



BÄUERLICHE ERZEUGERGENEINSCHAFT SCHWÄBISCH HALL



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KFW DEG

Rainforestation Farming

A Farmer's Guide To Sustainable Organic Farming
And Agro-Forest Biodiversity Management



Editors and Co-editors :
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Francisca Indarsiani (IRF)
Bobby Issac (LACON), Paciencia P.Milan (VSU)



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Project Partners

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INTERNATIONAL

Rainforestation Farming and NatureLife – International

- advocacy for sustainable development

The rainforestation farming concept was developed in the framework of a bilateral applied tropical ecology project of the German society for technical development and cooperation (GTZ) with involvement of the University of Hohenheim (UH) on all levels of needed research since 1990.

During the last two decades an intensive and sustainable cooperation developed between the University of Hohenheim, the Visayas State University on Leyte in the Philippines and NatureLife-International.

NatureLife - International with its Global Climate Initiative became one of the leading promoters of the Rainforestation Farming Concept, because **NatureLife-International is engaged in**

- Education for sustainable development.
- Mitigation of climate change impacts and protection of natural resources.
- Protection of biodiversity.
- Sustainable food production as contribution for a healthy life and protection of the natural and cultural environment.
- Rehabilitation of the environment and preparedness for climatic changes.

NatureLife- International is concerned about

- The depauperisation of a growing number of people particularly in rural areas of developing nations.

- The dramatic loss of fauna and flora.
- The scarcity of resources.
- The threats for peace, security and wellbeing in more and more regions of the globe.

NatureLife-International is aware that

- Nature is a part of a global network without borders for environmental threats.
- Ecological and economical measures for the securing of the future on a global scale needs to be addressed.
- Protection of our natural environment and environmental provision can only be achieved with the people and not against them and in narrow joint partnership and cooperation with all parties concerned.

NatureLife - International is supporting

Projects concerning:

- Preparedness for climate change impacts.
- Appropriate subsistence agriculture improvement and sustainable village development.
- Protection of nature.
- Environmental management and conservation.

Educational approaches for a better understanding of nature and environment. Promotion of sustainable development on a local, regional, national and international level.



Some examples of supported projects are :

- Food and income securing, poverty alleviation, landscape and biodiversity protection by rainforestation farming measures on former rainforest areas in
 - CO₂ Compensation project as contribution to the global climate protection issue in the Philippines
 - Biotope and nature protection projects in various areas of Germany



Southern China in cooperation with TIANZ Biodiversity Center



The Philippines in cooperation with the Baybay Rainforest Foundation and the Visayas State University



Vietnam in cooperation with CHESH and SPERI



Indonesia in cooperation with the Indonesian Rainforest Foundation



Sri Lanka in cooperation with the Wildlife and Nature Protection Society

For more information please contact:

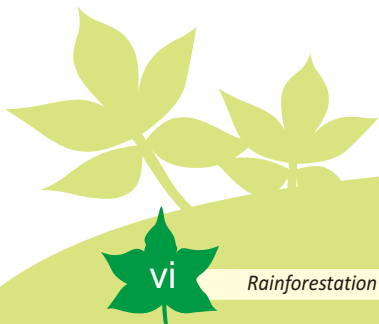
<http://www.naturelife-international.org>
<http://www.globeclimate.com>

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INTRODUCTION

“Borobudur” – how impressive this monument has been sitting there since about 1300 years; re-discovered in 1841 and since 1991 a declared UNESCO World Heritage site.

The masterpieces of stone carvings are witnesses to a once very rich fauna. They are at the same time symbols and directions for the wise treatment of nature. They still are today symbols for the sustainable development in the region of Borobudur. To this goal the Borobudur reforestation project and this farmer's guide is dedicated.

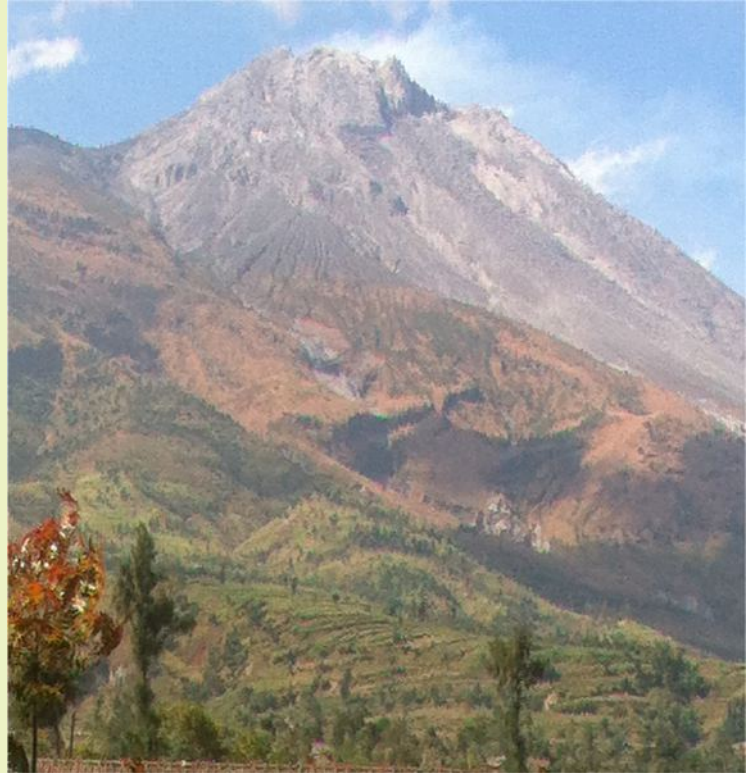


Background

On the island of Java in the Indonesian archipelago about 70% of the entire population of Indonesia are living on just 7% of the landmass of the country. One reason is the enormous fertility of the weathered volcanic soils. In Central Java for example the volcano Merapi is known as one of the most active volcanoes in Indonesia.

Despite impacts by volcanic ashes and earthquakes the people always return to work their land. Any arable land, even the smallest area, is utilised for farming even use up to the highest mountain slopes.

The range of production is as wide as the monsoonal climate allows and includes vegetables, fruits and spices. The negative effects of this rather intensive agriculture are also visible. The original rainforest has almost disappeared completely and with it the forest species abundance has also disappeared. Due to the topography the un-terraced slopes are prone to soil erosion and soil losses in all production areas on the slopes of the volcano. This is a common occurrence in all other volcanic slopes in Indonesia.



Agricultural production on the slopes of Gunung Merapi which is one of the most active volcanoes in Indonesia



Ash covered corn field in the Merapi area during the year 2010

We can see that population growth, soil erosion and deforestation are responsible for floods and soil losses in rainy season
the steady migration of the people mainly to the slum locations of megacities
the loss of homeland
the savannification of the mountainous region
drying up of water resources
disappearance of many animal and plant species due to habitat losses



Floods in Sumatra in 2012

These fertile soils were certainly the reason for the establishment of societies of an admirable high standard of culture about 1500 years ago. The erection of the Borobudur Temple pyramid is dated between 750-850 AC during the reign of the Sailendra dynasty. The massive pyramid is one of the most impressive Buddhist temple premises of Southeast Asia. It is located about 25 km northwest of Yogyakarta. Borobudur temple is a religious monument of great significance and it is at the same time an important source for the history of Java. The stone reliefs show people, their clothes and houses, means of transport including ships, animals and plants.



Typical Landscape in Central Java- the Selogriyo Region on the foothills of the volcano Gunung Sumbing

Stone relief from the Buddhist temple complex at Borobudur showing the former rich biodiversity of Central Java



They are a unique documentation of the village life and the life of the upper class in the given environment of the 9th century. After a painstaking excavation and restoration program this temple complex was declared a World Heritage site by the UNESCO in 1991. It is now a touristic highlight of the region. The temple complex of Prambanan about 18 km westward from Yogyakarta is also a declared World Heritage site.

