall be 0.5-1 hectare
- Parcel shall be less than 1 kilometre from the household of the owning participant farmer
- A reliable water source must be nearby the parcel
- Parcel must be previously-farmed agricultural land
 - Clearing land to plant a Forest Garden is contradictory to TREES' philosophy
- The proposed parcel must not already contain an agricultural system closely resembling a Forest Garden with four matured layers

2. What will Trees for the Future expect from you as a participant?

Trees for the Future expects participant farmers to complete certain activities in order to participate in the Forest Garden training program.

- Before first training event, all participant farmers are expected to securely establish a dead fence around his/her proposed Forest Garden site (Use location-appropriate examples – i.e. dead branches, millet stalks, woven bamboo)
 - This is necessary to protect the first items to be planted in the Forest Garden while a live fence grows and establishes
- All participant farmers are expected to collect nursery soil and manure in preparation for tree nursery activities
- All participant farmers are expected to prepare their fields for planting
- Participant farmers are expected to contribute their land, water, and labor to the project
- Participant farmers are expected to attend all training events throughout all four years of the project at an agreed meeting location (these training events are only for those who have agreed to participate in the program)
- Training events will have follow-up activities for participants to complete on their own fields – These will need to be completed within the specified timeline

3. What can you as a farmer expect from Trees for the Future?

Trees for the Future will provide the following support for participants in the Forest Garden training program:

- Tree seeds and tree sacks in each of the four years of the program (we do not provide Eucalyptus seeds)

- Marketable vegetable seeds annually starting with the completion of the gardening training module (we do not provide staple field crop seeds)
- Some tools in a graduated manner
- 3-4 training per year
- Your Trees for the Future facilitator will visit your farm four times per year to discuss challenges, progress, and ways to improve your Forest Garden

4. Site assessment checklist

I have some questions to ask you regarding your group and your farms

Site Assessment Checklist:

- The farmer, farmer's family or farmer group has secured tenure of the site _____
- The Forest Garden site is less than 1 kilometer from the farmer's home _____
- The tree nursery and Forest Garden sites are less than 1 km from a consistent water source _____
- The estimated area of the Forest Garden site is at least 0.4ha (1 acre): _____
- The site currently has less than 20% tree or perennial crop cover (tea or coffee, for instance): _____
- The site does not currently resemble a Forest Garden; it has 3 or fewer significant Forest Garden layers and fewer than 5 marketable products (fruit, vegetable, and animal): _____
- The site has been previously used for agriculture or other land-use activities (no natural habitat will be cleared to plant a Forest Garden) _____
- There are no chronic and significant pest problem(s) on the site that cannot be controlled with known organic means _____

If fewer than 70% of the farmers meet the criteria in the site assessment checklist:

The group does not currently meet our selection criteria. Let us talk about how you can recruit new participants to the program who meet the criteria so that your group can participate.

If 70% or more meet all of the criteria in the Checklist:

Your group meets our criteria for participating in the Forest Garden training program. I will conduct site visits with some (1/3) of the group members to inspect your farms.

5. Roles and field organizational structure

- Lead Facilitator
 - o Responsible for all field training, follow-up, and data collection for Trees for the Future
 - o Visits Forest Gardens at least 4 times per year to check progress, gather data, take photographs
 - o Data collection will require regular surveys and questions to check the state of the household and to track progress of the Forest Garden. By agreeing to join the program, you agree to answer these questions from the facilitator or assistant facilitator on a regular basis.
 - o Will be available by phone for consultation and questions on the Forest Garden Training Program and techniques
- Assistant Facilitator – (*where applicable*)

- o Supports Lead Facilitator in field visits, data collection, and training execution
- Lead Farmer
 - o The farmer group will need to elect a lead farmer to act as a conduit between the facilitators and farmer group (refer to the section below to explain lead farmer desired qualifications, responsibilities, and selection criteria)

6. Elect lead farmer (all projects and farmer groups must elect lead farmers)

Now that you understand the roles and responsibilities of TREES staff, the lead farmer, and participants, the group should elect a lead farmer.

Lead Farmer Qualifications:

- **Communicative:** The Lead Farmer must possess solid communication skills, as he/she must be able and willing to share knowledge, experience, and resources with the community. The farmer must also be enthusiastic about working as a trainer to extend agriculture/agro-forestry technologies and practices to the surrounding community
- **Well-respected:** As the Lead Farmer will be trained as a leader, he/she must therefore have already exhibited strong leadership tendencies. The farmer must be viewed as a capable and knowledgeable farmer whom the community deems an approachable resource and teacher.
- **Innovative/Experimental:** The Lead Farmer needs to be open-minded since he/she will be expected to implement different and perhaps unfamiliar technologies in the field. Preferably, the farmer will have demonstrated such willingness with past (possibly small-scale) endeavors.
- **Successful:** The selected farmer must have established some degree of agricultural achievement, such as maintaining garden and field crops with decent yields and productivity.
- **Tenured:** The Lead Farmer must own at least one hectare of land which he/she can devote to the project for the duration of at least five years.
- **Able-bodied:** As the Lead Farmer will be a living example of how to establish a sustainable agricultural system, he/she must be physically capable of maintaining the demonstration site. Age is a factor, as the farmer must be young enough to invest future years and labor in the project but mature enough to be a respected adult within the community.
- **Mobile:** The Lead Farmer must be able to attend trainings and demonstrations out-of-site without constraints due to familial and occupational duties.
- **Accessible:** Since the Lead Farmer will be working closely with participant farmers, his/her demo plot must be located in near proximity to fellow group members
- **Experienced:** The Lead Farmer should be familiar with the Forest Garden Approach, or be able to learn it quickly; previous collaboration with TREES is desirable. It is also advantageous for the farmer to have relevant experience with a diverse range of trees and crops.
- **Site Availability:** As the Lead Farmer's plot will serve as a demonstration site, it should be readily accessible by surrounding communities. Reliable transport is a plus.

Responsibilities

- Lead Farmers support and liaise between TREES facilitators and participant farmers within each farmer group

- Lead Farmers are to attend all community and training events and meetings as requested by TREES facilitators
- Lead Farmers will often host and assist with facilitation of training events
- Lead Farmers are responsible for visiting each trainee at least once each quarter to deliver planting materials and equipment
- Lead Farmers are expected to provide regular technical support to participant farmers
- Lead Farmers will occasionally collect M&E data where needed
- Though lead farmers do not receive pay for their role in the projects, TREES will provide the equivalent of up to \$15 per month, per year to ensure they are able to fulfill their lead farmer responsibilities (e.g. local travel expenses to visit farmers, to purchase mobile phone cards so they can call group members regularly)

Selection Criteria

- Lead Farmers are nominated and elected by the farmer group members
- Lead Farmers shall be selected to the purposeful inclusion of women

Activity 4: Calendar of Events

Description

The facilitator will discuss the purpose and timing of the events for the year

Instructions for Farmers

1. Calendar of training events/milestones

The Forest Garden Training Program is generally four years long and consists of the training events we went over earlier. I will now review the activity calendar and explain the timing of each training event and how each will have corresponding activities to be completed by participant farmers, gradually building towards a fully functioning Forest Garden System.

I have prepared a schedule for when each module and flexible activity will be facilitated with over the course of Year 1. They are as follows:

Timing of Training Modules for Year 1

Module	Agricultural Calendar	Module Facilitation (month)
Composting (flexible activity, found after Module 4 in this document)	As soon as possible in the first year. It can be added to Module 1 or Module 2, or facilitated as a separate training activity	
1: Forest Garden Design	At least 5 months before the main rainy season	
2: Propagating Agroforestry Seedlings	At least 3 months before the main rainy season	
3: Outplanting Agroforestry Seedlings	Just before the rains begin	
4: Permagardening for the Family	At least 6 weeks before the start of the gardening season	
5: Forest Garden Review and Planning (Year 2)	At the beginning of Year 2	

2. Answer questions

Are there any questions about Trees for the Future, the Forest Garden System, or the field organizational structure?

3. Discuss and sign MoU (optional for non-TREES projects - see example at the end of the module)

Now we will review the Memorandum of Understanding (MoU). Would each of you like to work with Trees for the Future to implement a Forest Garden on your parcel of land? If

so, come and list your name on the MoU. The lead farmer will sign this document for the group after I come and visit your farms.

4. Follow-up

If your farmer group is selected, you will need to establish rules for the group, decided by the group. Suggest rules for training sessions and I will write them on flipchart paper. After we have the list of ideas for rules, I will mention each rule and take a vote on who supports that rule. Majority support ratifies the rule. The lead farmer will keep the list of rules.

Example MoU:



Memorandum of Understanding

This Memorandum of Understanding is designed to reflect the understanding between Trees for the Future, hereinafter referred to as [TREES] and _____, hereinafter referred to as [Farmer Group] for the _____ Forest Garden Project of the _____ Country Program.

It is hereby understood by both parties that:

- TREES agrees to provide the materials, equipment, training and technical assistance for the implementation of the project defined during the Mobilization Meeting.
- [Farmer Group] agrees to the following terms for the duration of the project:
 - o [Farmer Group] will provide water, labor, materials, and land where needed to support project activities;
 - o [Farmer Group] will provide protection of project nurseries, tree planting sites, and project materials and equipment;
 - o [Farmer Group] will provide reasonable assurance that project equipment and materials distributed by TREES are used only by group members and members of their households for project activities;
 - o [Farmer Group] agrees that TREES may document project activities, forest gardens, participants, and in some cases participants' families through reports, stories, photographs and/or video which may be distributed for reporting and communications purposes;
 - o [Farmer Group] agrees that TREES is allowed to place signs at tree nursery sites and demonstration/forest garden sites;
- All members of [Farmer Group] who participate in this project agree that the criteria, conditions, and permissions listed above extend to each farmer group member individually;
- [Farmer Group] authorizes the selected Lead Farmer to sign this MoU on behalf of all individual group members participating in the project.

TREES and [Farmer Group] hereby express agreement to all of the above and enter into a joint agreement until such time that either partner shall amend or terminate said agreement in writing. This agreement nullifies all previous MoUs between said parties.

This agreement is effective for a period of XX, and may be renewed for up to one year after an assessment of both the [Farmer Group] and the individual members (listed below) is conducted by TREES' regional management and technicians. Both parties understand that this agreement may be terminated at any time if either party does not fulfill the terms described above.

This image shows a blank sheet of white paper with horizontal blue ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

Lead Farmer

Date _____

Mobilization Meeting: Facilitator's Notes



The facilitator should use the following pages to note down any questions or findings from the group that should be kept for or addressed at a later time. Depending on the module this may include species selection by group, crops identified in seasonal calendars, or anything else that should be noted.



Module 1: Forest Garden Design



Goal

Farmers will begin the Forest Garden project by creating a Forest Garden design for his or her family's field that meets the core Forest Garden design principles. Farmers will use their designs as a draft blueprint when developing their Forest Gardens, updating them as needed over the course of the project.

Learning Objectives

1. Learn the structure and layout of Forest Gardens, primary components and layers, and uses of different trees.
2. Learn to draw a map of a field to scale.
3. Learn Forest Garden design principles: security, erosion-control, soil quality enrichment, pest control, climate smart agriculture, family needs, women and youth, market-oriented.

Venue and Timing

This workshop should be held about five months before the rainy season. It should be held at the lead farmer's field. The facilitator will use a neighboring field for the top view mapping demonstration.

Relevant Technical Manual Chapters

Before this training event, the facilitator should read, review, and thoroughly understand the following chapters in the Technical Manual:

- Chapter 1: Introduction to the Forest Garden
- Chapter 2: The Forest Garden Approach

Preparation

- To ensure the training goes smoothly in the allotted time, meet with the lead farmer where the training site is located and ask him/her to show you where they would like to have a Forest Garden. Then briefly explain the session and the lead farmer's role. Let them know that the farmers mapping the farm will give them suggestions of how to better their Forest Garden site and that they should be ready with responses as to

what they think would work or not work. The farmer should be willing to speak for around 5 minutes.

- Make sure that the farmer either has enough room inside their home to conduct the session or has plenty of shade outside for all workshop participants. Look for surfaces the participants can use for the mapping exercise.
- Invite lead farmer's family to the workshop and explain the importance of their participation in the workshop.
- Identify one of the Lead Farmer's neighbors who will let the group map their field during Activity 1.
- Collect or identify 4 or 5 flat clean surfaces (sheet of wood, tables, wall) to use for drawing designs.
- Create the "Growing Potential" table on a piece of flipchart paper (for example see Activity 2).

Supplies

- Roll of flipchart paper and tape
- 5 Clipboards
- Pencils, one for each farmer
- 20 sheets of A4 (printer size) paper
- Markers of various colors
- Copies of Handout: How to map your Forest Garden, one for each farmer

Total Time

Approximately 4-5 hours

Handouts in Farmer Workbook

- How to map your Forest Garden

Module 1: Forest Garden Design

Summary of Activities

Opener: Forest Garden Recall and discussion (1.5 hours)

- Review Forest Garden concept and phases of establishment
- Review the Trees for the Future program expectations
- Recap dream field activity

Activity 1: Top View Mapping demonstration (45 mins)

- Draw the border of the land on the paper
- Draw the physical features
- Draw what is outside the field

Activity 2: Small group mapping (1 hour)

- Form groups
- Measure the border
- Draw the field
- Present maps

Activity 3: Forest garden design (2 hours)

- Discuss the land
- Discuss the family's needs
- Design a Forest Garden
- Present Forest Garden designs
- Family selects the best design

Take Home Activity 4: Design your own Forest Garden (15 mins)

- Follow-up

Opener: Forest Garden Recall

Description

The facilitator reviews the Forest Garden concept, then recaps the visioning exercise done during the mobilization meeting. It will get farmers to open their minds and think about the future – about what they want from their land and how trees can contribute.

Instructions for Farmers

1. Review Forest Garden concept and phases of establishment

There are many types of crops in a Forest Garden: fruit trees, timber trees, vegetables, field crops, and more all planted together in one area. Many of the plants grown will have multiple uses. There are many benefits, including providing nutritious food throughout the year by better using space and increasing biodiversity.

- Why are Forest Gardens important?
- What makes a Forest Garden different from what you have now?
- Do Forest Gardens use more or less water, nutrients and sunlight?
- Do Forest Gardens use more or less inputs such as chemical fertilizers, fuel-powered machinery or pesticides?
- What are the different layers of a Forest Garden, and a few examples of each?
 - o Tall plants
 - o Medium height plants
 - o Shrubs
 - o Ground covers
 - o Roots/tubers, Vines/climbers, vegetables/crops...
- What are the three phases of the Forest Garden Approach? What is the focus of the first phase?

2. Review the Trees for the Future program expectations

During this four-year training program you will learn how to grow your own Forest Garden. For each year you participate in the project, TREES will supply you with the materials you need to meet the goals of the trainings given. Some important program highlights are:

- We do provide highly marketable vegetables seeds
- We do provide seeds for useful and marketable woody shrubs and trees
- We do provide some of the necessary tools and materials needed to establish and manage your Forest Garden
- We do not provide Eucalyptus or invasive plants
- We do not provide current staple field crop seeds or seeds of vegetables you already grow
- We expect you to invest your own time, tools, water, and materials as well to demonstrate your commitment.

3. Recap dream field activity

Recall the dream activity you completed during our last meeting. You dreamed of planting all types of trees and food crops in your new Forest Garden. Close your eyes and picture your dream field again.

- What kinds of trees did you plant in your dream Forest Garden?
- What foods are you growing?
- What other products are you harvesting?

Today's workshop will help you turn your dream into a reality. We will design Forest Gardens in two steps. The first step is to map the field on paper and show everything that is in the field now. Then, based on what we see in the field and what we hear from the field's owners, we will use the same map to plan what to plant in the new Forest Garden.

Activity 2: Small Group Mapping

Description

Farmers practice mapping in small groups using the lead farmer's field. During the debrief, small groups share their observations and farmers will begin to be more receptive toward things they may not have observed and included in their maps.

Instructions for Farmers

1. Form groups

Split into small groups of 4 or 5 people and come and collect paper and markers. Choose a mapper, someone who understands the concept well, and a reporter.

2. Measure the border

Now we will all go to the field and the lead farmer will show you the boundaries of his/her field. Walk around the perimeter of the field with your group and measure the border by counting your steps as I showed you. While doing this, observe the trees, plants, objects, resources, and topography of the field as it is now. As you walk around the field, draw the perimeter onto the paper, scaling the shape, directions, and lengths as closely as possible.

- Start at one corner of the land and walk (taking steps of approximately one meter) in a straight line along the border of the land until it turns in another direction, counting the number of steps you take.
- When you arrive at the end of a line along the border, draw a line that corresponds to the number of steps you took, and write the number next to the line.
- From the end of that line, continue walking along the border until it turns again, counting the number of steps.
- Draw another line from the end of the first that corresponds to the number of steps you took as well as the direction you travelled. Write the number of steps next to that line.
- Continue following steps 3 & 4 until you have drawn a series of connecting lines with corresponding lengths and directions around the entire perimeter of the land. The end of the last line should connect with the beginning of the first line, where you began.

3. Draw the field

Work with your group members to draw a map of the field on the paper provided, like I did for the demonstration. Make sure to include:

- Border: be sure to write the number of steps/meters on each side as you walk and draw it.
- Physical features: buildings, paths, termite mounds, trees, hills, water, soil quality.
- Important things next to the field

4. Present maps

When everyone is finished drawing their map, each group will stand up and explain their map. We will all vote to select the map that looks most like the field. As you show your maps, I will make a list of crops that are growing on the farm now on flipchart paper.

Activity 3: Forest Garden Design

Description

The facilitator interviews the lead farmer's family to help them envision their future Forest Garden and develop a design. Farmers form the same small groups as Activity 2, and each group uses the same map. This activity can be done using markers of a different color than the previous activity, or on a separate piece of paper. Refer to the best map selected at the end of Activity 2 during the discussion.

Instructions for Farmers

1. Discuss the land

To make the best Forest Garden, you need to consider everything you observed in the field. You also need to think about what the family needs from the land. With that information you can start to determine how planting trees can meet those needs and improve the field.

Let's look at the map we voted on and discuss the challenges we see on the farm and how planting trees and garden design can address those challenges and meet the family's needs.

Questions about the farm:

- Is the field **secure** from animals and pests? How can you secure it? Does it need a **green wall**?
- Are there **erosion** problems on the field? How can you reduce erosion? Do you need to plant a **contour barrier**?
- Is the **wind** a major problem? What direction does the wind generally come from? How can you protect the field from wind? Do you need to plant a **windbreak**?
- Is the **soil quality** good? Does the soil quality vary across the field? Are there parts of the farm with degraded soil? How can you improve the soil? Do you need **compost**? Do you need to plant **fertilizer trees**?
- Are **pests** (animals, insects, diseases) a problem on the field? What do farmers do to **control pests**? Are there plants that repel pests? What are some alternatives to the use of expensive chemical pesticides?
- Are **rainfall patterns** changing? How can you keep more **water** in the soil? What can you plant that will tolerate unpredictable rainfall?
- What **weather** extremes should the field be prepared to endure? Are there frequent floods or droughts? How have weather patterns changed over the last few years? Which species might be the quickest to rebound from extreme weather?
- Is fire a problem in this area? What is a good way to protect the field from fire? Should you make a **fire break**? Where? How?
- Should the Forest Garden be divided into halves or sections for **rotating crops** or segmenting production? Should you plant lines of vegetation to **divide the sections**?

2. Discuss the family's needs

The lead farmer's family should move to the front of the group so they can answer questions about their household needs. As they talk, I will make a list of items that the family wants to grow in the future.

I will ask some questions that will give us information about the family's current situation and their interests. You all may help with some of the answers. Take notes on the responses, as you will use this information for the next activity.

Questions about the family:

- What trees would provide more **food** for the family?
- When is the **lean season(s)**?
- Which foods and other tree products can be **harvested in the lean season**?
- Does the family need **wood for cooking**? Where do they get it? What would make it easier? Which trees give fuelwood? Where could they be grown?
- Does the family need to **feed animals**? Where do they get the fodder? What are the challenges/issues with this (e.g. cost, land degradation, time, etc.)? Which trees are good for animal forage? Where could they be grown?
- What products will be the easiest for the family to **sell**?
- Which set of products is the **farmer group** dedicated to growing and selling?
- How can trees diversify the **timing** of when the family generates income?
- What products will make the most money in the **short term**?
- What will make the most money in the **long term**?
- How can the Forest Garden minimize the **burden of women** in the family?
How can the Forest Garden **increase income** specifically for women in the family?
- How can the Forest Garden provide young men or women in the family (youth) with **learning or business opportunities**?

3. Design a Forest Garden

Your challenge is to work with your small group to create a top view map that to show the design a Forest Garden to help the family get what they need from their field and improve the health of the land. Work in the same groups and use the same map from the previous activity. You will use **a different color marker** to draw your Forest Garden design. After you finish working in your small groups to make your Forest Garden design, your small group will stand up and explain your Forest Garden to everyone.

When designing the Forest Garden, think about:

- **Spacing:** Spacing trees so that each tree has enough room for its roots and canopy as it grows
- **Sun and shade:** The types of plants that need more sunlight and the types of plants that like shade
- **Orientation:** The shade of a tree will move straight from west to east so other trees, shrubs or plants which requires sunlight all day should not be established in that route.

4. Present Forest Garden designs

Each group will select someone to report out (7-10 minutes each). Describe the mapping process of the existing plot and any questions, concerns. Describe your map of recommended Forest Garden plants, the location of those plants, and the benefits you believe those plants will give the farmer and their family.

- Is the number of trees appropriate for the space? Are there too many trees? Not enough trees?
- Is the spacing correct for the type of tree? Are they too close? Too far apart?
- Are the trees placed correctly based on the movement of the sun?
- What crops or products will you plant around the trees when they are still small?
- As the trees grow and shade out the crops, what products (shrubs, ground covers, roots, vines, etc) will you grow underneath your trees?

5. Family selects the best design

Now that we have heard from all the groups, we want to hear from the lead farmer and his/her family about which Forest Garden design they like for their field and why.

Take Home Activity 4: Design your own Forest Garden

Description

This is the most important activity in Module 1. Farmers take what they learned from the workshop and create a design for their family's Forest Garden. The farmers will refer to and improve on this design throughout the four-year Trees for the Future training program.

Instructions for Farmers

1. Assess family needs

What does your family need from the land? Food, fuel, fodder for your animals? How will the design for your farm be the same or different from what you created today?

2. Design Forest Gardens

Over the next few days, map your farm and create your ideal Forest Garden design for your farm like we did today for the lead farmer.

3. Lead farmer follow-up visit

Within the next month, the lead farmer will come to visit your farm and can help you to design your Forest Garden, like you helped him today. I will also come to see your farm and review your Forest Garden design. You will keep your Forest Garden design and we will use it again for future workshops and site visits.

Follow-up

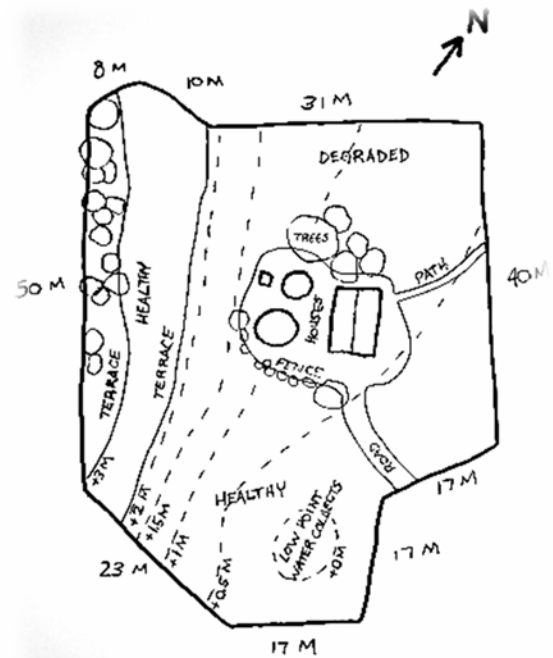
The facilitator follows up with each farmer about their Forest Garden design, photographing the map. Leave flip-chart paper and markers with the lead farmer for use by the farmers for the assignment.

Farmer Resource: How to Map your Forest Garden



Draw what your field looks like today

1. Walk your field to **measure the border** and then **draw the border** on your map. Draw an arrow outside the border to show North.
2. Draw the **physical features** as best you can in the correct location and size. Be sure to include:
 - Physical structures (houses, storage rooms, latrines, water taps, etc.)
 - Roads, driveways, walkways, etc.
 - Terraces, bunds, termite mounds, immovable structures, man-made or natural.
 - Trees and perennial plants, using a circle to represent the crown of the plant and its approximate size.
 - Major variations in slope, identifying high points and low points.
 - Rivers, streams, ponds, springs, swamps, seasonally flooded areas, gullies, and severely eroded or degraded areas.
 - Soil type and quality (e.g. very healthy, healthy, degraded, very degraded).
3. Draw the **outside of the field**, things next to the field that may affect the future Forest Garden like: neighbors who are rearing bees, dead trees or piles of brush next to the field that may attract pests, other fields where pesticides are sprayed.



Draw what your field will look like in the future

4. Talk to your family about what you will need from your Forest Garden.

Questions about the farm

- Is the field secure from animals and pests? How can you secure it? Does it need a green wall?
- Are there erosion problems on the field? How can you reduce erosion? Do you need to plant a contour barrier?
- Is the wind a major problem? What direction does the wind generally come from? How can you protect the field from wind? Do you need to plant a windbreak?
- Is the soil quality good? Does the soil quality vary across the field? Are there parts of the farm with degraded soil? How can you improve the soil? Do you need compost? Do you need to plant fertilizer trees?
- Are pests (animals, insects, diseases) a problem on the field? What do farmers do to control pests? Are there plants that repel pests? What are some alternatives to the use of expensive chemical pesticides?
- Are rainfall patterns changing? How can you keep more water in the soil? What can you plant that can tolerate unpredictable rainfall?
- What weather extremes should the field be prepared to endure? Are there frequent floods or droughts? How have weather patterns changed over the last few years? Which species might be the quickest to rebound from extreme weather?
- Is fire a problem in this area? What is a good way to protect the field from fire? Should you make a fire break? Where? How?
- Should the Forest Garden be divided into halves or sections for rotating crops or segmenting production? Should you plant lines of vegetation to divide the sections?

Questions for the family

- What trees would provide more **food** for the family?
- Which foods and other tree products can be **harvested in the lean season**?
- Does the family need **wood for cooking**? Where do they get it? What would make it easier? Which trees give fuelwood? Where could they be grown?
- Does the family need to **feed animals**? Where do they get the fodder? What are the challenges/issues with this (e.g. cost, land degradation, time, etc.)? Which trees are good for animal forage? Where could they be grown?
- What products will be the easiest for the family to **sell**?
- Which set of products is the **farmer group** dedicated to growing and selling?
- How can trees diversify the **timing** of when the family generates income?
- What products will make the most money in the **short term**?
- What will make the most money in the **long term**?
- How can the Forest Garden minimize the **burden of women** in the family? How can the Forest Garden **increase income** specifically for women in the family?
- How can the Forest Garden provide young men or women in the family (youth) with **learning or business opportunities**?

Reviewing the Forest Garden Design

- Is the number of the trees appropriate for the space? Are there too many trees? Not enough trees?
- Is the spacing correct for the type of tree? Are they too close? Too far apart?
- Are the trees placed correctly based on the movement of the sun?

Evaluation Checklist for Skills Learned in Year One



At the end of the year you will be evaluated on the following practices that you learned and discussed during training events. After demonstrating that you have completed the year one evaluation criteria, you will be invited to continue in the second year of the project.

Year 1 Evaluation Criteria

- Green Wall
 - o At least one row planted, surrounding the entire site
 - o At least part of the second row is planted
 - o Proper spacing between rows
 - o Proper spacing across lines
 - o Terminal buds pruned
 - o Brush and weeds cleared
 - o Dead fence surrounding green wall (for all projects where this is determined to be a requirement)
- Alley Cropping and/or Contour Planting
 - o Minimum of 1 row planted across cropping area
 - o Agroforestry trees interspersed throughout site
 - o Proper spacing between rows
 - o Proper spacing between trees within rows
 - o Contour lines followed (on sloped sites)
- Compost
 - o Appropriate placement
 - o At least two active piles
 - o Good mix of materials (N, C, water, air)
 - o Passes stick test when the pile's stick is pulled out; if the stick is warm it passes the test)
 - o Demonstrated product and application
- Permagarden
 - o Double-dug beds
 - o Raised or sunken beds
 - o Amended soils
 - o Mulching
 - o Triangular spacing
 - o Adequate spacing between plants
 - o At least four species/plant types
 - o At least two species/types that were not planted previously by the family
 - o Companion planting

Module 1: Facilitator's Notes



The facilitator should use the following pages to note down any questions or findings from the group that should be kept for or addressed at a later time. Depending on the module this may include species selection by group, crops identified in seasonal calendars, or anything else that should be noted.



Module 2: Growing Agroforestry Seedlings



Goal

Farmers will use appropriate nursery techniques to propagate seedlings for planting in their Forest Gardens.

Learning Objectives

1. Understand benefits of tree nurseries.
2. Learn best practices for preparing a tree nursery site and constructing nursery beds.
3. Learn how to pretreat commonly used tree seeds.
4. Learn sowing methods for seed species supplied.
5. Learn tree nursery management best practices.

Venue and Timing

This module should be facilitated three to four months before the start of the main rainy season. It should take place on the lead farmer's Forest Garden site or a participant farmer's site. The Forest Garden should have a nursery site identified prior to the workshop. Though individuals' nurseries rarely need to take up more than about 50 square meters of space, the site for this training event should be spacious enough for all trainees to safely work around each other during module activities.

Relevant Technical Manual Chapters

Before this training event, the facilitator should read, review, and thoroughly understand the following chapters and sections in the Technical Manual:

- Chapter 4: Seeds
- Chapter 5: Seedling Propagation
- Chapter 13: Permagardening (Convenient Spacing Tools section)

Preparation

- Identify a nursery site (on the lead farmer's or a participant farmer's land) where the training will take place and inspect the site to make sure it meets the general nursery site requirements.
- Decide which agroforestry tree seeds to provide, based on Forest Garden designs and applicability for the project area.

- Depending on the tree species that participants will grow, and resources available (e.g. will they have tree sacks?), determine which tree nursery techniques (bareroot bedding, tree sacks, and/or vegetative propagation) and seed pretreatment techniques (e.g. soak, scarify and soak, boil and soak, etc.) need to be covered with the group.
- Prepare 100-150 seeds for planting, based on the selected species' pretreatment requirement.
- Prepare cuttings, if necessary.
- 3-4 weeks before the workshop, ask the lead farmer to sow several seeds in 5 tree sacks and care for them.

Supplies

- ½ wheelbarrow of wood ash
- ½ wheelbarrow of charcoal ash
- 4 x 1.5 meter wire mesh for sifting soil
- 3 wheelbarrows of sand
- 1 wheelbarrow of topsoil
- 1 wheelbarrow of manure (If topsoil is sandy, bring two wheelbarrows of manure)
- 15 tree sacks per participant (5 for the activity, 10 for the assignment)
- 5 spade shovels
- 3 watering cans
- 1 wheelbarrow of *Azadiractha indica* (neem) or *Eucalyptus sp.* leaves, where available
- 100-150 hard-shelled tree seeds (e.g. *Leucaena leucocephala*, *Acacia nilotica*)
- nail clippers (1 set for each participant and 1 set for each facilitator)
- 100-150 Pretreated seeds
- 5 tree sacks with several germinated trees (~10-15 cm tall and 8cm in diameter)
- 50 liters of water
- 1 cup
- String
- 3 containers of soil for opener activity: one sand, one clay and one loam. Add water to the soil so it is moist for the demonstration.
- Materials for building shading structures for nursery beds: corner poles, cross-poles, and shading material (palm fronds or grasses) - (see Activity 1)

Total Time

Approximately 4 hours

Handouts in Farmer's Workbook

- Types of Soils
- Nursery Construction
- Nursery Species Chart

Module 2: Growing Agroforestry Seedlings

Summary of Activities

Opener: Name That Soil (30 mins)

- Do a simple soil test
- Improving soils through mixing types and amending

Activity 1: Build a Tree Nursery (2 hours)

- Form small groups
- Determine where to establish the nursery
- Establish nursery beds appropriate to the seeds selected

Activity 2: Seed Pretreatment (30 mins)

- Why pretreat seeds
- Compare treated and non-treated seeds
- Demonstrate scarify and soak method
- Practice scarify and soak

Activity 3: Sowing Seeds (30 mins)

- Farmer demonstrates how to sow
- Farmers practice sowing

Activity 4: Nursery Care (30 mins)

- Discuss the importance of raising healthy seedlings
- Demonstrate proper watering techniques
- Demonstrate proper weeding techniques
- Demonstrate proper thinning techniques
- Pruning green wall seedlings
- Hardening off

Debrief and Take Home Activity 5: Establish Your Tree Nursery (30 mins)

- Debrief workshop activities
- Identify your nursery site
- Prepare beds (bare root and sacks) and build your shade structures over them
- Sack and seed distribution
- Follow-up

Opener: Name That Soil

Description

Good soil is important for raising healthy tree seedlings. This activity teaches farmers how to identify different types of soils, how to select the best type of soil to use for the nursery, and how to add amendments to improve soil that has too much sand or clay.

Instructions for Farmers

Today you will learn how to prepare a tree nursery. First I want to talk about one of the most important components in your nursery: the soil.

1. Do a simple soil test

Soils are composed of three types of materials: silt, sand, and clay. The best soil for growing seedlings is a mix of all three, called loamy soil. These three containers have soils from three different locations, containing sandy, clayey, and loamy soils.

Everyone come and look and touch the soils.

- Which is best for raising seedlings, and why?
- What are the types?
- What are the drawbacks of sand for nursing trees?
- What are the drawbacks of clay for nursing trees?
- Why is loamy soil best for nursing trees?
- How can you tell the type of soil (sand, loam, clay) by holding it in your hand?
- Where can you collect good soil?

2. Improving soil through mixing types and amending

For the two soil samples you decided not to use in the nursery, how can you improve those soils?

