# Forest Garden Farmer Workbook

Year Two



Forest Garden Training Center



# Forest Garden Farmer Workbook YEAR TWO

Dear Farmer,

Congratulations! You are now in the second year of the Forest Garden training program, which consists of five workshops. These workshops will be delivered by Trees for the Future trainers who will guide you in attaining the knowledge and skills you need to continue building and maintaining your own Forest Garden.

This Farmer Workbook includes activities and resources you will use throughout the year. There are evaluation checklists in each section that you and your Lead Farmer can use to assess your progress. We hope you will keep the workbook clean and safe and bring it to all the Trees for the Future workshops.

Please do not hesitate to tell your facilitator, trainer, or extension agent how this resource has helped you or how it can be improved. We want you to be successful and wish you luck as you progress through the program.

Good luck, The team at Trees for the Future

#### This workbook is made up of five workshops:

Workshop 7 – Forest Garden Review, Optimization, and Planning Workshop 8 – Seed Saving Workshop 9 – Pruning and Harvesting Workshop 10 – Water Management and Conservation Workshop 11 – Integrated Pest Management



# Workshop 7: Forest Garden Review, Optimization, and Planning

#### Activity Checklist: Optimizing your Forest Garden

- □ Updated top view map of Forest Garden
- □ Created side view map of Forest Garden
- □ Plan for your nursery production
- □ Plan for seed sourcing for the year's seeds and perennials
- □ Plan for crop rotation in your permagarden



Notes:



#### Side View Map

Side view maps are a way to look at your Forest Garden and see gaps in the vertical space. Plant a diverse variety of trees, shrubs, and plants to fill in those gaps using layers that optimize the space. Use the space below to draw a side view map of part of your Forest Garden.



From: www.worldagroforestry.org





# Updates to Seasonal Calendar

#### Calendar 1: Foundation and 12 Months of Fruit

Months						
Seasons						
Holidays						
Food Availability						
12 Months of Fruit						

#### Calendar 2: Seasonal Market Calendar, Prices

Months						
Product 1:						
Product 2:						
Product 3:						
Product 4:						
Product 5:						



#### Planning

It's helpful to set goals for yourself and your Forest Garden. This can help you set priorities and improve things. You may use this space to list your goals for this year in your Forest Garden.

#### List of this Year's Goals

- Goal 1:
- Goal 2:
- Goal 3:



## **Nursery Planning**

This tree nursery planning chart will help you plan the number of trees you will plant for each species, what is needed for raising it in the nurseries, and when it needs to be seeded in the nursery.

#### **Tree Nursery Planning Chart**

Tree species by area	Number needed for planting	Small tree sack, large tree sack, bare root, or direct seed	Seeding date
Green Wall			
Alleys			
Other Areas			



## Seed Planning

You will have a workshop this year where you learn about and start saving tree and vegetable seed. These seed planning charts will note what Trees for the Future will provide and help you think about what seeds you will purchase or save this year.

Trees for the Future will Provide (fill in)

Tree	Vegetable Seeds
Seeds/Seedlings	



#### Seed Collection and Purchasing Plan Chart

Tree Seed Type	Amount	Buy or Collect (from	Season/Month
	Needed	where?)	Needed
Vegetable seed type	Amount	Buy or Collect	Season/Month
	Needed		Needed



## Permagarden Crop Rotation Planning

Crop rotation is an important part of keeping the soil healthy and pests away. How will you rotate beds based on what you grew last year, to help plan what you will grow this year? A simple way to remember your rotations are to use:

# LEAF > FRUIT > ROOT > LEGUME

- 1. Write in the type of crop (leaf, fruit, root, or legume) you planted in the last season in 3 beds or 3 areas in the first line.
- 2. Choose a different crop type to plant in those beds this season and write them in the 'Season 2' line. This will be what you plant this year.
- 3. Choose a crop from the next type to plant in each bed in seasons 3 and 4
- 4. After season 4, rotate back to the type planted in season 1.

**Crop Rotation Chart** 

	Bed 1	Bed 2	Bed 3
Season 1 (last season)			
Season 2 (this season)			
Season 3 (next season)			
Season 4 (following season)			





# Workshop 8: Seed Saving







## **Collecting Seeds**

Characteristics of a good seed source tree

- Healthy and vigorous with no disease
- Mature, not too young
- Has the qualities you want (e.g. tall and straight for timber, good production for fruit)







When collecting tree seeds, follow these steps:

- 1. Collect seeds when they are mature, right before emerging from pods.
- 2. Place a tarp or blanket on the ground.
- 3. Collect seeds by hitting with a stick, shaking the tree, or climbing to remove pods, flowers or fruits.
- 4. Collect seeds from all over the tree the crown of the tree, rather than just the low- hanging seeds.
- 5. Avoid collecting seeds that have already been on the ground, as they are prone to insect damage.