In the Borobudur region the “Forum Borobudur” is dedicated to a sustainable development of the area with the Temple Borobudur as their focal point. The Forum Borobudur is not only an inspiration for cultural affairs but also a promoter and supporter of projects in sustainability in the volcanic surrounding areas.

World Heritage Myth- Challenge for a sustainable development:

The impressive reliefs of Borobudur show it very clearly; a fascinating cultural level concerning clothing, houses, ships, means of local transport, musical and work instruments, food, the diversity of animals and plants that were characteristic of the Java in the 9th century. Much of this is now gone forever. The reliefs of Borobudur are therefore a reminder from ancient times for the present modern world to deal diligently with the remaining nature.

A message of sustainable development to the millions of people who visit each year to carry away with them from Borobudur.

What is Sustainability?

Sustainability in its real sense means being prepared for the future. Sustainable development is providing for the present needs without obstructing the needs of generations to come. In the center of sustainability man is placed. Sustainable economic behavior is therefore not to use up all resources of the planet, but to save as much as possible for generations to come. We therefore need to keep air, water and climate intact, protect and beware biodiversity, use soil and minerals in a responsible way and support the living quality of all people on this globe.

Sustainable Education- a fundamental necessity

Education on sustainable development provides children, youth and adults with sustainable thinking and acting. It might enable people to decide on the future keeping in mind how a one person's actions impacts on generations to come or the living of people in other regions of the world. Education for sustainable development provides know how concerning local, regional and global interconnections about the challenges like climatic change and social justice for all.

Education for sustainable development strengthens the competence to realize the problems of un-sustainable development and provides knowledge about sustainable developments to use sustainable methods on a local, regional and global level. The ability of far sighted thinking, interdisciplinary



knowledge, acting autonomously and participation in decision making processes of the society is of utmost importance.

What is Rainforestation Farming?

Rainforestation Farming is a sustainable farming system used as a strategy for forest restoration using native or indigenous tree species in combination with agricultural crops.

Why Rainforestation Farming?

The concept of Rainforestation Farming is to plant trees native to their forest. It is now proven and tested that the forest becomes more sustainable as an increasingly diversification of local trees are planted instead of foreign tree species. Its intent is to recreate an ecosystem as close as possible to the

original state of the forest, with most of the physical structure and productivity matching the original ecosystem and biodiversity.

To put simply, Rainforestation Farming is planting trees native to the area with local agricultural crops.

Rainforestation Farming aims to replace the destructive forms of “kaingin” or slash and burn practice, form a buffer zone around the primary forests, protect existing biodiversity and help maintain the natural water cycle. Most importantly Rainforestation Farming can provide the local farmers with a stable and higher income.

With these objectives in mind, we are not only thinking of saving our forest ecosystems but also want to address the needs of our farmers in terms of food products, timber production and other forest products that can be grown in a long term sustainable way.

Forest Resources Inventory and Site Selection

■ Forest Resource Inventory

Plant inventory is important prior to all activities needed to be done in establishing a Rainforestation Farm. It is the preliminary inspection of the local forest area to obtain needed information such as original forest type or vegetation.

Things to look out for in site selection

What are the things you should watch out for in site selection?

You have to check the distance from the target nursery site. Ideally, the nursery site should be located next to or near the restoration site in order of facilitate the later transfer of the wildlings.

The location of the site near an old growth or secondary forest should also be considered. The forest will be the source of your wildlings. Don't forget to ask local people near the area who are knowledgeable about the native tree species in the site area. They can be a big source of information on what tree species that previously existed in the area. This is to avoid planting exotic species.

Remember:

- **Only those tree species that are native to that area must be used.**
- **Do not plant exotic species**



Example of a mothertree from the hardwood tropical timber group of the plant family Dipterocarpaceae



A single winged seed from a mothertree from the plant-family of Dipterocarpaceae

■ Site Selection

Potential Rainforestation Farming Sites in Central Java

Mid-mountain grassland (*Imperata cylindrica*) areas with some remnants of forest such as in the surrounding of the volcanoes of Gunung Merbabu, Gunung Lawu, Gunung Sumbing or the limestone Menorah Hills

Partly deforested areas near remnants of forests can be reforested with local native trees in combination with rainforest fruit trees

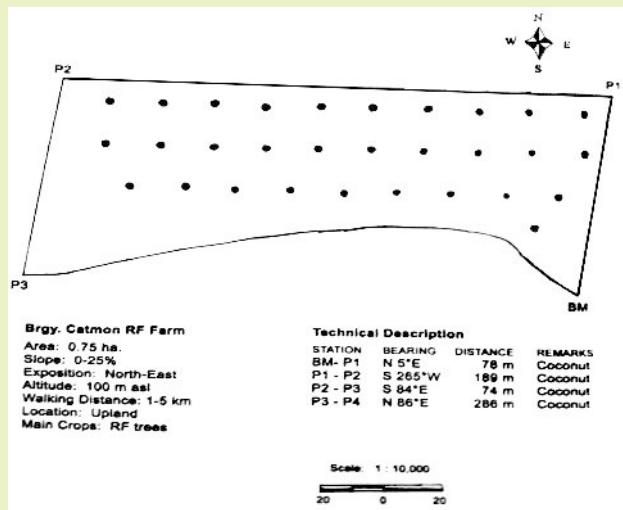


Example of a typical Rainforestation Farming Site. On the hillside of Punthuk Setumbuh the three major goals of the Rainforestation Farming Technology are practiced: Improvement of the ecosystem functions and the biodiversity situation and creation of a new and improved economical option for the rural people.

Punthuk Setumbuh in Central Java near the Borobudur Temple Complex



■ Mapping of a Proposed Reforestation Area



It is very useful if each potential rainforestation site is initially mapped with basic information of all trees present with attached information so that a planting scheme for the indigenous and fruit trees can be determined.

Example of a simple map of a Rainforestation Farming Area





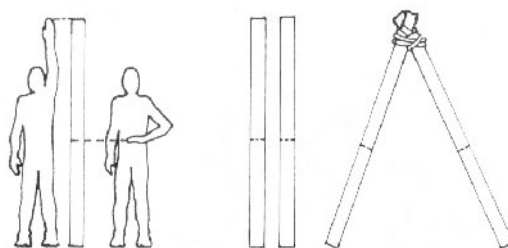
■ Site selection for a nursery

After detailed inspection of the site and identifying the local tree species in the area, you may now start the development of the Rainforestation Farm. It is best to begin with your own nursery. Seed collection, treatment and care for the seedlings must be given detailed attention so that it will give you a good start for a successful Rainforestation Farm.

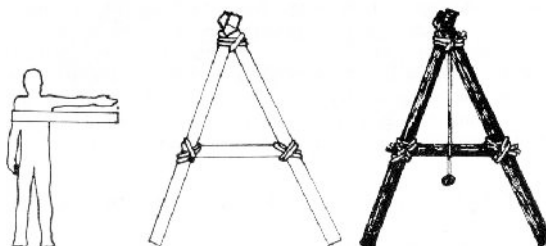
To start your Rainforestation Farm, here are some easy steps to follow.

- Look for an area with good source of water and temperature. A shaded place is the best site for nursery establishment. It must also be located near the areas to be reforested.
- Clean the area from solid wastes and non-biodegradable materials.
- Make a canal for good drainage.
- Leave any standing trees already present on location.
- Make a seed plot measuring 1 m x 3 m. The distance in between seed plots must be 45 cm and between rows of seed plots should be 1 meter. Below is an illustration of how it will look like.
- If terracing is needed the appropriate tool to find the contour lines is the A-frame.