- How do you turn sandy soil into good soil for raising seedlings?
- How do you turn clayey soil into good soil for raising seedlings?
- What is the fourth important medium for healthy soils? (humus)
- What is humus and where does it come from?
- Where can you get manure/compost?
- Where can you get sandy soil? Loamy soil?

Activity 1: Build a Tree Nursery

Description

Farmers form small groups and each group prepares a 1 meter x 1 meter nursery bed to practice building nurseries and sowing the seeds provided, using bare-root and sack seedling growing methods.

Instructions for Farmers

1. Form small groups

Split into groups of 4 to 5 farmers each.

2. Where to establish the nursery

The first thing you want to do is identify the best place for establishing your nursery. What are some important considerations you need to think about?

Nursery siting

- What do you look for when deciding where to site your tree nursery?
- Why would you put the tree nursery near your home? Why not in your field?
- How big will the beds need to be to raise the seedlings you want?
- How much space do you need for your nursery sites, including the beds and work space?
- Why is it so important to have easy access to water from a year-round reliable water source?
- What can damage your tree nursery?
- How do you prepare the nursery site?

3. Establish nursery beds appropriate for the seeds selected

For each growing method, each group will build a 1 meter square tree nursery with the materials I brought today (tree sacks, soil, compost/dried manure, neem/eucalyptus leaves, palm/banana leaves or grasses for shade, poles, shovels, sifting material, screens). I will walk around and answer questions while you are building your nursery.

Tree Sack nursery

- Which trees are best to grow in sacks?
- How do you prepare the soil mixture/potting medium?
- How do you fill the sacks? (how tightly to pack the soil)
- How do you prepare the land for the sacks? How do you arrange the sacks?
- What are the pros and cons of tree sacks?

Bareroot

- Which trees can be grown in bareroot beds?
- How do you prepare the beds?
- What is double digging?

- How do you mix or amend the soil to obtain the best growing substrate?
- What are the pros and cons of bareroot seedlings?

Direct seeding and cuttings

- Which species are good for direct seeding? How is it done (2-3 per hole)? What are the challenges with direct seeding?
- Which can be grown by planting cuttings? How?

Protecting the nursery

- What can attack the nursery (livestock, pests, disease)? What should you do to protect the nursery?
- Why is it important to protect seedlings from direct sun?
- What locally-available items can you use to protect your nursery?
- How do you build a shade structure?
- How can you remove most weeds before planting your nursery?

Activity 2: Seed Pretreatment

Description

After small groups prepare tree nursery beds and shade structures, the facilitator instructs farmers how to treat the selected agroforestry seeds before planting using the scarify-and-soak technique. After instruction, farmers practice pretreating seeds themselves with monitoring and feedback from the facilitator.

Instructions for Farmers

1. Why pretreat seeds

We have prepared our nursery site. Now we will pretreat the tree seeds for planting.

- Who has experience with pretreating seeds before sowing?
- Why would you want to pretreat seeds versus just sowing them without pretreating them?
- What are some common seed pretreatment methods?

2. Compare treated and non-treated seeds

We will look at seeds that have been pretreated and compare them to seeds that have not been pretreated.

- Do you notice any difference between pretreated and untreated seeds?
- Do you notice anything else about these treated seeds?

3. Demonstrate scarify and soak method

I will now demonstrate **the scarify and soak** method used for most hard-coated agroforestry tree seeds (e.g. *Leucaena leucocephala*, *Acacia nilotica*). The easiest tool for this is a nail clipper.

- Why do you use a nail clipper?
- Where do you cut and how deep?
- How long do you soak them in water?
- Where do you want to avoid cutting?
- What does pretreating the seed actually do to the seed?

4. Practice scarify and soak

Now you all will practice using nail clippers to scarify some hard-coated seeds. I will walk around to make sure you are scarifying in the correct place and the correct depth. When you are finished scarifying the seeds, place them in a cup of water to soak overnight.

- How long do scarified seeds need to soak in water?
- Do all seeds need to be scarified before soaking?
- When would a seed not need to be scarified before soaking? Examples?
- Do all seeds need to be pretreated before sowing? Examples of some that do not?
- What are some other seed pretreatment methods? When do you pretreat seeds?

Activity 3: Sowing Seeds

Description

Now that the nursery beds, sacks, and seeds are prepared, a volunteer from the group demonstrates how to sow seeds, then farmers practice sowing.

Instructions for Farmers

1. Farmer demonstrates how to sow

For each seedling growing method, I would like a volunteer to demonstrate the sowing technique.

- What time of day is it best to sow seeds? Why?
- What time of day should you pretreat your seeds, so they will be ready to sow at the right time?
- How deep should you plant the seeds?
- **Sacks:** How many seeds should be sown per sack?
- **Bareroot:** How should seeds be spaced in a nursery bed?

2. Farmers practice sowing

Everyone will now practice sowing seeds in sacks and beds.

Activity 4: Nursery Care

Description

Farmers discuss how to care for seedlings in their nursery and demonstrate proper watering, weeding and thinning techniques.

Instructions for Farmers

1. Discuss the importance of raising healthy seedlings

To raise healthy seedlings, you need to take proper care of your seedlings by watering, weeding and thinning. Seedlings are living things, and like any living thing, they grow and produce best when they are given the proper nutrients and care

- What resources do seedlings need to be healthy, and where do they come from? (nutrients, sunlight, air, water)
- What happens if you give them too much of anything, i.e. water, sunlight, or nutrients?
- What happens if you plant stunted or unhealthy seedlings in your field?

2. Demonstrate proper watering techniques

Who wants to demonstrate how to water seedlings? [with the watering can head attached and not attached]

- What times of day should you water your nursery?
- If it rains and the soil is still very wet at watering time, should you still water your nursery?
- How much water should you use to water your seedlings?
- If a watering can is available, what is proper watering technique?
- If a watering can is not available, what is proper watering technique? What other materials can you use instead of a watering can?
- How do you know if you're not watering enough? What should you do?
- How do you know if you're watering too much? What should you do?

3. Demonstrate proper weeding techniques

Timely weeding is very important for a healthy and productive tree nursery

- Why is it important to weed your nursery?
- How often should you weed your tree nursery?
- When should you start weeding in your nursery?
- Why should I keep grasses and weeds cleared around the beds?

4. Demonstrate proper thinning techniques

Who can demonstrate how to thin seedlings on the tree sacks I brought today?

- Why should you thin your germinated seedlings?
- How many seedlings should remain in tree sacks after thinning?
- At what spacing should bareroot seedlings be thinned?
- Should you thin in the sun or in the shade?
- How tall should seedlings be when thinned?
- What should you do if you have some sacks where no seeds germinated?

- How do you decide which seedlings to thin out, and which to replant?
- After transplanting, why should disturbed soil be repacked?
- Should replanted seedlings be watered? When?

5. Pruning green wall seedlings

- What's the purpose of pruning green wall seedlings?
- Why is it important to prune the terminal buds for the first time while they are in the nursery?
- How do you prune them?
- Is this the only time they should be pruned? When else?

6. Hardening off

- What is hardening off?
- Why is it important?
- When does it start? How long should it last?
- What happens if you do not do it?

Debrief and Take Home Activity 5: Establish your Tree Nursery

Description

Following the training, farmers will each be given 10 small tree sacks and 20-30 seeds and instructed to establish their nursery beds, shading, and practice sowing seeds in beds and sacks.

Instructions for Farmers

You will practice what you learned today and build a tree nursery on your own farm within one week.

1. Debrief workshop activities

- Do you have any questions about what we practiced and learned today?
- Will you be able to use what you learned today to build your own tree nursery?

2. Identify your nursery site

Determine where you will place your nursery. Be sure you find a place that meets the following criteria:

- sufficient area
- suitable climate and soils
- water of adequate quantity and quality
- security from theft, vandalism, animals
- appropriate drainage—slight slope if needed
- wind protection

3. Prepare beds (bare root and sacks) and build your shade structures over them

Double dig and amend soils for bare root beds, mix soils and fill sacks, build shade structures, and sow the seeds you were given. The beds should be large enough to hold all the seedlings you would like to grow.

4. Sack and seed distribution

If your nursery looks good when the lead farmers comes to inspect it, the lead farmer will give you more tree sacks and seeds for your nursery.

Follow-up

When lead farmer visits participant farmers, he/she will observe and mentor farmers to pretreat and sow several seeds, ensuring proper technique. Upon visit completion the lead farmer will distribute 3,000 more tree sacks (where applicable) and agroforestry seeds.

Evaluation Checklist for Skills Learned in Year One



At the end of the year you will be evaluated on the following practices that you learned and discussed during training events. After demonstrating that you have completed the year one evaluation criteria, you will be invited to continue in the second year of the project.

Year 1 Evaluation Criteria

- Green Wall
 - At least one row planted, surrounding the entire site
 - At least part of the second row is planted
 - Proper spacing between rows
 - Proper spacing across lines
 - Terminal buds pruned
 - Brush and weeds cleared
 - Dead fence surrounding green wall (for all projects where this is determined to be a requirement)
- Alley Cropping and/or Contour Planting
 - Minimum of 1 row planted across cropping area
 - Agroforestry trees interspersed throughout site
 - Proper spacing between rows
 - Proper spacing between trees within rows
 - Contour lines followed (on sloped sites)
- Compost
 - **Appropriate placement**
 - **At least two active piles**
 - **Good mix of materials (N, C, water, air)**
 - **Passes stick test when the pile's stick is pulled out; if the stick is warm it passes the test)**
 - **Demonstrated product and application**
- Permagarden
 - **Double-dug beds**
 - **Raised or sunken beds**
 - **Amended soils**
 - **Mulching**
 - Triangular spacing
 - Adequate spacing between plants
 - At least four species/plant types
 - At least two species/types that were not planted previously by the family
 - Companion planting

Module 2: Facilitator's Notes



The facilitator should use the following pages to note down any questions or findings from the group that should be kept for or addressed at a later time. Depending on the module this may include species selection by group, crops identified in seasonal calendars, or anything else that should be noted.



Module 3: Outplanting Agroforestry Seedlings



Goal

Using the tools provided, farmers will outplant seedlings in their Forest Garden using proper spacing and best practices.

Learning Objectives

1. Learn when to outplant different trees and how to harden off seedlings for outplanting.
2. Learn how to prepare planting hole for outplanting.
3. Learn the appropriate species, spacing, and planting locations for green walls, alley cropping, and contour planting.
4. Learn how to extract, transport, and plant seedlings.
5. Learn how to care for transplanted seedlings: replacing dead seedlings, weeding, watering, mulching, fertilizer, firebreaks, pest identification and mitigation (including livestock), and irrigation methods.

Venue and Timing

This module should take place at the beginning of the rainy season. Hold the workshop on a farm that has slope, if possible, in order to demonstrate using an A-frame and planting contour lines. Ensure the host farmer is ready to outplant.

Relevant Technical Manual Chapters

Before this training event, the facilitator should read, review, and thoroughly understand the following chapters and sections in the Technical Manual:

- Chapter 7: Outplanting Seedlings
- Chapter 8: Agroforestry Technologies
- Chapter 9: Popular Agroforestry Tree Species
- Chapter 10: Tree Care (Dry Season Seedling Care section)
- Chapter 13: Permagardening (Convenient Spacing Tools section)

Preparation

- Consult with the host farmer to make sure his/her Forest Garden site fits the venue criteria.
- Inspect the host farmer's nursery to ensure seedlings are ready for outplanting, at least 5 seedlings per participant, including both potted and bareroot seedlings.
- Ensure that the host farmer's family and their neighbors have agreed on the boundaries of the field where green walls will be planted, if needed.
- Invite host farmer's family to the workshop.

Supplies

- Measuring tape
- Sharp, clean knives or razor blades for pruning roots and removing sacks
- 2 wheelbarrows for transporting seedlings
- 5 spade shovels or appropriate digging tools
- 3 watering cans with water
- 4 liters of wood ash and 4 liters of charcoal ash
- String to help keep lines straight
- Sticks for marking planting rows and spacing during activity opener
- Materials for A-frames: Supply enough materials for a demonstration A-frame and for small groups of 4 or 5 to each construct an A-frame. 3 pieces of wood/metal/poles about 1 to 1.5 meters long, string, rock, nails and hammer (optional)
- 25 small sticks, about 15-20 cm long, to mark contour line
- It is expected that in this early stage the farmers will be planting fast-growing trees in line plantings; if farmers are also planting fruit trees then the facilitator should acquire the additional necessary materials, such as manure for planting hole preparation.

Total Time

Approximately 4 hours

Handouts in Farmer Workbook

- Seedling care checklist
- Diagrams of agroforestry techniques and spacing
- Diagram of making/using an a-frame

Module 3: Outplanting Agroforestry Seedlings

Summary of Activities

Opener: Walk off (30 mins)

- Introduce workshop topic: Planting agroforestry seedlings
- Green wall protection
- Demonstrate spacing for 10 centimeters and 20 centimeters
- Farmers compete to see who can space the best

Activity 1: Review Forest Garden design (30 mins)

- Review host farmer Forest Garden design

Activity 2: Use an A-frame to find contour lines (1 hour)

- Demonstrate how to make an A-frame
- Demonstrate how to find the contour line
- Practice building an A-frame and finding contour lines

Activity 3: Where and how to dig planting holes (30 mins)

- Mark where to dig in the field
- Demonstrate digging holes and outplanting
- Farmers practice digging holes

Activity 4: Outplanting Learn-and-Teach stations (1.5 hours)

- Teach a small group of 5 farmers how to extract and transport seedlings to outplant holes
- The first group of 5 farmers teaches 5 new farmers how to extract and transport seedlings
- Continue small group Learn and Teach until all farmers have learned extraction and transport of seedlings

Activity 5: Caring for outplanted seedlings (30 mins)

- Discuss seedling care with large group
- Debrief the workshop activities

Take Home Activity 6: Outplant your seedlings (30 mins)

- Farmers outplant seedlings from nursery to field
- Follow-up

Opener: Walk Off

Description

Proper spacing is important when planting trees in a Forest Garden. Many farmers do not have access to measuring instruments and must determine spacing using local methods. This activity allows the farmers to share their methods for spacing and test their accuracy.

Instructions for Farmers

1. Introduce workshop topic: Planting agroforestry seedlings

Today we will move the seedlings from the nursery site to plant them in the field using a few important agroforestry technologies. Can anyone tell me an example of an agroforestry technology?

- What is a green wall, and what are the benefits? What about alley crops? Contour lines? Windbreaks? How are these different from each other?
- How does a green wall protect the field? How does a windbreak protect the field? How do alley crops and contour lines protect the field?
- Do nitrogen-fixing trees have to be planted in lines? Does it make sense to plant trees randomly around your Forest Garden? How can you use agroforestry trees you dispersed throughout the Forest Garden? (it's up to you. Cut them if you want the wood/leaves; leave them if they're not competing for sunlight with your crops and you want larger pieces of timber down the line)

Green wall protection

One of the most important factors leading to the success of any tree planting is protection. As green wall trees are planted around the borders of your fields, these trees are most at risk of being eaten by livestock. If you live in a place where there is even a slight chance that animals will graze near it (your animals or others') then it is essential that you first surround your site with a dense, animal-proof dead fence about one meter in height.

- How can you protect your green walls from livestock? (a dead fence)
- How do you construct a dead fence? What materials can you use? How tall should it be? How far should it be from where you will plant your green wall, and why?
- Is it really worth the time it takes to construct a dead fence around your young living fence? (YES! Grazing goats, sheep, cattle, etc, can and will eat all of your seedlings and you will have wasted months of work and resources)

2. Demonstrate spacing for 10, 20, 30, 50 and 100 cm

Before you plant your trees you need to know how far apart to space them. Different trees need different spacing. The technologies or purposes for which you are using the trees also affects the spacing.

- What are the purposes for which we are planting trees today?
- What spacing should you use for the technologies we are practicing?
- Does spacing change when you are using thorny species in a green wall? How?
- How does the spacing change for a green wall? For alley cropping? For a windbreak? For a contour row?
- How many rows should you plant for a green wall? What is the spacing between rows?

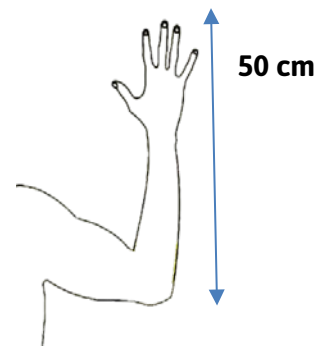
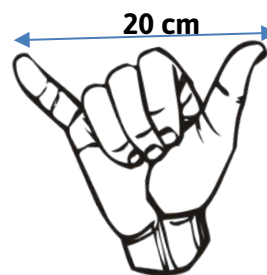
When we plant a green wall row we often space the trees 30 centimeters apart. How can you measure our tree spacing if you do not have a tape measure?

- How can you measure 10 centimeters using our hand? (length across knuckles when making a fist)
- How can you measure 20 centimeters using your hand? (see figure below)
- How can you use these two methods to measure 30 centimeters?
- How can you measure 50 cm?

3. Farmers compete to see who can space the best

Who thinks they are good at measuring using this method? Three to five people come to the front and measure the spacing we will use in the field today without a measuring tape. When you are finished, I will compare it to the measuring tape to see who is the most accurate.

- How can you measure one meter? 5 meters? 10 meters?
- Who is closest?



Useful spacing tools for when you do not have a tape measure

Activity 1: Review Forest Garden Design

Description

The host farmer reviews the Forest Garden design created in Module 1 and explains which line plantings will be done in the field during the workshop. As this is the first year, the priority plantings will be the green wall along the border and rows of alleys or contour strips that transect the field.

Instructions for Farmers

1. Review host farmer Forest Garden design

The host farmer should come to the front and review their Forest Garden design.

- Which species do you want to plant?
- Which agroforestry technologies will we use?
- Where will we plant trees today? (reference landmarks and way points, such as paths, depressions and structures to orient farmers to locations on the field)
- What crops will you plant in the field this season?
- Is it ok to plant crops among the trees you plant?
- What are some things to think about when planting crops near the trees?
- What are your plans for next season?
- When is the best time to plant? How do you know if the rainy season has started?

Activity 2: Use an A-frame to Find Contour Lines

Description

The facilitator demonstrates construction of an A-frame and shows farmers how to use an A-frame to find the contour lines on the field in order to construct earthworks such as terraces, contour bunds, and diversion swales to mitigate erosion.

Instructions for Farmers

1. Demonstrate how to make an A-frame

If your field is on sloped land, then water can quickly wash the soil away if it is not protected. You can use an A-frame to find the contours of the slope, which tells you where you can effectively construct earthworks and/or plant trees to reduce erosion and allow more water to sink into the ground. I will demonstrate how to build an A-frame.

- What is a contour line?
- Why is it important to establish terraces, contour bunds or even to plant trees and grasses in strips along the contours?
- If the land is sloping, how do you know where the contour is?
- Has anyone used an A frame?
- How do you build an A frame?

2. Demonstrate how to find the contour line

Now that we have our A-frame we can use it to find the contour lines in the field. Once we find the contour lines we can add trees to reduce erosion.

- How do you find a contour with an A frame?
- What are living contour barriers?
- What are some plants that can be used as living contour barriers?
- What are some materials that can be used as non-vegetative contour barriers?
- What are terraces?
- What is a contour bund?

3. Small groups practice building an A-frame and finding the contour line

Form small groups of 4 or 5 people. Come and collect the supplies you need from me to build an A-frame. Once you finish building your A-frame, practice using it to find the slope on the field.

Activity 3: Where and How to Dig

Description

The facilitator demonstrates proper spacing for a variety of planting methods applicable to the field: green wall, alley planting, contours, and windbreaks. Then the facilitator demonstrates how to dig holes and plant seedlings.

Instructions for Farmers

1. Mark where to dig in the field

Before we begin, remember that trees should be considered a permanent part of your fields, and green walls form distinct boundaries.

- Do you know where the boundaries of your Forest Garden site are?
- If you share that boundary with neighbors, do they agree with the boundary?
- What happens if you plant your green wall and your neighbor feels it is on their land?
- How can you prevent this kind of problem?

Now we will go to the field and use sticks to mark the rows where we will plant agroforestry trees.

- When is the best time of year to plant?
- What spacing should you use for the type of trees you are planting today, between rows and between trees in a row?
- How is the spacing different for planting a green wall? For planting alleys? For contour strips? For a windbreak?
- If you plant near a dead fence, how much space do you leave between the dead fence and the green wall?
- How do you ensure trees are planted in straight lines?
- How do you ensure proper spacing or that the planting follows the original design?

2. Demonstrate digging holes and outplanting

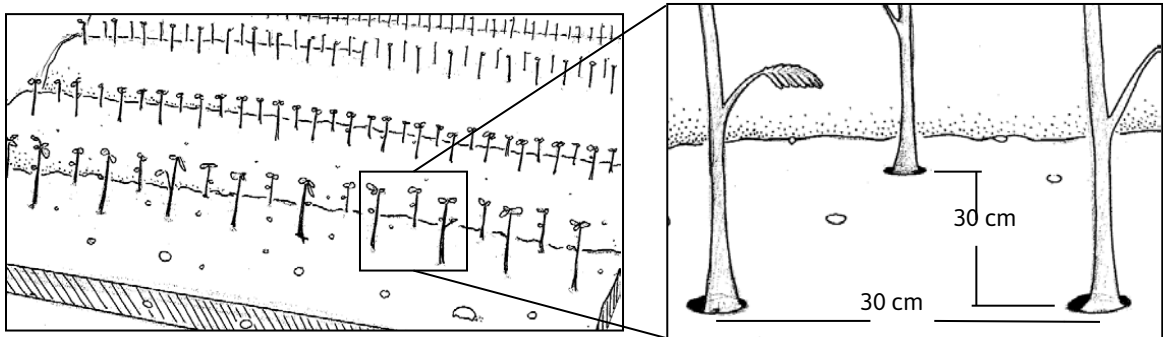
I will now demonstrate digging the first hole in each row, and planting a seedling.

- When should you dig the holes?
- When should you plant the seedlings?
- How big do you dig the holes?
- How deep do you dig the holes?
- How can you prepare the soil for the seedling?
- What can you add to the soil before planting? If you do not have compost, what else can you add? Why do you add wood ash? Why do you add charcoal?
- How should soil be packed into the hole around the seedling?
- Do you need to water the seedlings?

3. Farmers practice digging holes

Now, you will practice digging. Continue to dig holes following my example.

When planting trees in rows, stagger the trees to avoid root binding



Activity 4: Outplanting Learn-and-Teach Stations

Description

While the large group continues to dig the holes for outplanting, the facilitator takes a small group of five farmers to the nursery and instructs them on how to properly extract and transport the agroforestry seedlings. After instructing the first small group, those farmers teach the next small group under the supervision of the facilitator, and so on.

Instructions for Farmers

1. Teach a small group of 5 farmers how to extract and transport seedlings to outplant holes

I will take a group of 5 farmers to the nursery and show them how to remove the seedlings and carry them without damaging them. The rest of you will continue to dig the holes. Everyone will have a chance to come to the nursery and practice.

- How and why do you harden off seedlings?
- How do you protect roots when extracting seedlings in plastic sacks?
- How do you extract seedlings from bareroot beds?
- When and how do you prune roots?
- How quickly must seedlings be planted after being extracted from the nursery?
- What is the best time of day to plant?
- How should seedlings be transported? For short distances? For long distances?
- What else do you need to do when transplanting bare roots? Why?
- Why is it good to prepare the holes one to two weeks before outplanting?
- How deep should you plant the seedling? What if the hole I prepared is too deep or too shallow?
- What are J-roots and how do you prevent them?
- How tightly do you pack the soil around the seedlings?
- What should you do with all these plastic scraps that used to be nursery bags?

2. The first group of 5 farmers teaches 5 new farmers how to extract and transport seedlings

Take the seedlings and place them next to the planting holes. Bring another group of 5 farmers and teach them what you learned. When the second group has placed their seedlings next to the holes, then your group should start planting the seedlings.

Second group, bring 5 more farmers to the nursery and teach them what you learned.

3. Continue small group Learn and Teach until all farmers have learned extraction and transport of seedlings

We will continue until everyone learns how to extract and transport seedlings and all the seedlings are planted.

Activity 5: Caring for Outplanted Seedlings

Description

After all the seedlings are outplanted, the facilitator will bring the group together to discuss what they learned, answer any questions, and go over how to care for the outplanted seedlings

Instructions for Farmers

1. Discuss seedling care with large group

Now that we have outplanted all of the seedlings from the nursery, how do we continue to care for them in the field?

- What are the biggest risks to the newly planted seedlings?
- Why is it generally necessary to construct a dead fence around your site before planting your green walls?
- When should farmers check for dead seedlings to replace? How do you know if a seedling is dying? When should dead ones be replaced?
- What are four ways to prevent fires? How do you rake a firebreak?
- When should farmers start to check for weeds and pests?
- How do you check for insects? What will you do if locusts or other insects come?
- Are livestock a threat to the seedlings? Why? How do you prevent it?
- Do you need to water the seedlings?
- Do you add mulch or fertilizer to the trees?

2. Debrief the workshop activities

Does anyone have questions about what we did today?

- Does the planting we did today resemble the plans the host farmer explained in the first activity? Did we put the trees in the right places? Or did we make any changes?

Take Home Activity 6: Outplant your Seedlings

Description

Farmers outplant their seedlings from their nurseries to their Forest Gardens based on their Forest Garden designs and using the techniques learned during the workshop.

Instructions for Farmers

1. **Build a dead fence around your entire site**

If there is any chance that livestock (yours or others') will roam near your site then it is mandatory that you construct a dead fence made from the branches of thorny trees approximately one meter high around your entire site. You should construct the dead fence at least one meter away from where you will be planting your green wall rows.

2. **Farmers outplant seedlings from nursery to field**

When your seedlings are ready, prepare your planting holes then outplant them to your Forest Gardens using the skills you learned today. Review your Forest Garden designs to decide where to plant, and be sure you and your neighbors agree on the placement of your green walls. The lead farmer will come to your farm within the next few weeks to look at your progress. I will also come to see how your Forest Garden is looking.

Follow-up

The lead farmer will visit each participant farmer within 2-3 weeks of the training event to ensure that your dead fence is built and to check progress and counsel on proper outplanting spacing and techniques. Within 4-6 weeks the facilitator will also visit. The facilitator will go through the Seedling Care Checklist during his/her visit.

Evaluation Checklist for Skills Learned in Module 3



At the end of the year you will be evaluated on the following practices that you learned and discussed during training events. Those in bold are topics that we discussed or practiced today. In demonstrating that you have completed the year one evaluation criteria, you will be invited to continue in the next year of the project.

Year 1 Evaluation Criteria

- **Green Wall**
 - **At least one row planted, surrounding the entire site**
 - **At least part of the second row is planted**
 - **Proper spacing between rows**
 - **Proper spacing across lines**
 - **Terminal buds pruned**
 - **Brush and weeds cleared**
 - **Dead fence surrounding green wall (for all projects where this is determined to be a requirement)**
- **Alley Cropping and/or Contour Planting**
 - **Minimum of 1 row planted across cropping area**
 - **Agroforestry trees interspersed throughout site**
 - **Proper spacing between rows**
 - **Proper spacing between trees within rows**
 - **Contour lines followed (on sloped sites)**
- **Compost**
 - Appropriate placement
 - At least two active piles
 - Good mix of materials (N, C, water, air)
 - Passes stick test when the pile's stick is pulled out; if the stick is warm it passes the test)
 - Demonstrated product and application
- **Permagarden**
 - Double-dug beds
 - Raised or sunken beds
 - Amended soils
 - Mulching
 - Triangular spacing
 - Adequate spacing between plants
 - At least four species/plant types
 - At least two species/types that were not planted previously by the family
 - Companion planting

Seedling Care Checklist

Use this checklist to identify the measures that farmers can take to protect their Forest Garden.

Protection from Fire

- Does the field have a fire break?
- Has the farmer weeded around newly planted trees?
- Does the farmer start fires on the farm for:
 - o Smoking tobacco?
 - o Cooking?
 - o Distilling?

Protection from Pests

- Can the farmer identify common pests?
- Are any pests visible on the trees?
- Do trees have physical protections (thorny branches, sacks, sticks, etc.)?
- Are seedlings planted a far enough distance from the dead fence?

Protection from People

- Is the farmer sharing use of the field?
- If yes, has the farmer explained the importance of the new seedlings and where they are planted in the field?
- Has the farmer started pruning the green wall trees?

Protection from Wind and Water

- Did the farmer mulch around the trees?
- Did the farmer use earthworks to preserve water?
- Is the field exposed to fierce winds?
- Remind the farmer about best practices for watering seedlings

Module 3: Facilitator's Notes



The facilitator should use the following pages to note down any questions or findings from the group that should be kept for or addressed at a later time. Depending on the module this may include species selection by group, crops identified in seasonal calendars, or anything else that should be noted.



Module 4: Permagardening for the Family



Goal

Using provided seeds and tools, farmers will meet their family's priority subsistence needs by nursing, planting and maintaining at least 6 types of nutritious vegetables, including 3 not previously planted.

Learning Objectives

1. Motivate interest in growing new types of nutritious vegetables.
2. Understand considerations for nursery and garden site selection.
3. Learn best practices for growing a variety of nutritious vegetables, including land preparation, spacing, nursing, and planting methods.
4. Understand how companion planting and triangular spacing can increase yield and reduce pests and moisture loss.
5. Learn basic garden care including soil amending, mulching, watering and natural pest control.

Venue and Timing

This module should be given about six weeks before the start of the main gardening season, commonly the cool dry season that follows the rainy season. The training can be held at the lead farmer's Forest Garden or a participant farmer's Forest Garden.

Relevant Technical Manual Chapters

Before this training event, the facilitator should read, review, and thoroughly understand the following chapters and sections in the Technical Manual:

- Chapter 5: Seedling Propagation (Soils section)
- Chapter 13: Permagardening

Preparation

- Ask lead farmer what vegetables his/her family would like to plant during Module 4.
- Prepare lead farmer to give smart answers to nutrition-related questions in the Opener activity.

- Ask lead farmer to prepare nursery site, including double digging the beds.
- Purchase the vegetable seeds that will be used for the training event.
- Ensure lead farmer begins nursing vegetables in seedling beds 4-6 weeks before workshop.
- Identify three literate farmers to read the nutrition story in the opener activity. Go over the story with the “actors” in advance if the farmers are not literate.
- Review the module instructions and corresponding permagardening sections of the Trees for the Future Forest Garden Technical Manual.

Supplies

- Vegetable seeds
- 5 hoes or picks
- 5 shovels
- 1 wheelbarrow of finished compost
- 1 bucket of charcoal powder
- 1 bucket of wood ash
- 3 watering cans
- 5 buckets
- String
- Flip chart
- Markers

Total Time

4-5 hours

Handouts in Farmer’s Workbook

- diagram of garden setup/design, triangular spacing

Module 4: Permagardening for the Family

Summary of Activities

Opener: Nutrition story (30 mins)

- Volunteers read/act out story
- Debrief nutrition lessons learned from story
- Discuss nutrition needs of the lead farmer's family

Activity 1: Permagarden design (45 mins)

- Discuss garden site selection criteria for lead farmer's Forest Garden design
- Make a plan for the lead farmer's permagarden

Activity 2: Germination beds (1 hour)

- Instruct large group on how to prepare nursery site and nurse vegetable seeds

Activity 3: Small group Learn-and-Teach (1 hour)

- Farmers form small groups, collect vegetable seeds or seedlings, and discuss planting methods
- Small groups prepare beds for their assigned vegetable
- Small groups start planting/transplanting the first section of their bed
- Call all groups together for first Learn-and-Teach
- Continue Learn-and-Teach

Take Home Activity 4: Start your germination beds and permagardens (30 mins)

- Debrief Learn-and-Teach and discuss permagardening best practices
- Design your permagarden
- Follow-up

Opener: Nutrition Story

Description

The facilitator or volunteers read a story that demonstrates the importance of planting a variety of crops on the field. In this story, modified from a story originally developed by Farm Radio International, the wife and husband grow one crop - millet. In bad times when millet doesn't grow well, the wife has limited income and cannot buy enough nutritious food for herself and her family and her health suffers. Another farmer, the wife's friend, intercroops vegetables in the millet field. In addition, she grows other vegetables in a garden. By diversifying what she grows, her family has enough food to stay healthy.

Emphasize that one of the benefits of crop diversification is the variety of foods produced. Different kinds of foods provide different nutrients, all of which are needed for good health. It is especially important for infants and children to eat a variety of food, including colorful fruits and vegetables. The facilitator can bring examples of nutritious red, green, orange, and white vegetables from the market. After the debrief, discuss the nutrition needs of the lead farmer's family.

Instructions for Farmers

1. **Volunteers read/act out story (on the following page)**

Can three volunteers, one man and two women, come to the front and read a story about millet farmers? After we hear the story, we will discuss it.

2. **Debrief nutrition lessons learned from story**

- What did you think of the story?
- What is the friend doing in the story that is good for her family?
- What are some examples of nutritious foods that you should try to include in our family's diets?

3. **Discuss nutrition needs of the lead farmer's family**

Now we will hear from the lead farmer's family about which vegetables they want to grow in their home garden and why.

- What types of foods have the most nutrients?
- Is it important for you and your family to eat a variety of nutritious vegetables? Why?
- What are some ways that you currently make sure that your family and children have enough nutritious food to eat?
- Which of the nutritious vegetables do you already grow? Which do you know how to grow? Which do you want to start growing? Which do you currently buy?
- What will you plant this year? Help lead farmer to decide which red, orange, green, and white vegetables to grow to improve the nutrition for his/her family.

The Story of Two Families Growing Millet

Have three participants read the story. Replace the names with names appropriate for the community you are in.

First Day

Wife: (breathless) Oh my goodness, friend, it's hot today.

Friend: Yes, it certainly is.

Wife: (groaning) Ohhhh ...

Friend: (worried) Are you alright?

Wife: (weakly) What happened?

Friend: You fainted. You don't look well. Have you eaten today?

Wife: (hesitant) Umm...no, I haven't.

Friend: You haven't eaten? No wonder you fainted. Why didn't you have some breakfast?

Wife: (hesitant) To be truthful, we don't have much food in the house these days. But I really don't want to talk about that right now. You know, I think I should get back to the house.