Seed Processing

#### Steps for Processing Dry Seeds



- Allow seed pods/capsules to dry in an open, dry place for a few days, while keeping protected.
- Seeds may fall out of pods when shaken or may require putting them in a sack to hit/loosen with a stick. Seeds with harder pods or shells may require breaking with a heavy tool or stone. Be careful not to damage them or they will not germinate.
- Winnow then clean seed to let the husks and debris blow away and leave the seed.
- Sort seeds for uniform size and remove damaged or discolored seed.

#### Steps for Processing Wet Seeds



- Generally used for fruits and berries.
- Harvest mature and ripe fruit from selected plant/tree.
- Remove as much flesh/pulp as possible from the seed.
- If flesh still remains on the seed, submerge seed in water long enough for flesh stuck to seed to soften.
- Separate pulp from seed with hands or against a wire seed, being careful not to damage the seed.
- Rinse with clean water.
- Sow immediately or soon after for recalcitrant seed, keeping seed moist (e.g. in moist sawdust) until sowing.
- Dry and store if seed can be stored



# Seed Storage



A good storage location is dry, cool, dark, protected from rodents and other pests, and has good air flow.

Good storage containers are air-tight and labeled with important information.

#### Labels

It is important to label seed that you have collected so you know the species, when, and from where it was collected. Include the information in the template here:

Example Seed Label
Seed Name: Calliandra
Collector Name: Peter Lukwago
Date of Collection: June 12, 2021
Collection Location: Mosque Ikinu Kiambu
Germination rate (if tested): <u>85%</u>
Weight (if scale is available <u>): 250g</u>



# Workshop 9: Pruning and Harvesting

Activity Checklist: Prune your Forest Garden Trees

- **U** Unhealthy branches in the Forest Garden are pruned
- Green Wall tree branches and terminal buds are pruned (except for windbreak line)
- **D** Branches are woven back into the Green Wall to reinforce it.
- **D** Pruned slow growing trees in the nursery for form and health.
- □ Pruned young fruit trees for better form
- □ Pruned timber trees for better form removing low branching
- Alleys and contours are correctly pruned/coppiced with clean cuts and little signs of breakage or tearing.
- Green manure is applied to the field





## **Pruning Considerations and Sanitation**

Considerations when pruning Agroforestry Trees:

- Use a sharp pruning tool to avoid damage to the tree
- Clean the tool with alcohol before use to prevent spread of disease
- Make clean cuts, sawing or cutting completely through the branch
- Do not rip or tear the branch off as it can damage the bark and tree
- Make the cut at an angle or straight down so water does not collect on top





Basic pruning tools

Always clean tools before and after cutting trees to prevent disease



Prune tree branches near the trunk



## **Pruning Agroforestry Trees**

Prune agroforestry trees in the dry season to manage growth and provide shade for crops in the upcoming growing season.

Cutting the tree just above the ground will create lots of stems (coppicing, left picture)

Cut the branches at head height or higher, to maintain one trunk (pollarding, right picture)



Using cut leaves and branches from agroforestry trees for:

- Filling in gaps in living fence longer branches that were pruned can be woven into the living fence/green wall to fill in gaps, especially those low in the fence where lateral branches do not reach
- Green Manure leaves, branchlets, and small branches can be stripped off and turned into or placed on top of the soil as a mulch and green fertilizer (also called chop and drop).
- Feeding Livestock if from appropriate species, leaves and branchlets can be stripped and fed to livestock.

## **Pruning Fruit Trees**

Prune fruit trees to:

- Promote healthy, vigorous growth regular pruning strengthens trees by focusing growth on the root system and the branches you want to grow.
- Encourage production by improving health and encouraging bud growth, pruning increases the quantity and quality of fruit and nut production.
- Prevent and control disease by improving tree health, trees are less susceptible to disease. Identifying and pruning diseased branches early can also prevent disease from spreading to the rest of the tree.

General Guidelines for Pruning Fruit Trees:

- Remove dead, damaged, and diseased branches.
- Decrease the density of branches to promote air circulation, healthier growth, and productivity.
- Train the branches to grow how you want them to grow.