Example of a subsistence gardening area in a sloping place. Terraces are in place and stabilized. Shade providing trees are integrated. Tiny small vegetable seedlings are for the first time protected by banana fiber shields.

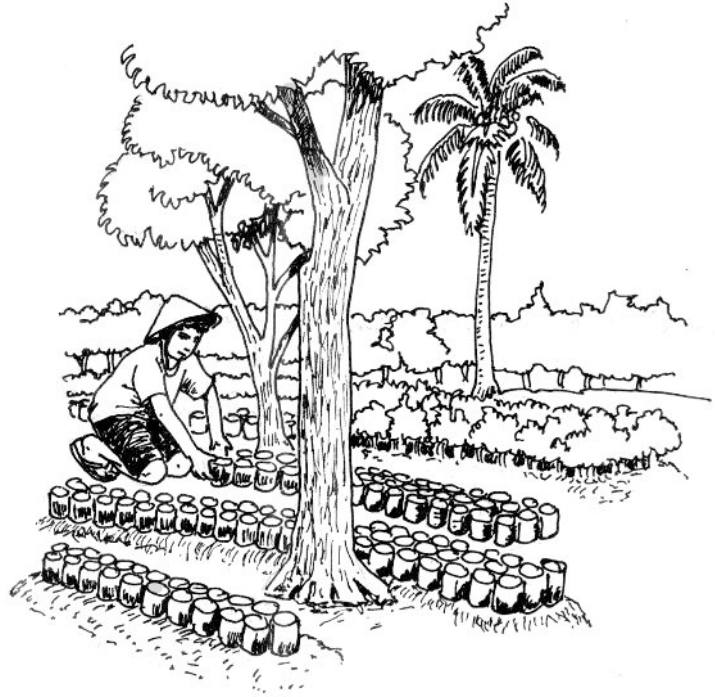


Construction of an A-frame: Get two long sticks and one small as indicated. Fix them together to form an A. Fix a pendula to the A-frame.





Use the A-frame to find the points of the same altitude in any sloping area. If the pendula is in the middle of the A frame the end points of the long arms are exactly at the same altitude (fix them with two small sticks in the ground).



Nursery set up in a sloping area. The pots should be placed on a layer of sand, rice husk or sawdust up to 25 cm thickness. This will prevent root damage to the seedlings during seedling collection if the fine roots creep out of the bag into the ground over time.



Nursery set up in Punthuk Setumbuh, Central Java with an open recovery chamber (left), potted tree seedlings (center), Lemongrass seedlings (left and right). The seedlings area is shaded by a net made from fibers.

It is also important to construct a nursery shed house measuring approximately 5m wide and 8m long. Part of the shed house must be open as a working area while the other half can be utilized as storage area for tool, seeds and nursery items.

Tools and Materials

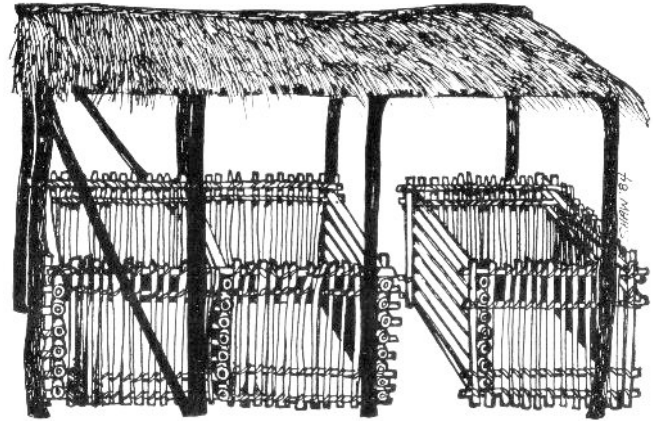
- | | |
|------------------|---|
| 1. Brush knife | 13. Saw |
| 2. Lever | 14. Wires |
| 3. Rake | 15. Sharpening stone |
| 4. Hammer | 16. Seedbox |
| 5. Nails | 17. Pail or bucket |
| 6. File | 18. Cutter |
| 7. Chisel | 19. Potting soil: humus soil, top soil, river sand (note: top soil and river sand are mixed to 50-50% proportion) |
| 8. Watering hose | |
| 9. Polybags | |
| 10. Shovel | |
| 11. Pick | |
| 12. Wheelbarrow | |

Compost Production Facilities and Procedure

A simple compost production and processing area needs to be found nearby the nursery location. Give enough space for accumulating green material, getting it chopped into smaller pieces and then placed into the three-chamber compost stockade. The size of the stockade depends on the quantities of compost you plan to process.



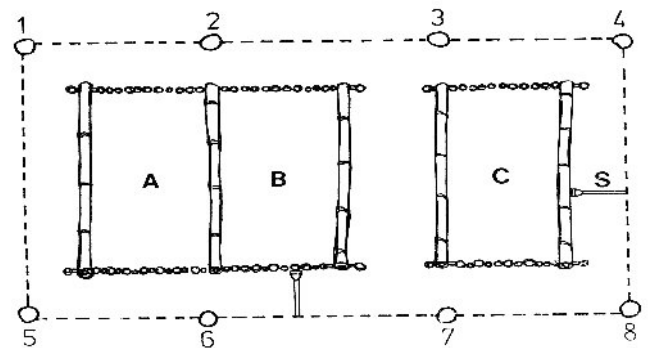
Simple Compost Stockade made from bamboo consisting of three chambers



Compost stockade with three chambers: The chopped raw material is placed into the first chamber A (far left) and left there for about two weeks to break down. The break down process is accelerated if the chamber is lined with banana leaves to form a lining parcel of the raw material inside the chamber.

Then it is shoveled to the second chamber (B) lined with Banana leaves to cover the still wet compost material. Leave the material here for another three weeks.

Then transfer the material into the third chamber (C) as compost for further use.



Construction plan for compost stockade which needs to be roofed with Palm leaves or grass to protect the composting material from drying out or getting too wet.

Useful materials for making good quality compost



Useful materials for making high quality compost are any green vegetable or garden waste (drawing 2-3,5), any vegetable or green material from the kitchen (drawing 5), manure from animals like chicken, goat or cow (drawing 4).

All larger materials should be chopped (drawing 1) and about 2-3 shovels of old

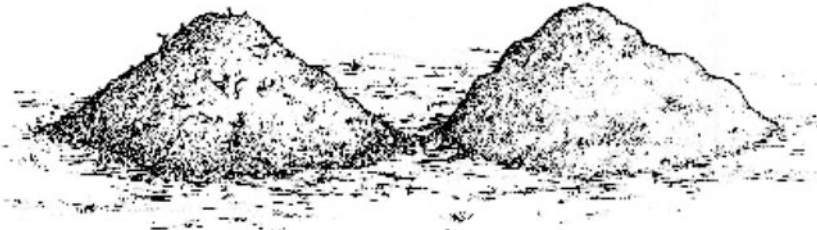
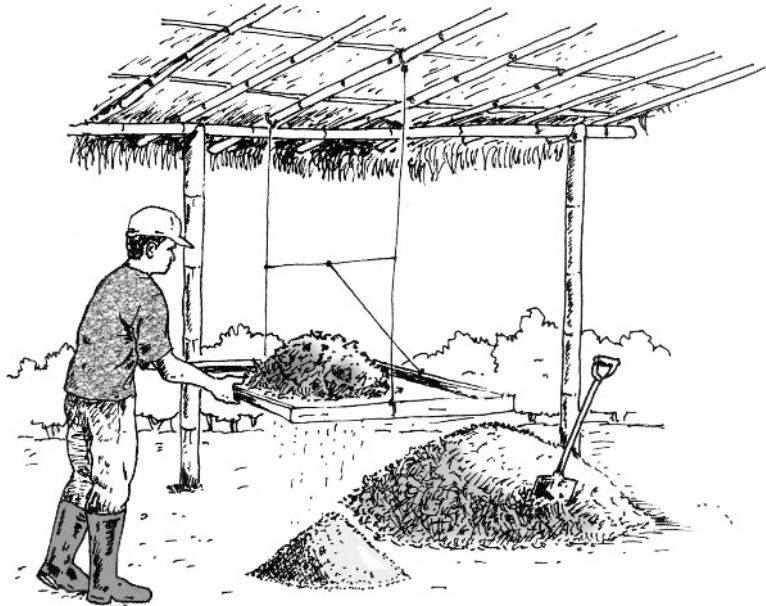
compost (drawing 6) if available, should be mixed as starter to a heap of raw material to accelerate the decomposing process.