Friend: Alright, let me help you up. If you lean on me, we can walk home together.

Husband: Wife! Are you okay? What happened to you?

Friend: She fainted in the field. Let's help her to sit down.

Husband: Oh, this isn't good. Wife, didn't you eat today?

Wife: No, there wasn't any millet left after I fed the children. Oh, Husband, what are we going to do? ... I'm so worried that

Husband: (interrupting and whispering) Shhh ... shhh. Let's not talk about it now.

Second Day

Friend: I am happy that your wife is feeling better, though she did tell me that you're having problems. I know that your harvests were good last year. What happened this year?

Husband: Last year, millet prices were good - we received a lot of money for our crop. So this year we decided to put all our land into one crop - millet. But, then we had a Striga infestation and millet prices were low. We received almost nothing.

Friend: What about your other crops?

Husband: We didn't grow any other crops. We used all the land for one crop - millet.

Friend: Well that explains it. My friends, I know that farmers are being encouraged to grow improved variety millet. But when farmers grow nothing but millet, it is dangerous for the family's nutrition and well-being.

Wife: I know, I know. I especially worry about the children because they need more variety in their diet.

Friend: They certainly do. You all do. That's why you are so weak - you need to eat more than just millet to stay healthy. You need a variety of foods.

Husband: Well tell us, friend, how do you survive? You have the same amount of land as we do. But you don't seem to suffer.

Friend: We saw that many people made money growing improved variety millet the last few years. But we didn't want to put all our land into just the millet. It seemed like a big risk, especially with the threat of Striga and the changing rainfall patterns. After all, the prices can be high one year and low the next.

Wife: Um hmm.

Friend: So we decided to lower our risks by planting a variety of different crops.

Wife: (curious) How did that help?

Friend: We grow several crops at the same time to give us security. Growing different crops is called diversification. If any crop fails, we always have something else to eat or sell.

Wife: Hmmm. And this way you are not dependent on one crop or one market. No matter what happens in the market, you always have food to eat.

Friend: Exactly!

Husband: But how do you grow so many crops on a small plot of land?

Friend: I can show you how. Why don't you both come by tomorrow and visit my plot? I'll show you how we do it.

Third Day

Friend: Here is where we grow our millet. You'll see that we intercrop beans and squash beneath the millet. We cook the bean leaves into our foods because they are rich in vitamins. So, we have many crops from one piece of land!

Wife: Do you grow anything else?

Friend: Yes. I also grow several different types of vegetables in my garden. You see? It is right next to my house, so I can care for them regularly and pick a variety of vegetables easily before meals.

Wife: There's much more than just millet growing here!

Friend: Exactly. With the millet we intercrop two vegetables - beans and squash or pumpkins. Then I fill my garden with different vegetables so we always have something to eat. Sometimes there are six or eight different crops growing here! The beans help combat Striga infestation, and this variety of grains and vegetables provides a good diet for the children.

Husband: By making such a great effort to diversify crops and provide good nutrition to your family, you are a farmer who deserves congratulations!

Activity 1: Permagarden Design

Description

The lead farmer and participant farmers create a design for the lead farmer's vegetable nursery that demonstrates understanding of garden site selection criteria, earthworks, triangular spacing, and companion planting. Farmers will design the garden using a medium selected by the facilitator, such as drawing on flip chart paper, using vegetable cutouts on flip chart paper or the ground, or as a more interactive session where volunteers represent the different vegetables and stand in the section of the garden where that vegetable will be planted.

Instructions for Farmers

1. Discuss permagarden site selection criteria for lead farmer's Forest Garden

Let us look at the Forest Garden design for the lead farmer's field that we completed during the first workshop. Where is the garden located within the Forest Garden? What criteria should we look at when deciding where to put the garden?

- Location – Does the site have easy access? Is it near the home so that family members can easily check on and work in it regularly and so that the products can be easily harvested for meals each day?
- Sun – Garden vegetables need lots of sun. Is there an open area that receives direct sunlight for a good part of the day? During a heavy rain, how will water flow through the garden? How can you reduce erosion?
- Slope – Is the garden area flat? Or does it slope?
- Water – Where will the family get water for the garden? Can rainwater be captured or guided underneath the garden beds from the roof of the home or nearby slopes?
- Soil – Vegetables need healthy soil to grow. Is the soil fertile? Is there any bedrock near the surface of the soil? How can you improve the soil?
- Protection – Is the area protected from wind, intruding animals and children?
- Space – Is there enough space to move around the garden? Where will the compost piles be located?
- Sectioning – Should you divide the garden into sections? Should you plant anything to separate the sections?

2. Make a plan for the lead farmer's permagarden

Now that we know where to put the garden, we will create our permagarden design before we go and plant.

- What will the lead farmer's family grow this year?
- How many beds should we dig?
- How big should you make the beds?
- Is the soil fertile? How can we improve the fertility?
- What vegetables should we plant next to each other? Why?
- What vegetables should we not plant next to each other? Why?
- What type of spacing will grow more vegetables in the garden?
- When is the best time to start nursing seeds?

Activity 2: Vegetable Nursery

Description

The facilitator takes farmers to the nursery, started a few weeks before the workshop, and instructs farmers on why and how to prepare a nursery and nurse vegetable seeds.

Instructions for Farmers

1. Instruct large group on how to prepare a vegetable nursery site and nurse vegetable seeds

We started some of the vegetable seeds in this nursery a few weeks ago. Today we will plant some of the nursed seedlings in the garden.

- What are three benefits of the nursery and transplant system over direct seeding?
- What are the three most important things when deciding where to build your vegetable nursery?
- How do you prepare soil for a nursery? How do you reduce weeds?
- How do you protect the nursery? From goats? From pests/ants? From the sun? From heavy rains?
- How do you plant seeds in the nursery?
- How closely should the seeds be spaced?
- How do you care for plants in the nursery? How often do you weed? When do you thin?
- When do you water the nursery? How much water should you use?
- What are some reasons seeds do not germinate?
- Which of the vegetables we discussed today should be nursed? Which should be direct seeded?

Activity 3: Small Group Learn-and-Teach

Description

Farmers form small groups and each group is given a vegetable seed or seedling. Each group should include a farmer with experience growing that vegetable. Using the Learn-and-Teach approach, each group practices planting their assigned vegetable and then teaches the larger group. After the small group provides instructions on how to plant the vegetable, a few volunteers act out what they learned based on instructions called out by the rest of the large group. This is repeated until each small group has had a chance to teach about their assigned vegetable. The facilitator should select different volunteers each time so that most farmers get hands on practice.

The facilitator and lead farmer should decide how large of the garden area to use for the practical activity. Depending on group size and time available, the farmers might not be able to complete planting the entire garden during the workshop.

Instructions for Farmers

1. Farmers form small groups, collect vegetable seeds or seedlings, and discuss planting methods

Form small groups with one group for each of the vegetables we will plant in the lead farmer's garden. Each group should include someone who has experience growing the vegetable. Then I will hand out the different vegetable seeds or seedlings to each group. You will discuss with your group the proper technique for planting the vegetable you are given.

- Do you need to nurse the vegetable before planting? How long to nurse?
- What is the spacing between planting?
- What are the companion plants?
- What plants should this vegetable not be planted near?
- What are common pest problems? How can you address those pests?

2. Small groups prepare beds for their assigned vegetable

Now that you know how to plant your vegetable, go to the section of the garden marked for your vegetable in the garden design. Work in your small group to prepare beds for your vegetable.

- The lead farmer has already double dug the beds, but who can remind us what double digging is, and why it is important?
- What do you do after double digging the beds? (add amendments, remove rocks and break down soil chunks for a smooth surface)
- How do you maximize the number of plants you can grow in a bed without planting them too closely? Is it best to line them up evenly in rows or to stagger them like triangles?
- What other benefits do you get from triangular spacing?

3. Small groups start planting/transplanting the first section of their bed

Once the beds are prepared, work with your group members to start planting your seeds. You will either seed directly or come and collect plants started in the nursery. Prepare to tell the rest of the group how to plant your vegetable. After we have all planted a section of our bed, I will call all the groups together and we will have the small groups tell us what they are doing.

4. Call all groups together for first Learn-and-Teach

Everyone stop working in your beds and come to Group 1. Group 1 will tell us how to plant their vegetable.

Then I will ask for three volunteers to come and demonstrate how to plant this vegetable. We will do something a little different. The volunteer can only move when you give them instructions.

- How can you measure the correct spacing without a tape measure?
- How do you plant your vegetable seed/seedling?
- For nursed plants:
- How do you know the vegetable is ready to transplant?
- How do you prepare your vegetable seedling for transplanting?

5. Continue Learn-and-Teach

We have learned from Group 1 how to plant [vegetable type]. Now we will learn from Group 2.

Take Home Activity 4: Start your Vegetable Nursery

Description

The facilitator distributes a portion of vegetable seeds, those that need to be nursed before planting, to the farmers. Farmers take these seeds home to immediately begin establishing their vegetable nurseries.

Instructions for Farmers

1. **Debrief Learn-and-Teach and discuss permagardening best practices**

Everyone has learned how to grow a variety of vegetables today. After the workshop, you will take some seeds and start your own vegetable nursery. The lead farmer will come inspect your nursery within 2 weeks and, if the nursery is satisfactory, will distribute the rest of the seeds that need to be nursed before the permagardening season.

- What are the top 3 challenges you might face in your garden?
- How and when do you water your garden?
- Why do you mulch?
- How can you control pests?

2. **Design your permagarden**

Draw a design for your own home garden with the site selection considerations in mind—location, sun, slope, water, soil, protection, space and sectioning.

Follow-up

The lead farmer visits participant farmers' Forest Gardens within 2 weeks. Once the lead farmer inspects the vegetable nursery and reviews the permagarden design, he/she will distribute the remaining vegetables seeds for farmers to plant in their gardens.

At the beginning of the permagardening season, the lead farmer will visit each participant farmer's permagarden again to inspect that their gardens were sited well, and the beds were double dug and amended, and to check on the progress of the vegetable seedlings. If things are satisfactory, the lead farmer will distribute the rest of the seeds that will be direct seeded.

- How will the seeds and seedlings be arranged in the beds?
- What spacing should be used for each of the vegetables?
- After planting the vegetables, what will you do next? (mulch and water)

Evaluation Checklist for Skills Learned in Year One

At the end of the year you will be evaluated on the following practices that you learned and discussed during training events. Those in bold are topics that we discussed or practiced today. After demonstrating that you have completed the year one evaluation criteria, you will be invited to continue in the second year of the project.

Year 1 Evaluation Criteria

- Green Wall
 - At least one row planted, surrounding the entire site
 - At least part of the second row is planted
 - Proper spacing between rows
 - Proper spacing across lines
 - Terminal buds pruned
 - Brush and weeds cleared
 - Dead fence surrounding green wall (for all projects where this is determined to be a requirement)
- Alley Cropping and/or Contour Planting
 - Minimum of 1 row planted across cropping area
 - Agroforestry trees interspersed throughout site
 - Proper spacing between rows
 - Proper spacing between trees within rows
 - Contour lines followed (on sloped sites)
- Compost
 - Appropriate placement
 - At least two active piles
 - Good mix of materials (N, C, water, air)
 - Passes stick test when the pile's stick is pulled out; if the stick is warm it passes the test)
 - Demonstrated product and application
- **Permagarden**
 - **Double-dug beds**
 - **Raised or sunken beds**
 - **Amended soils**
 - **Mulching**
 - **Triangular spacing**
 - **Adequate spacing between plants**
 - **At least four species/plant types**
 - **At least two species/types that were not planted previously by the family**
 - **Companion planting**

Module 4: Facilitator's Notes



The facilitator should use the following pages to note down any questions or findings from the group that should be kept for or addressed at a later time. Depending on the module this may include species selection by group, crops identified in seasonal calendars, or anything else that should be noted.



Year 1: Flexible Activities



The following activity is flexible, meaning it can be conducted either as a part of a module or on its own. It is necessary that this activity be conducted during Year One, preferably toward the beginning.

Flexible Activity: Composting

Goal

Farmers will discuss the benefits of compost and will learn how to build and maintain compost piles.

Learning Objectives

1. Learn the benefits of maintaining and using compost.
2. Learn to build and constantly maintain compost piles.

Venue and Timing

This activity should be facilitated as soon as possible in the first year of the project. The activity can be added to the end of Module 1, or if time and resources allow, it can be facilitated as a separate module early in Year One. It should be held at the lead farmer's field.

Relevant Technical Manual Chapters

Before this training activity, the facilitator should read, review, and thoroughly understand the following chapter in the Technical Manual:

Chapter 14: Compost

Preparation

- Identify an appropriate site in the host farmer's field
- Collect the materials needed to build a compost pile

Supplies

- 6 large sacks of dry, brown (carbon) materials
- 3 large sacks of green (nitrogen) materials (you want to add about 1 part nitrogen for every 4 parts of carbon materials)
- 1 - 20 liter bucket of manure and/or, fertile topsoil, or finished compost as your source for bacteria
- Compost enhancement materials, if available (e.g. charcoal powder, wood ash, egg shells, etc)
- 3 - 20 liter buckets of water
- 1 - 3m x 3m plastic sheet, if available

Total Time

Approximately 1.5 hours

Instructions for Farmers

1. Discussion of compost and its benefits

Compost is an essential part of any healthy Forest Garden. The many benefits it provides makes it one of the most important and essential components of your permagarden as well as your Forest Garden. Compost drastically improves soil structure and fertility, helping you to produce sustainable yields of highly nutritious and lucrative crops.

- What are some of the many benefits of using compost in your Forest Gardens?
- How does compost improve crop yields?
- Is it good to have microorganisms and insects in your soil? Why?
- Where should compost be added to your Forest Garden? (everywhere, but particularly around your high-value food and market crops)
- How often should compost be added to the trees, vegetables, and other crops in your Forest Garden? (prior to the growing season for each crop)
- Why is it good to have multiple compost piles active at all times?

2. Materials needed to make compost

Now we will discuss the materials you will need to build and maintain compost piles

- What are the five key elements of any compost pile?
- Why is it important to have bacteria in your compost pile?
- Why do you need to keep your compost piles moist and aerated?
- What are some examples of carbon-rich (brown) materials?
- What are some examples of nitrogen-rich (green) materials?
- Where can you find the carbon- and nitrogen-rich materials? (they should be able to find them all around their Forest Garden sites (including kitchen scraps) and communities)
- What are some materials that can be used to enhance the quality of or nutrients in your compost?
- What materials should you avoid adding to your compost piles? Why?

- Does it matter where you place your compost piles? What are some considerations in identifying an appropriate site for your compost?

3. Building a compost pile

Now we will practice building a compost pile. We have the materials needed to build the first pile here. Let's practice layering the materials.

- How do we get started?
- How big should the footprint of the base of the compost pile be?
- How much of each element do we add to each layer?
- How high should the compost pile be? Why?
- Why is it helpful to cover the compost piles with plastic? Is it necessary to cover them plastic?

4. Maintaining your compost piles

- Once the compost pile is built, do you need to do anything to it?
- How often do you turn the piles and add water? Why?
- Is it ok if the pile gets hot? Why is this good?
- Why is it good to have multiple compost piles at any given time? (so that you always have some compost ready to use, for a continuous supply of free, nutrient-rich, organic fertilizer)
- Is it ok to put compost that is not fully decomposed around your plants? (No – if it is still decomposing, the compost could burn, stunt, or kill your plants. This is similar to putting fresh manure around your plants, it will do the same thing)
- What can you do to influence the speed of the decomposition process?
- How can you check to be sure your compost pile is decomposing?
- What three things are you looking for when using a stick to diagnose the state of your compost pile?
- What should I do if the pile is too dry? Too wet?
- If the compost pile is not getting hot, what might the reasons be?
- What is wrong if the pile smells terrible?
- How do you know when your compost is ready for use?



Module 5: Forest Garden Review and Planning



Goal

In the beginning of year 2, farmers will reassess their Forest Garden design based on discussion and analysis of lessons learned in the first year of the project. Facilitators will also update and renew the project MoU and Participant Farmer List for year 2.

Learning Objectives

1. Review the characteristics and benefits of Forest Gardens.
2. Learn more about structure and layout of a Forest Garden.
3. Understand the benefits of growing fruit trees.
4. Understand the benefits of collectively growing and selling fruit trees.

Venue and Timing

This workshop should be held at the lead farmer's Forest Garden site, where the Module 1: Forest Garden Design workshop was facilitated the first year.

Relevant Technical Manual Chapters

Before this training event, the facilitator should review and thoroughly understand the following chapters and sections in the Technical Manual:

- Chapter 1: Introduction to the Forest Garden
- Chapter 2: Phased Approach

Preparation

- Determine which months each module (and flexible activities where relevant) are to be facilitated using the table in Activity 4.
- Ask the lead farmer and participant farmers to bring their Forest Garden designs from Module 1 to the workshop. Prepare the lead farmer to present it to the group.
- Take a photograph of the Lead Farmer's design from Module 1 and print out 5 copies.
- Review all of the resources from the previous year.
- Update the farmer group MoU for the year, to be signed at the end of the workshop.

Supplies

- Roll of flipchart paper and tape
- Markers of various colors
- 5 copies of the lead farmer's Forest Garden design from Module 1 (the facilitator can take a photograph of the design on flipchart paper and print out for participants)
- 5 notebooks
- 5 pens
- 2 copies of the Farmer Group MoU for the upcoming year (to be signed by the farmer group attending the workshop)
- Participant Farmer List template
- A small ball

Total Time

Approximately 4 hours

Handouts in Farmer's Workbook

- Priority Fruit Trees
- Update Your Own Forest Garden Design

Module 5: Forest Garden Review and Planning

Summary of Activities

Opener: Lessons learned ball toss (1 hour)

- Congratulate farmers for completing the first year of training and explain the purpose of the meeting
- Farmers toss a ball and review what they learned in year one
- Review key points not discussed during the ball toss and get feedback on year one activities

Activity 1: What are growing? (30 mins)

- Why plant fruit trees
- Market opportunities for fruit trees
- Decide which tree the group will grow and sell collectively

Activity 2: Review lead farmer's Forest Garden design (1 hour)

- Lead farmer presents Forest Garden design created in Module 1
- Form small groups and inspect lead farmer's field
- Small groups present recommendations for lead farmer's Forest Garden

Activity 3: Peer review of Forest Garden designs (45 mins)

- Pair and share feedback on Forest Garden designs
- Debrief peer review and discuss year two plans for individual farmers

Activity 4: Plan year two activities (45 mins)

- Discuss year two plans for the group
- Discuss agroforestry technologies in year 2
- Read and discuss Memorandum of Understanding (optional for non-TREES projects)
- Sign Memorandum of Understanding
- Update the Participant Farmer List (PFL)

Take Home Activity 5: Update your Forest Garden designs (15 mins)

- Farmers update Forest Garden designs before the next visit from the facilitator
- Follow-up

Opener: Lessons Learned Ball Toss

Description

This activity gives farmers time to share what they learned during the first year of the Forest Garden training program. The facilitator records feedback to share with TREES staff for monitoring and evaluation purposes.

Instructions for Farmers

1. Congratulate farmers for completing the first year of training and explain the purpose of the meeting

Congratulations on your hard work in establishing a Forest Garden that will provide food and income for your family for many years to come. Forest Gardens are constantly changing, that is why it is important to review our Forest Garden designs regularly so that you can update and improve them. Today we will review what you have learned during the first year of trainings and discuss the plan for year two.

The Forest Garden Approach has three phases for establishment. In the first year you focused on Phase 1: protecting the field. In the coming year you will start Phase 2: diversifying your field by planting a variety of vegetables, fruit trees and crops to feed your family and sell at market. Phase 3 will focus on techniques to increase and optimize the productivity of your Forest Garden. You will continue to protect your field throughout the whole program. Do you have any questions about the Forest Garden Approach?

2. Farmers toss a ball and review what they learned in year one

Everyone stand in a circle. I will start by saying something I learned this year and then toss the ball to someone else. That person says something they learned in the past year about Forest Gardens and tosses the ball to someone who has not spoken. The game continues until everyone has a chance to share something they learned about Forest Gardens.

- What is a Forest Garden?
- What are the benefits of Forest Gardens compared to other cropping systems?
- What are Forest Garden layers? How do these layers help to maximize production?
- How do you protect and revitalize your field?
- How does diversifying the trees and crops you plant help your family?
- How does it help the land?
- What techniques and skills have you learned and practiced?
- What are you doing differently now than you were before? What are the results so far?

3. Review key points not discussed during the ball toss and get feedback on year one activities

Thank you all for sharing what you learned. Please continue to share your successes and challenges today so you can all learn from one another's experiences. I would like to hear from you about the workshops and your work in your Forest Garden during the first year. I will write down your feedback on flip chart paper so I can take it to share with the rest of the TREES staff.

- What are three things you liked and disliked about the training events?
- Which materials did you find most and least helpful?
- What are three things you like about the support TREES provided?
- What are three things in the project that could be improved for next year?
How?

Activity 1: What Are We Growing?

Description

Farmers discuss which fruit trees and other fruiting plants (bananas, plantains and vines) they are currently growing and which they would like to start growing, including any the group will grow and sell together.

Instructions for Farmers

1. Why plant fruit trees

Who is growing fruit trees now?

- What are three benefits to planting fruit trees in your Forest Garden?
- What are the benefits of integrating annual crops with tree crops?

2. Market opportunities for fruit trees

Fruit trees have many benefits, you can sell fruits at the market, fruits can improve your family's nutrition and health, and they can provide food/produce at different times throughout the year. We will discuss different types of fruit trees that can grow in this community.

- Which fruit trees are people growing in this community now?
- Which new types of fruit trees could grow well in this community?
- What kind of fruit do people like to eat?
- Can the fruit be sold locally?
- What types of fruit are in highest demand?
- Which fruits are overabundant and difficult to sell?
- What times during the year do you have little to eat or sell?
- Which fruit trees are productive at times of the year when other foods are scarce?

3. Decide which tree the group will grow and sell collectively

By growing and selling high-quality fruits from common and profitable fruit trees, the group can get access to better markets which will mean higher prices for your produce. The input costs are lower if the group buys in bulk. We will have a discussion to decide which type of tree you would like to grow collectively. We can do a pairwise ranking if the group has trouble deciding.

- Where can you sell the fruits we've discussed for the most profit?
- How much would it cost to send fruit to a more profitable market?
- How can the fruit be selected and/or processed to make it more marketable?
- What inputs are needed?

Activity 2: Review Lead Farmer's Forest Garden Design

Description

Review the lead farmer's Forest Garden design. Farmers form small groups and inspect the lead farmer's field then provide feedback to the lead farmer on how to improve his/her Forest Garden in year two.

Instructions for Farmers

1. Lead farmer presents Forest Garden design created in Module 1

In our first Forest Garden training we created a design for the lead farmer's field. Now we will look at that design and hear from the lead farmer about what they did in year one.

- What did you plant in year one?
- How are your green walls doing? Will you need to plant a lot more trees to complete them and fill in gaps in the coming year?
- Are soils better protected (i.e. through windbreaks, green walls, alley crops, and/or contour lines)?
- Do you notice any changes in soil health? For example, more organic matter in their soils, more beneficial insects living in/around the soil (e.g. earthworms and beetles), better water retention, improved yields? The changes may not be noticeable in the first year, so you should continue to observe the soils year to year.
- What were some successes?
- What were some challenges?
 - o What challenges have you had with Forest Garden design?
 - o What challenges have you had with tree nurseries?
 - o What challenges have you had with planting to protect your field?
 - o What challenges have you had with outside factors, like pests, droughts, floods?
 - o How have you addressed these challenges? Do others have ideas for how they could be addressed?
- Have other farmers in the group faced similar challenges? How have they overcome them?
- What would you like to improve?

2. Form small groups and inspect lead farmer's field

Form groups of 4 or 5 people and come to collect paper and pen for each group. Take 30 minutes to walk around the Forest Garden site and take notes about what you observe. When you finish your observations, come and collect flip chart paper and markers and prepare to present to the group. Think about the following questions as you make your observations:

- What Forest Garden components and techniques do you observe?
- What has the farmer done well?
- What could be improved? How?

Also consider the following questions from Module 1: Forest Garden Design:

Questions about the farm:

- Is the field **secure** from animals and pests? How can you secure it? Does it need a **green wall**?
- Are there **erosion** problems on the field? How can you reduce erosion? Do you need to plant a **contour barrier**?
- Is the **wind** a major problem? What direction does the wind generally come from? How can you protect the field from wind? Do you need to plant a **windbreak**?
- Is the **soil quality** good? Does the soil quality vary across the field? Are there parts of the farm with degraded soil? How can you improve the soil? Do you need **compost**? Do you need to plant **fertilizer trees**?
- Are **pests** (animals, insects, diseases) a problem on the field? What do farmers do to **control pests**? Are there plants that repel pests? What are some alternatives to the use of expensive chemical pesticides?
- Are **rainfall patterns** changing? How can you keep more **water** in the soil? What can you plant that will tolerate unpredictable rainfall?
- What **weather** extremes should the field be prepared to endure? Are there frequent floods or droughts? How have weather patterns changed over the last few years? Which species might be the quickest to rebound from extreme weather?
- Is fire a problem in this area? What is a good way to protect the field from fire? Should you make a **fire break**? Where? How?
- Should the Forest Garden be divided into halves or sections for **rotating crops** or segmenting production? Should you plant lines of vegetation to **divide the sections**?

Questions about the family:

- What trees would provide more **food** for the family?
- When is the **lean season(s)**?
- Which foods and other tree products can be **harvested in the lean season**?
- Does the family need **wood for cooking**? Where do they get it? What would make it easier? Which trees give fuelwood? Where could they be grown?
- Does the family need to **feed animals**? Where do they get the fodder? What are the challenges/issues with this (e.g. cost, land degradation, time, etc.)? Which trees are good for animal forage? Where could they be grown?
- What products will be the easiest for the family to **sell**?
- Which set of products is the **farmer group** dedicated to growing and selling?
- How can trees diversify the **timing** of when the family generates income?
- What products will make the most money in the **short term**?
- What will make the most money in the **long term**?
- How can the Forest Garden minimize the **burden of women** in the family? How can the Forest Garden **increase income** specifically for women in the family?
- How can the Forest Garden provide young men or women in the family (youth) with **learning or business opportunities**?

3. Small groups present recommendations for lead farmer's Forest Garden

Each group will present their recommendations for the lead farmer's Forest Garden. Then we will hear from the lead farmer about his/her plans for year two.

- Based on the recommendations heard from the groups, what changes does the lead farmer plan to make to the Forest Garden design?
- What new plants or trees will you add to your Forest Garden as a result of your exchanges with other farmers and TREES facilitators?

Activity 3: Peer Review Forest Garden Designs

Description

Farmers get into pairs to review and critique each other's Forest Garden design for their own field, using the questions from the previous activity.

Instructions for Farmers

1. Pair and share feedback on Forest Garden designs

Pair into groups of two and exchange your Forest Garden design with your partner. Ask questions about successes and challenges your partner has had during their first year of work on their Forest Garden, like we asked the lead farmer. Give your partner advice on how to improve their Forest Garden during year two. Then listen to your partner's advice for you on how to improve your Forest Garden.

- What did you plant in year one?
- How are your green walls doing? Will you need to plant a lot more trees to complete them and fill in gaps in the coming year?
- Are soils better protected (i.e. through windbreaks, green walls, alley crops, and/or contour lines)?
- Do you notice any changes in soil health? For example, more organic matter in their soils, more beneficial insects living in/around the soil (e.g. earthworms and beetles), better water retention, improved yields? The changes may not be noticeable in the first year, so you should continue to observe the soils year to year.
- What were some successes?
- What were some challenges?
 - What challenges have you had with Forest Garden designs?
 - What challenges have you had with tree nurseries?
 - What challenges have you had with planting to protect your field?
 - What challenges have you had with outside factors, like pests, droughts, floods?
 - Have other farmers in the group faced similar challenges? How have they overcome them?
- What would you like to improve?
- What changes do you plan to make to the Forest Garden design as a result of what you have learned over the course of the year and the advice from your partner?
- What new plants or trees will you add to your Forest Garden as a result of your exchanges with other farmers and TREES facilitators?

2. Debrief peer review and discuss year two plans for individual farmers

Before we start talking about the group activities for year two, each farmer should stand up and mention the two changes or additions you plan to make to your Forest Garden design as a result of what you have learned over the past year.

- Does anyone have concerns for the coming year that might affect your continued success in establishing your Forest Gardens?

Activity 4: Plan Year Two Activities

Description

Farmers discuss plans for year two, including the workshop schedule, and sign the Memorandum of Understanding.

Instructions for Farmers

1. Discuss year two plans for the group

During the first year you planted trees to protect and revitalize the soils in your Forest Gardens. In the second year, you will start to plant fruit trees and vegetables that you can sell in the market. I will tell you the training schedule for next year.

- How can you work together as a group to get the most out of your Forest Gardens?
- What are the main crops you will plant this year as a group? Do you need to plant more agroforestry trees for your green wall? Fruit trees? Vegetables?
- What are your interests and needs for Year 2? What are your priorities?

2. Discuss agroforestry technologies in year 2

Last year you began planting your green walls, alleys and/or contours. This year you will continue to fill in the rows of your green walls and plant more alleys/contours.

- How many trees will you need to plant this year to meet the Year 2 annual evaluation criteria? (see Year 2 criteria)
- Are you clearing the weeds and brush from your trees regularly?
- Does your dead fence need to be mended or rebuilt so that it will continue to protect your site? If not, you need to be sure it is in good condition before receiving seeds to start your nurseries.

I have prepared a schedule for when each module and flexible activity will be facilitated with over the course of Year 2. They are as follows:

Timing of Training Modules for Year 2

Module	Agricultural Calendar	Module Facilitation (month)
6. Fruit Tree Propagation	At least three months before the main rainy season	
7. Outplanting Fruit Trees	Before the start of the main rainy season	
8. Permagardening for the Market	Before the main gardening season	
Flexible Activity 1: Harvesting agroforestry trees	Generally during the dry season, during Module 6 or 7	

Flexible Activity 2: Transplanting slower growing seedlings from germination beds	Dependant on species, but often about 3+ months after planting	
Flexible Activity 3: Harvesting and preparing suckers	According to timing of banana planting	
9. Field Optimization (Year 3)	At the beginning of Year 3	

Activities 3-5 are optional for non-TREES projects

3. Read and discuss Memorandum of Understanding

I will read the Memorandum of Understanding (MoU), which you all will need to sign before we close the meeting today. We sign a new MoU each year, after reviewing the progress you have made on your Forest Garden in the previous year. An important part of the review involves an evaluation of each farmer's Forest Garden. It is important that everyone knows that your commitment to the project, which is demonstrated by adopting the skills and techniques you learn in the workshops, is a key criterion we look at when we decide to continue with the project for another year.

4. Sign Memorandum of Understanding

When everyone agrees on the terms, we will all sign the MoU. I will take a copy and I will leave a copy here with the lead farmer.

5. Update the Participant Farmer List (PFL)

Finally I will pass around the Participant Farmer List sheet for farmers to fill in for year 2.

If any farmers who were invited to participate in year two of the project are not present, the lead farmer will take the PFL and MoU to them to fill in and sign, and return the completed documents to the facilitator.

Take Home Activity 5: Update your Forest Garden Designs

Description

Farmers update their Forest Garden designs based on the feedback they received from the facilitator and their peers. The facilitator will review the updated Forest Garden design on the next field visit and the farmer will bring it to the next workshop as well.

Instructions for Farmers

1. Farmers update Forest Garden designs before the next visit from the facilitator

Think carefully about what we talked about today and the changes you plan to make to update your Forest Garden design for the coming year. I will come visit within the next 4 weeks to inspect your field and review your updated Forest Garden design. You will also bring your updated Forest Garden design to the next workshop, so keep it in good condition.

- Is the field protected?
- Is the soil in better condition? Does it hold water?
- Are pests a problem?
- Will the field provide the family with what they need? Food? Fodder for animals? Fuel for cooking?
- What can the family harvest and sell?

Follow-up

The facilitator will examine, discuss, and photograph each participant farmer's updated Forest Garden design on the next visit to the farmer's field, usually within 1-2 months. Remind the farmer to keep their Forest Garden design and bring it to the next workshop.

Evaluation Checklist for Skills Learned in Year Two



At the end of the year you will be evaluated on the following practices that you learned and discussed during training events. After demonstrating that you have completed the year two evaluation criteria, you will be invited to continue in the third year of the project.

Year 2 Evaluation Criteria

- Green Wall
 - o At least two rows planted, surrounding the entire site
 - o At least part of the third row is planted
 - o Dead trees and gaps from the first year are replanted
 - o Proper spacing between rows
 - o Proper spacing between trees within rows
 - o Woven branches
 - o Pruned into a hedge
 - o Brush and weeds cleared
 - o Dead fence surrounding green wall (for all projects where this is determined to be a requirement)
- Alley Cropping and/or Contour Planting
 - o Minimum of 3 rows planted across cropping area
 - o Agroforestry trees interspersed throughout site
 - o Proper spacing between rows
 - o Proper spacing between trees within rows
 - o Contour lines followed (on sloped sites)
 - o Coppiced or pollarded in year 2
- Fruit Trees
 - o At least 3 species of fruit trees/plants
 - o Proper spacing between fruit trees planted
 - o Trees appear to receive enough water
 - o Each tree is weeded and mulched
 - o At least 2 species of fruit root stock growing
 - o Fruit trees for grafting are transplanted from beds to sacks or trenches
- Compost
 - o Three active piles, Passes stick test
 - o Demonstrated product and use
- Permagarden
 - o Raised or sunken beds
 - o Amended soils
 - o Mulching
 - o At least six species/types
 - o At least two new species/types that were not planted previously by family
 - o Rotation planting

Module 5: Facilitator's Notes



The facilitator should use the following pages to note down any questions or findings from the group that should be kept for or addressed at a later time. Depending on the module this may include species selection by group, crops identified in seasonal calendars, or anything else that should be noted.



Module 6: Growing Fruit Tree Seedlings



Goal

Farmers will use appropriate nursery techniques to cultivate fruit seedlings for planting in their Forest Gardens.

Objectives

1. Learn how to prepare various fruit tree seeds for planting.
2. Learn fruit tree nursery establishment and seedling propagation techniques.
3. Learn fruit tree nursery management best practices.