After the fruit tree is shaped, remove any new branches growing from the trunk to avoid crowding.



Prune secondary branches shooting from too close to the trunk (30 cm).

For grafted trees at any age branches sprouting from beneath the graft location should be removed.

## **Pruning the Green Wall**

Prune the terminal buds of green wall/living fence trees in the nursery to encourage lateral growth.

As green wall trees grow, weave the branches between the trees next to them to form a solid barrier, especially lower to the ground where smaller animals might enter. Prune the tops of the trees at head height and use the branches to fill in gaps or as green manure or livestock feed.



The *terminal bud* refers to the top-most growth from the central, leading stem.

Prune the terminal bud by making a clean, angled cut just above the highest lateral branches







# Workshop 10: Water Management and Conservation

Activity Checklist: Establish Water Conservation Techniques

- □ Mulched all vegetable beds and fruit trees
- Established and/or adapted cuvettes and half-moon (boomerang) berms around fruit trees.
- □ Established vegetative strips in erosion-prone areas.
- Optional, based on need: Built an advanced water conservation technique (diversion swales, check dams, pond or roof harvesting).





# Water Management and Soil Conservation Practices

Mulching (right) improves water retention by minimizing evaporation. It also improves soil fertility and structure, and reduces erosion and weeds.





Cuvettes (left, also seen above) are basins around trees to conserve and concentrate water around the tree's roots. They reduce disease and pests by preventing water and debris from collecting around the trunk. The first cuvette is dug around young trees, one meter from the trunk. A second cuvette should be made as the tree grows, creating a large circle one meter (one big step) out from the first cuvette.

Half-moon (boomerang) berms are used instead of cuvettes on sloped land, to capture and redirect water and nutrients down around the crown of trees.

Use berms and swales across contour lines to slow and redirect the movement of runoff into your cultivated areas or underground.





Vegetative Strips of closely spaced trees, shrubs, and/or grasses should be planted along contours or the outer edges of terraces to stabilize the soil, slow water, and capture topsoil from runoff.



Prevent the loss of precious water from your Forest Garden by redirecting it from building roofs, roads, pathways, or gullies using earthworks, and storing it in water ponds or cisterns.





# Workshop 11: Integrated Pest Management

Activity Checklist: IPM in your Forest Garden

- Scouted the field to be aware of insect presence, and can share what they have been seeing, including location, what plants are affected, prevalence of any type of pest or disease.
- Created and applied at least one new natural pesticide according to what pests are identified in the field
- **C**leaned the field of debris. Anything diseased or that might spread disease is removed.
- **Use of companion planting and rotation to deter pests and attract pest predators**



Notes:



## **Basics of Integrated Pest Management**

Integrated Pest Management (IPM) starts with preventing the colonization and spread of pests in your forest garden. Do this by using good agriculture practices, regular scouting and physical control, and good sanitation. Natural pesticides can be used where needed to control pests but should not be the only line of defense.

Prevent pests and disease through:	
<ul> <li>Agricultural Practices</li> <li>Focused on improving soil fertility and providing adequate water to plants so they are strong and resistant</li> <li>Planted vegetative borders</li> <li>Correct use of intercropping</li> <li>Correct use of crop rotation</li> <li>Added companion plants to deter pests and attract beneficial insects/pest predators plants</li> </ul>	<ul> <li>Sanitation</li> <li>Clean tools and wash hands when moving between cultivated areas.</li> <li>Remove and burn plant materials that are infected with pests and disease.</li> </ul>
Control or treat pests and disease when present	t through:
<ul> <li>Physical Control</li> <li>Scouting Forest Garden regularly to identify/diagnose problems while they are still manageable</li> <li>Hand pick insects and eggs from plants.</li> <li>Set up traps to catch insects and assist with scouting</li> </ul>	Chemical Control <ul> <li>Make and use natural</li> <li>pesticides</li> </ul>



# Natural Pesticide Recipes

Write down the natural pesticide recipes that you learn in the workshop here:

Recipe Name:	Pest Name:
Ingredients	
Directions	
Application Instructions	
Recipe Name:	Pest Name:
Recipe Name:	Pest Name:
Recipe Name:	Pest Name:
Recipe Name: Ingredients	Pest Name:
Recipe Name: Ingredients	Pest Name:
Recipe Name: Ingredients Directions	Pest Name:
Recipe Name: Ingredients Directions	Pest Name:
Recipe Name: Ingredients Directions	Pest Name:
Recipe Name: Ingredients Directions Application Instructions	Pest Name:



centimeters