Manure from animals will do the same effect. The well mixed raw material is then placed into chamber A of the stockade and rinsed with water to keep it wet.

Soil Mixture Preparation

The soil mixture or potting media should be as follows:

Collect some garden or forest soil and river sand. You can even mix the normal soil in your area with compost soil. The ratio of the garden or forest soil (including compost) and river sand should be 2:1. Mix soil thoroughly.



Sieved river sand

Mixture of sieved soil and compost

Working space for soil and sand sieving. The bagging material should be mixed with 1 part sieved river sand, 2 parts mixture of soil and compost. Addition of rice husk is useful.

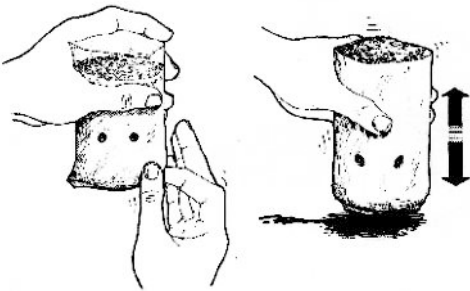
Heaps of material ready for mixing: Sieved river sand and mixture of compost + sieved soil (1 part compost, 2 parts sieved soil)

Remember:
Do not cook or sterilize the soil or compost as this will kill microorganism and many microorganisms will add fertility to your soil.

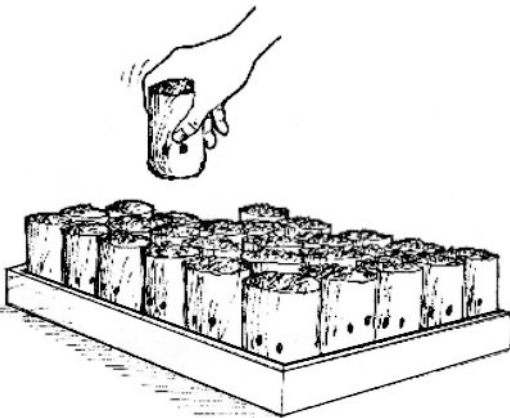
■ Bagging the Soil



Filling the polybags with ready mix of sand-soil-compost. Do not press the mixture into the bag. Leave at least 1 cm space from the rim down.



Place the ready bags into upright position in a wooden tray for easy transport to the potting site and to their final place in the nursery.



Bagged polybags pots ready for being seeded or used for planting wildlings

Alternative to polybags

An alternative to the use of polybags, which are not biodegradable and therefore can become hazardous waste after being used is the production of so-called banana fiber pots. However, this is only to recommend for smaller quantities of seedlings.

Production procedure for banana fiber pots

Select a place where you can put up a bench and some trunks/posts with different diameters.



Banana fiber pot production area with all needed material placed nearby

Flattened banana trunk material placed on a rack with posts of different diameter in front of the bench.

Strips of banana fiber material for binding the pots is placed on the bench.

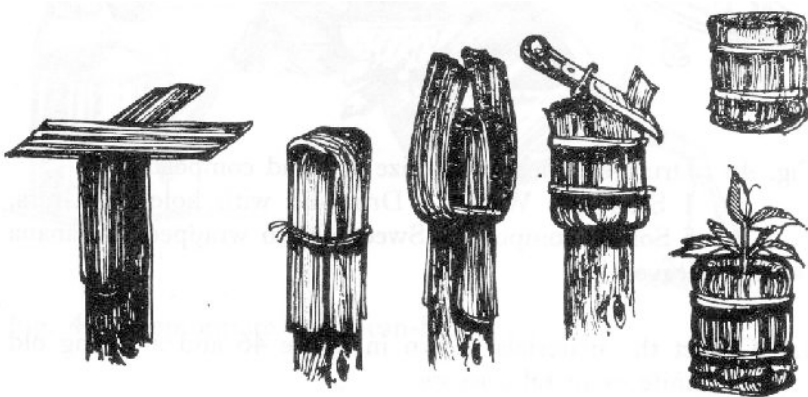
It is to recommend to set up the banana fiber pot production area in such a way so close to the nursery so that the banana fiber pots can be stored in a dry area inside the nursery.



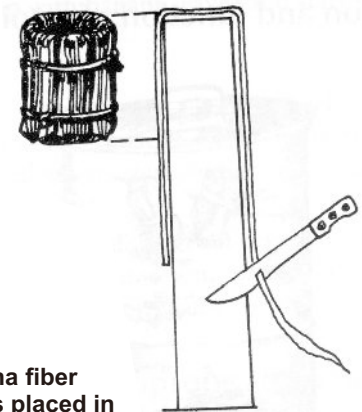
Location for drying flattened banana trunk material on a rack



Set up of the location for production of banana fiber pots of different sizes: Posts with different diameters (10cm-30 cm) are placed in a way that a person sitting on the bench can work comfortably at each post and reach at the same time the banana fiber materials U flattened and dried trunk material and dried banana fiber strings.



Procedure for the production of a banana fiber pot.



The banana fiber material is placed in such a way on a selected post with the required diameter needed. Then at the top of a pot with the required height can be produced by cutting off the excess banana fiber.

Chapter 3 Seed Collection

■ Mother Tree Selection and Protection

Remember:

It is most important to know the mother trees in your area. Collect seeds from mother trees in your area. Most Indonesian trees are seeding during the first months of rainy season.

You must visit the mother trees every week during fruiting season because fallen seeds have to be brought back to your nursery immediately as some seeds have a short viability period.

The mother tree should be healthy with a straight trunk and balanced branches with plenty of leaves. The height should not be less than four meters and the age between fifteen to thirty years old or older.



Collection of tree seeds under a labeled mother tree. The seeds should be collected in bamboo baskets or fiber nets. Plastic bags are not advised for seed collection and seed storage.

■ Treatment/ Method of Seed Germination

Once you have collected the seeds for your nursery, it is important to treat and look after them in the appropriate method. However, if the seeds are big then it is best if you can plant them directly into the prepared bags.

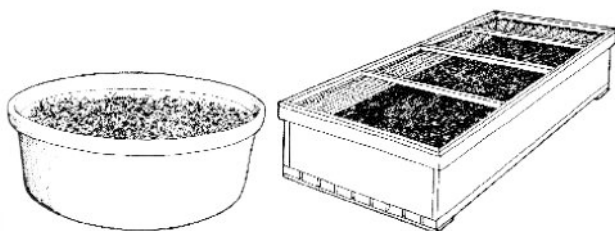
■ Germinating Hard Seeds

1. Collect well ripened and good seeds.
2. Let them stand for 2-3 days in cool dry place.
3. Clean seeds and air dry for 2 days on a bamboo rack..
4. Sun-dry for 3 days on a bamboo rack.
5. Put dried seeds in a hessian sack and store for 5-8 days.
6. Dry seeds again under the sun for one day.
7. Then soak seeds in cold water for 24 hours.
8. Collect up all seeds. Wrap the sack of seeds with plastic for 3 days to produce heat.
9. Sow the seeds in the seed plot or directly in the polybag.
10. Germination will occur on average in 18-27 days.