Venue and Timing

This module should be facilitated three to four months before the start of the main rainy season. This workshop should take place on the lead farmer's or a participant farmer's farm. The farm should have a nursery site prepared prior to the workshop, with enough space for participants to meet and conduct training activities.

Relevant Technical Manual Chapters

Before this training event, the facilitator should read, review, and thoroughly understand the following chapters and sections in the Technical Manual:

- Chapter 4: Seeds
- Chapter 5: Seedling Propagation
- Chapter 6: Fruit Trees (Rearing Fruit Seedlings section)
- Chapter 11: Pruning, Harvesting, and Tree Management

Preparation

- Identify a nursery site (on the lead farmer's or a participant farmer's land) where the training will take place and inspect the site to make sure it is protected with a fence or otherwise safe from animals. The host farmer can use the agroforestry tree nursery site, if there were no problems with that location.
- Ensure that the site also has trees in green wall and alleys that are ready to be pruned and harvested.

- Select locally available fruit species, at least one to use as rootstock for grafting and at least one that does not need to be grafted, in addition to the species the group agreed to plant in Module 5.
- Decide which tree nursery (bareroot bedding, tree sacks) and seed pretreatment techniques (e.g. soak, scarify and soak, boil and soak, etc.) need to be covered with the group based on the fruit species selected.
- Ask the host farmer to prepare 5 fruit seedling sacks with multiple seedlings in each pot. These should be started about 4 to 6 weeks before the training event, depending on the species. The seedlings should be about 5 to 10 cm tall.
- Prepare seeds for planting if pretreatment requires overnight soaking or another process that cannot be completed during the workshop.

Supplies

- ½ wheelbarrow of wood ash
- ½ wheelbarrow of charcoal ash
- Screen material for sifting potting soil
- 5 sharpened, clean knives or pruning shears
- 3 wheelbarrows of sand or topsoil
- 2 wheelbarrows of compost or decomposed manure
- 15 tree sacks per participant (5 for the activity, 10 for the assignment)
- 5 spade shovels
- 3 watering cans
- 1 wheelbarrow of *Azadiractha indica* (neem) or *Eucalyptus sp.* leaves (where available)
- Ripe fruits of selected species for extracting seeds (a few per participant)
- 5 tree sacks with several germinated trees (~10 cm tall)
- 50 liters for watering seedlings
- String
- Any materials needed for pretreatment of selected species

Total Time

Approximately 4 hours

Handouts in Farmer's Workbook

- Pruning Correctly
- Fruit Tree Nursery

Module 6: Growing Fruit Tree Seedlings

Summary of Activities

Opener: Fruit tree nursery discussion (1 hour)

- Nursery siting
- Seed quality
- Germination beds
- Tree sack and bareroot nurseries
- Direct seeding and cuttings
- Protecting the nurseries

Activity 1: Establish a fruit tree nursery (1.5 hours)

- Form small groups
- Build nursery sites appropriate for the seeds selected

Activity 2: Extract and pretreat fruit tree seeds for planting (30 mins)

- Demonstrate how to extract seed from a fruit
- Why pretreat seeds
- Demonstrate pretreatment method for selected fruit trees
- Practice seed extracting and pretreatment methods
- Demonstrate how to extract and pretreat selected fruit tree seeds
- Practice seed extraction and pretreatment methods

Activity 3: Sow fruit tree seeds in the tree nursery (30 mins)

- Farmer demonstrates how to sow
- Farmers practice sowing

Activity 4: Fruit tree nursery care and maintenance (30 mins)

- Review best practices in nursery management
- Demonstrate thinning

Debrief and Take Home Activity 5: Build your fruit tree nursery (30 mins)

- Instructions for Farmers
- Follow-up

Opener: Fruit Tree Nursery Discussion

Description

Facilitator finds a shady, cool place to discuss considerations and best practices for identifying nursery sites, and raising seedlings in nurseries.

Instructions for Farmers

Before we begin the activities, let's talk about some important considerations when siting nurseries and raising seedlings.

1. Nursery siting

- Why would you put the tree nursery near your home? Why not in your field?
- What are the three most important things to look for when deciding where to place your tree nursery? (reliable water access, protection, and ease of access)
- What can damage your tree nursery?
- How do you prepare the nursery site?
- Did anyone have problems with their nursery site last year?

2. Seed quality

Seed quality determines the quality of the tree that grows from it, so pay close attention to where your seed comes from. Proper storage between harvesting and sowing the seed is also very important to ensure the seed is viable when you plant it.

- Why is seed quality important? (discuss genetic diversity and physical seed traits)
- How can you tell if a seed is likely to be good?
- How do you prepare the seed for storage? How do you store it? How long can you store it?
- Should you harvest seed from fruits that come from the same tree? Should they be from trees that are near each other? Why or why not?
- If you buy fruit from the market for extracting seed, should you buy all the fruit from the same vendor? Why or why not?
- In fruits with more than one seed, should you extract and plant multiple seeds from the same fruit?

3. Germination beds

- Which seeds are commonly sprouted in a small pot or germination bed?
- Why start seeds in a germination bed?
- Which types of seeds should you start in a germination bed?
- When do you transplant seedlings from germination beds to pots or trenches?
- How long do the selected fruit trees need to stay in the nursery before transplanting to pots or trenches?

4. Tree sack nursery

- Which trees are best raised in tree sacks?

- How do you prepare the potting soil for tree sacks?
- How do you fill the sacks? (how tightly to pack the soil)
- How do you prepare the land for the sacks? How do you arrange the sacks?
- How many seeds do you sow in each sack?
- How long do the selected fruit trees need to stay in the nursery before outplanting?

5. Bareroot nursery

- Which trees can be grown in bareroot beds?
- How do you prepare the beds? (How deep do you dig? How do you amend the soil?)

6. Direct seeding and cuttings

- Which fruit seeds can be direct seeded? How is it done (2-3 per hole)?
- Which can be propagated by cuttings? How?

7. Protecting the nursery

- What can attack the nursery (goats, termites, fungi)? What should you do to protect the nursery?
- Why is it important to protect a tree nursery from the sun?
- What locally-available items can you use to protect your nursery?
- How do you build a shade structure?
- How can you remove most weeds before planting our nursery?

Activity 1: Make a Fruit Tree Nursery

Description

Farmers form small groups and each group prepares a 1-meter x 1-meter tree nursery bed demonstrating nursery techniques appropriate for the seeds provided: sacks or bareroot.

Instructions for Farmers

1. Form small groups

Today we will build a tree nursery for fruit seedlings, similar to what we did last year for agroforestry seedlings. Make small groups of 4 farmers.

2. Build nursery sites appropriate for the seeds selected

For each seedling production method, each group will build a 1-meter square tree nursery with the materials I brought today. I will walk around and answer questions while you are building your nursery.

Activity 2: Treat Fruit Tree Seeds for Planting

Description

After small groups prepare tree nursery sites, the facilitator instructs farmers how to extract seeds from ripe fruits and treat the selected fruit seeds before planting. After instruction, farmers practice extracting and pretreating seeds themselves with monitoring and feedback from the facilitator.

Instructions for Farmers

1. Demonstrate how to extract seed from a fruit

We will use local fruits to extract seeds for sowing in our nursery. I will demonstrate how to open the fruit and remove the seed so that it is not damaged. Then you will practice.

- What are characteristics of a fruit to use for seed?
- How do you extract the seed from the fruit?
- Why do you use local varieties of fruit for seed?

2. Why pretreat seeds

We have prepared the nursery site. Now we will pretreat the fruit tree seeds for planting.

- How do you treat this type of fruit tree seed?
- What are two reasons to treat seeds before sowing?
- Do you need to remove all the fruit pulp from the seed? Why?

3. Demonstrate pretreatment method for selected fruit trees

I now demonstrate how to treat the fruit seeds we are planting today.

4. Practice seed extracting and pretreatment methods

Now you all will practice the techniques I demonstrated.

- Do all seeds need to be pretreated before sowing? Examples?
- What are different seed pretreatment methods? When do you pretreat seeds?

Activity 3: Sow Fruit Tree Seeds in the Tree Nursery

Description

Now that the nursery site and seeds are prepared, the facilitator requests a volunteer to demonstrate sowing techniques appropriate for the seeds provided. Farmers practice sowing.

Instructions for Farmers

1. Farmer demonstrates how to sow

For each nursery type, I would like a volunteer to demonstrate the sowing technique.

- What time of day is it best to sow seeds? Why?
- How deep should you plant the seeds?
- **Sacks:** How many seeds should be sown per sack?
- **Bareroot:** How should seeds be spaced in a nursery bed?

2. Farmers practice sowing

Everyone will now practice sowing using the techniques you learned.

- What spacing do you use for bareroot?

Activity 4: Care for the Fruit Trees in the Nursery

Description

Farmers review best practices for how to care for trees in the nursery using proper watering, weeding and thinning techniques.

Instructions for Farmers

1. Review best practices in nursery management

To produce healthy, vigorous fruit seedlings in your nurseries you need to take proper care of our seedlings.

- What are the three most important things to do to care for the tree nursery?
- How and when do you water the nursery?
- How and when do you weed the nursery?
- How and when do you move seeds from the germination bed to a sack or trench?
- How and when do you harden off the seedlings?

2. Demonstrate thinning

I would like a different volunteer to demonstrate how to thin fruit trees in the sacks I brought today.

- What do you do when more than one seedling germinates in a sack?
- What do you do when no seedlings germinate in a sack?
- What is the best method for thinning seedlings?
- Why do you thin seedlings? When?

Take Home Activity 5: Build your Fruit Tree Nursery

Description

Following the training, farmers are given 10 small tree sacks each (where applicable) and instructed to establish their nursery beds, construct shading, amend the bareroot beds, and fill the seedling sacks provided.

Instructions for Farmers

You will practice what you learned today and build a fruit tree nursery on your own farm within one week.

1. Prepare nursery site

Identify an appropriate nursery site, establish the nursery beds for bareroot (double-dug and amended) and potted seedlings, and fill the sacks provided with good potting soil.

2. Sack and seed distribution

If your nursery is in good condition when the lead farmers comes to inspect it, the lead farmer will give you more tree sacks for your nursery.

If your dead fence is in good condition, the lead farmer will also give you agroforestry seeds for you to raise in your nursery to continue planting your green walls and alleys/contours.

3. Obtain fruits for seed extraction

You will be responsible for obtaining the fruits and extracting and pretreating the seeds for your nursery. In preparation for the lead farmer's visit, you will be expected to obtain, through harvesting or purchasing, several fruits of the species you will be sowing.

Follow-up

Prior to visiting each farmer, the lead farmer will call to inform the farmer of the visit so that he/she can obtain the fruits prior to the visit. When the lead farmer visits participants, he/she will ask the farmer how and where the fruit was obtained, then observe and counsel participant farmers to extract, pretreat and sow several seeds, ensuring proper technique. When the lead farmer is satisfied with the farmer's knowledge and practice, he/she will distribute 10 more tree sacks (where applicable).

Evaluation Checklist for Skills Learned in Module 6



At the end of the year you will be evaluated on the following practices that you learned and discussed during training events. Those in bold are topics that we discussed or practiced today. In demonstrating that you have completed the Year two evaluation criteria, you will be invited to continue into the third year of the project.

Year 2 Evaluation Criteria

- Green Wall
 - o At least two rows planted, surrounding the entire site
 - o At least part of the third row is planted
 - o Dead trees and gaps from the first year are replanted
 - o Proper spacing between rows
 - o Proper spacing between trees within rows
 - o Woven branches
 - o Pruned into a hedge
 - o Brush and weeds cleared
 - o Dead fence surrounding green wall (for all projects where this is determined to be a requirement)
- Alley Cropping and/or Contour Planting
 - o Minimum of 3 rows planted across cropping area
 - o Agroforestry trees interspersed throughout site
 - o Proper spacing between rows
 - o Proper spacing between trees within rows
 - o Contour lines followed (on sloped sites)
 - o Coppiced or pollarded in year 2
- Fruit Trees
 - o At least 3 species of fruit trees/plants
 - o Proper spacing between fruit trees planted
 - o Trees appear to receive enough water
 - o Each tree is weeded and mulched
 - o At least 2 species of fruit root stock growing
 - o Fruit trees for grafting are transplanted from beds to sacks or trenches
- Compost
 - o Three active piles
 - o Passes stick test
 - o Demonstrated product and use
- Permagarden
 - o Raised or sunken beds
 - o Amended soils, Mulching
 - o At least six species/types
 - o At least two new species/types that were not planted previously by family
 - o Rotation planting

Module 6: Facilitator's Notes



The facilitator should use the following pages to note down any questions or findings from the group that should be kept for or addressed at a later time. Depending on the module this may include species selection by group, crops identified in seasonal calendars, or anything else that should be noted.



Module 7: Planting Fruit Tree Seedlings



Goal

Using the tools provided, farmers will plant suckers and/or fruit seedlings using proper spacing and best practices.

Learning Objectives

1. Learn the proper timing for planting and outplanting a variety of fruit trees.
2. Learn how to properly space and orient fruit trees on their field.
3. Learn where and how to prepare planting holes and plant selected fruit tree seedlings and/or suckers.
4. Learn best practices for fruit tree care and maintenance after outplanting.

Venue and Timing

This module should take place at the beginning of the rainy season. Hold the workshop on a participant farmer's Forest Garden site with fruit tree seedlings ready for outplanting.

Relevant Technical Manual Chapters

Before this training event, the facilitator should read, review, and thoroughly understand the following chapters and sections in the Technical Manual:

- Chapter 5: Seedling Propagation (Caring for Your Seedlings in the Nursery section)
- Chapter 6: Fruit Trees (Rearing Fruit Trees section)
- Chapter 7: Outplanting Seedlings

Preparation

- Inspect the host farmer's nursery to ensure seedlings are ready for outplanting, at least 5 seedlings per participant. Remind the host farmer to harden off the seedlings.
- Understand the planting and care requirements for all species selected.
- Identify a section of the Forest Garden to practice pruning and harvesting skills.
- Prepare plantain and/or banana suckers, where relevant. If possible, identify a nearby location where suckers can be harvested so farmers can practice during the training.
- Invite host farmer's family to the workshop.

Supplies

- Measuring tape
- 5 sharpened machetes for pruning and harvesting
- Knives or razor blades for pruning roots and removing sacks
- 2 wheelbarrows for transporting seedlings
- 5 round shovels or appropriate digging tools
- 3 watering cans with water
- ½ wheelbarrow of wood ash
- ½ wheelbarrow of charcoal dust
- 1 wheelbarrow of compost or decomposed manure
- Soil for filling tree sacks
- Plantain and banana suckers, if relevant
- Sticks for marking planting rows
- String
- Host farmer's Forest Garden design

Total Time

Approximately 3 hours

Handouts in Farmer's Workbook

- Tree Spacing Diagram

Module 7: Planting Fruit Tree Seedlings

Summary of Activities

Opener: Review Forest Garden design (20 minutes)

- Review host farmer Forest Garden design
- Discuss plants to intercrop with fruit trees
- Agroforestry technologies, protection, and care

Activity 1: Learn where and how to prepare planting holes (30 mins)

- Mark where to plant the trees in the field
- Demonstrate preparing holes
- Farmers practice preparing planting holes

Activity 2: Outplanting Learn-and-Teach stations (45 mins)

- Teach a small group of 5 farmers how to extract and plant seedlings in the prepared holes
- The first group of 5 farmers teaches 5 new farmers how to extract, transport, and plant the seedlings
- Continue small group Learn and Teach until all farmers have practiced removing, transporting, and planting the seedlings

Activity 3: Caring for outplanted seedlings and suckers (45 mins)

- Discuss seedling/sucker care with large group
- Debrief the workshop activities

Take Home Activity 4: Outplant your seedlings (15 mins)

- Farmers plant suckers and outplant seedlings from nursery to field
- Follow-up

Opener: Review Forest Garden Design

Description

The host farmer reviews the Forest Garden design which was revised after Module 5 and explains which fruit trees farmers will practice with during the workshop. The facilitator should discuss options for planting vegetables and crops to intercrop among the young fruit tree seedlings as they grow.

Instructions for Farmers

- **Review host farmer Forest Garden design**

Invite the host to the front and review her/his Forest Garden design.

- What changes have been made to the design since Module 5?
- What agroforestry trees will be planted this year? Where and why? What is the benefit of planting agroforestry trees dispersed throughout the field?
- Which fruit species will we plant?
- Where will we plant the trees today? (reference landmarks such as paths, depressions and structures to orient farmers to locations on the field)
- Why is using proper spacing so important?
- What crops will you plant in the field this season? next season?

- **Discuss plants to intercrop with fruit trees**

The fruit trees we are planting today will take several years before they start bearing fruit. To maximize what you are getting from your Forest Gardens, you can plant other crops to harvest while the fruit trees are young.

- How can you intercrop field crops with your fruit trees?
- What crops are good to intercrop with fruit trees?
- What else can be planted while your fruit trees are growing?
- What considerations are there when planting crops among newly planted seedlings?

- **Agroforestry technologies, protection, and care**

In addition to planting fruit trees, we will also continue planting our green walls, alleys, and contours. You must also continue to protect and care for them as they grow.

- What does the host farmer need to still plant this year to meet the Year 2 evaluation criteria for agroforestry technologies? (see Year 2 evaluation criteria)
- Are there gaps or holes in the green wall or alleys/contours that need to be replanted?
- Are the green walls and alleys/contours well pruned and managed? If not, how could they be improved?
- Is the dead fence still intact, or does it need to be mended or rebuilt to ensure protection?
- Are all brush and weeds cleared from around the trees?

Activity 1: Where and How to Dig

Description

The facilitator demonstrates proper spacing for the types of fruit trees being planted and demonstrates best practices for preparing holes for planting seedlings and suckers.

Instructions for Farmers

1. Mark where to plant the trees in the field

We will go to the field and practice spacing and marking the rows and points where we will plant the fruit trees.

- When is the best time of year to plant?
- What spacing should you use for the types of trees we are planting today?
- If you plant near a fence, how much space do you leave between the fence and the tree?
- If your land is sloped, do you plant in a straight line, or on the contours?
- Should you plant in a grid, or using triangular spacing?
- How do you ensure trees are planted in straight lines?
- How do you ensure proper spacing and that the planting follows the original design?

2. Demonstrate preparing holes

Watch how I dig the first hole in each row we will plant today and plant seedling or sucker.

- How wide do you dig the holes?
- How deep do you dig the holes?
- How can you ensure there are plenty of nutrients in the soil for the young seedling?
- What can you add to the soil before planting? If you do not have compost, what else can you add? Why do you add wood ash? Why do you add charcoal?

3. Farmers practice preparing planting holes

Now, you will practice preparing the planting holes. Continue preparing them following my example.

Activity 2: Outplanting Learn-and-Teach Stations

Description

While the large group continues to prepare holes for outplanting, the facilitator takes a small group of five farmers to the nursery and instructs them on how to properly extract, transport, and plant the fruit tree seedlings. After instructing the first small group, those farmers teach the next small group under the supervision of the facilitator, and so on.

Instructions for Farmers

1. Teach a small group of 5 farmers how to extract and plant seedlings in the prepared holes

I will take a group of 5 farmers to the nursery and show them how to remove the seedlings and carry them without damaging them. Everyone will have a chance to come to the nursery and practice. The rest of you will continue to prepare the holes and plant the seedlings and/or suckers as I demonstrated.

- How and why do you harden off seedlings?
- How do you protect roots when extracting seedlings in plastic sacks and bareroot beds?
- When and how do you prune roots? How quickly must seedlings be planted after being extracted from the nursery?
- What special precautions do you take when planting bareroots?
- What are J-roots, and how do you avoid them?
- What is the best time of day to plant?
- How should seedlings be transported? For short distances? For long distances?
- Why is it good to prepare the holes one to two weeks before outplanting?
- How deep should the seedling be placed in the planting hole?
- What do you do if the hole is too deep? Too shallow?
- How should soil be packed into the hole around the seedling or sucker?
- How much water do you need for each seedling or sucker? How often?
- What should you do with all these plastic scraps that used to be nursery bags?

2. The first group of 5 farmers teaches 5 new farmers how to extract, transport, and plant the seedlings

Remove the seedlings from the nursery, take them to the Forest Garden site, and plant them. Bring another small group of 5 farmers and teach them what you learned. When the second group has placed their seedlings next to the holes, then your group should start planting the seedlings.

Second group, bring 5 more farmers to the nursery and teach them what you learned.

3. Continue small group Learn and Teach until all farmers have practiced removing, transporting, and planting the seedlings

We will continue until everyone learns how to extract, transport and plant seedlings.

Activity 3: Caring for Outplanted Seedlings and Suckers

Description

After all the seedlings and suckers are outplanted, the facilitator brings the group together to discuss what they learned, answer any questions, and go over how to care for the outplanted seedlings and suckers. The facilitator also discusses any special considerations for caring for seedlings remaining in the nursery.

Instructions for Farmers

1. Discuss seedling/sucker care with large group

Now that we have outplanted our seedlings from the nursery and planted suckers, how do we continue to care for them in the field?

- What are the biggest risks to the newly planted seedlings?
- When should farmers check for dead seedlings or suckers to replace? How do you know if a seedling or sucker is dying? When should dead ones be replaced?
- How do you rake a firebreak?
- When should farmers start to check for weeds and pests?
- What is one thing you can do to mitigate weeds and moisture loss while providing organic matter to the soil? (mulch)
- Do you add mulch or fertilizer to the trees?
- How do you check for insects? What will you do if locusts or other insects come?
- Do you need to water the seedlings?
- What is a cuvette and how can you make one to help the trees?
- What other simple water conservation or irrigation techniques can you do (mulching, water bottles)?
- Which seedlings need to remain in the nursery longer? (mango and citrus) Why? How do you continue to care for those seedlings?

2. Debrief the workshop activities

Does anyone have questions about what we did today?

- Does the planting we did today resemble the plans the host farmer explained in the first activity? Did we put the trees in the right places?
- What did you learn?

Take Home Activity 4: Outplant your Seedlings

Description

Farmers will plant plantain and banana suckers (if available) and outplant their fruit and agroforestry seedlings from the nursery to their Forest Gardens based on their Forest Garden designs and using the techniques learned during this workshop and in Year 1.

Instructions for Farmers

Farmers plant suckers and outplant seedlings from nursery to field

When your seedlings are ready, outplant them to your Forest Gardens using the skills and best practices you learned today and in Year 1. Look at your Forest Garden design to decide where to plant. Look at the Year 2 evaluation criteria and be sure you will meet the performance expectations regarding green walls, alley cropping, and/or contours.

The lead farmer will come to your farm within the next few weeks to evaluate your progress. I will also visit your Forest Garden soon. If you are planting trees that grow from suckers, you should collect and prepare your suckers and then plant them at the same time you are outplanting your seedlings.

Follow-up

The lead farmer visits each participant within 2-3 weeks of the training event to check on progress and counsel on proper outplanting spacing and techniques. Within 4-6 weeks the facilitator will also visit.

Evaluation Checklist for Skills Learned in Module 7



At the end of the year you will be evaluated on the following practices that you learned and discussed during training events. Those in bold are topics that we discussed or practiced today. In demonstrating that you have completed the Year two evaluation criteria, you will be invited to continue into the third year of the project.

Year 2 Evaluation Criteria

- Green Wall
 - o At least two rows planted, surrounding the entire site
 - o At least part of the third row is planted
 - o Dead trees and gaps from the first year are replanted
 - o Proper spacing between rows
 - o Proper spacing between trees within rows
 - o Woven branches
 - o Pruned into a hedge
 - o Brush and weeds cleared
 - o Dead fence surrounding green wall (for all projects where this is determined to be a requirement)
- Alley Cropping and/or Contour Planting
 - o Minimum of 3 rows planted across cropping area
 - o Agroforestry trees interspersed throughout site
 - o Proper spacing between rows
 - o Proper spacing between trees within rows
 - o Contour lines followed (on sloped sites)
 - o Coppiced or pollarded in year 2
- **Fruit Trees**
 - o **At least 3 species of fruit trees/plants**
 - o **Proper spacing between fruit trees planted**
 - o **Trees appear to receive enough water**
 - o **Each tree is weeded and mulched**
 - o **At least 2 species of fruit root stock growing**
 - o **Fruit trees for grafting are transplanted from beds to sacks or trenches**
- Compost
 - o Three active piles, Passes stick test
 - o Demonstrated product and use
- Permagarden
 - o Raised or sunken beds
 - o Amended soils, Mulching
 - o At least six species/types
 - o At least two new species/types that were not planted previously by the family
 - o Rotation planting

Seedling Care Checklist



Use this checklist to identify the measures that farmers can take to protect their Forest Garden.

Protection from Fire

- Does the field have a fire break?
- Has the farmer weeded around newly planted trees?
- Does the farmer start fires on the farm for:
 - o Smoking tobacco?
 - o Cooking?
 - o Distilling?

Protection from Pests

- Can the farmer identify common pests?
- Are any pests visible on the trees?
- Do trees have physical protections (thorny branches, sacks, sticks, etc.)?
- Are seedlings planted a far enough distance from the dead fence?

Protection from People

- Is the farmer sharing use of the field?
- If yes, has the farmer explained the importance of the new seedlings?
- Has the farmer started pruning the green wall trees?

Protection from Wind and Water

- Did the farmer mulch around the trees?
- Did the farmer use earthworks to preserve water?
- Is the field exposed to fierce winds?
- Remind the farmer about best practices for watering seedlings

Module 7: Facilitator's Notes



The facilitator should use the following pages to note down any questions or findings from the group that should be kept for or addressed at a later time. Depending on the module this may include species selection by group, crops identified in seasonal calendars, or anything else that should be noted.



Module 8: Permagardening for the Market



Goal

Farmers will meet new market opportunities by expanding vegetable production, increasing garden diversity, and scheduling planting and harvesting to meet demand.

Learning Objectives

1. Learn appropriate land preparation and planting techniques for the vegetables selected during the current season.
2. Learn how to time planting and harvesting to meet market demand.
3. Learn improved planting, harvesting, and post-harvest processing and storage techniques.

Venue and Timing

This module should be given at the start of the main gardening season, commonly the cool dry season that follows the rainy season. The training should be held at the lead farmer's or a participant farmer's Forest Garden.

Relevant Technical Manual Chapters

Before this training event, the facilitator should review and thoroughly understand the following chapters and sections in the Technical Manual:

- Chapter 5: Seedling Propagation (Soils and Caring for Your Seedlings in the Nursery sections)
- Chapter 13: Permagardening

Preparation

- Draw seasonality chart on flip chart paper (empty, to be filled in during workshop).
- Fill in important holidays in the correct months, to help farmers better understand the agricultural season during which each holiday falls.
- Purchase vegetables – identified in Module 5 – at the market to bring to the workshop to use for the opener activity. There should be at least one vegetable from each of the four rotational planting groups.

Supplies

- 5 hoes
- 5 shovels
- Wheelbarrow
- 1 wheelbarrow of finished compost
- 1 bucket of charcoal powder
- 1 bucket of wood ash
- 3 watering cans
- Bucket
- String
- A variety of vegetables
- Roll of flipchart paper and tape
- Markers

Total Time

4-5 hours

Handouts in Farmer's Workbook

- Families of Vegetables for Crop Rotation Planning
- Types of Vegetables for Crop Rotation Planning
- Seasonal Crop and Market Analysis Chart
- Market Opportunities
- Garden Design

Module 8: Permagardening for the Market

Summary of Activities

Opener: Sorting vegetable types (30 mins)

- Explain the different categories of vegetables and relevance to crop rotation
- Farmers sort vegetables by type

Activity 1: Market analysis (1 hour)

- Ask farmers about what they grow now to sell in the market
- Use happy face, neutral face, and sad (disappointed) face pictures to discuss current market prices for select vegetables
- Create seasonal market analysis chart for the selected vegetables

Activity 2: Market planning (1 hour)

- Group selects top three vegetables from the seasonal market analysis
- Small groups create a plan for how to sell that vegetable at market when the price is highest
- Small groups present plans and get feedback
- Group discussion on which vegetables to produce and sell together

Activity 3: Growing the vegetables (1 hour)

- Discuss best practices for planting and harvesting the select vegetables
- Prepare garden beds in the Forest Garden
- Practice transplanting seedlings from germination beds to sacks, trench and/or bareroot beds

Take Home Activity 4: Start your market garden (30 mins)

- Debrief permagardening best practices
- Instruct farmers to transplant slow-growing fruit trees in the nursery (if it has not yet been done)
- Follow-up

Opener: Sorting Vegetable Families

Description

The facilitator brings a variety of common vegetables from the market and farmers sort them into the four main families: leaf, fruit, root, and legume.

Instructions for Farmers

1. Farmers sort vegetables by type

I brought vegetables from the market.

- Who can tell me which group these vegetables belong in?
- What other vegetables do you grow? Which group does each belong in?

2. Explain the different categories of vegetables and relevance to crop rotation

Different types of crops take different amounts and types of nutrients from the soil.

They also attract different pests and diseases. To improve long-term soil health and productivity, it is important to rotate crops in your Forest Garden so that you are not planting the same thing in the same place season-after-season. It is important to rotate vegetables in the garden for the same reasons.

- What are the four main types of vegetables?
- Which types need the most nutrients from the soil?
- Which types do not take as many nutrients from the soil?
- Which types give back nutrients to the soil?
- In what order should you rotate different types of vegetables?
- How does crop rotation minimize pests and disease?

Activity 1: Market Analysis

Description

Farmers discuss the prices of vegetables in the market place at different times of the year.

Instructions for Farmers

1. Ask farmers about what they grow now to sell in the market

Today we will discuss growing vegetables to sell in the market.

- What do you plan to grow this year? How have you traditionally decided what to grow?
- How much do you plan to consume and how much do you plan to sell?
- Who do you sell to?
- Is it always easy to sell products?
- Why is it more difficult to sell during certain times of the year?
- If you are going to the market with a bag of maize and everyone is selling maize, will the price of maize be high or low?
- If you are going to the market with a bucket of tomatoes and everyone is selling maize, will the price of tomatoes be high or low?

2. Use happy face, neutral face, and sad (disappointed) face pictures to discuss current market prices for select vegetables

I brought some vegetables today that I purchased from the market. I want us to discuss the prices for these vegetables at different times of the year. I have three pictures: a happy face, a neutral face, and a sad (disappointed) face. The faces represent the price of the vegetable as high, average or low.

- If you were a farmer selling this vegetable in the market **today**, would you be happy, neutral, or disappointed about the price?
- What are other vegetables you can grow and sell in the market for a good price?

3. Create seasonal market analysis chart for the selected vegetables

I created a calendar on the flip chart paper that represents an entire year. Now I want to discuss the prices for these vegetables in different seasons. I will draw a happy face, neutral face, or sad face to show whether the price is good, average, or bad at different times of the year.

- When is the best time to sell?
- For the months when prices are highest, why are they high?
- For the months when prices are lowest, why are they low?
- In what months would you want to sell?
- How could you and your group sell more in those months?
- Why is it important to think about how prices change during the year when deciding what to plant

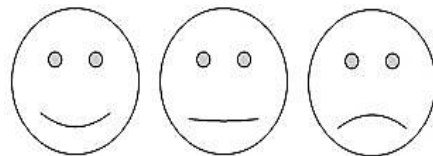
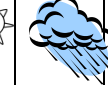


Figure 1: Empty seasonal market analysis to fill in during workshop. This can be done by month or by season.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Holidays												
	Dry 	Dry 	Dry 	Rain 	Rain 	Rain 	Rain 	Rain 	Rain 	Rain 	Dry 	Dry 

Figure 2: Example of a seasonal market analysis that is filled in.

	J	F	M	A	M	J	J	A	S	O	N	D
												
Haricots 												
Sorgho 												

Activity 2: Market Planning

Description

Small groups develop a plan for collectively growing their selected vegetables. The small groups present their plans and the group decides if they want to produce and sell vegetables together.

Instructions for Farmers

1. Group selects at least three vegetables from the seasonal market analysis

We have discussed many different vegetables and the prices they fetch in the market. The group should pick at least three vegetables from the ones selected and we will talk more about how to grow them.

2. Small groups create a plan for how to sell that vegetable at market when the price is highest

Form three groups. Each group will develop a plan for how you can sell one of the vegetables you selected at a high price.. Then each group will present their plan.

- Which variety should you grow? Do you know where to get seed?
- When is the price highest? How can you try to get your goods to market during the best time? When should you plant to get your product to market at the best time? (mark on seasonal calendar when they should plant)
- What are challenges to getting your goods to market when the price is highest?
- Is it possible to produce the vegetable to sell in the market at this time?
- Is it possible to store the vegetable until the price is highest?
- Is it possible to process the vegetable to add value?
- What do you consider to be high quality for your product? How do you know which is high quality and which is not?

3. Small groups present plans and get feedback

Each group will now present their plan for how to grow and sell the vegetable they selected.

- Do all markets have the same price? Or does the price change depending on which market you sell in?
- Which buyers pay a higher price for higher quality? Which buyers accept lower quality?
- Do you sell higher quality products for a higher price? Do you sell lower quality products for a lower price?
- Is it better to eat or sell the best looking products?

4. Group discussion on which vegetables to produce and sell together

Does the group want to collectively grow and sell vegetables? Which ones?

- Which vegetables are best to sell as a group?
- Which are best to sell as an individual?
- What are the advantages/disadvantages of marketing as a group?

Activity 3: Growing the Vegetables

Description

The facilitator discusses different varieties and best practices for growing the vegetables the group chose in Activity 2. Small groups then prepare the garden area based on instructions from the facilitator. The facilitator and host farmer should decide how large of the garden area to use for the practical activity.

Instructions for Farmers

1. Discuss best practices for planting and harvesting the selected vegetables

We will now talk about how best to grow the vegetables we talked about today.

Does anyone here have experience growing these vegetables? Please come to the front and help me teach the group the proper techniques.

- Do you need to nurse the vegetable before planting? How long to nurse?
- What is the spacing between seeds for nursing?
- What are the companion plants?
- What are common pest problems? How can you address those pests?
- What category of vegetable is this? (leaf, root, fruit, legume)
- When do you plant it in the crop rotation? What was planted in this bed last season? What should be planted this year?
- What is the best spacing for planting the vegetable?
- What is triangular spacing and why is it helpful?
- What are two things you should do after planting these vegetables?