■ Germinating Seeds in a Seed-box

Two kinds of seed containers or seed boxes are commonly in use:

Plastic vessels and containers made from wood which are elevated seed boxes.



Commonly used seed boxes: Plastic vessels (left) and elevated seed-boxes (right)

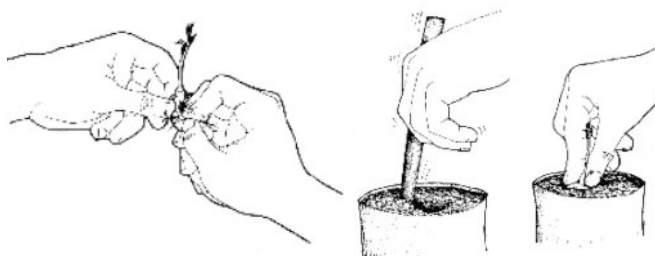
The elevated seed-box is designed to control water/rainwater from seedlings. This is different from seeds germinated in open nursery plots since watering is uncontrollable especially during heavy rain.

The mixture of the soil in the seed box is preferably 75% sieved river sand and 25% sieved topsoil/compost mixture.

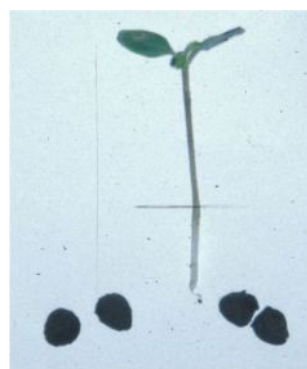
Place the seed germination bed/box inside the shed house.

Remember:
The seedlings will be ready for potting when their height reaches about 2.5 – 5 cm.

■ Potting the Seedling



- ▶ The seedlings must be transferred to the bags as soon as they unfold their first leaves.
- ▶ Use a stick to put a hole in the poly bags.
- ▶ Place the seedling carefully in the poly bag through the hole.
- ▶ The seedlings must be watered daily.
- ▶ Keep them under half-shade light conditions.
- ▶ Regularly move them every two months to prevent establishment/penetration of the roots in the soil.



Example: Seed and seedling of *Dracontomelon dao*

Wildlings Collection, Treatment and Recovery or Growth Chamber Construction

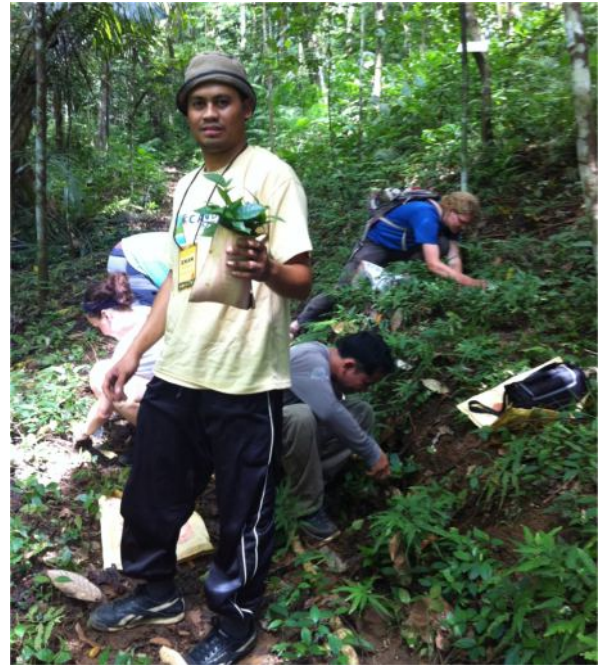
Collection of Wildlings

Wait for a shady or rainy day to collect wildlings in the forest from under the mother trees.



Wildlings growing underneath a mother tree

Wildlings collection by digging them out with a small soil ball



- The wildlings are transported in a folded banana leaf or banana stalk.
- Do not use plastic bags for transporting the uncovered and unprotected seedlings or wildlings.
- Do not disturb the fine roots by removing soil particles or exposing them to direct sunlight.
- Sprinkle the wildlings with some water during transport to keep them wet

■ Treatment of Wildlings

To avoid stress affecting the growth of the wildlings and a high percentage of mortality the following treatments should be applied:

- cut the leaves with a scissor to half the size
- cut the root ball leaving only the primary root intact
- put the wildlings in a prepared polybag with potting mix
- avoid bending root of wildlings
- place the bags with the treated wildlings inside a recovery or growth chamber
- there is no need to water the wildlings inside the growth chamber for about 2-3 months.
- when the next two leaves are starting to grow the wildling is in good health.
- after 2-3 months open the growth chamber
- transfer the wildlings to the hardening site of the nursery
- now water the seedlings weekly



Cutting of leaves of a wildling with scissors. Remove about 50-70 % of the leaf. This treatment will prevent stress-induced overshooting growth.

■ Construction of Growth/ Recovery Chamber for Treated Wildlings

Look for a shaded place or make a fixed shade area by providing nets or palm leaf-structures to protect the recovery /growth chambers from the impact of direct sunlight.



Construction of the recovery chamber



Coverage of the recovery chamber



View of the recovery chamber underneath shade providing nets



Opening of the recovery chamber after 3 months and transport of wildlings to the hardening site

Steps to be taken for the construction of a recovery chamber

1. Using the 2x2-inch timber lumber, make a rectangular frame with a length of 8 meters and 2 meters width. On midway of each of the 2 meters, a 1-meter piece of lumber should be nailed vertically. This will serve as post and base in the frame of the lumber on top of the two protruding poles.
2. When the frame is finished, attach the bamboo strips from one side of the base to the other side. Make sure that the bamboo strips are securely nailed to the lumber.
3. Place the potted wildlings/seedlings inside the frame.
4. Cover the frame with gauge 14 plastic sheets. Start from one side. Do not cut the plastic. Use thumb tacks to fasten the plastic to the bamboo strips and lumber. Cover each of the heads of the thumb tacks with a clear plastic adhesive tape twice to ensure that no air will escape from the chamber.
5. Leave about 10 to 12 inches of plastic “over-hanging” the ground from the base of the frame of the growth chamber.

Wildlings or seedlings in hardening area of a nursery

Potted seedlings or wildlings placed in a partly shaded area of a tree nursery

The areas with seedlings of the same kind are should be protected by a small wall

The pots should be placed on a sand layer or rice husk layer of at least 20 cm thickness



Chapter 5 The Rainforestation Farm

Grassland, alpha-alpha (*Imperata cylindrica*), monoculture plantations, mixed forested areas on volcanic soils or limestone can all be successfully converted into a Rainforestation Farming area.

The best time to prepare the area is during the drier months so work is faster and not hampered by too much rain.

Fence the whole area if possible with a green fence of *Gliricidium septum* or any other fast growing hedge material like hibiscus.



Green fence using the plant *Gliricidium septum*. This plant produces long branches usefull as fire wood; the leaves are a good feed for chicken and goats.

A five meter broad fire line should then be made around the area.

Plant the fire line with sweet potatoes, taro, eggplant, pepper, etc. towards the rainy season.

Once the area is cleaned, it is now ready for staking bamboo splits. A rope is needed to align the sticks.

For one hectare *Imperata cylindrica* (alang-alang) area or open area:

- distance of bamboo sticks should be 1x1x2 m spacing.
- for the area with existing trees:
- distance of bamboo sticks should be 2x2 m spacing.

For coconut area or tree plantation area:

- distance should be 2x2x8 m spacing.



Placing bamboo sticks along a planting line in an old coconut plantation. The spacing must be calculated according to needs.

Planting

Plant only on rainy or shady days.

Make a hole on each staked area. It must be deep enough to accommodate the seedlings. Recommended size is 30cm square and 30cm deep for tree seedlings. For rainforest fruit trees, dig a hole approximately 1metre square and 1metre deep.

If the soil on your land is very poor, dig a bigger hole and add some compost.



Transport of the potted seedlings on a shady day to the planting site.



Hole for planting a tree seedling raised in a polythene bag. The bag must be slit open and the seedling with the undisturbed root ball placed gently into the planting hole. A small portion of manure in the planting hole is favourable for the start of the tree seedling.

Transplanting











Planting the already 0.5-1.0m tall Tree-seedling in an appropriate hole, big enough not to bend the roots and lined with some compost /manure. Careful removal of the plastic bag is very important so as not to destroy the fine root tips or expose them to the bright sun. After filling the hole with soil then press the soil gently and water the plant.





Most Recommended Timber Species

Here is a list of some of the recommended timber species for ecological reforestation on islands with no pronounced dry season.

Sun demanding local forest tree species of Indonesia recommend for Rainforestation Farming on volcanic soils and limestone areas.

Local Names	Botanical Name	Plant Family	Height	Remarks
Sobi (jav./bali) Kosambi (Sunda) Kasambhi (Madurese) 	<i>Schleicheria oleosa</i>	Spindaceae	up to 25 m	Timber, Shellac Batik colour,
Jamuju (jav.) Kayu embun (Sum.) Cemara bineh (Mad.) Tarupanda (Bali)  	<i>Dacrycarpus imbricatus</i>	Podocarpaceae	up to 50 m	Timber

Local Names	Botanical Name	Plant Family	Height	Remarks
<p>Pohon Johar (jav.) Juwar (Sunda)</p> 	<p><i>Senna siamea</i></p> 	<p>Leguminosae</p>	<p>5-20 m</p>	<p>Timber, edible leaves</p> 
<p>Kokoleceran</p> 	<p><i>Vatica bantamensis</i></p>	<p>Diptero carpaceae</p>	<p>up to 30 m</p>	<p>Timber</p>
<p>Resak hiru</p> 	<p><i>Vatica rassak</i></p>	<p>Dipterocarpaceae</p>	<p>up to 50 m</p>	<p>Timber</p>

Local Names	Botanical Name	Plant Family	Height	Remarks
Pohon Kemenyan 	<i>Styrax benzoin</i> 	Styracaceae	up to 25-40 m	Resins
Sarangan	<i>Castanopsis mollisima</i>	Fabaceae	Up to 50 m	Timber
Kantil 	<i>Michelia alba</i>	Magnoliaceae	Up to 25 m	Timber
Sawo Kecil 	<i>Manilkara kanki</i>	Sapotaceae	up to 25 m	Fruit, Timber


Local Names	Botanical Name	Plant Family	Height	Remarks
Kedoya 	<i>Dysoxylum gaudichaudianum</i>	Meliaceae	25-45m	Timber
Rengas	<i>Gluta renghas</i>	Anacardiaceae	Up to 45 m	Furniture
Cemplonan	<i>Drymaria cordata</i>	Caryophyllaceae	10-20 m	Med. Plant
Rampelas	<i>Ficus ampelas</i>	Moraceae	up to 20 m	Saponines
Lame	<i>Alstonia scholaris</i>	Apocynaceae	20-25 m	Artefakts

Table of recommended forest trees on limestone


















Local Names	Botanical Name	Plant Family	Height	Remarks
<p>Pohon Jati</p> 	<p><i>Teconia grandis</i></p>	<p>Verbenaceae</p>	<p>25-45m</p>	<p>Timber</p>
<p>Sonobrit (jav.) Kayu snorkeling Linggota</p> 	<p><i>Dalbergia latifolia</i></p> 	<p>Leguminosae</p> 	<p>up to 20-40 m</p>	<p>Timber</p>
<p>Dadap merah</p> 	<p><i>Erythrina crista-galli</i></p>	<p>Fabaceae</p> 	<p>up to 7 m</p>	<p>Edible leaves</p>

Table of recommended fruit and other useful trees

Local Names	Botanical Name	Plant Family	Height	Remarks
Durian	<i>Durio zibethus</i>	Bombaceae	up to 20 m	Fruit
Rambutan	<i>Nephelium lappaceum</i>	Sapindaceae	up to 15 m	Fruit
Nangka	<i>Artocarpus heterophyllus</i>	Moraceae	up to 20 m	Fruit
Mangga	<i>Garcinia mangostana</i>	Guttiferae	up to 15 m	Fruit
Gandaria (jav.) 	<i>Bouea macrophylla</i>	Anacardiaceae	up to 27 m	Juice
Pala 	<i>Myristica fragrans</i>	Myristicaceae	up to 20 m	Spice
Salak condet (jav.) 	<i>Salacca edulis</i> 	Palmae	up to 5 m	Fruit

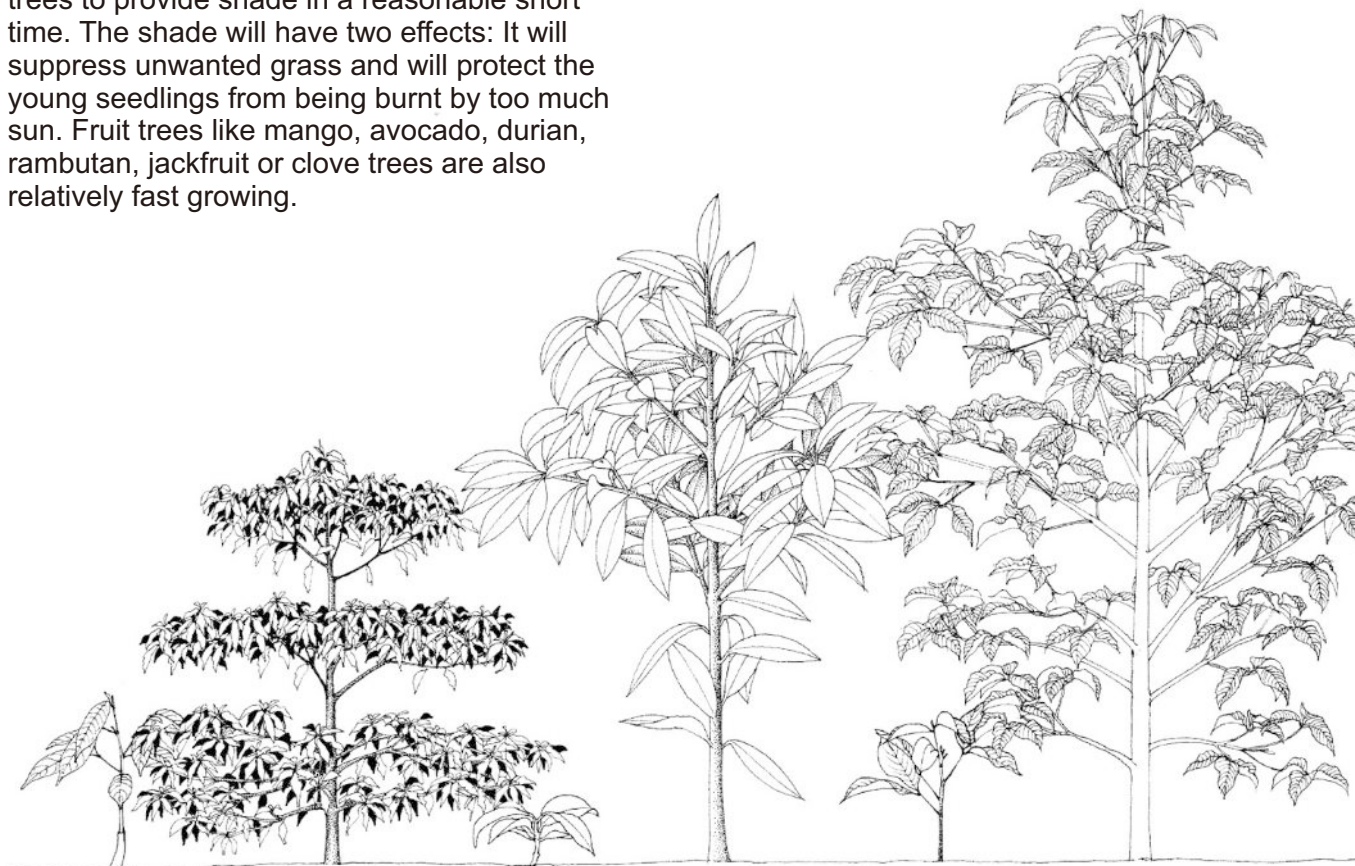
Local Names	Botanical Name	Plant Family	Height	Remarks
<p>Buah Kapundung</p> 	<p><i>Baccaurea racemosa</i></p> 	<p>Euphorbiaceae</p>	<p>15-20 m</p>	<p>Fruit</p>
<p>Kepel</p> 	<p><i>Stelechocarpus burahol</i></p>	<p>Annonaceae</p>	<p>up to 25 m</p>	<p>Fruit</p>
<p>Enau</p> 	<p><i>Arenga pinnata</i></p>	<p>Palmae</p>	<p>up to 25 m</p>	<p>Palm Sugar</p>