2. Form small groups and prepare vegetable beds in the Forest Garden

Now we all know how to plant these vegetables and which type of bed to prepare. Form small groups and each group should prepare a bed for one of the vegetables the host farmer will plant in his/her Forest Garden.

- What type of bed will you prepare?
- Should it be sunken? Ground level? Raised? Why?
- Should it be double-dug? Why?
- How do you amend the soil? (need to amend the garden area every season)
- What is the appropriate spacing for this vegetable?

Take Home Activity 4: Start your market garden

Description

Farmers start a vegetable nursery for their market garden. After the workshop, the facilitator will give the vegetable seeds the group chose to grow to the lead farmer to distribute to the group. Farmers who have not yet transplanted their slower-growing fruit seedlings in their nurseries will do so.

Instructions for Farmers

Debrief permagardening best practices

After the workshop, you will start your own vegetable nursery. The lead farmer will come inspect your nursery within 2 weeks and then distribute the seeds that the group chose to grow and sell together.

- What are the top 3 challenges you might face in your garden?
- How and when do you water your garden?
- Why do you mulch?
- When do you weed?
- How can you control pests?
- How do you improve the soil quality?

Follow-up

The lead farmer visits participant farmers' Forest Gardens within 2 weeks. When the garden area meets the criteria, the lead farmer will distribute the vegetables seeds for farmers to plant in their gardens. The lead farmer will also inspect the fruit tree nursery to ensure fruit seedlings were transplanted properly from Flexible Activity 2.

Evaluation Checklist for Skills Learned in Module 8



At the end of the year you will be evaluated on the following practices that you learned and discussed during training events. Those in bold are topics that we discussed or practiced today. In demonstrating that you have completed the Year two evaluation criteria, you will be invited to continue into the third year of the project.

Year 2 Evaluation Criteria

- Green Wall
 - o At least two rows planted, surrounding the entire site
 - o At least part of the third row is planted
 - o Dead trees and gaps from the first year are replanted
 - o Proper spacing between rows
 - o Proper spacing between trees within rows
 - o Woven branches, Pruned into a hedge
 - o Brush and weeds cleared
 - o Dead fence surrounding green wall (for all projects where this is determined to be a requirement)
- Alley Cropping and/or Contour Planting
 - o Minimum of 3 rows planted across cropping area
 - o Agroforestry trees interspersed throughout site
 - o Proper spacing between rows
 - o Proper spacing between trees within rows
 - o Contour lines followed (on sloped sites)
 - o Coppiced or pollarded in year 2
- Fruit Trees
 - o At least 3 species of fruit trees/plants
 - o Proper spacing between fruit trees planted
 - o Trees appear to receive enough water
 - o Each tree is weeded and mulched
 - o At least 2 species of fruit root stock growing
 - o Fruit trees for grafting are transplanted from beds to sacks or trenches
- Compost
 - o Three active piles, Passes stick test
 - o Demonstrated product and use
- **Permagarden**
 - o **Raised or sunken beds**
 - o **Amended soils, Mulching**
 - o **At least six species/types**
 - o **At least two new species/types that were not planted previously by family**
 - o **Rotation planting**

Module 8: Facilitator's Notes



The facilitator should use the following pages to note down any questions or findings from the group that should be kept for or addressed at a later time. Depending on the module this may include species selection by group, crops identified in seasonal calendars, or anything else that should be noted.



Year 2: Flexible Activities



The following activities are flexible, meaning they can be facilitated in whichever module makes the most sense for the year, considering the agricultural calendar, species growth rates, etc. It is necessary that all flexible activities be conducted during one of the modules in a given year. The activities themselves can be found in the following pages.

Flexible Activity 1: Harvesting and pruning agroforestry trees (1 hour)

- Visit field to inspect agroforestry trees
- Demonstrate how to harvest fuelwood and fodder
- Practice harvesting

Flexible Activity 2: Transplanting slow-growing seedlings in germination beds (1 hr)

- Discuss the timing of transplanting
- Demonstrate and practice transplanting seedlings

Flexible Activity 3: Harvesting and preparing suckers (30 mins)

- Review vegetative propagation methods
- Volunteer demonstrates how to harvest and prepare suckers for planting

Flexible Activity 1:

Harvesting and Pruning Agroforestry Trees

Description

Farmers learn and practice how to harvest fuel and fodder from the agroforestry trees planted in their Forest Gardens the previous year.

Instructions for Farmers

1. Visit field to inspect agroforestry trees

Today we will plant the fruit trees that we nursed in the field. We will use many of the techniques we learned when planting agroforestry seedlings, however, fruit trees need more care and maintenance so you will learn some new things today too. Before we go to the nursery, let us visit the Forest Garden to see how the agroforestry trees are doing.

2. Volunteers demonstrate how to harvest fuelwood and fodder

Many of the trees planted are ready to be harvested for fuelwood for cooking, fodder for animals, or stems and leaves for green fertilizer. The green walls need pruning to grow strong and dense. Today you will learn the correct way to prune your green walls and harvest products. Has anyone started harvesting your agroforestry trees to use in the home or for soil improvement?

- How and when should you prune our green wall?
- How do you ensure the green wall forms a solid barrier?
- How and when should you prune your alley crops/contours?
- How and when should you harvest for fuelwood?
- How and when should you harvest for fodder? How can you store fodder?
- How else can the leaves and stems you harvest be used?

3. Farmers practice harvesting

Each farmer should use the tools provided to practice pruning and harvesting. I will come around and answer any questions.

Flexible Activity 2: Transplanting Slower Growing Seedlings from Germination Beds

Description

The facilitator instructs participants on the timing and steps involved in nursing and transplanting slower-growing seedlings (e.g. mango and citrus) that require a longer period in the nursery before outplanting. Some seedlings that were selected for planting will not be ready to outplant this season, so the facilitator will explain why and demonstrate how to transplant those seedlings from the germination bed to sacks, trenches, and or thinned into bareroot beds.

Instructions for Farmers

1. Discuss the time needed in the nursery for the fruit trees being planted

Different types of trees need different amounts of time in the nursery to grow before you plant them in the Forest Garden. We started nursing seeds during the last workshop a few months ago.

- Which types of trees will be ready to outplant today?
- How do you know the tree is ready to outplant?
- Why do some seedlings require more time in the nursery?
- Which types of trees need to stay in the nursery?
- How much time do they need? When should they be planted?

2. Demonstrate transplanting or thinning seedlings from germination beds to sacks, trenches and/or bareroot beds

I will show you how to move the seedlings from the germination bed to the nursery.

- When do you move a seedling from a germination bed?
- How do you protect the seedling when you extract and transport it?
- Will you transplant the seedling to a sack, trench or bareroot bed? What's the difference?
- How do you prepare the nursery sack, trench or bareroot bed?

3. Practice transplanting seedlings from germination beds to sacks, trench and/or bareroot beds

Now everyone will practice transplanting the seedlings.

- How do you continue to care for the trees that will remain in the nursery?
- How do you know your seedling is ready to outplant to the Forest Garden?

Flexible Activity 3: Harvesting and Preparing Plantain and Banana Suckers

Description

A volunteer demonstrates how to harvest a plantain or banana sucker from a parent plant and prepare a sucker for outplanting in the Forest Garden.

Instructions for Farmers

1. Review vegetative propagation methods

Some fruit trees do not need to start from seed. They can grow from parts of a parent plant.

- What are different types of vegetative propagation?
- Which types of fruit trees can grow from cuttings?
- What is the best time of year for planting this type of tree?

2. Volunteer demonstrates how to harvest and prepare suckers for planting

Has anyone used this type of planting method before? Please come to the front and help me demonstrate how to harvest and prepare suckers.

- What are characteristics of a good parent tree?
- How do you remove the sucker from the parent tree?
- How far should you dig before removing the sucker from the ground?
- Why is it important to protect the roots when removing the sucker?
- How do you prepare the sucker for planting?



Module 9: Field Optimization



Goal

Farmers will adopt optimization techniques that better utilize space, time, sunlight, and water to increase production efficiency by using top view mapping, side view mapping, and seasonal calendars.

Learning Objectives

1. Learn how to make a seasonal calendar.
2. Learn how to diversify crops and time planting and harvesting to increase use of time on the field.
3. Learn how to make a side view map.
4. Learn which types of plants increase use of vertical space (e.g. timber trees, shrubs, and vines).
5. Understand the benefit of garden level perennials (root crops, grasses, vines, ginger, shrubs, cover crops) for soil conservation, segmentation and pest control.

Venue and Timing

This module should be given at the beginning of year three. The training should be held at a Forest Garden that is representative of most of the Forest Gardens in the area.

Relevant Technical Manual Chapters

Before this training event, the facilitator should review and thoroughly understand the following chapters and sections in the Technical Manual:

- Chapter 1: Introduction to the Forest Garden
- Chapter 2: Phased Approach
- Chapter 15: Optimizing Your Forest Garden Understory

Preparation

- Determine which months each module (and flexible activities where relevant) are to be facilitated using the table in Activity 5.
- Draw seasonal calendar chart on flip chart paper (empty, to be filled in during workshop).

- Draw example of a side view map on flip chart paper, based on a Forest Garden you have visited in the project.
- Identify multiple options for perennial plants that the group can grow to: a) fill in the vertical layers of their Forest Gardens, and b) provide food or income in the lean months. Consider native plants that are used traditionally for food, medicines, etc. Be sure that these options are appropriate for the local agroecological conditions and that seeds or cuttings are locally accessible.
- Update the farmer group MoU for the year, to be signed at the end of the workshop.

Supplies

- 2 copies of the Farmer Group MoU for the upcoming year (to be signed by the farmer group attending the workshop)
- Participant Farmer List template
- Vegetable pictures cards
- Roll of flipchart paper and tape
- Markers of various colors
- a small ball

Total Time

3-4 hours

Handouts in Farmer's Workbook

- Map of Field
- Seasonal Harvest Calendar
- Examples of Side View Maps
- Side View Mapping
- Optimizing Your Forest Garden

Module 9: Field Optimization

Summary of Activities

Opener: Lessons learned ball toss (45 mins)

- Congratulate farmers for completing the second year of training and explain the purpose of the meeting
- Farmers toss a ball and review what they learned in the last two years
- Review key points not discussed during the ball toss and get feedback on year one activities

Activity 1: Create a top view map (45 mins)

- Walk around the host farmer's Forest Garden
- Create a top view map of the Forest Garden
- Host farmer discusses successes and challenges of year 2

Activity 2: Seasonal crop calendar (1 hour)

- List the crops growing in the Forest Garden
- Create a seasonal calendar for the Forest Garden
- Discuss seasonal calendar and gaps in harvesting
- Discuss the benefits of planting perennials and types of perennials available

Activity 3: Side view mapping (1 hour)

- Explain the concept of side view mapping and walk through field to be mapped
- Show example of side view map of a Forest Garden visited during a previous workshop
- Small groups create a side view map of the host farmer's Forest Garden
- Small groups present side view maps and select the best one
- Discuss gaps from side view map

Activity 4: Optimization strategies for the Forest Garden (45 mins)

1. Review the gaps identified in the three mapping activities: top view map, seasonal calendar and side view map
2. Small groups make recommendations for optimizing the Forest Garden
3. Small groups present recommendations for host's Forest Garden
4. Discuss techniques participant farmers will adopt to optimize time and space in their Forest Gardens

Activity 5: Plan year three activities (30 mins)

- Discuss year three plans for the group
- Read and discuss Memorandum of Understanding, sign MoU, and update Participant Farmer List (optional for non-TREES projects)

Take Home Activity 6: Create a side map and update top map of your Forest Garden

- Farmers create a side view map of a transect of their Forest Garden
- Follow-up

Opener: Lessons Learned Ball Toss

Description

This activity gives farmers time to share what they learned during the second year of the Forest Garden training program. The facilitator records feedback to share with TREES staff for monitoring and evaluation purposes.

Instructions for Farmers

1. Congratulate farmers for completing the second year of training and explain the purpose of the meeting

Congratulations on making it through the second year of the Forest Garden training program! Today we will review what you have learned during the first two years of trainings and discuss our plans for year three.

The Forest Garden Approach has three phases for establishment. In the first year you focused on Phase 1: protecting the field. In the second year you focused on Phase 2: diversifying your field by planting a variety of vegetables, crops and fruit trees to feed your family and sell at market. In Phase 3 you will focus on optimizing your Forest Gardens to increase productivity and sustainability. As you optimize your Forest Gardens, protection and revitalization of the site and soils will be an on-going activity. Do you have any questions?

2. Farmers toss a ball and review what they learned in the last two years

Everyone stand in a circle. We will play the ball toss game we played at the beginning of year 2. I will start by saying something I learned in the last two years and then toss the ball to someone else. That person says something they learned about Forest Gardens and tosses the ball to someone who has not spoken. The game continues until everyone has a chance to share something they learned about Forest Gardens.

- What are the benefits of Forest Gardens compared to other cropping systems?
- What are Forest Garden layers? How do these layers help to maximize production?
- How do you continue to protect your Forest Gardens and revitalize your soils?
- How does diversifying the trees and crops you plant help your families?
- How does it help the land?
- What techniques and skills have you learned and practiced?
- What are you doing differently now than you were before? What are the results so far?

3. Review key points not discussed during the ball toss and get feedback on year one activities

Thank you all for sharing what you learned. Please continue to share your successes and challenges today so you can all learn from one another. I would like to hear from you about the workshops and your work in your Forest Garden during

the second year. I will write down your feedback on flip chart paper so I can take it to share with the rest of the TREES staff.

- What are three things you liked and disliked about the training events?
- Which materials did you find most and least helpful?
- What are three things you like about the support TREES staff provided?
- What are three things in the project that could be improved for next year?
How?

Activity 1: Map the Forest Garden

Description

Farmers inspect the host farmer's Forest Garden then discuss successes and challenges of the last year. The facilitator draws a top view map of the Forest Garden and the farmers identify gaps in the use of space in the field.

Instructions for Farmers

1. Walk around the host farmer's Forest Garden

We will start the workshop today by taking a walk around the field and observing what is planted. Think about the following questions as you walk around the Forest Garden.

- Are there any empty spaces where nothing is planted? Is there empty space around the perimeter? Is there empty space around the fruit trees?
- What Forest Garden components, layers, and techniques do you observe?
- What has the farmer done well?
- What could be improved? How?

2. Create a top view map of the Forest Garden

Now I will draw a map of the Forest Garden to show what we observed, like we did when we made our Forest Garden designs in year 1. The top view map, which captures the view of the Forest Garden site from above, shows us how we use space on the ground. By looking at what is there now, we can identify empty space that the farmer could better use in the Forest Garden.

I will show the green wall, agroforestry trees, fruit trees, permagarden, slopes and permanent objects.

- What are the top three gaps to fill to improve the use of space in the Forest Garden?

3. Host farmer discusses successes and challenges of year 2

The farmer hosting us on his/her field today will come to the front and discuss his/her Forest Garden design and what they did over the last year.

- How are your green walls doing? Will you need to plant a lot more trees to complete them and fill in gaps in the coming year?
- Do you notice any changes in soil health? For example, more organic matter in their soils, more beneficial insects living in/around the soil (e.g. earthworms and beetles), better water retention, improved yields?
- Do you have any erosion problems during heavy rains? If so, how can erosion be minimized?
- What were some successes?
 - o Are your plants growing better than before?

- o Are you growing more types of products than before?
 - o What did you do with the food crops you grew? Did you sell them? Did you use them to feed your family?
 - o What are some of the techniques you learned that you used in your Forest Garden?
 - o Have you noticed any changes in how water moves through the field? In how wind moves through the field? How soil moves through the field when it rains?
- What were some challenges?
 - o What challenges have you had with Forest Garden design?
 - o What challenges have you had with tree nurseries?
 - o What challenges have you had with planting to protect your field?
 - o What challenges have you had with your garden?
 - o What challenges have you had with outside factors, like pests, droughts, floods?
 - o How have you addressed these challenges? Do others have ideas for how they could be addressed?
- Have other farmers in the group faced similar challenges? How have they overcome them?
- What would you like to improve on in the coming year?

Activity 2: Seasonal Crop Calendar

Description

The facilitator guides the group in the creation of a seasonal calendar that shows when all the different plants in the Forest Garden are ready to harvest. This exercise helps the farmers visualize the times of year when the Forest Garden is not producing. Then the farmers discuss the gaps in the use of time in the field and the benefits of adding perennials to the Forest Garden.

Instructions for Farmers

1. List the crops growing in the Forest Garden

Today we will learn how to grow crops that you can harvest at different times of the year to increase productivity of your Forest Garden. First let us review what our host has in his/her Forest Garden now. Call out the plants in the Forest Garden one by one and I will write the name or draw a picture on the flip chart paper.

2. Create a seasonal calendar for the Forest Garden

Now let us discuss when the different plants in the Forest Garden can be harvested over the course of a full year. I created a calendar, like we used to talk about selling vegetables at market during the last permagardening workshop. Let us fill in the calendar with check marks to show when you can harvest each of the different crops from your Forest Garden. Be sure to include all food crops as well as other products that can be used, sold, or traded, e.g. fuelwood and fodder.

Figure 1: Example of a seasonal calendar. Write and draw/use cutout pictures of the different crops planted in the Forest Garden.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	Dry ☀	Dry ☀	Dry ☀	Rain ●	Rain ●	Rain ●	Rain ●	Rain ●	Rain ●	Rain ●	Dry ☀	Dry ☀
Maize												
Beans												

3. Discuss seasonal calendar and gaps in harvesting

- What time of year does the Forest Garden produce the most?
- What time of year does the Forest Garden produce the least?
- Who has plants in your Forest Garden that you harvest during the lean months? What are these and when do you harvest them?
- What plants can you add to your Forest Garden to harvest during the lean months?

- What are the top three gaps to fill to improve the use of time in the Forest Garden?

4. Discuss the benefits of planting perennials and types of perennials available

- There are some types of plants that will produce year after year without replanting (provide a local example). We call these types of plants perennials.
- What types of perennials grow in this community?
- What types of perennials produce food crops or other products that can be sold at market?
- What times of the year do these perennials produce?
- What are some native species that families traditionally use for food, medicines, or other products that can be grown in our Forest Gardens?
- How can planting perennials benefit the Forest Garden? (soil and water conservation, segmentation, pest control)

Activity 3: Side View Mapping

Description

The facilitator guides the group through an exercise to create a side view map of the Forest Garden, which shows the side view of the Forest Garden site. Then the facilitator leads a discussion around gaps in the vertical structure of the Forest Garden and the types of plants to add (roots and tubers, ground covers, shrubs, vines, tall timber trees, etc.) to fill those gaps. The facilitator will bring a side view map s/he has drawn on flip chart paper based on a Forest Garden observed in the project.

Instructions for Farmers

1. Explain the concept of side view mapping and walk through field to be mapped

In previous workshops we created maps of our Forest Gardens. The maps of the garden showed what it looks like when we look down on the land from above. Today we will create a side view map that shows the different layers of plants in the garden as we see them while walking along a straight line through the Forest Garden, called a transect walk.

- What do you see?
- What are the different layers of plants in a Forest Garden? (1. Root layer 2. Ground cover layer 3. Herbaceous layer 4. Bush-Shrub 5. Small tree layer 6. Large tree layer 7. Climber)

Figure 2: Example of the different layers in a Forest Garden, from www.worldagroforestry.org

(http://www.worldagroforestry.org/Units/Library/Books/Book%2082/imperata%20grassland/html/4.8_mutlistory.htm?n=27)

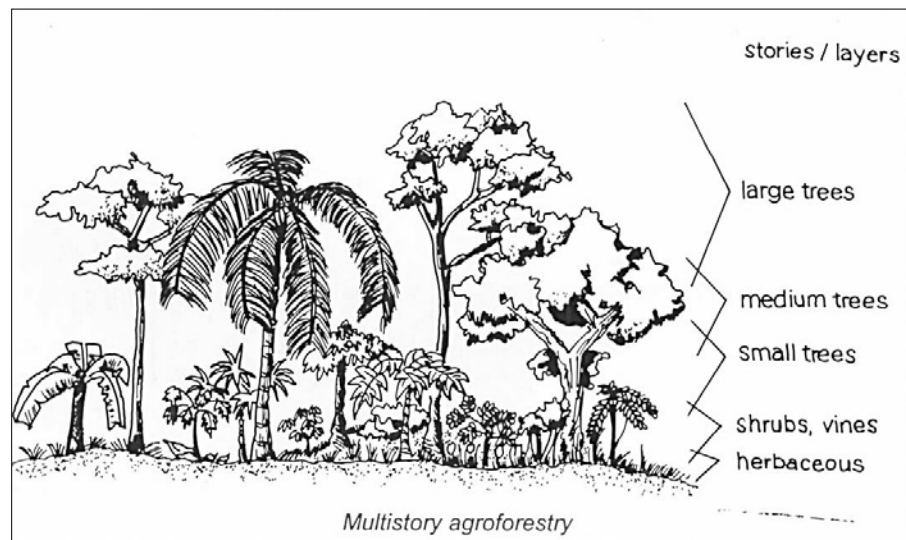
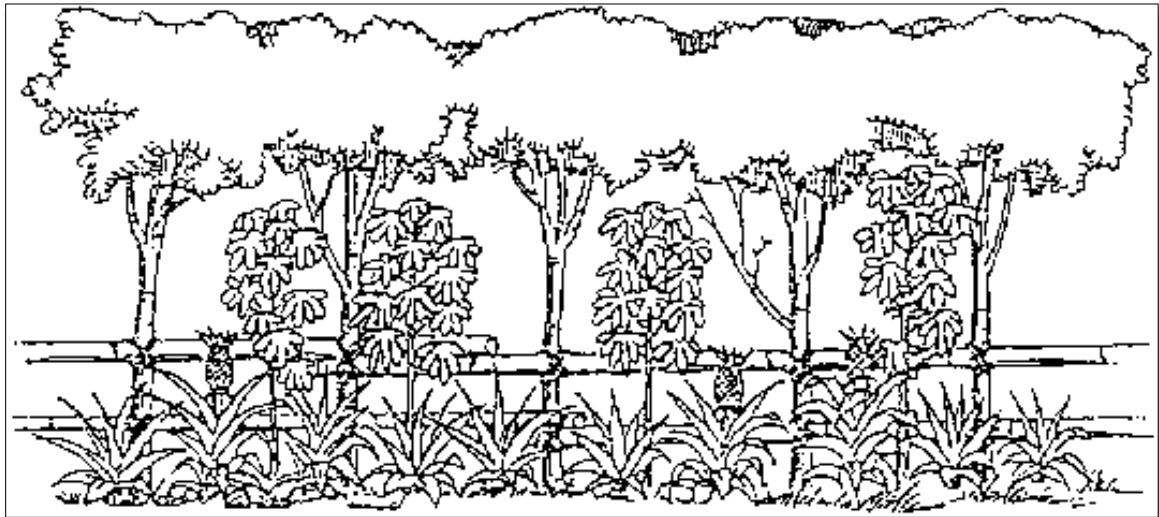


Figure 3: Example of the different layers in a Forest Garden, from www.fao.org



2. Show example of side view map of a Forest Garden visited during a previous workshop

Here is a side view map of a Forest Garden we have visited in this project.

- How is this different from other maps we have created?
- Where do you see gaps in the drawing? Is there space in the Forest Garden that is not being used?
- What types of plants could fill those gaps?

3. Small groups create a side view map of the host farmer's Forest Garden

Form groups of 4 or 5 people and come to collect flip chart paper and markers.

Take 30 minutes to take a transect walk through the host's Forest Garden and draw a side view map.

4. Small groups present side view maps and select the best one

Each group will come to the front and present your side view map of our host's Forest Garden. Then we will choose the map we think is the best representation of the Forest Garden and use that one for the next activity.

5. Discuss gaps from side view map

The side view map shows how the host farmer uses space above the ground. By looking at what is there now, you can identify empty space that the farmer could better use in the Forest Garden.

What are the top three gaps to fill to improve the use of vertical space in the Forest Garden?

Activity 4: Optimization Strategies for the Forest Garden

Description

Small groups analyze the host farmer's Forest Garden based on the top view map, seasonal calendar and side view map and provide feedback to the host farmer on how to improve his/her Forest Garden in year three in order to optimize vertical and horizontal space and produce crops at different times of the year.

1. Review the gaps identified in the three mapping activities: top view map, seasonal calendar and side view map

We have completed three activities to help you think about how you use space and time, and sunlight and water, to optimize your Forest Gardens. The top view map shows how you use space across the ground. The seasonal calendar shows how you use time. The side view map shows how you use space above the ground, between the surface and the canopy. You all will analyze the gaps, both in the maps and in the seasonal calendar, to identify crops that can be planted to produce more to eat, sell, or trade in the slower times of year, while at the same time filling in the empty spaces.

2. Small groups make recommendations for optimizing the Forest Garden

In your small groups, discuss plants to add to our host's Forest Garden to increase productivity by better using time and space. Prepare to present your recommendations to the group.

- What types of plants could fill those gaps on the top view map?
- What types of plants could fill those gaps on the seasonal calendar?
- What types of plants could fill those gaps on the side view map?
- Which tall trees are good for timber?
- What is the benefit of planting agroforestry trees dispersed throughout the field?
- What types of plants would improve the soil (nitrogen-fixing, weed suppression, moisture retention)?
- Did you see any erosion problems? What could you do to keep more soil and water in the Forest Garden?
- What do you want the field look like in 5 years?

3. Small groups present recommendations for host's Forest Garden

Each group will present their recommendations for the host farmer's Forest Garden. Then we will hear from our host about how these inform his/her plans for year three.

- Based on the recommendations heard from the groups, what changes do you, the host farmer, plan to make to the Forest Garden design?
- What new plants or trees will you add to your Forest Garden as a result of your exchanges with other farmers and TREES facilitators?
- How does this help you maximize your use of time? How will you increase the number of harvests?

- Are there still any gaps in the calendar?
- How does this help you maximize your use of space?

4. Discuss techniques participant farmers will adopt to optimize time and space in their Forest Gardens

Before we start talking about the group activities for year three, each farmer should stand up and mention the two changes you plan to make to your Forest Garden as a result of what you have learned today.

- How will you apply the strategies you learned today to your field?
- How is your field similar or different from our host's field?
- What perennials do you want to add to your Forest Garden?
- Which timber trees do you want to add to your Forest Garden?
- Are there any challenges to adding these new plants/products? How can you overcome them?

Activity 5: Plan Year Three Activities

Description

Farmers discuss plans for year three, including the workshop schedule, and sign the Memorandum of Understanding.

Instructions for Farmers

1. Discuss year three plans for the group

During the first year you planted trees to protect your Forest Gardens and revitalize your soils. In the second year you diversified your Forest Gardens by planting fruit trees and vegetables. In the coming year you will continue to increase productivity of your Forest Garden by optimizing what you grow and how. The training topics we will cover this year will teach you all to raise and plant timber trees, to graft fruit trees, and to sustain your garden's productivity permanently.

- How can you work together as a group to get the most out of your Forest Gardens? What are your interests and needs for Year 3? What are the priorities?
- What are the main crops you will plant next year as a group? Do you need to plant more agroforestry trees for your green walls, alleys, and contours? Fruit trees? Vegetables? Timber trees?
- What species will you focus on, and on average how much would each farmer hope to plant? What timber species should you plant? About how many timber trees on average will each farmer hope to plant?

I have prepared a schedule for when each module and flexible activity will be facilitated with over the course of Year 3. They are as follows:

Timing of Training Modules for Year 3

Module	Agricultural Calendar	Module Facilitation (month)
10. Timber Trees and Perennials	Facilitated with enough time for the slower-growing species to be ready for planting at the start of the main rainy season.	
11. Permagardening for the Future	During a time of year when gardens are not traditionally planted, to demonstrate how to grow vegetables at different times of the year.	

12. Grafting	When rootstock started in Year 2, and scions, are ready for grafting (this may be before, between, or after modules 10 and 11).	
13. Advanced Optimization (Year 4)	Beginning of Year 4	

Activities 2-4 are optional for non-TREES projects

2. Read and discuss Memorandum of Understanding

I will read the Memorandum of Understanding (MoU), which you all will need to sign before we close the meeting today. We sign a new MoU each year, after reviewing the progress you have made on your Forest Garden in the previous year. An important part of the review involves an evaluation of each farmer's Forest Garden. It is important that everyone knows that your commitment to the project, which is demonstrated by adopting the skills and techniques you learn in the workshops, is a key criterion we look at when we decide to continue with the project for another year.

3. Sign Memorandum of Understanding

When everyone agrees on the terms, we will all sign the MoU. I will take a copy and I will leave a copy here with the lead farmer.

4. Update the Participant Farmer List (PFL)

Finally, I will pass around the Participant Farmer List sheet for farmers to fill in for year. If any farmers who were invited to participate in year two of the project are not present, the lead farmer will take the PFL and MoU to them to fill in and sign, and return the completed documents to the facilitator.

Take Home Activity 6: Create a side view map of your Forest Garden

Description

Farmers create a side view map of their Forest Garden after doing a transect walk, as demonstrated in the workshop. The facilitator will review the side view map on the next field visit.

Instructions for Farmers

Farmers create a side view map of a transect of their Forest Garden

Take a walk along a straight line through the middle of your Forest Garden and draw a side view map. Think about plants you can add to your Forest Garden to optimize time and space.

Follow-up

The facilitator will visit each farmer within the next month to examine and photograph each participant farmer's Forest Garden side view map, and discuss optimization strategies.

Evaluation Checklist for Skills Learned in Year 3



At the end of the year you will be evaluated on the following practices that you learned and discussed during training events. In demonstrating that you have completed the Year three evaluation criteria, you will be invited to continue into the fourth year of the project.

Year 3 Evaluation Criteria

- Green Wall
 - o Three rows, fully surrounding the Forest Garden site
 - o Gaps replanted
 - o Well-managed
 - o Dead fence surrounding green wall if still needed (for all projects where this is determined to be a requirement)
- Alley Cropping and/or Contour Planting
 - o Optimum number planted
 - o Gaps replanted
 - o Well-managed
- Fruit Trees
 - o At least 4 species planted
 - o At least 2 species grafted
 - o Proper spacing between trees
 - o Each tree mulched and weeded
- Timber Trees
 - o At least 1 species planted
 - o Proper spacing between trees planted
 - o Each tree is weeded and mulched
- Compost
 - o Three active piles
 - o Well-managed
- Permagarden
 - o Multiple species
 - o Demonstrated use and explanation of at least 3 IPM measures
 - o Production timed for demand
 - o Demonstrated use of the 4 S's
 - o Perennials planted on berms around garden

Module 9: Facilitator's Notes



The facilitator should use the following pages to note down any questions or findings from the group that should be kept for or addressed at a later time. Depending on the module this may include species selection by group, crops identified in seasonal calendars, or anything else that should be noted.



Module 10: Growing Timber Trees and Perennials



Goal

Farmers will use appropriate nursery techniques to cultivate timber and perennial seedlings to plant in their Forest Gardens.

Learning Objective

1. Learn how to treat selected timber tree seeds for planting.
2. Learn timber tree nursery propagation techniques.
3. Learn timber tree nursery management best practices.
4. Learn how to propagate and plant perennials.

Venue and Timing

This module should be timed to give selected species enough time in the nursery for outplanting prior to the start of the following main rainy season. This workshop should take place on the lead farmer's or a participant farmer's farm. The farm should have a protected nursery site prepared prior to the workshop.

Relevant Technical Manual Chapters

Before this training event, the facilitator should read, review, and thoroughly understand the following chapters and sections in the Technical Manual:

- Chapter 4: Seeds
- Chapter 5: Seedling Propagation
- Chapter 11: Pruning, Harvesting, and Tree Management
- Chapter 12: Cut and Carry Livestock Management
- Chapter 15: Optimizing your Forest Garden Understory (Earthworks section)

Preparation

- Identify a tree nursery site (on the lead farmer's or participant farmer's land) where the training will take place and inspect the site to make sure it is protected with a

- fence or otherwise safe from animals. The host farmer can use the agroforestry or fruit tree nursery site, if there were no problems with that location.
- Determine which timber tree seeds to provide, based on Module 9 discussion, and acquire some for use in the training event.
 - Instruct lead farmer to prepare 5 timber seedling sacks with multiple seedlings in each sack. These should be started about 6 weeks before the training event, depending on the species. The seedlings should be about 5 to 10 cm tall.
 - Determine which nursery production method and seed pretreatment techniques need to be covered or reviewed with the group
 - Pretreat seeds for planting if the species requires overnight soaking or another process that cannot be completed during the workshop.
 - Collect perennial planting material.

Supplies

- ½ wheelbarrow of wood ash
- ½ wheelbarrow of charcoal ash
- sifting screen material
- 1 sharp knife
- 3 wheelbarrows of sand or topsoil
- 2 wheelbarrows of manure
- 15 tree sacks per participant
- 5 spade shovels
- 3 watering cans
- 1 wheelbarrow of *Azadiractha indica* or *Eucalyptus* sp. leaves (where available)
- nail clippers (1 set for each participant and 1 set for each facilitator)
- 5 pretreated seeds and 5-10 untreated seeds per participant
- 5 tree sacks with several germinated trees (~5 to 10 cm tall)
- 50 liters of water for watering seedlings
- 5 sharpened, clean machetes or other tools for pruning
- String

Total Time

Approximately 4 hours

Handouts in Farmer's Workbook

- Soil and Water Conservation Techniques
- Examples of Berms and Swales
- Perennials

Module 10: Growing Timber Trees and Perennials

Summary of Activities

Opener: Harvesting and pruning agroforestry trees (1 hour)

- Visit field to inspect green wall and demonstrate proper pruning techniques
- Volunteers demonstrate how to harvest fuelwood, fodder and fertilizer.
- Farmers practice harvesting.