Local Names	Botanical Name	Plant Family	Height	Remarks
Bacang (jav.) 	<i>Mangifera foetida</i>	Anacardiaceae	20-25 m	Sambal ingredient
Kemang 	 <i>Mangifera caesia</i>	Anacardiaceae	20-40 m	Fruit

NOTE : Because it is never certain if the planted seedlings love sunlight or prefers shaded conditions, planting must be done in two steps :

For the first year:

Use fast growing pioneer trees or even banana trees to provide shade in a reasonable short time. The shade will have two effects: It will suppress unwanted grass and will protect the young seedlings from being burnt by too much sun. Fruit trees like mango, avocado, durian, rambutan, jackfruit or clove trees are also relatively fast growing.



Example of a planting scheme in an open grassland area as a combination of pioneer or first year trees and fruit trees or second year trees.

From Left to right:

Durio zibethus (2nd year) Terminalia microcarpa (1st year)
Garcinia mangostana (2nd year) Calophyllum blancoi (1st year)
Nephelium lappaceum (2nd year) Vitex parviflorus (1st year)

For the second year:

When the first planted trees are already providing shade then the high valued hardwood trees can be planted under them. It is also to recommend to plant them under banana-trees,

which can be harvested after two years. You can include any forest tree from the local surrounding and fruit trees like durian, mangostein, rambutan, salak palm, jack fruit and clove trees.

Maintaining the Rainforestation Farm

Visit your area frequently. Remove vines.



Ring weeding around 6 month old *Terminalia microcarpa* in an *Imperata cylindrical* grassland

Young Mangosteen Fruit tree at his site in a RF Farm in Negros, Philippines 2010.

This seedling is about 1 year old and the area around the seedling is kept free of weeds by regular ring-weeding. About 6 months this kind of weeding is necessary to protect the young tree from being overgrown by creepers.

Ring-weeding must be done every two months during the first year. After two or three years, ring-weeding might be only necessary about every 6 months.

Removal of creeping plants and vines from the growing young trees is very important for a good growth.



Branch Cutting

Branch Cutting is recommended only if a young shade-tolerant tree is disturbed by leaves and lower branches of fast growing trees or plants like banana.



Pruning of pioneer trees should be performed with a saw not with the bush knife.

Enrichment with Shade-tolerant Crops



Tumeric (*Curcuma longa*) Family Zingiberaceae under diverse shade providing trees in Central Java



Ginger (*Zingiber officinale*) Family Zingiberaceae under shade providing trees in Central Java



Lemongrass (*Cymbopogon citratus*, Fam. Gramineae)(left) and ginger (*Zingiber officinalis*, Fam. Zingiberaceae)(right) in terrassed fields in Central Java

List of shade tolerant crops

Spices:

Zingiber officinalis or Ginger
Zingiber nivium or Milky way ginger
Zingiber ottensii or Caco Delight Ginger
Zingiber spectabilis or Beehive Ginger
Zingiber zerumbert or Shampoo Ginger
Curcuma sumatrana or Olean Ginger
Curcuma alismatifolia or Siam Tulip
Curcuma cordata or Jewel of Thailand
Curcuma longa or Tumeric
Curcuma rubescens or Ruby Ginger
Eletaria cardamomum or Cardamon
Cymbopogon citratus. or Lemongass

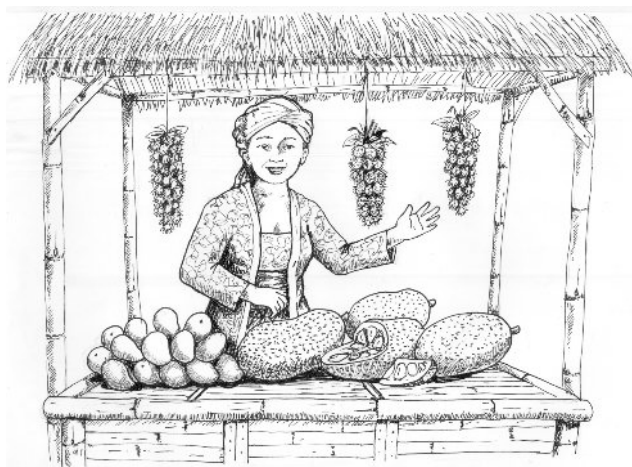
Other crops

Pineapples
 Vanilla
 Coffee
 Medicinal Plants

Harvesting and Marketing of Fruits



Fruit harvesting using baskets



Local Marketing of fruits: The better placed, displayed and arranged then the higher the attraction for the buyer

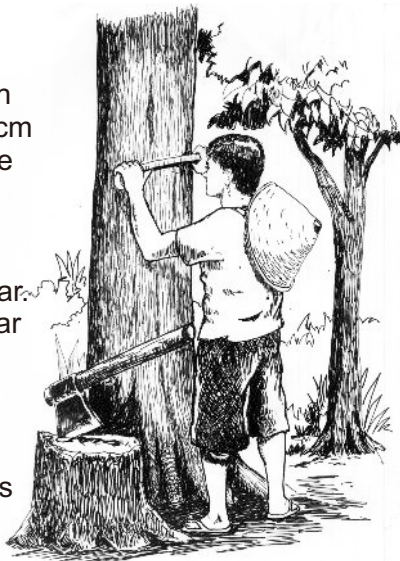
Fruits can also be processed into candies, jams, dried fruits, drinks, juices, marmalades and other products that can become an additional source of income.

Harvesting of Pioneer Trees and Marketing of Lumber



Harvested Pioneer Trees *Melia dubia*, a fast growing pioneer tree, after 8 years

When the trees reach a diameter of 35-50 cm at eye height they are then ready for marketing. Avoid harvesting all trees at the same year. Cut only 10% per year and replace them immediately on the gaps created from cutting. Don't replant in areas without sunlight.