Activity 1: Timber tree considerations (30 mins)

- Discuss timber trees and their growth considerations
- Timber tree spacing and planning

Activity 2: Pretreat timber tree seeds for sowing (30 mins)

- Discuss benefits of timber trees
- Discuss seed quality
- Facilitator demonstrates pretreatment method for selected timber trees
- Farmers practice seed pretreatment methods

Activity 3: Sow timber tree seeds in the tree nursery (30 mins)

- Volunteer demonstrates how to sow
- Farmers practice sowing
- Review best practices in nursery management

Debrief and Take Home Activity 4: Build your timber tree nursery (15 mins)

- Prepare nursery site
- Sack and seed distribution
- Follow-up

Opener: Harvesting and Pruning Agroforestry Trees

Description

Farmers practice pruning a green wall and harvesting fuelwood, fodder and fertilizer from the agroforestry trees planted in their Forest Gardens.

Instructions for Farmers

1. Visit field to inspect green wall and demonstrate proper pruning techniques

Your green walls need regular pruning to grow strong and dense. The more you cut them, the more they will branch into each other! Today we will review and practice the correct way to prune and harvest the green wall and agroforestry trees to use for fodder and fuelwood. Who would like to come demonstrate how to prune the green wall?

- How and when should you prune your green wall? How do you ensure the green wall forms a solid barrier?
- What do you need to do before pruning your trees? (sharpen and clean the knife/machete)
- How do you cut the stems to be sure you're not damaging the trees?

2. Volunteers demonstrate how to harvest fuelwood, fodder and fertilizer.

Who would like to demonstrate how to harvest fodder and fuelwood?

- How should you prune your alley crops/contours? Which parts of the tree do you prune? At what angle do you cut?
- What should you do with the agroforestry trees you dispersed throughout the Forest Garden? (It's up to you. Cut them if you want the wood/leaves; leave them if they're not competing for sunlight with your crops and you want larger pieces of timber down the line)
- When should you prune your alley crops/contours? What time of day? What time of year? How should you harvest fuelwood? Where do you cut? At what angle do you cut?
- When should you harvest fuelwood?
- How should you harvest fodder? Which parts of the tree do you harvest? Where do you cut? At what angle do you cut?
- When should you harvest fodder? What time of day?
- How can you store fodder?
- How should you harvest for fertilizer? Which parts of the tree do you cut? How do you use the tree for fertilizer?
- When should you harvest for fertilizer?
- What are other ways you can harvest and use the leaves and stems from the trees?

3. Farmers practice harvesting.

Each farmer should use the tools provided to practice pruning and harvesting. I will come around and answer any questions.

Activity 1: Timber Tree Considerations

Description

The facilitator discusses different considerations for timber trees, including growth characteristics, spacing, and management.

Instructions for Farmers

1. Discuss timber trees and their growth characteristics

Today we will discuss timber trees and practice planting them in nurseries.

- Why is it beneficial to plant timber trees in your Forest Garden?
- What qualities do we want to see with timber trees? What are the best growth characteristics of timber trees?
- What are some timber species would grow best in your area?
- Where do you want to plant timber trees in your Forest Gardens? Why?

2. Timber tree spacing and planning

- What spacing should you use for planting your timber trees in your Forest Garden?
- How should you care for your timber trees as they grow?
- Should you ever thin your timber trees? Why? When?
- What spacing should they be thinned to?
- Should you prune your timber trees? How? When?
- How long should you let your timber trees grow before harvesting them? (As long as you want; the longer they grow, the more you can sell them for)
- What should you do when you cut them down? (replant them; it is best to cut them in segments then replant what is cut so there is a constant rotation of trees at different ages)

Activity 2: Treat Timber Tree Seeds for Sowing

Description

The facilitator discusses seed quality and instructs farmers how to treat the selected timber tree seeds before sowing. After instruction, participants practice pretreating seeds themselves with monitoring and feedback from the facilitator.

Instructions for Farmers

1. Discuss benefits of timber trees

In the last workshop we talked about ways to better use the space in your Forest Garden by growing plants at different heights or layers. Today we will start nursing timber trees to fill out the top layer in your Forest Gardens.

- What are two reasons to plant timber trees?
- What are some valuable types of timber trees that grow here?
- What time of year do those types of timber trees produce seed?
- How long do each of these species require in the nursery before outplanting? What makes a good timber tree?

2. Discuss seed quality

Seed quality determines the quality of the tree that grows from it, so pay close attention to where your seed comes from. Proper storage between harvesting and sowing the seed is also very important to ensure the seed is viable when you plant it.

- Why is seed quality important? (discuss genetic diversity and physical seed traits)
- How can you tell if a seed is likely to be good?
- Is it a good idea to plant seeds from any tree of the species you want to plant?
- How do you ensure good genetic quality and diversity in seeds?
- How do you prepare the seed for storage? How do you store it? How long can you store it?

3. Facilitator demonstrates pretreatment method for selected timber trees

Some timber tree seeds need to be treated before planting. I will now demonstrate how to treat the timber tree seeds we are planting today.

- How do you treat this type of timber tree seed? What are two reasons to treat seeds before sowing?

4. Farmers practice seed pretreatment methods

Now you all will practice the technique I demonstrated.

- Do all seeds need to be pretreated before sowing? Examples of which seeds do and don't? What are different seed pretreatment methods? When do we pretreat seeds?

Activity 3: Sow Timber Tree Seeds in the Tree Nursery

Description

The facilitator will request a volunteer to demonstrate sowing techniques appropriate for the seeds provided and workshop participants will practice sowing. Farmers will review best practices for how to care for trees in their nurseries and demonstrate proper watering, weeding and thinning techniques.

Instructions for Farmers

1. Volunteer demonstrates how to sow

For each seedling production method, I would like a volunteer to demonstrate the sowing technique.

- What time of day is it best to sow seeds? Why?
- How deep should you plant the seeds?
- **Sacks:** How many seeds should you sow per sack?
- **Bareroot:** How should seeds be spaced in a nursery bed?

2. Farmers practice sowing

Everyone will now practice sowing using the techniques you learned.

- How long do timber trees stay in the nursery?
- What is the spacing for this type of tree in the field?

3. Review best practices in nursery management

For your tree nursery to grow, you need to take proper care of your seedlings.

- What are the three most important things to do to care for the tree nursery?
- How and when do you water the nursery?
- How and when do you weed the nursery?
- How and when do you thin the seedlings in the nursery?
- How and when do you outplant seedlings to the field?
- If some species selected for planting require less time in the nursery, when should those species be sown?

Take Home Activity 4: Build your Timber Tree Nursery

Description

Following the training, farmers will each be given 10 tree sacks (where applicable) and instructed to set-up those tree sacks in their nurseries. Farmers are expected to use soil and water conservation techniques, as applicable, in their gardens.

Instructions for Farmers

1. Prepare nursery site

Prepare the nursery beds and prepare the tree sacks we will give you today.

2. Sack and seed distribution

If your nursery looks good when the lead farmers comes to inspect it, the lead farmer will give you more tree sacks and seeds to sow in your nursery.

Follow-up

When the lead farmers visit participants, he/she will observe and counsel participant farmers to pretreat and sow several seeds, ensuring proper technique. When the lead farmer is satisfied with what the farmer has done s/he will distribute the appropriate number of sacks and seeds to the farmer.

Evaluation Checklist for Skills Learned in Module 10



At the end of the year you will be evaluated on the following practices that you learned and discussed during training events. Those in bold are topics that we discussed or practiced today. In demonstrating that you have completed the Year two evaluation criteria, you will be invited to continue into the fourth year of the project.

Year 3 Evaluation Criteria

- Green Wall
 - o Three rows, fully surrounding the Forest Garden site
 - o Gaps replanted
 - o Well-managed
 - o Dead fence surrounding green wall if still needed (for all projects where this is determined to be a requirement)
- Alley Cropping and/or Contour Planting
 - o Optimum number planted
 - o Gaps replanted
 - o Well-managed
- Fruit Trees
 - o At least 4 species planted
 - o At least 2 species grafted
 - o Proper spacing between trees
 - o Each tree mulched and weeded
- **Timber Trees**
 - o **At least 1 species planted**
 - o **Proper spacing between trees planted**
 - o **Each tree is weeded and mulched**
- Compost
 - o Three active piles
 - o Well-managed
- Permagarden
 - o Multiple species
 - o Demonstrated use and explanation of at least 3 IPM measures
 - o Production timed for demand
 - o Demonstrated use of the 4 S's
 - o Perennials planted on berms around garden

Module 10: Facilitator's Notes



The facilitator should use the following pages to note down any questions or findings from the group that should be kept for or addressed at a later time. Depending on the module this may include species selection by group, crops identified in seasonal calendars, or anything else that should be noted.



Module 11: Permagardening for the Future



Goal

Farmers will implement techniques to enhance long-term health and continuous productivity of the Forest Garden.

Learning Objectives

1. Learn how to grow vegetables at non-traditional times of the year.
2. Learn how to use soil and water conservation techniques to stop, slow, sink and spread water as it flows through the field.
3. Learn how to stabilize earthworks by planting perennials.
4. Learn advanced pest management techniques and natural pest controls.

Venue and Timing

This module should be given during a time of year when gardens are not traditionally planted, to demonstrate how to grow plants at different times of the year. If the workshop is given during the rainy season and fruit trees seedlings are ready for outplanting, facilitate Module 7: Planting Fruit Tree Seedlings during Activity 2 in this workshop.

Relevant Technical Manual Chapters

Before this training event, the facilitator should read, review, and thoroughly understand the following chapters and sections in the Technical Manual:

- Chapter 5: Seedling Propagation (Soils section)
- Chapter 7: Outplanting Seedlings
- Chapter 13: Permagardening
- Chapter 16: Integrated Pest Management

Preparation

- Ask host farmer which annuals and perennials his/her family would like to plant during the workshop.
- Ask host farmer to find/recreate updated Forest Garden design to identify timber tree outplanting locations.
- Collect seeds and planting material.

- Inspect tree nursery to determine whether timber tree and fruit tree seedlings are ready for outplanting.
- Inspect field for pests and decide which natural pest control method to include in training.
- Translate the *Permagardening for the Future* story into the local language, using local names, greetings, vegetables, etc. where appropriate.
- Retrieve Seasonal Market Analysis chart from Module 8, if available.

Supplies

- Forest Garden design for host farmer's field
- Perennial planting material
- Ingredients to make natural pesticide
- 2 wheelbarrows for transporting seedlings
- 5 round shovels or appropriate digging tools
- 3 watering cans with water
- ½ wheelbarrow of wood ash
- ½ wheelbarrow of charcoal dust
- 1 wheelbarrow of compost or decomposed manure
- Sticks for marking planting rows
- 5 hoes
- String
- Bucket
- Flip chart
- Markers

Total Time

3-4 hours

Handouts in Farmer's Workbook

- Perennials & Off-season Vegetables

Module 11: Permagardening for the Future

Summary of Activities

Opener: Gardening for the Future story (30 mins)

- Volunteers read/act out story
- Debrief lessons learned from story

Activity 1: Earthwork techniques for soil and water conservation (2 hours)

- Human rain drop
- Facilitator explains how to conserve soil and water in the Forest Garden
- Design earthworks plan for the permagarden
- Form small groups and practice constructing berms, swales and other earthworks techniques in the Forest Garden

Activity 2: How to grow vegetables in the offseason (30 mins)

- Explain best practices for planting and growing vegetables in the offseason

Activity 3: Planting timber trees and perennials and (flexible) grafted fruit trees (45 mins)

- Review Forest Garden design
- Outplant timber trees
- Review benefits of perennials
- Plant perennials on berms to stabilize soil

Activity 4: Pest Control (1 hour)

- Inspect the field for pest problems
- Discuss techniques to address common pest problems
- Practice making natural pest controls

Take Home Activity 5: Start your off-season garden and outplant timber trees and perennials and (flexible) outplant fruit seedlings (30 mins)

- Debrief gardening best practices, soil and water conservation and pest control
- Instruct farmers to plant perennials to stabilize berms, segment field and control pests
- Instruct farmers to outplant timber tree seedlings and slow-growing fruit tree seedlings in the Forest Garden
- Follow-up

Opener: Gardening for the Future story

Description

Three volunteers read a story that demonstrates the benefits of using permaculture techniques to create a garden that provides nutritious food for the family throughout the year. Emphasize the benefits of permaculture for: providing healthy food for the family, improving the soil quality, and reducing the use of costly fertilizer and dangerous pesticides.

Instructions for Farmers

1. Volunteers read/act out story (on the following page).

Can three volunteers, one man and two women, come to the front and read a story about two families and their farms? After we hear the story, we will discuss it.

2. Debrief lessons learned from story.

- What did you think of the story?
- What is the neighbor doing that is making his life difficult? Why is it making life difficult?
- What are the husband and wife doing in the story that is good for the health of their family?
- What are the husband and wife doing in the story to increase the productivity of their Forest Garden?
- What are the husband and wife doing that reduces the cost of inputs for the Forest Garden?

The Story of Two Families Growing Vegetables

Have three participants read the story. Replace the names with names appropriate for the community.

Wife: Husband, I am so happy we went to that training last year and changed the way we made our permagarden. We were able to grow and sell more in our garden and at the same time we spend less time working in the garden!

Husband: Yes, my wife. I am happy too. Instead of working harder, we are working smarter.

Neighbor: Greetings neighbors. Oh! I am so tired! I kept my kids home from school today so that they could help me till and plant in our home permagarden and we still have much work to do!

Wife: You look very tired indeed! Here, take some water. What are you growing this season?

Neighbor: We are growing all [local vegetable] again this season. Last season the prices we got in the market were not good because there were so many people selling [local vegetable] at the same time. Also, last season we had a big problem with pests and we had a smaller yield than the year before. So this season I sold a goat so I could buy pesticide and fertilizer from the agrochemical shop. We hope it will be better this time. Have you started to build your garden?

Husband: Last year we learned about a way to build our garden so we do not have to re-build it every season. It makes for less work to start the garden so we do not need the children to stay home from school to help us. Some of the plants we planted last season are still producing. And we were able to save more water in the garden so we could continue growing some vegetables in the off-season. We are able to produce a variety of nutritious vegetables to keep our family healthy and strong, even during the lean season. Every month of the year we are able to harvest something from our garden! Come take a look!

Neighbor: Wow! You have so many different types of plants growing here! That must require a lot of different pesticides to keep the pests away!

Wife: Actually, the plants work together as a team to improve the soil and keep some pests away so we are spending less money on buying expensive fertilizer and chemical pesticide than we did before. The marigolds you see there help keep pests away from our tomatoes. And those onions deter pests from our eggplants.

Neighbor: So you don't have any pests at all??

Wife: We have some, but we carefully observe our garden to catch pest problems when they are small and manage them with natural ways if we can. Even when we have pests, they usually only attack one of the many plants we have, so it is not that bad.

Husband: Those agrochemicals are very dangerous for the children and for us if we don't handle them properly. So we want to use them only as a last resort if the other things we try don't work.

Neighbor: How can I learn how to build a garden like this for my family?

Husband: We are happy to come and share what we learned with you!

Neighbor: Thank you and bless you! I want to learn well so I can have a garden like yours!

Activity 1: Earthworks Techniques for Soil and Water Conservation

Description

Farmers construct soil and water conservation techniques, such as berms and swales, in the permagarden.

Instructions for Farmers

1. Human rain drop

Heavy rains can wash away the nutrient-rich topsoil from your Forest Garden. I would like 5 volunteers to come to the front. I will position you to represent different features on the field—mounds, slopes, ditches. Then I will act as a drop of rain moving through the field.

- How does water move through your field?
- Where does it move fast?
- Where does it slow down?
- What are three benefits of controlling the way water flows through your field?

2. Facilitator explains how to conserve soil and water in the Forest Garden

We can control the way water flows through our permagardens—and slow it down so it is absorbed by the soil underneath the beds—with the 4 S's of water control: stop, slow, sink and spread. The 4 S's are achieved by constructing swales, berms, pathways and holes out of soil, rocks, and other debris, in the appropriate places, to slow down the water and direct it to where we want it go, then stopping it so that it can spread underneath the garden beds and tree roots and sink deep into the soils.

- What is a berm? Where and why do you construct a berm?
- What is a swale? Where and why do you construct a swale?
- What techniques can you use to control water around trees in the Forest Garden?
- What are two benefits of mulch?

3. Design earthworks plan for the permagarden

Based on the features in the field and location of the permagarden, how should we use the soil and water conservation techniques we discussed to direct water to the garden?

- Where does water move the fastest? (look for heavy erosion/gullies) Is this a problem?
- How can we slow it down and direct it to where we want it to go (e.g. to our garden, trees, water catchments, underground, etc.)?

- Which soil and water conservation techniques should you use? Why? Where?
- Why does planting a variety of crops help you save water in the field? (i.e. better use of space, more shade from trees)

4. Form small groups and practice constructing berms, swales and other earthworks techniques in the Forest Garden

Form small groups and I will assign each group a soil and water conservation technique to practice on a section of the Forest Garden, based on our design. After some time, I will have you all rotate to a different section so that you will be able to practice all of the techniques we learned today.

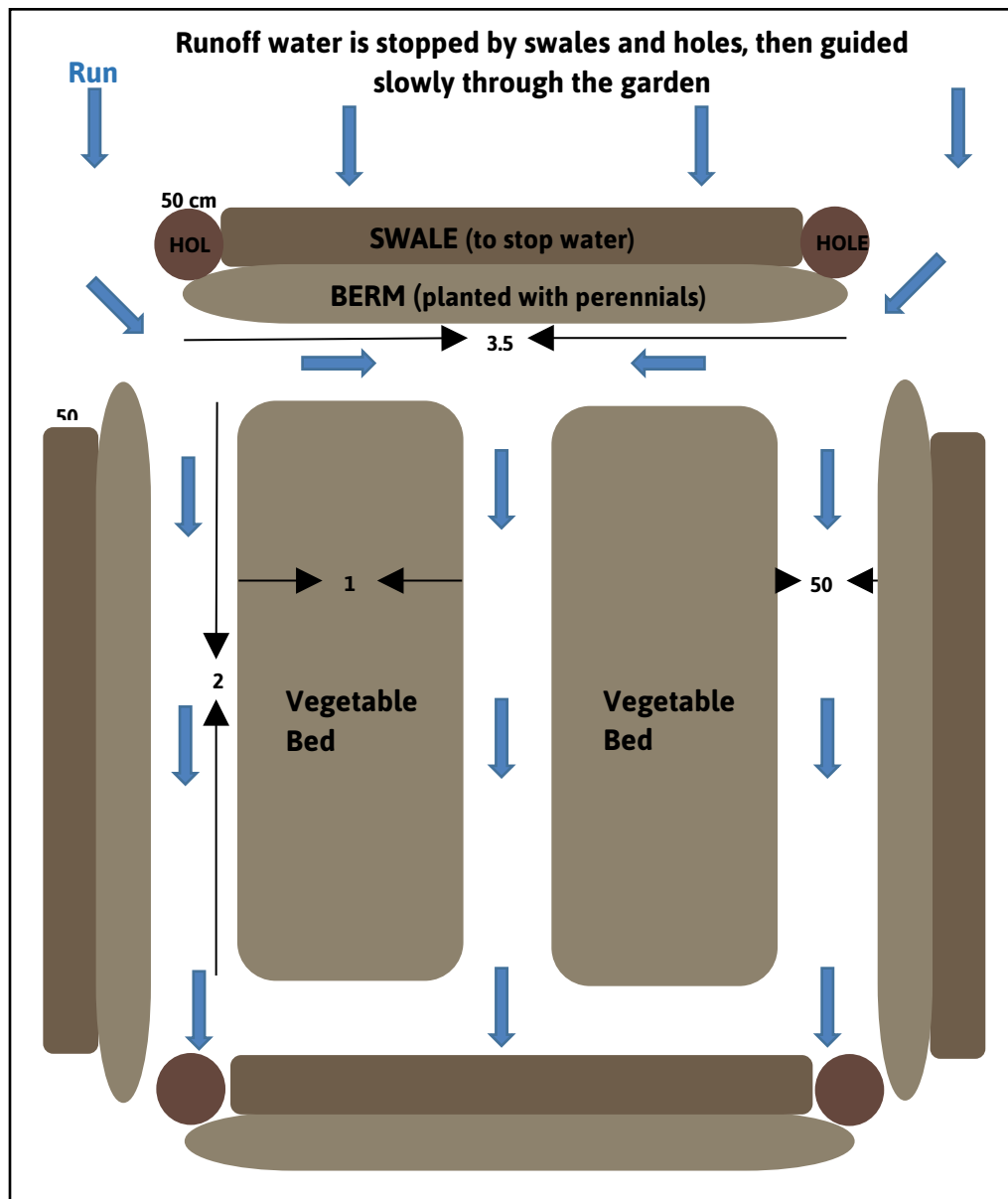
- How do you slow water?
- How do you stop water?
- How do you sink water?
- How do you spread water?

5. Plant perennials in nursery

In the last workshop we talked about perennial plants you can add to your Forest Garden to make it more productive. Perennial plants can also help benefit your field in other ways: they can help with soil and water conservation, you can use perennials to segment the field, and perennials can help control pests. We will plant some perennials in the nursery so that in the next workshop we can outplant them in our Forest Garden—on the berms we constructed today to stabilize and in other areas based on the Forest Garden design.

- What are characteristics of plants that help stabilize soil?
- What are a few perennials that would be good to plant on your berms? Why?
- What are characteristics of plants that can help protect your field from pests?
- What are a few perennials that would be good to plant for pest control? Why?
- What are characteristics of perennials that would be good to plant to segment the field?
- What are a few perennials that would be good to plant for segmentation? Why?
- How do you propagate them? (seeds, cuttings)
- Do you need to nurse the plants? For how long?
- Can you plant cuttings?
- Where do you get them? How do you plant and care for them?
- What is the spacing for this type of plant?
- What is the best time of day to water the field? Why?
- What can you do to keep the sun from drying out the soil? (mulch)
- What available materials can we use as mulch?

Figure 1: Permagarden design showing earthworks techniques



Activity 2: How to Grow Vegetables in the Offseason

Description

The facilitator discusses best practices for growing vegetables in the current season.

Instructions for Farmers

1. Explain best practices for planting and growing vegetables in the current off-season.

Many vegetables that you grow in your gardens can be planted at other times of the year as well, if you prepare the land in a different way.

- What do you grow during this season?
- What can you grow during this season? Which varieties of the vegetable grow best during this season?
- What would you like to grow during this season?
- What is most valuable to sell during this season? (refer to seasonal market analysis from Module 8, if available)
- How do you normally prepare a bed for this type of vegetable?
- How should you prepare a bed for this type of vegetable in the current season?
- How should you water this type of vegetable? (example: onions in sunken beds, don't overwater, just keep moist)

Activity 3: Planting Timber Trees & Perennials and Grafted Fruit Trees (flexible)

Description

During this activity, farmers will outplant timber trees and perennials previously planted in the nursery. If grafted fruit trees are ready for outplanting, facilitate **Module 7: Activities 2 and 3** during this activity. The facilitator reviews the benefits of perennials for soil and water conservation, field segmentation and pest control. Then farmers go into the field to inspect and reshape the berms constructed in the previous workshop and plants perennials on the earthworks to stabilize soil.

Instructions for Farmers

1. Review Forest Garden Design

During the last two workshops we talked about adding short plants, medium height plants and tall trees to use more of the vertical space in your Forest Gardens. Today you will plant perennials and timber tree seedlings in the field to optimize the vertical space. Let us review the Forest Garden design the host farmer created for his/her field so that you will know where to plant today.

- What is a perennial?
- Why is it good to plant timber trees in your Forest Garden?
- Where will you plant timber trees? Why?
- Where will you plant perennials? Why?

2. Outplant timber trees

Form small groups. Each group will go to a different location in the field and prepare planting holes for the timber tree seedlings. Then go to the nursery and collect the seedlings to outplant.

- What spacing should you use for the types of trees you are planting today?
- Why is it good to space timber trees closer together initially?
- If you plant near a fence, how much space do you leave between the fence and the tree?
- How do you ensure proper spacing and that the planting follows the original design?
- How wide do you dig the holes? How deep do you dig the holes?
- How can you ensure there are plenty of nutrients in the soil for the young seedling?
- What can you add to the soil before planting? If you do not have compost, what else can you add? Why do you add wood ash? Why do you add charcoal?
- What qualities do you want your timber trees to have?

- How do you care for the timber trees once they are planted?

3. Review benefits of perennials

In the optimization workshop we talked about perennial plants you can add to your Forest Garden to make it more productive. Perennial plants can also help with soil and water conservation.

- What are some benefits of perennials for pest management?
- What are some benefits of perennials for soil health?
- What are some benefits of perennials for segmenting the field?
- What are characteristics of plants that help stabilize soil?
- What are examples of plants to use to stabilize soil?
- How do you propagate this type of plant? (seeds, cuttings)
- Do you need to nurse the plant? How long do you nurse the plant?

4. Plant perennials on berms to stabilize soil

You will plant some perennials on the berms you constructed to stabilize the soil. You might need to reshape the berms before planting.

- What is the spacing for this type of plant?
- How do you care for the perennials you planted? Do you need to water? When and how much should you water?

Activity 4: Pest Control

Description

The facilitator discusses the concept of integrated pest management and explains natural methods for pest control, including natural pesticides, aromatic pest confusers, and insectary and nectary plants.

Instructions for Farmers

1. Inspect the field for pest problems

Let us go walk around the Forest Garden and look for pests. In the same small groups you formed earlier, go into the field and do a transect walk. Every few steps, stop and inspect the health of the plants and soil and look for pests or evidence of pest attacks (e.g. holes, spots, wilting leaves, etc.). Take notes and/or collect the pests or evidence of attacks you see in the field. While you are in the field, look at the plants and observe their qualities—size, shape, coloring.

- What is a pest?
- What are common pests you find in your field?
- Which plants have many pests?
- Which plants do not have many pests?
- What time of year brings many pests?
- What insects do you know of that eat common pests?
- What plants attract those insects (e.g. by providing food or shelter)?
- Do you know of any plants that repel pests because of their smell? What?
- What do you now do to prevent pests in the field?
- What do you do now to get rid of pests that are already there?

2. Discuss techniques to address common pest problems

- What damage from pests or disease did you see in the field?
- Were the pests a large problem that needs action?
- Were the pests attacking many types of plants, or just one or two?
- What pests or diseases do you think will affect your garden this season?
- What actions can you take to control the pests?
- Do you think you need chemicals? What alternatives to chemicals can you use to reduce the pests?
- Who has experience using these techniques?
- What can you grow that is not as susceptible to pests? Are different varieties better to combat pest and disease?

3. Practice natural pest control methods

I will teach you a natural way to control the pest you observed in the field today. Get back into your small groups and then come and collect the materials and I will demonstrate how to make a natural pest control.

Take Home Activity 5: Start your Off-Season Garden, Build Earthworks, and Outplant Timber Tree & Perennials and Outplant Fruit Seedlings (flexible)

Description

Farmers start their off-season gardens using the techniques learned in the workshop. Farmers also outplant timber trees, perennials and fruit seedlings, when ready.

Instructions for Farmers

1. **Debrief gardening best practices, soil & water conservation and pest control**

After the workshop, you will start your own vegetable nursery. The lead farmer will come inspect your nursery within 2 weeks and then distribute the seeds.

- What are the top 3 challenges you might face in your garden?
- How and when do you water your garden?
- How do you conserve/save water?
- Why do you mulch?
- When do you weed?
- What natural methods can you use to control pests?
- How do you improve the soil quality?

2. **Earthworks techniques**

You will use the earthworks techniques you learned today in your own permagarden to stop, slow, spread, shade, and sink water as it flows through your field.

3. **Instruct farmers to plant perennials to stabilize berms, segment field and control pests**

Inspect the berms in your field and reshape them, if necessary. Then outplant the perennials into your Forest Garden based on your design.

4. **Instruct farmers to outplant timber tree seedlings and slow-growing fruit tree seedlings in the Forest Garden**

When your slow-growing fruit seedlings and timber tree seedlings are ready, you should outplant them in your Forest Garden according to the Forest Garden design.

Follow-up

The lead farmer will visit participant farmers' Forest Gardens within 2 weeks. When the garden area meets the criteria, the lead farmer will distribute the vegetable seeds for farmers to plant in their gardens. The lead farmer will also inspect the perennials, fruit tree and timber tree seedlings outplanted in the field.

Evaluation Checklist for Skills Learned in Module 11



At the end of the year you will be evaluated on the following practices that you learned and discussed during training events. Those in bold are topics that we discussed or practiced today. In demonstrating that you have completed the Year two evaluation criteria, you will be invited to continue into the fourth year of the project.

Year 3 Evaluation Criteria

- Green Wall
 - Three rows, fully surrounding the Forest Garden site
 - Gaps replanted
 - Well-managed
 - Dead fence surrounding green wall if still needed (for all projects where this is determined to be a requirement)
- Alley Cropping and/or Contour Planting
 - Optimum number planted
 - Gaps replanted
 - Well-managed
- **Fruit Trees**
 - **At least 4 species planted**
 - **At least 2 species grafted**
 - **Proper spacing between trees**
 - **Each tree mulched and weeded**
- **Timber Trees**
 - **At least 1 species planted**
 - **Proper spacing between trees planted**
 - **Each tree is weeded and mulched**
- Compost
 - Three active piles
 - Well-managed
- Permagarden
 - Multiple species
 - **Demonstrated use and explanation of at least 3 IPM measures**
 - Production timed for demand
 - **Demonstrated use of the 4 S's**
 - **Perennials planted on berms around garden**

Module 11: Facilitator's Notes



The facilitator should use the following pages to note down any questions or findings from the group that should be kept for or addressed at a later time. Depending on the module this may include species selection by group, crops identified in seasonal calendars, or anything else that should be noted.



Module 12: Grafting



Goal

Farmers will learn and practice appropriate grafting techniques for fruit trees in their Forest Garden.

Learning Objectives

1. Learn the concept and benefits of grafting.
2. Identify desired characteristics of a tree to use for scions.
3. Learn how to prepare scions.
4. Learn common grafting techniques.
5. Learn how to care for grafted seedlings.

Venue and timing

This module should take place at the lead farmer's or a participant farmer's Forest Garden, once seedlings reach the correct size for grafting.

Relevant Technical Manual Chapters

Before this training event, the facilitator should read, review, and thoroughly understand the following chapters and sections in the Technical Manual:

- Chapter 4: Seeds
- Chapter 6: Fruit Trees (Grafting section)

Preparation

- Identify fruit trees on or near the host's farm that can be used as a source for scions.
- 7-10 days before the workshop, the host farmer prepares scion branches (3 for each participant farmer): removes all leaves for 20 cm down from the terminal bud to promote swelling of the buds.
- Inspect nursery to check if seedlings are the correct size for grafting (i.e. when they are around a year old or at least the thickness of a pencil).
- Draw cross section of stem on flipchart paper.

- On the day of the training event, collect two sticks for each farmer – one about 1 cm thick and the other about 2 cm thick and .5 m long – from living trees for farmers to practice making grafting cuts.

Supplies

- Seedlings (3 per participant)
- Sharp knife or utility knife (one for every 2 or 3 participant)
- Alcohol or bleach for disinfecting the knives
- Electrical tape or other weather resistant tape
- Plastic (transparent and thicker plastic is best), sourced from a grocery bag or polyethylene tubes (tree sacks) to use for binding (often used in tree nurseries)
- Grafting compound (optional, if available), such as tar or beeswax; if beeswax is used, be sure to have the necessary tools in place to warm the beeswax to liquid form.
- Rubber Bands (optional), often a cheap and effective way of keeping the cambium layers of you graft in tight contact.
- A selection of fruits from the market

Total time

3-4 hours

Handouts in Farmer's Workbook

- Side Grafting
- Crown Grafting

Module 12: Grafting

Summary of Activities

Opener: How do we find the perfect fruit tree? (30 mins)

- Discuss characteristics of a high quality fruit tree
- Discuss market benefits of grafted fruit varieties

Activity 1: Preparing and collecting scions (45 mins)

- Discuss the characteristics of a good scion source
- Demonstrate how to prepare and collect a scion
- Farmers practice preparing and collecting scions

Activity 2: Grafting demonstration and practical (2 hours)

- Demonstrate local grafting techniques
- Demonstrate side graft
- Farmers practice grafting on seedlings in nursery

Activity 3: Caring for grafted seedlings (45 mins)

- Review the steps
- Discuss aftercare of grafted seedlings
- Debrief grafting practical

Take Home Activity 4: Grafting practical (15 mins)

- Practice grafting on sticks and agroforestry trees
- Collect scions and graft them onto your fruit tree seedlings
- Follow-up

Opener: How do We Get the Perfect Fruit Tree?

Description

This activity prompts farmers to think about qualities of a good fruit tree and understand the benefits of grafting.

Instructions for Farmers

1. Discuss characteristics of a high quality fruit tree

Imagine the best fruit tree on your farm. Why is it a good fruit tree? What does that fruit tree look like? What makes it a good fruit tree? I would like a volunteer to come to the front and draw our best fruit tree and the fruit it produces.

- What are qualities of a desirable fruit tree?
- How can you get more fruit trees like this?
- Do you always get the same fruit if you plant it from seed?
- Does anyone have a fruit tree with small fruits or bad fruits? How could you change the type of fruits coming from that tree? (i.e. top-working)
- What is grafting?
- How does grafting work?
- What are three benefits of grafting?
- What are some types of trees that should be grafted?
- Does anyone have experience grafting?

2. Discuss market benefits of grafted fruit varieties

By improving the yield and quality of fruit in your Forest Garden, you can get more for your fruits at the market. Here are some fruits I brought from the market.

- Which of these will get the best price at the market today? Why?
- Who is selling fruit at the market?
- Are you happy with the price you are getting?
- How can you get a better price? Can you bring your fruit to market at a different time? Can you sell a different variety?
- Has anyone eaten a fruit that you cannot find easily at the market?

Activity 1: Preparing and Collecting Scions

Description

The facilitator takes the farmers to the trees the host farmer prepared to use as scions and describes the desired length, width and other characteristics of a scion. Then farmers practice collecting and preparing scions.

Instructions for Farmers

1. Discuss the characteristics of a good scion source

The branch of the mature fruit tree that you use to graft onto another tree is called a scion.

- What size should your scions be? Width? Length?
- Should you collect scions from flowering trees?
- How can you tell if a branch is a good candidate for a scion?

2. Demonstrate how to prepare and collect a scion

Let's now practice collecting scions from mature trees. First, watch me demonstrate how to cut a scion from a mature tree.

- What tool do you use to cut the scion?
- Should it be sharp and clean? Why?
- Why do you remove the leaves from the branch a week before you cut off the scion?
- Where on the tree should you collect your scions?

3. Farmers practice preparing and collecting scions

Now you all will practice collecting the scions the host farmer prepared last week. Once you collect at least three scions, find at least three more branches that would make good scions and prepare them like I showed you.

- What do you look for when choosing which scion to graft to your seedling?

Activity 2: Grafting Demonstration and Practical

Description

If a participant has grafting experience, they demonstrate what they know for the group. Then the facilitator demonstrates the side grafting technique with the scions collected and seedlings from the host farmer's nursery. Farmers practice the side grafting technique demonstrated by the facilitator. Farmers first practice cutting on sticks before using the seedlings and scions.

Instructions for Farmers

1. Participant farmer demonstrates local grafting techniques

Does anyone have experience grafting? Please come to the front and demonstrate what you know.

- What materials do you need for grafting?
- What do you call the part of the tree that you graft the scion to?
- What type of grafting technique are you demonstrating?
- What advice can you give for ensuring a successful graft?
- What qualities do you look for in a seedling/rootstock to use for grafting?

2. Demonstrate side graft

We have collected scions from mature fruit trees. We will use the seedlings planted in the nursery for our rootstock. I will demonstrate the side grafting technique and then you all will practice with the scions you collected.

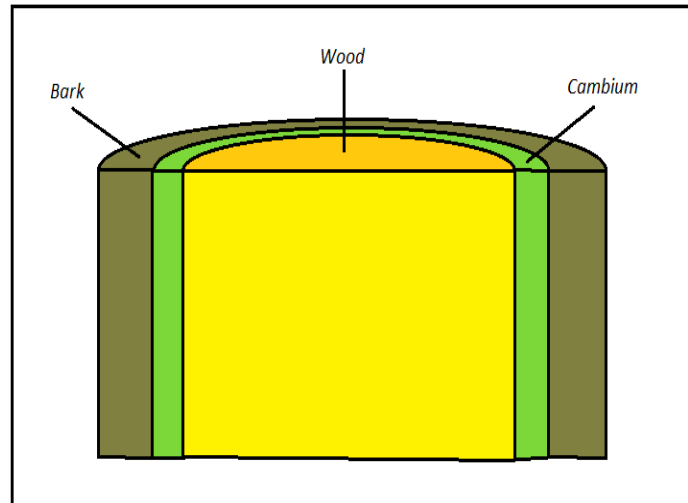
- How do you prepare your tools and materials for grafting?
- How do you prepare a scion for grafting?
- How do you make the cuts for a side graft?
- What do you need to do to form the union for a successful graft?
- What is the cambium layer?
- Why is it important to line up the cambium layer of the scion with the cambium layer of the rootstock?
- Why do you use a grafting compound?
- Why do you wrap plastic around the graft? How do you check to see if you have a good seal with the plastic? (check for moisture droplets the following day)
- Why do you remove all but a few leaves above the graft?
- When do you remove the terminal bud? Why?

3. Farmers practice grafting on seedlings from the nursery

Form a group of 2 or 3 people and come and collect the grafting materials. First collect one small stick to use as a mock-scion and one bigger stick to use as the mock-rootstock. Practice making the types of cuts I demonstrated for the scion and rootstock, then practice grafting the two together. You can practice cutting and

grafting a few times with the same sticks. I will walk around and inspect what you have done. When they look good, I will instruct you to select three seedlings from the nursery that are ready for grafting and you can practice grafting the scions you collected to the rootstock.

Figure 1: Cross Section of Woody Stem



Activity 3: Caring for Grafted Seedlings

Description

The group debriefs the grafting practical and discusses how to care for grafted seedlings.

Instructions for Farmers

1. Review the steps

Can someone come up to the front with their grafted seedlings and review the grafting process, explaining the importance or significance of each step?

2. Discuss aftercare of grafted seedlings

After the seedling is grafted using this technique, it needs to remain in the nursery until you can see if the graft was successful.

- How do you care for grafted seedlings?
- How will you know if the graft was successful?
- When do you remove the plastic and tape?
- How do you prune the seedling after removing the plastic? When? Why is pruning important for a grafted tree?
- Why does grafting sometimes fail?
- If the graft fails, will the seedling die?
- If it doesn't die, can you try to graft it again? When?
- What time of year should you prune grafted seedlings?

3. Debrief grafting practical

Let us talk about successes and challenges from today's activity.

- What are five basic steps for performing a graft.
 - sourcing the scion and the rootstock
 - preparing the scion and the rootstock for grafting
 - grafting the scion and the root stock
 - waiting for the graft to take and for the scion to sprout new growth
 - removing the wrapping and maintaining the grafted tree
- What did you think about the work today?
- What was easy about today's activities? What was difficult in today's activities?
- What observations do you have?
- What other types of grafting are there? Do scions always have to be grafted to potted seedlings?
- How do you plan to apply grafting and other vegetative propagation methods on your farms?

Take Home Activity 4: Grafting Practical

Description

Each farmer practices grafting directly onto their agroforestry trees. The lead farmer will come and inspect their grafting technique and then the farmer will practice grafting on fruit tree seedlings under the supervision of the lead farmer.

Instructions for Farmers

1. Practice grafting on sticks and agroforestry trees.

When you go back to your farm, practice grafting first on sticks, and then when you are comfortable, on some of your agroforestry trees. Use sticks that have similar qualities to seedlings: small, fresh branches that are the same thickness and greenness of the seedlings in your nursery.

If you want, you can practice whip grafting and other grafting techniques in addition to side grafting. Please come and talk to me if you are interested in learning different grafting techniques. The lead farmer will come and visit your farm and help you to perfect your grafting technique.

2. Collect scions and graft them onto your fruit tree seedlings.

Once you have more practice grafting on agroforestry trees, you will practice grafting your fruit tree seedlings under the supervision of the lead farmer. Collect scions from mature fruit trees using the practices you learned today, then graft them on seedling rootstock from your nursery. You should practice making ten graft unions and I will come visit your Forest Garden in a few weeks to see how you did.

Follow-up

The lead farmer visits and oversees fruit tree grafting. The facilitator will visit and check to see if the grafts were successful and advise the farmer on grafting techniques, including techniques not covered during the training.

Evaluation Checklist for Skills Learned in Module 12



At the end of the year you will be evaluated on the following practices that you learned and discussed during training events. Those in bold are topics that we discussed or practiced today. In demonstrating that you have completed the Year two evaluation criteria, you will be invited to continue into the third year of the project.

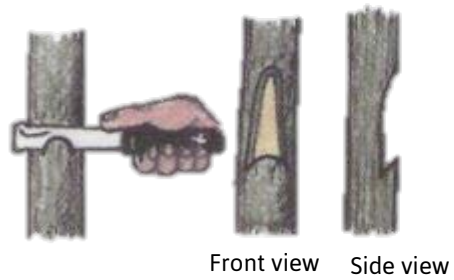
Year 3 Evaluation Criteria

- Green Wall
 - o Three rows, fully surrounding the Forest Garden site
 - o Gaps replanted
 - o Well-managed
 - o Dead fence surrounding green wall if still needed (for all projects where this is determined to be a requirement)
- Alley Cropping and/or Contour Planting
 - o Optimum number planted
 - o Gaps replanted
 - o Well-managed
- **Fruit Trees**
 - o At least 4 species planted
 - o **At least 2 species grafted**
 - o Proper spacing between trees
 - o Each tree mulched and weeded
- Timber Trees
 - o At least 1 species planted
 - o Proper spacing between trees planted
 - o Each tree is weeded and mulched
- Compost
 - o Three active piles
 - o Well-managed
- Permagarden
 - o Multiple species
 - o Demonstrated use and explanation of at least 3 IPM measures
 - o Production timed for demand
 - o Demonstrated use of the 4 S's
 - o Perennials planted on berms around garden

Side Grafting

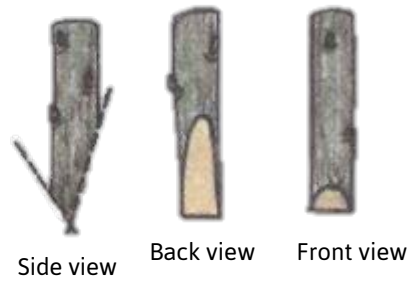


Rootstock Preparation



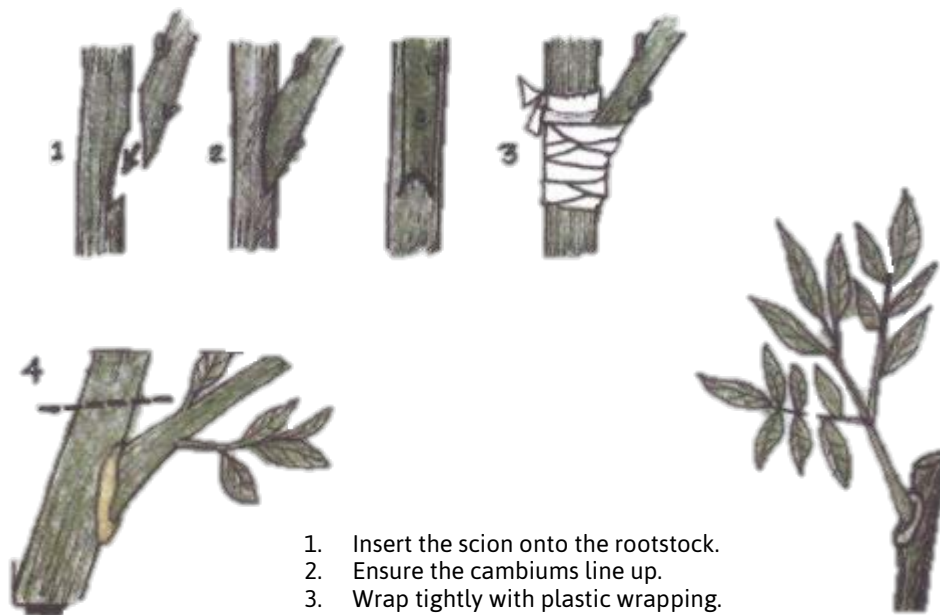
Front view Side view

Scion Preparation



Side view Back view Front view

Make a downward cut 2.5-4 cm long

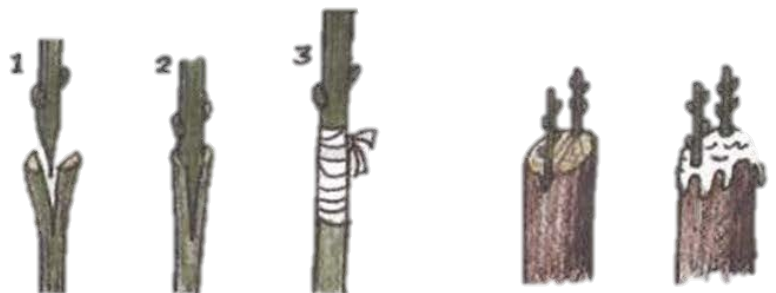
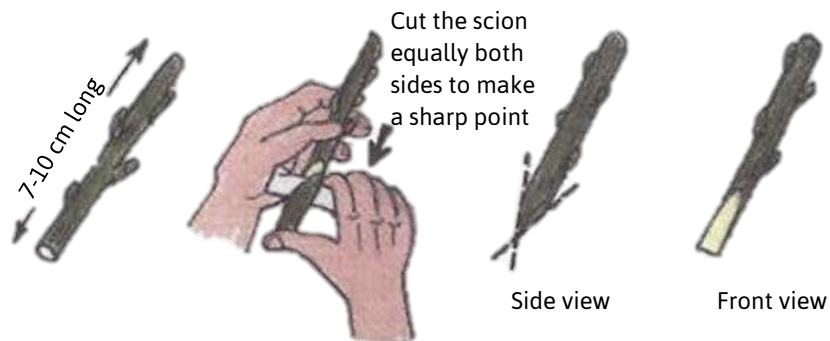
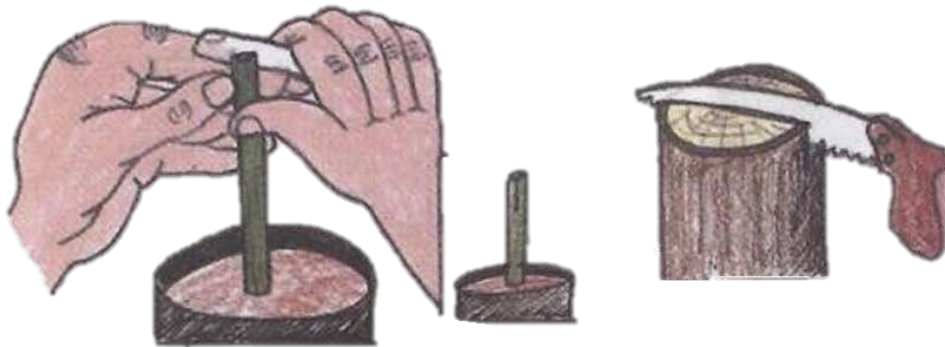


1. Insert the scion onto the rootstock.
2. Ensure the cambiums line up.
3. Wrap tightly with plastic wrapping.
4. After the scion begins to grow, cut off the rootstock above where it was grafted.

Crown Grafting



Rootstock Preparation



1. Insert the scion in the rootstock.
2. Line up the cambium layers
3. Wrap tightly the plastic

Use wax to seal the grafts for larger trees

Module 12: Facilitator's Notes



The facilitator should use the following pages to note down any questions or findings from the group that should be kept for or addressed at a later time. Depending on the module this may include species selection by group, crops identified in seasonal calendars, or anything else that should be noted.



Module 13: Advanced Optimization



Goal

Farmers will adopt advanced optimization techniques to increase production efficiency.

Learning Objective

1. Learn new soil and water conservation techniques for sloped land, such as: terraces, boomerang berms, diversion swales.
2. Understand interactions among plants and how to group them into guilds.

Venue and Timing

This module should be given during the beginning of year four. The training should be held at a Forest Garden that has slope, if possible, in order to demonstrate using an A-frame and finding contour lines.

Relevant Technical Manual Chapters

Before this training event, the facilitator should read, review, and thoroughly understand the following chapters and sections in the Technical Manual:

- Chapter 1: Introduction to the Forest Garden
- Chapter 2: Phased Approach
- Chapter 5: Agroforestry Technologies (Contour Planting section on making an A-frame)
- Chapter 15: Optimizing Your Forest Garden Understory

Preparation

- Determine which months each module (and flexible activities where relevant) are to be facilitated using the table in Activity 5.
- Locate copies of top view map and seasonal calendar for the chosen field, if available.
- Identify various plants that make up two to three different types of guilds appropriate for the group being trained.

- Update the farmer group MoU for the year, to be signed at the end of the workshop.

Supplies

- If the original copies of the top view map and seasonal calendar are damaged: print copies of top view map and seasonal calendar or redraw on flipchart paper.
- Materials for A-frame: 3 pieces of wood/metal/poles about 1 to 1.5 meters long, 1 piece of wood/metal/pole about 1 meter long, string, rock, level (optional), nails and hammer (optional). Sticks to mark off contour lines.
- Shovel
- pick axe
- 2 copies of the Farmer Group MoU for the upcoming year (to be signed by the farmer group attending the workshop)
- Participant Farmer List template
- Roll of flipchart paper and tape
- Markers of various colors

Total Time

3-4 hours

Handouts in Farmer's Workbook

- Seasonal Harvest Calendar
- Guild Example
- Advanced Soil and Water Conservation Techniques
- Optimizing Your Forest Garden

Module 13: Advanced Optimization

Summary of Activities

Opener: Walk the field and recall top view map (30 min)

- Walk around the host farmer's Forest Garden
- Debrief and review top view map to identify gaps

Activity 1: Side view mapping the field (1 hour)

- Review side view mapping
- Small groups create side view maps of the Forest Garden
- Small groups present side view maps and select the best one

Activity 2: Seasonal crop calendar (30 min)

- Review seasonal calendar from previous year
- Update seasonal calendar from previous year
- Discuss gaps in harvesting during seasonal calendar

Activity 3: Design a guild (1 hour)

- Explain the different functions of plants in a guild
- Farmers sort plants into different categories
- Small groups design a guild

Activity 4: Advanced earthworks techniques (2 hours)

- Review earthworks techniques
- Review how to make an A-frame and how to find the contour line
- Demonstrate and practice advanced earthworks techniques

Activity 5: Plan year four activities (30 mins)

- Discuss year four plans for the group
- Read and discuss Memorandum of Understanding
- Sign Memorandum of Understanding
- Update Participant Farmer List

Take Home Activity 6: Advanced soil & water conservation techniques (15 min)

- Discuss techniques participant farmers will adopt to optimize their Forest Gardens
- Use advanced soil and water conservation techniques in your Forest Garden
- Follow-up

Opener: Walk the Field and Recall Top View Map

Description

Farmers walk around the field and recall the top view maps they created the previous year in the Field Optimization module. Then the facilitator leads a discussion around gaps in the horizontal structure of the Forest Garden and the types of plants to add to fill those gaps.

Instructions for Farmers

1. Walk around the host farmer's Forest Garden

We will walk around the field and observe what is planted. Think about the following questions as you walk around the Forest Garden.

- What Forest Garden components and techniques do you observe?
- What has the farmer done well?
- What could be improved? How?
- Did you see any erosion problems? What could you do to keep more soil and water in the Forest Garden?

2. Debrief and review top view map to identify gaps

Last year we drew a top view map of this Forest Garden. Let us look at it to see how the field has changed over the past year.

- Where did you see gaps in the Forest Garden based on the top view map?
- What do you want the field look like in 5 years?

Activity 1: Side View Mapping of the Field

Description

Small groups create a side view map of the Forest Garden. Then the facilitator leads a discussion around gaps in the vertical structure of the Forest Garden and the types of plants to add (ground cover, shrubs, tall timber trees) to fill those gaps.

Instructions for Farmers

1. Review side view mapping

Last year we created a side view map to show the different layers of plants in the garden as we see them while walking along a straight line through the Forest Garden, called a transect walk. We will do the same activity today to see how the Forest Garden has changed over the last year.

- What are the different layers of plants in a Forest Garden? (1. Root layer 2. Ground cover layer 3. Herbaceous layer 4. Bush-Shrub 5. Small tree layer 6. Large tree layer 7. Climber)

2. Small groups create side view maps of the Forest Garden

In your small group, come to collect flip chart paper and markers. Take 30 minutes to draw side view maps of the Forest Garden.

3. Small groups present side view maps and select the best one

Each group will come to the front and present your maps of the host farmer's Forest Garden. Then we will choose the maps will think best represent the Forest Garden.

- Are there any gaps in the vertical structure of the Forest Garden?

Activity 2: Seasonal Crop Calendar

Description

The facilitator reviews the seasonal calendar from the previous year and revises it to show when different plants in the Forest Garden are ready to harvest. This exercise helps the farmers visualize the times of year when the Forest Garden is not producing.

Instructions for Farmers

1. Review seasonal calendar created in Field Optimization workshop

We will review the seasonal calendar for the Forest Garden that we created last year to show what crops you can harvest at different times of the year.

2. Update seasonal calendar

Call out the plants in the Forest Garden that have been added since last year. I will write the name/draw a picture on the flip chart paper. Let's now fill in the calendar with check marks to show when you can harvest each of the different crops from your Forest Garden.

- What new crops did the farmer plant in the last year to optimize the use of time in the Forest Garden?

3. Discuss gaps in seasonal calendar

- What time of year does the Forest Garden produce the most?
- What time of year does the Forest Garden produce the least?
- Do all plants need to produce food or income? Or is it good to include plants that provide benefits to your productive plants?
- What plants can you add to your Forest Garden to harvest during the slow months? When do you harvest them? (think about the various layers discussed in Activity 1 as well)

Activity 3: Design a Guild

Description

The facilitator explains the concept of a guild and small groups design guilds to show how plants in their Forest Gardens work together to optimize use of space and sustainability.

Instructions for Farmers

1. Explain the different functions of plants in a guild

A guild is a grouping of complementary plants that grow well together and can become more productive than if they were on their own. As a healthy forest is one of the most productive ecosystems on Earth, we aim to mimic natural forests when designing our Forest Gardens. When planting a guild there are several things to keep in mind:

- Nature plants in steps: Large plants depend upon the smaller plants around them.
- Nature always plants a variety: Observe the large diversity of plant life that occurs in an undisturbed forest; each plant has a specific purpose.
- Nature “stacks” plants in both time and space: When you walk through a forest you see many layers of plants growing together using different spaces from below ground to the highest levels, and becoming active or dormant at different times of the year.
- The different functions of plants in a guild are:
 - o Food Staples - legumes, fruits, vegetables, and fats (e.g. seeds and nuts)
 - o Food for the soil - legumes and organic matter that provide nutrients to the soil
 - o Climbers - important for making the most of vertical space
 - o Supporters - plants that provide support to climbers
 - o Miners or diggers - deep roots or tubers that open the soil and bring up nutrients from deep below the surface
 - o Groundcovers - protects soil, provides shade, holds moisture, and suppresses weeds
 - o Protectors - protection for others in the system (e.g. repellents, attractors, etc.)

2. Farmers sort plants into different categories

I have pictures of crops that are common in your Forest Gardens. I will hand these out and then I want to hear from you about the plant you are holding and how it functions in a guild.

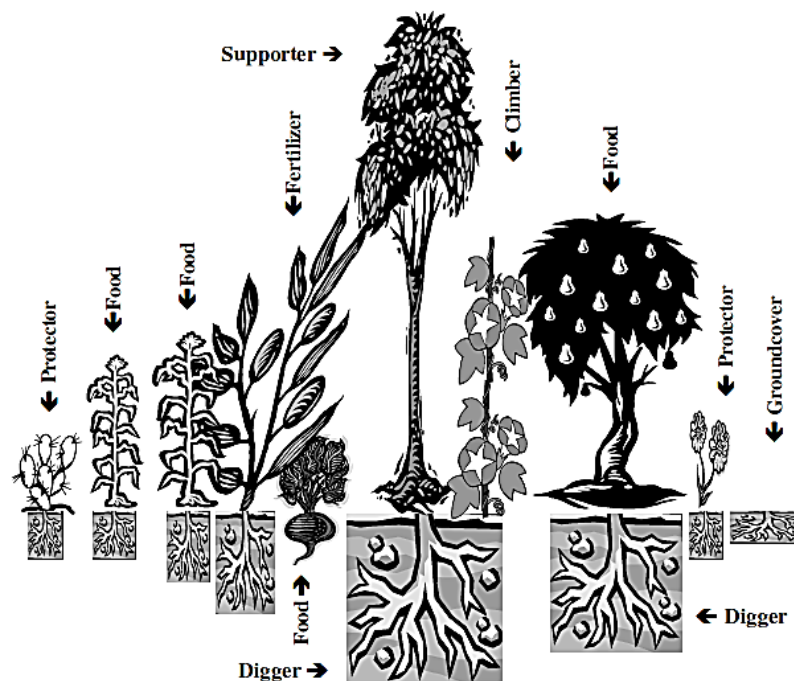
- What is the function of your plant?
- Where does the plant fit in the vertical space of the Forest Garden?
- What are good companions for your plant?

3. Small groups design a guild

When you optimize your Forest Garden you are creating guilds of plants that grow well together to best use the space in our field. Go and stand with farmers holding plants that would work well with your plant in a guild.

- Why did you put those plants together in a guild?
- How are you using vertical space?
- How are you using horizontal space?
- What time of year can you harvest in your guild?

Figure 1: Example of a guild in a Forest Garden



Activity 4: Advanced Earthworks Techniques

Description

The facilitator reviews construction of an A-frame and how to use an A-frame to find the contour lines on the field in order to construct earthworks such as terraces, boomerang berms and diversion swales to mitigate erosion.

Instructions for Farmers

1. Review earthworks techniques

We learned about the 4 S's of water control. Today will learn more techniques to help stabilize the soil.

- What factors influence soil erosion? What are the 4 S's of water control?
- How do you slow water? How do you stop water?
- How do you sink water? How do you spread water?
- How does mulch help to conserve water?
- If the land is sloping, how do you know where to construct SWC structures? How do you know where to plant?

2. Review how to make an A-frame and how to find the contour line

If your field is sloping, then water can quickly wash the soil away. The steeper the slope, the faster the water (and soil) will move. You can use an A-frame to find contour lines to determine where to plant in your garden to reduce erosion and allow more water to sink into the ground. You will mark the contour lines with sticks.

- How do you build an A frame? How do you find a contour with an A frame?

3. Demonstrate and practice advanced earthworks techniques

Once you find the contour lines you can shape the soil and/or add plantings to reduce erosion.

- What are living contour barriers? What are some plants that can be used as living contour barriers?
- What are contour berms? What are some materials that can be used as non-vegetative contour barriers?
- What are terraces?
- What are advantages and disadvantages of living contour barriers, contour berms, and terraces?
- How can we make contour berms more effective/stable? How do we form contour berms if trees are already planted along the contour line?
- What techniques can we use to direct water toward our trees? (cuvettes, boomerang berms) What are diversion swales?

Activity 5: Plan Year Four Activities

Description

Farmers discuss plans for year four, including the workshop schedule, and sign the Memorandum of Understanding.

Instructions for Farmers

1. Discuss year four plans for the group

I will tell you the training schedule for next year.

- How can you work together as a group to get the most out of your Forest Gardens?
- What are your interests and needs for Year 4? What are the priorities?
- What are the main crops you will plant next year as a group? Do you need to plant more agroforestry trees for your green walls? Fruit trees? Vegetables? Timber trees?
- What species will you focus on, and on average how much would each farmer hope to plant?
- What optimization and guild species should you plant?

I have prepared a schedule for when each module and flexible activity will be facilitated with over the course of Year 3. They are as follows:

Timing of Training Modules for Year 4

Module	Agricultural Calendar	Module Facilitation (month)
14. Pruning and Harvesting	At the end of the dry season	
15. Sustainability Planning	Four to six months before the Graduation	
16. Graduation Planning	About one month before the Graduation	

2. Read and discuss Memorandum of Understanding

I will read the Memorandum of Understanding (MoU), which you all will need to sign before we close the meeting today. We sign a new MoU each year, after reviewing the progress you have made on your Forest Garden in the previous year. An important part of the review involves an evaluation of each farmer's Forest Garden. It is important that everyone knows that your commitment to the project, which is demonstrated by adopting the skills and techniques you learn in the workshops, is a key criterion we look at when we decide to continue with the project for another year.

3. Sign Memorandum of Understanding

When everyone agrees on the terms, we will all sign the MoU. I will take a copy and I will leave a copy here with the lead farmer.

4. Update the Participant Farmer List (PFL)

Finally, I will pass around the Participant Farmer List sheet for farmers to fill in for year 4. If any farmers who were invited to participate in year four of the project are not present, the lead farmer will take the PFL and MoU to them to fill in and sign, and return the completed documents to the facilitator.

Take Home Activity 6: Adopt optimization and soil and water conservation (SWC) techniques in Forest Gardens

Description

Farmers construct earthworks such as contour berms, boomerang berms and diversion swales to mitigate erosion on their Forest Gardens.

Instructions for Farmers

1. Discuss techniques participant farmers will adopt to optimize their Forest Gardens

Each farmer should stand up and mention two changes you plan to make to your Forest Garden in the next year.

- How will you apply the strategies you learned today to your field?
- How is your field similar or different from our host's field?
- What perennials do you want to add to your Forest Garden?
- What other trees do you want to add to your Forest Garden?

2. Use advanced soil and water conservation techniques in your Forest Garden

Construct an A-frame and use it to find the slope on your field. Then build the appropriate soil and water conservation structures like contour berms, living contour barriers, swales, cuvettes, and boomerang berms to control how soil and water move through your Forest Garden.

Follow-up

The lead farmer will visit participants to answer questions and provide guidance.

Evaluation Checklist for Skills Learned in Year 4



At the end of the year you will be evaluated on the following practices that you learned and discussed over the course of the project. Those in bold are topics that we discussed or practiced today. In demonstrating that you have completed the project criteria, you will receive Master Forest Gardener Certification at the end of the year.

YEAR 4 Evaluation Criteria

- Green Wall
 - o Fully surrounding the Forest Garden site
 - o Gaps replanted
 - o Well-managed
 - o Dead fence surrounding green wall if still needed (for all projects where this is determined to be a requirement)
- Alley Cropping and/or Contour Planting
 - o Optimum number planted
 - o Gaps replanted
 - o Well-managed
- Fruit Trees
 - o At least 4 species planted
 - o At least 2 species grafted
 - o Well-pruned
- Timber Trees
 - o At least 2 species planted
 - o Proper spacing between trees planted
 - o Each tree is weeded and mulched
- Compost
 - o Three active piles
 - o Well-managed
- Permagarden
 - o Multiple species
 - o Amended beds
 - o Demonstrated use of the 4 S's
 - o Perennials maintained on berms
- **Optimization**
 - o **Optimum number of fruit trees planted**
 - o **Optimum number of timber trees planted**
 - o **Demonstrated use of guilds**
 - o **Demonstrated use and explanation of at least 5 IPM measures**
 - o **Ground cover planted among fruit and timber trees**
 - o **Demonstrated use of soil and water conservation measures**

Module 13: Facilitator's Notes



The facilitator should use the following pages to note down any questions or findings from the group that should be kept for or addressed at a later time. Depending on the module this may include species selection by group, crops identified in seasonal calendars, or anything else that should be noted.



Module 14: Pruning and Harvesting Trees



Goal

Farmers will learn and practice pruning and harvesting methods that follow best practices to sustainably manage trees and harvest fruit, fodder, fuelwood, fertilizer and timber.

Learning Objective

1. Understand the benefits of pruning.
2. Learn pruning best practices for different types of trees to enhance tree health and increase yields.
3. Learn best practices for harvesting seeds and fruit.
4. Learn best practices for storage of seeds, fodder, and fruit.

Venue and Timing

This module should be given at the end of the dry season. The training should be held at a Forest Garden that has a variety of pruning needs and some mature, fruiting fruit trees.

Relevant Technical Manual Chapters

Before this training event, the facilitator should read, review, and thoroughly understand the following chapters and sections in the Technical Manual:

- Chapter 4: Seeds
- Chapter 11: Pruning, Harvesting, and Tree Management
- Chapter 12: Cut and Carry Livestock Management

Preparation

- Walk through the host farmer's field to identify and mark trees to prune.
- Ask participants to bring sharpened machetes.

Supplies

- Pruning tools: freshly sharpened machetes (one per 5 participants)

Total Time

3-4 hours

Handouts in Farmer's Workbook

- Pruning Best Practices
- Pruning Foliage
- Pruning for Fertilizer
- Seed Collection and Observation Chart

Module 14: Pruning and Harvesting Trees

Summary of Activities

Opener: Field visit (30 mins)

- Walk around the field and discuss characteristics of the most productive fruit trees

Activity 1: Why prune and train? (30 mins)

- Discuss benefits of pruning

Activity 2: Pruning and harvesting agroforestry trees (1 hour)

- Review tools needed for pruning
- Review best practices for pruning and harvesting fuel, fodder and fertilizer from agroforestry trees
- Farmers practice pruning agroforestry trees

Activity 3: Pruning fruit trees (1 hour)

- Facilitator demonstrates how to prune fruit trees
- Farmers practice pruning fruit trees

Activity 4: How to harvest and store fruit (30 mins)

- Discuss characteristics of quality fruit for the market
- Review best practices for harvesting and storing fruit

Activity 5: Collecting and Storing Tree Seeds (30 mins)

- Why collect and save seeds?
- Which seeds to collect?
- Discuss collecting and storing tree seeds

Take Home Activity 6: Prune your Forest Garden (15 mins)

- Prune agroforestry and fruit trees in your Forest Garden
- Follow-up

Opener: Field Visit

Description

Farmers visit the field to observe fruit trees and discuss which ones are more productive and why.

Instructions for Farmers

Walk around the field and discuss characteristics of the most productive fruit trees

Let us go to the field and look at the fruit trees. Some fruit trees produce more than others.

- Which fruit trees are most productive?
- Where are those trees located in the field?
- Why do some trees produce more fruit?
- Do you want fruit trees to grow as tall as possible?
- If the tree has lots of branches, will it produce more fruit?

Activity 1: Why Prune and Train?

Description

The facilitator leads a discussion on the benefits of pruning and training for improving the health and productivity of a tree.

Instructions for Farmers

1. Discuss benefits of pruning

After a tree is outplanted in the field it still requires care. Some species, like most fruit trees, require a lot of maintenance to keep them healthy and productive. Others, such as green wall species, require just a little annual maintenance. Pruning is an essential part of this maintenance for all trees planted for a purpose. Improper pruning can hurt the tree, but proper pruning will greatly enhance the tree's usefulness and health.

- How can pruning improve the health of the tree?
- How can pruning help the tree grow?
- Why is it important to prune a grafted tree?
- How can pruning improve the productivity of the tree?
- Why do you prune agroforestry trees? (create green wall, encourage straight shoots, reduce competition and prevent overshadowing, harvest fuelwood/fodder/fertilizer)
- Why do you prune fruit trees? (shaping when young, shaping when established, disease, sunlight and airflow)
- How can pruning hurt the tree or decrease productivity?
- What is training? Why do you train the branches of fruit trees?

Activity 2: How to Prune and Harvest Agroforestry Trees

Description

The facilitator shows the farmers the appropriate tools used for pruning and reviews how to prune agroforestry trees. Then farmers will practice pruning agroforestry trees in the field while the facilitator supervises.

Instructions for Farmers

1. Review tools needed for pruning

Having the right tool is important so that you can make cuts to the tree without damaging it.

- What tools do you need for pruning?
- When do you use the different tools?
- Why is it important to keep your tools sharp?
- Why is it important to keep your tools clean, especially when pruning away diseased branches?

2. Review best practices for pruning and harvesting fuel, fodder and fertilizer from agroforestry trees

- How and when should you prune your green wall?
- How should you prune your alley crops/contours? Which parts of the tree do you prune? At what angle do you cut?
- When should you prune your alley crops/contours? What time of year?
- How should you harvest fuelwood? Where do you cut? At what angle do you cut?
- When should you harvest fuelwood?
- How should you harvest fodder? Which parts of the tree do you harvest? Where do you cut? At what angle do you cut?
- When should you harvest fodder? What time of day?
- How can you store fodder?
- How should you harvest leaves/stems for green fertilizer? How do you use the tree for fertilizer?
- When should you harvest for green fertilizer?
- What are other ways you can harvest and use the leaves and stems from the trees?

3. Farmers practice pruning agroforestry trees

Form small groups of 3 or 4 people and come collect pruning tools. Your group will start by pruning agroforestry trees in the Forest Garden. I will walk around to inspect your work and answer questions.

Activity 3: How to Prune Fruit Trees

Description

The facilitator demonstrates how to prune fruit trees. Farmers form small groups and practice pruning. Small groups tell the facilitator how and where they will make cuts on the tree before they start to prune.

Instructions for Farmers

1. Facilitator demonstrates how to prune fruit trees

Now let us go to the field and I will discuss tips and best practices for pruning, and demonstrate how to prune a fruit tree. When you prune a tree, you start by looking at the tree and deciding which branches you want to cut.

- Which trees need pruning? Why?
- What types of pruning are there, and what times of year do you do each type?
- Which branches on the tree should be pruned? Why?
- Where on the tree do you cut?
- At what angle do you cut? Why do you cut at an angle?
- How do you prune larger branches?
- How often should you prune fruit trees when they are young? How often should you prune fruit trees when they are mature?
- How do you shape a young fruit tree?

2. Farmers practice pruning fruit trees

Now you will practice pruning fruit trees in the Forest Garden in the same small groups. Discuss with your group where and how you will prune the tree. Call me over to tell me your pruning plan before you start cutting the tree. I will walk around to inspect your work and answer questions.

Activity 4: How to Harvest and Store Fruit

Description

The facilitator reviews best practices for harvesting and storing fruit in order improve quality and price in the market.

Instructions for Farmers

1. Discuss characteristics of quality fruit for the market

When you go to the market, do you see some fruits that look nicer than others? Do those fruits sell better than the ones that don't look nice?

- What is considered good quality for the fruit you are growing?
- How does harvesting affect quality?
- How does storage affect quality?

2. Review best practices for harvesting and storing fruit

Using the proper techniques for harvesting and storing your fruit is important to make sure you get the best price in the market.

- When is the best time to harvest fruit from the tree?
- How ripe should the different fruits you grow be when harvesting them?
- How do you harvest?
- What tools do you use to harvest?
- What type of container do you use for storage?
- Where do you store the fruit?

Activity 5: Collecting and Storing Tree Seeds

Description

Farmers discuss the benefits of collecting and saving tree seeds to plant in their Forest Garden and the facilitator explains best practices for seed collection and storage.

Instructions for Farmers

1. Why collect and save seeds?

As part of the training program TREES provided you with many of the tree seeds you needed in your Forest Garden. In the future, you will need to collect and store seeds on your own in order to plant more agroforestry, timber and fruit trees in your Forest Garden because seeds are not always available for purchase in the market.

- What are benefits to collecting your own seed? (free, you know it is stored well, you can sell them)
- What are characteristics of trees that are good for seed? (good health, high-quality production, high-quantity production, good form, adapted to local environment, mature) Why save and store seeds? (trees don't always produce seeds when you need them)

2. Which seeds to collect?

You should collect seeds that are suited to the local environment and provide benefits to your Forest Garden.

- Which species do you want to plant in your Forest Gardens?
- Are seeds for those species available in the market?
- What time of year does that tree produce seed?
- When are most agroforestry tree seeds available?
- Are any farmers or groups currently selling tree seeds in the community?
- Who is buying seeds? What types of seeds are they buying?

3. Discuss best practices for collecting and saving seeds

Now that we have discussed which tree seeds to collect, let us review the best practices for collecting and storing those types of seeds.

- How can you increase genetic diversity in your stored seeds? (multiple mother trees, select trees throughout growing range, select trees growing among other healthy trees, select mother trees at least 100 meters apart)
- How do you know the seed is ready for collection? What tools do you need for seed collection? What are the benefits of collecting seeds from the ground? What are the benefits of collecting seeds from the tree?
- How do you extract the seeds from the pod?
- Does this type of seed remain viable for a long time? (orthodox or recalcitrant)
- Do you need to dry the seeds and how? How do you store the seeds?

State:		Zone:		Community:	
		Tree Species			
Observation Date					
	Growth Cycle State & Notes at Time of Observation (e.g. dormant, leafing, flowering, seeding, etc.)				

Figure 1: Seed Collection and Observation Chart

Take Home Activity 6: Prune your Forest Garden

Description

Farmers prune the agroforestry and fruit trees in their Forest Garden, under the supervision of the lead farmer.

Prune agroforestry and fruit trees in your Forest Garden

When you go back to your farm, walk through your field and assess which trees need pruning. Make sure to properly sharpen your tools and decide where to cut before you start pruning. The lead farmer will visit you to supervise and help you with pruning.

Follow-up

The lead farmer will visit participants to answer questions and provide guidance on pruning.

Evaluation Checklist for Skills Learned in Module 14



At the end of the year you will be evaluated on the following practices that you learned and discussed over the course of the project. Those in bold are topics that we discussed or practiced today. In demonstrating that you have completed the project criteria, you will receive Master Forest Gardener Certification at the end of the year.

Year 4 Evaluation Criteria

- Green Wall
 - Fully surrounding the Forest Garden site
 - Gaps replanted
 - Well-managed
 - Dead fence surrounding green wall if still needed (for all projects where this is determined to be a requirement)
- Alley Cropping and/or Contour Planting
 - Optimum number planted
 - Gaps replanted
 - Well-managed
- **Fruit Trees**
 - **At least 4 species planted**
 - **At least 2 species grafted**
 - **Well-pruned**
- **Timber Trees**
 - **At least 2 species planted**
 - **Proper spacing between trees planted**
 - **Each tree is weeded and mulched**
- Compost
 - Three active piles
 - Well-managed
- Permagarden
 - Multiple species
 - Can discuss at least 4 IPM measure applied
 - Demonstrated use of the 4 S's
- Optimization
 - Optimum number of fruit trees planted
 - Optimum number of timber trees planted
 - Demonstrated use of guilds (beneficial plant associations/polyculture patches)
 - Demonstrated use and explanation of at least 5 IPM measures
 - Ground cover planted among fruit and timber trees

Module 14: Facilitator's Notes



The facilitator should use the following pages to note down any questions or findings from the group that should be kept for or addressed at a later time. Depending on the module this may include species selection by group, crops identified in seasonal calendars, or anything else that should be noted.



Module 15: Sustainability Planning



Goal

Farmers will make a plan to work collectively to decrease costs and increase profits.

Learning Objectives

1. Learn how to identify key actors and structure of value chains.
2. Understand the benefits of collective buying and selling.
3. Learn to identify the challenges to working as a group and ways to mitigate them.
4. Learn how to create a sustainability plan.

Venue and timing

This workshop can be held at any location with adequate seating and shade.

Preparation

- Draw blank tables on flip chart paper: “Challenges for farmer-based organizations,” “Farm input needs,” “Potential buyer table,” and “Sustainability planning table.”

Supplies

- Flip chart paper, markers
- Value chain actor cards
- Print out of donkey collaboration picture

Total time

3-4 hours

Handouts in Farmer’s Workbook

- The Value Chain, Donkey Metaphor for Collaboration
- Challenges for Farmer Based Organizations
- Farm Inputs
- Potential Buyers
- Sustainability Plan

Module 15: Sustainability Planning

Summary of Activities

Opener: Human value chain (45 mins)

- Recall crops the group plans to sell together
- Explain a value chain and discuss the roles of value chain actors
- Create a human value chain
- Discuss the agricultural value chain

Activity 1: Why should we collaborate (30 mins)

- Discuss the donkey metaphor for collaboration
- Discuss the benefits of forming a farmer group

Activity 2: Collective input needs (1 hour)

- List input needs
- Discuss options for reducing input costs

Activity 3: Market opportunities

- Discuss the quality, volume and prices for different types of buyers
- List potential buyers for the crop the group is selling collectively

Activity 4: Create a group sustainability plan (1 hour)

- Identify priorities
- Create a sustainability plan
- Select a person to lead the group in marketing

Opener: Human Value Chain

Description

This activity helps participants understand the many parts of the value chain.

Instructions for Farmers

1. Recall crops the group plans to sell together

Today we will talk more about working together as a group to purchase the inputs you need for your farms and to sell what you produce together.

- Which vegetable crops will you sell collectively?
- Which tree crops will you sell collectively?
- Are there other products you plan to sell collectively?
- How can you get the highest prices for what you sell?
- Can you add value to any of these products? How?

2. Explain a value chain

Many people are involved in getting you the supplies you need to grow your crops and getting your crops to the people who will buy them. We will discuss the concept of a value chain and talk about where you fit in the value chain for one of the crops the group plans to sell collectively.

What is a value chain?

3. Hand out the value chain actor cards and discuss the different roles

I will hand out cards of different people in the value chain. Then each of you will tell us the role of the person on your card.

- How does a product go from seed to market?
- Who are all the people involved?
- Where do those people live and work? (the capital? A port town? The central town? The village?)
- What are the roles of the different actors in the value chain?

Value Chain Cards

The 14 actors in this value chain game include the individuals listed below. Feel free to replace the general names with the names of actual market actors.

- Input dealer
- Farmer (member of a group)
- Farmer (not in a group)
- Local trader
- Mill/Processor

- Consumer
- Urban supermarket
- Wholesaler
- Transporter
- Financial institution
- Exporter
- Extension officer
- Large-scale buyer
- Local rural market

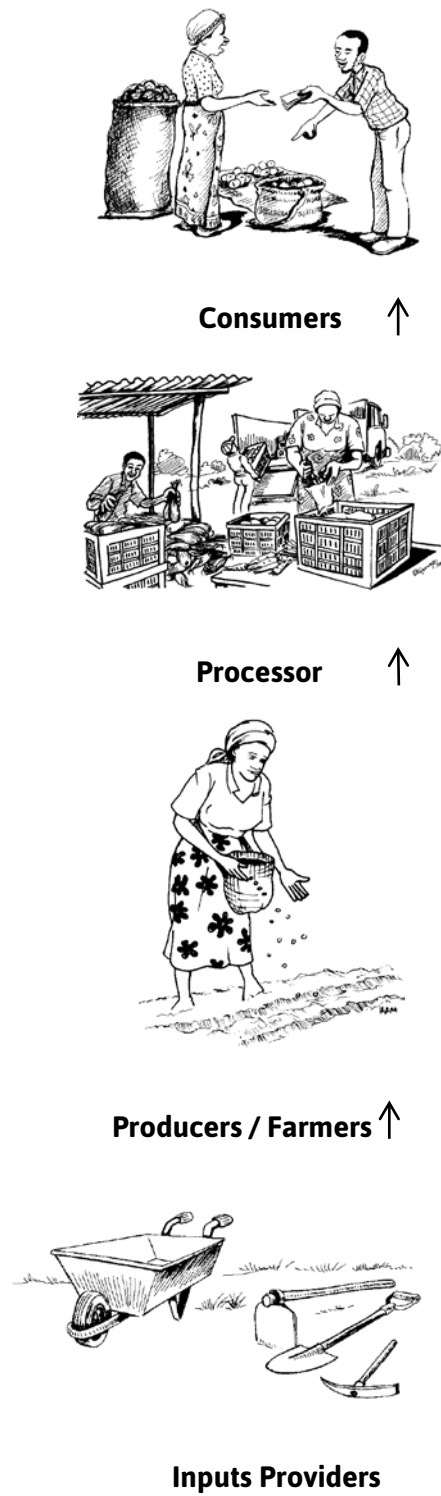
4. Participants create a human value chain

Each of you represents the actor described on the card you are holding. Standing in a line, place a hand on the shoulder of the person to whom you sell your products or provide a service. Once everyone is in the correct order, I will draw the value chain on flip chart paper.

5. Discuss value chain

- Where are you located on the value chain?
- What does this say about the need for many value chain actors to work together?
- What does this tell you about potential markets for your products?
- Besides selling to the value chain actor directly above you (or on whom you placed your hands during this activity) which other actors might you be able to sell to if you form a group? What would it take in terms of quantity and quality for you to be able to sell to them?
- What happens if you can't deliver on the quantity or quality of product you promised in a contract?

Figure 1: A simple, generic Value Chain



Activity 1: Why Should We Collaborate?

Description

Using the picture of donkeys, the facilitator helps farmers create a list of six specific ways that they can work together to increase profit.

Instructions for Farmers

1. Discuss the donkey metaphor for collaboration

Take a look at the picture of the two donkeys.

- What do you see in this picture?
- What happened when the donkeys were working against each other?
- What happened when the donkeys were working together?

2. Discuss the benefits of forming a farmer group

Cooperation can make challenging and time-consuming tasks manageable; it is the foundation on which farmer groups are formed and it is the basis on which different farmer groups can work together.

- Is anyone here a member of a group other than this one? (women's group, savings and loan group, water committee, religious group)
- What are some benefits to joining a group?
- What are some benefits specific to a farmer group? (examples: renting/sharing equipment, bulk purchasing of inputs, bulk storage, marketing, sharing information, training, sharing transportation costs)
- What are challenges to being in a group? (use black chart below) (examples: side selling, poor quality, low participation)
- What are the reasons for those challenges?
- What can you do to plan for these risks before they become issues? How can you mitigate these issues? (Rules? Agreements? Protocols?)

Figure 2: Donkey metaphor for collaboration

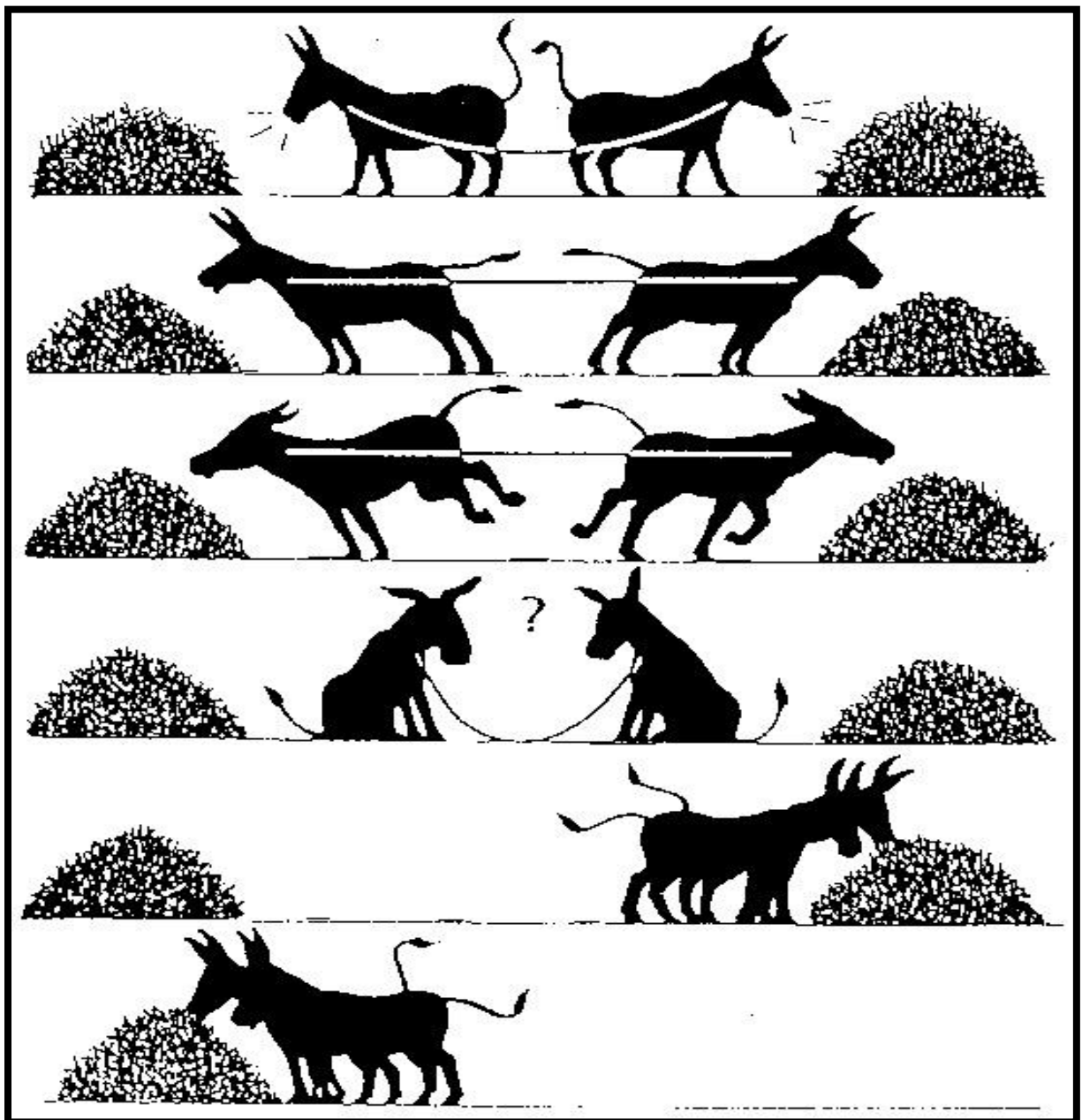


Figure 3: Challenges for farmer based organizations

Challenge	Reasons for happening?	What can we do?

Activity 2: Collective Input Needs

Description

Farmers list the needs for their Forest Garden: seeds, fertilizer, tools, etc., and discuss how forming a group could reduce input costs.

Instructions for Farmers

1. List input needs

What are the different inputs you need for your Forest Gardens? Mention all of the inputs you use in your Forest Gardens, including things like seeds, planting materials, tools, equipment, transport, labor, etc., and I will write them on the flip chart.

2. Discuss options for reducing input costs

- How can you reduce some of these costs?
- From the list we came up with, which can you purchase in bulk as a group, or undertake collectively, to reduce cost?
- Which can you purchase for the group and share (i.e. equipment)? How can you help each other reduce costs (i.e. shared labor)?
- What other linkages to actors in the value chain does the group need? To people in government? Anyone else?

Figure 4: Farm Inputs

Inputs	Quantity Needed	Benefit from collective action? (yes/no)	How do we purchase it?

Activity 3: Market Opportunities

Description

Farmers discuss the different buyers for their product and the desired quality, quantity and price for each. The facilitator starts with a blank table and recreates it with the participants while explaining each column (Buyer, Volume, Quality, etc.).

Instructions for Farmers

1. Discuss the quality, volume and price for different types of buyers

For the next activity we will discuss market opportunities for the products you are selling or would like to sell as a group. We will talk about quality, volume and price for those product(s). What are the products you are selling collectively?

Quality: Increasing quality of your products starts with what you do in the field. Every step of processing, cleaning, storing and transporting affects quality.

- What do you consider to be high quality for your product?
- How do you know which is high quality and which is not?
- Which of your buyers pay a higher price for higher quality?
- Which buyers accept lower quality?
- Is your product high quality or low quality?

Price: The rules of supply and demand are the largest influence on price, but you can negotiate and find ways to sell at a higher price.

- What is the difference in price when you sell directly from your farm instead of taking the product to the market?
- How do you know what prices to ask for?
- Do you sell higher quality products for a higher price?
- Do you sell lower quality products sell for a lower price?
- What is a low price for you?
- What do you consider a high price?

Volume: Buyers operate at different levels of volume. Some will only buy large amounts, while others will make smaller purchases.

- What is a large volume for you?
- What do you consider to be a small volume for sale?
- What is your preferred size of order? Why?

2. List potential buyers for the crop the group is selling collectively

Fill out the table on the flip chart as follows:

Put a ↓ in boxes for high quality, large volumes or higher price.

Put a ↑ in boxes for low quality, low volumes or lower prices.

Put a – in boxes for moderate quality, moderate volumes or moderate prices.

- Which market opportunities are feasible based on cost? Based on distance?
- Which market opportunities should you pursue?

Figure 5: Potential buyer table

Buyer	Location	Quality	Volume	Price

Activity 4: Create a Group Sustainability Plan

Description

The group makes a sustainability plan to meet members' input needs and increase access to markets. Part of this activity can be completed during the next group meeting, depending on time needed.

Instructions for Farmers

1. Identify top priorities

Refer to the list of input needs and potential sellers and identify the action items the association should pursue, and key people to reach out to in order to benefit your members and improve your market access.

2. Create a sustainability plan

You will develop a sustainability action plan that will identify the task, who is responsible for the task, when they will complete the task, and how much the task will cost.

3. Select a person to represent the group

Once you have created your sustainability plan, select who you want to attend a meeting to represent your group and present your sustainability plan to other groups. During that meeting, your group leaders will plan a graduation ceremony to celebrate your successful completion of the Forest Garden Certification Program.

Note: At the end of this module is a Cooperative Bylaws Template. If the farmer group has not developed bylaws, this template can be used.

Figure 6: Sustainability planning table

Action item:			
Task	Who	When	Cost
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

Cooperative Bylaws Template

This template has been modified slightly from the original version available on http://cultivate.coop/wiki/Cooperative_Bylaws. It has been changed to be applicable internationally.

I. **Mission, purpose, and legal structure**

This section often includes the cooperative's mission statement, vision statement, or stated purpose. This is also a good place to restate the information outlined in the Articles of Incorporation. The Bylaws should agree with the Articles, but you may wish to include this useful phrase:

"The articles of incorporation are hereby made a part of these bylaws. In case of any inconsistency between the articles of incorporation and these bylaws, the provisions of the articles of incorporation are controlling."

II. **Membership**

This section should describe each membership class (if more than one). For each membership class, outline who is eligible for membership, the requirements for membership, voting rights. Specify rules for suspension or termination of membership, including guidelines for returning member investments. Note that membership shares are often non-transferrable.

III. **Membership Meetings**

This section should address the details of annual (or periodic) general membership meetings. Such details may include:

- i. How often are regular membership meetings held? How is the agenda compiled? How is the time and location of the meeting announced?
- ii. How are special membership meetings called? How are special meetings announced?
- iii. What decision-making process is used? Consensus? Modified consensus? Majority vote? What percentage of participants must vote in favor in order to approve a decision? Do stand-asides affect the outcome? Possible "majority" thresholds include 50% plus 1, 66%, 75%, and occasionally greater percentages.
- iv. What number or percentage of members is needed for quorum?

IV. **Board of Directors:**

The "Board Directors" section should answer these questions:

- i. What is the minimum or maximum number of Board Directors? It may be useful to specify a range in the Bylaws, so the Board can grow if needed. Cooperatives often try to have an odd number of directors. Do you want the Board to reflect certain constituents? Many consumer-owned cooperatives strive to fill a certain number of seats with staff members.
- ii. How are Board Directors elected? How long are Board terms? Many cooperatives try to stagger terms, so that only about half of the Board seats are up for re-election at a time. This helps to ensure organizational stability and preserve institutional memory.
- iii. How are vacancies filled? Some cooperatives allow the Board Directors to fill vacant seats, while others require a special vote of the membership. Others offer vacant seats to runners-up from recent elections.
- iv. Under what circumstances can Directors be removed? What is the process for removing Directors? In cases of serious misconduct or negligence, suspension or removal may be automatic. In other cases, there may need to be a mechanism for empowering members to recall Directors or Board Decisions.

- v. Will Directors be paid for serving on the Board? If so, how much? Different governments have different statutes.
- vi. Do you wish to prohibit Board Directors from voting if they have a conflict of interest (such as compensation of officers)? Here is a useful phrase:
"It shall be the duty of all board directors to make prompt and full disclosure to the board of any personal, professional, or financial conflict of interest in a matter under discussion. When a conflict of interest is disclosed, the board member must not participate in the discussion or vote on the relevant issue."
- vii. How often are Board Meetings held? How will the time and location be communicated to members? Under what circumstances can emergency Board meetings be called, and how will they be announced?
- viii. What are the general duties of Board Directors? What is their relationship to the management, staff, and members?
- ix. What is the role of the management? Typically (co-)managers oversee daily operations in compliance with general guidelines set by the Board, and report to the Board of Directors.
- x. Will there be Board Committees? Should these be defined in the Bylaws? How are Board Committees formed? What are the limitations of Committees' decision-making power?

V. Board Officers

The Board may be required to designate a President / Chair, Secretary, Treasurer, and / or alternatives. Check your area's requirements, and outline the duties of each officer in subsections. Also specify how officers are designated (elected directly by the membership or chosen by Board Directors) and how long their terms last.

VI. Finances

Be sure to cover the following (check your government's statutes):

- i. How are net proceeds (both margins and losses) apportioned?
- ii. How are proceeds distributed?
- iii. What are your policies for patronage refunds and reserves?
- iv. Check the local government's code for guidelines for equity records. Cover equity redemption for terminating members, deceased members, and unclaimed equity.

VII. Administration and Miscellaneous

This section can include a variety of topics (organized into subsections). Topics may include when the fiscal year begins, what meeting process is used (Robert's Rules of Order, Butler's Formal Consensus, or another system detailed in a separate text that can be referenced by members), use of a corporate seal or logo, indemnification and insurance coverage for Directors, financial reviews, options for advisory councils and committees, and more. Separate sections can be created for these topics if desired.

VIII. Amendment to the Bylaws

It is important to state the procedure for amending the Bylaws. How does a Board Director or member propose an amendment? How is an amendment approved? (This often requires a period or special general membership meeting and a vote of the membership. Some cooperatives require that members petition for a special meeting and / or Bylaws change in order to demonstrate that their proposal has some support.)

IX. Dissolution

What procedures should be followed if the cooperative goes out of business? If members or Board Directors are interested in dissolving the cooperative voluntarily? How will remaining assets be divided?

Module 15: Facilitator's Notes



The facilitator should use the following pages to note down any questions or findings from the group that should be kept for or addressed at a later time. Depending on the module this may include species selection by group, crops identified in seasonal calendars, or anything else that should be noted.



Module 16: Graduation Planning



Goal

Representatives from farmer groups will identify ways to collaborate and plan the Trees for the Future Forest Garden training graduation ceremony.

Learning Objectives

1. Learn to plan an event or ceremony to commemorate the completion of the Forest Garden training program.
2. Motivate Forest Garden group leaders to plan and continue group activities after the completion of the training program.
3. Understand the benefit of inter-group collaboration.

Venue and timing

This workshop should be held at a location that is central to the farmer groups clustered in a geographic area.

Supplies

- Contact list for lead farmers
- Flip chart paper
- Markers

Total time

3-4 hours

Handouts in Farmer's Workbook

- Graduation Planning Checklist

Module 16: Graduation Planning

Summary of Activities

Opener: Group building ice breaker

- Congratulate farmers for completing the Forest Garden training and explain the purpose of the meeting
- Introduction and successes/challenges
- Ball and string challenge

Activity 1: Share sustainability plans

- Group representatives present sustainability plans

Activity 2: Opportunities to collaborate

- Discuss the donkey metaphor for collaboration
- Discuss the benefits of collaboration between groups

Activity 3: Plan graduation ceremony

- Explain Trees for the Future support for graduation
- Draft graduation program
- Discuss key lessons to share during graduation
- Create action plan for graduation ceremony

Opener: Group Building Ice Breaker

Description

Farmer group representatives will introduce themselves and share one success and one challenge their group encountered during the four-year Forest Garden training program.

Instructions for Farmers

1. Congratulate farmers for completing the Forest Garden training and explain the purpose of the meeting

Congratulations on successfully completing the entire four-year Forest Garden training program! Today you will meet with representatives from the other farmer groups in this area that also completed the program to talk about your plans for the future and to plan your graduation ceremony.

2. Introduction and successes/challenges

We will start by going around so that everyone can introduce yourself and then mentioning one success and one challenge you faced over the last four-year training program. I will start.

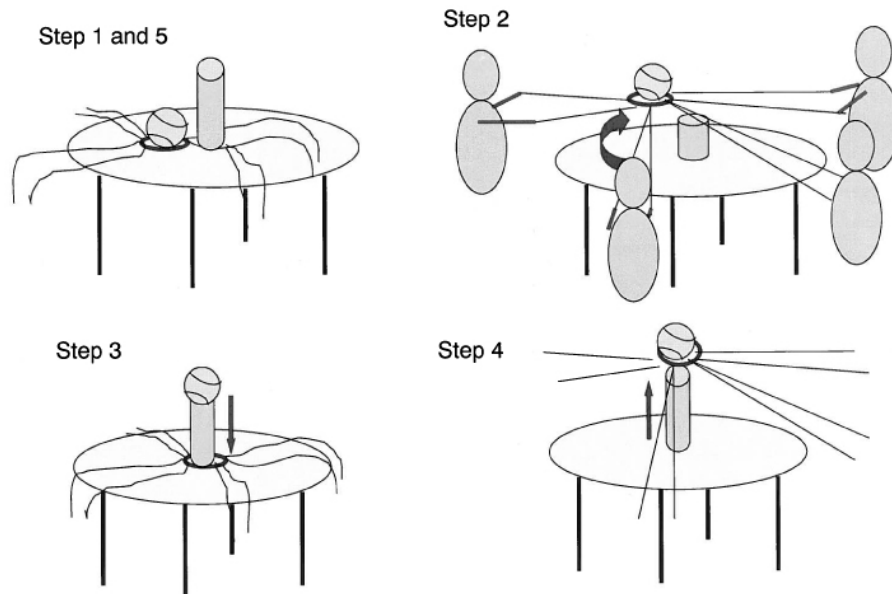
- In what way has your group been successful during the training program?
- What is a challenge your group faced during the training program?
- What training topics did you want to learn about that you didn't learn about?

3. Ball and string challenge

Now we will do a team activity. I have tied pieces of rope to this ring and set a ball on top. Each of you pick up one end of the rope and pull it tight so the string is stretched and the ball is still in the ring. Work together to move the ball over to the bucket without dropping it.

- What was challenging about this activity? What did you enjoy most?
- Communication is important to succeed. How did the group communicate during the activity?
- How did you work together?
- Did one person act as the leader?
- How did you make decisions about how to achieve your goal?
- What were some challenges?
- How can you use the lessons you learned here when working in a group?
 - o Challenge, don't belittle
 - o Innovate: create your own plans and come to your own conclusions, introduce your own plans for change
 - o Collaborate: draw answers from the group working together
 - o Celebrate: celebrate your accomplishments

Figure 1: Ball and string challenge



Activity 1: Share Sustainability Plans

Description

Farmer group representatives will present the sustainability plans their group created and get feedback from workshop participants and the facilitator.

Instructions for Farmers

1. Group representatives present sustainability plans

Each group created a sustainability plan during your last workshop. I would like the group representatives to come forward and present your group's sustainability plan. Then we will discuss your plan and other group representatives will provide feedback.

- How is the plan similar to the plan for your group?
- How is the plan different from the plan for your group?
- What is the group doing to access new market opportunities?
- What is the group doing to access new resources from businesses, NGOs or the government?
- What is the group doing to improve the quality of their product?
- What is the group doing to reduce their input costs?

Activity 2: Opportunities to Collaborate

Description

Farmer group representatives discuss common activities and opportunities for collaboration.

Instructions for Farmers

1. Discuss the donkey metaphor for collaboration

Take a look at the picture of the two donkeys. Remember this picture from your last training?

- What do you see in this picture?
- What happened when the donkeys were working against each other?
- What happened when the donkeys were working together?

2. Discuss the benefits of collaboration between groups

Cooperation is the foundation on which farmer groups are formed and it is the basis on which different farmer groups can work together.

- What does your group have in common with other groups you heard about today?
- Are you growing the same crops?
- Do you have similar input needs? (*use Farm Inputs table below*)
- How can your groups collaborate to sell your crops?
- How can your groups collaborate on input needs? Which can you purchase in bulk as a group to reduce cost? Which can you purchase and share (i.e. equipment)?
- How can your groups collaborate to access resources from businesses, NGOs or the government?
- What challenges might arise when collaborating with another group? (*use Challenges for farmer based organizations chart below*)
- What are the reasons for those challenges?
- What can you do to plan for these risks before they become issues? How can you mitigate these issues?

Figure 2: Farm inputs table

Inputs	Quantity Needed	Benefit from collective buying? (yes/no)	How do we purchase it?

Figure 3: Challenges for farmer based organizations

Challenge	Reasons for happening?	What can we do?

Activity 3: Plan Graduation Ceremony

Description

Farmer group representatives start to develop a plan and program for a graduation ceremony.

Instructions for Farmers

1. Explain Trees for the Future support for graduation

Trees for the Future is excited for your graduation ceremony that we will be hosting on your behalf soon, to recognize your commitment and success in establishing Forest Gardens. We have also provided a sample program based on the type of ceremony other groups have had.

2. Draft graduation program

Let us discuss a program for your graduation, based on the sample program.

- Who should we invite? Elected officials? Government agency representatives? Business representatives (i.e. buyers)? NGO representatives? Traditional leaders?
- Who will speak from the group? Which guests should we ask to speak?
- Do you want to have awards? What category of award? Examples:
 - o Best attendance: graduate who attended the most training workshops as documented in Facilitator's register.
 - o Outstanding leadership: graduate who gave the best support to the facilitator in terms of: farmer mobilization; and preparation for workshops and general logistics for meetings. (does not include lead farmer)
 - o Best technology adoption: graduate who best transferred and implemented learnt technology to his/her farm such as; soil erosion control, green wall and pest management.
 - o Outstanding participation: graduate who demonstrated the greatest spirit of cooperation and participated freely and willingly in all training activities.
- Do you want to have an exposition of farm products? Do you want to have prizes for the best of different types of produce from the Forest Garden?
- Do you want to have food and drinks? What kind?
- Can we do this with the budget we have?

3. Discuss key lessons to share during graduation

The graduation ceremony is an opportunity for you to share key lessons with other farmers in the community.

What lessons do you want to share with ceremony guests?

4. Create action plan for graduation ceremony

After the meeting today, you will all need to do more to make the graduation ceremony a success. Create an action plan to decide who will do what to plan the graduation ceremony and keep each other accountable. (See Gradation Checklist in Farmer's Workbook, page 108)

Figure 5: Sustainability planning table

Action item:			
Task	Who	When	Cost
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

Module 16: Facilitator's Notes



The facilitator should use the following pages to note down any questions or findings from the group that should be kept for or addressed at a later time. Depending on the module this may include species selection by group, crops identified in seasonal calendars, or anything else that should be noted.



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