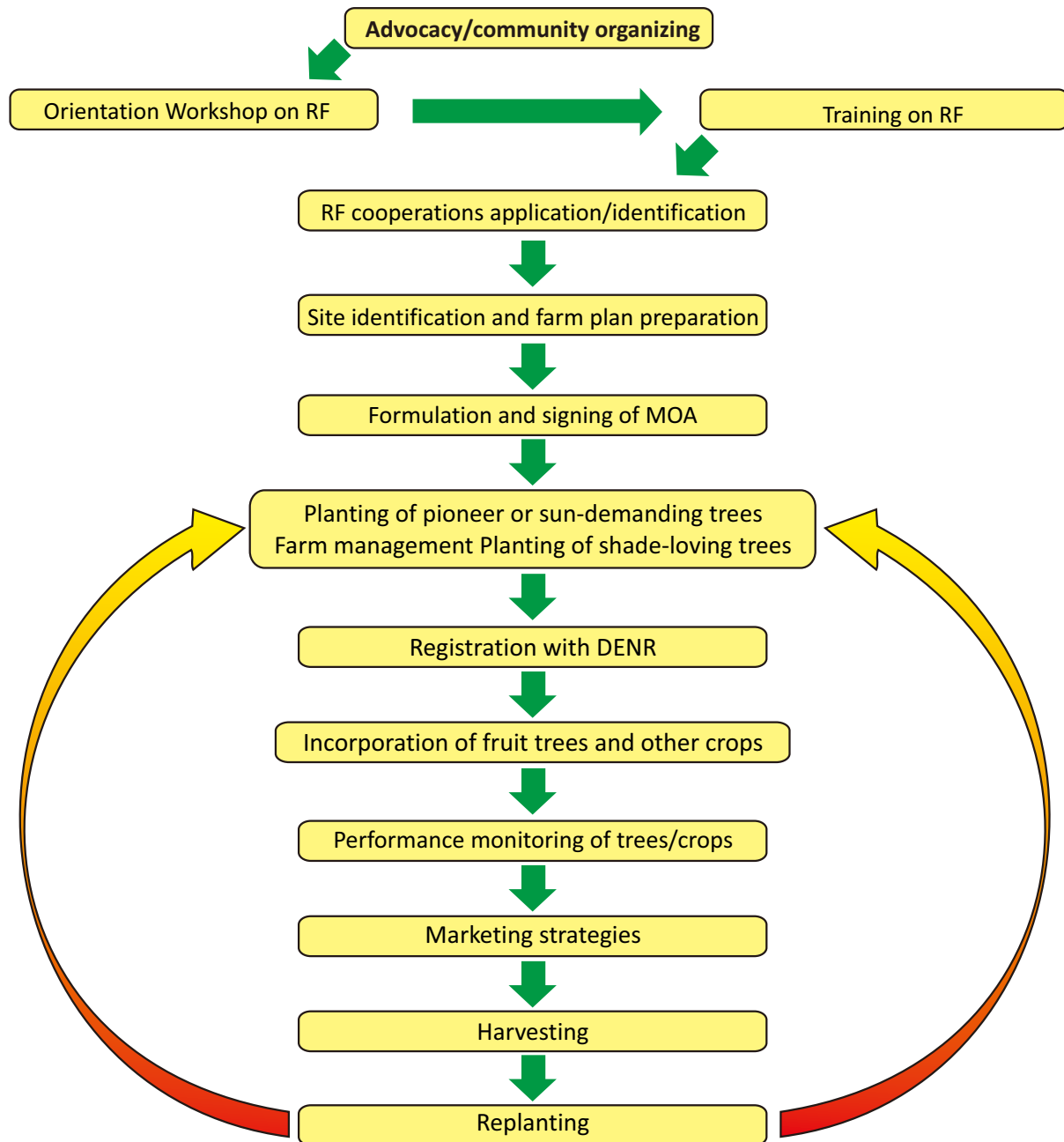
Diameter measurement at eye level (dbh) of a harvestable tree. Pioneer trees are usually harvestable after 4-5 years, timber trees need much longer times depending on the tree species with some needing up to 50 years before harvesting

Possible processing of harvested timber



Processing of harvested timber with a simple transportable sawing system

Diagrammatic Flow of Strategies in Implementing Rainforestation Farming in a Community Cooperative Farm Plan



Source: Milan, P.P., 2002, "Rainforestation" as A Model of Forest Biodiversity Conversation and Restoration. Paper presented during the 21st EENP National Science Conference, Cebu City

■ The Rainforestation Farm

The following pictures show the development of a Rainforestation Farm on degraded grassland in the Philippines and the succession of tree planting including some examples of indigenous trees after 15-20 years time.

Upper row from left to right: Imperata cylindrica grassland with 6 month old pioneer trees like Pterocarpus indicus, Melia dubia and Terminalia microcarpa
Lower row from left to right: Two year old trees in an old coconut plantation; Four years old high diverse mixed rainforestation farming site





2 year old Durian seedling



15 year old indigenous mixed forest



18 years old Meranti



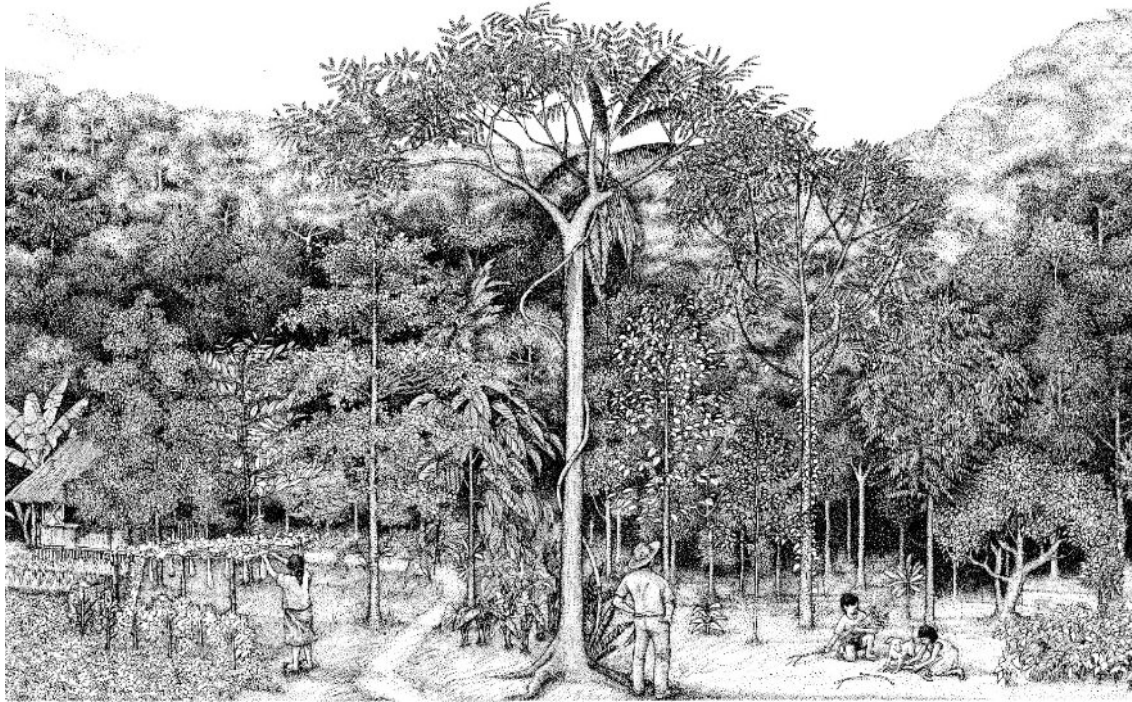
20 years old Pioneer tree
Melia dubia,
Family Meliaceae



20 years old Meranti tree
Shorea contorta,
Family Dipterocarpaceae



20 years old hard timber tree
Dracontomelon dao,
Family Anacardiaceae



Idealized single Rainforestation Farm after about 15 years with high diversity cropping system in form of a home garden, fruit and timber trees.

Insight of a Rainforestation Farm in the Philippines with a highly diverse mixture of fruit trees, timber trees and shade tolerant crops under trees. This area was 15 years ago an Imperata Grassland Savanna.



Rainforestation Farming supports Biodiversity

Many soil organisms such as fungi and bacteria help as potential decomposers to speed up decomposition of the solid wastes in the environment. Their presence in the ecosystem plays an important role. With the cool, moist soil condition in the Rainforestation Farm, their efficiency to decompose is enhanced.

By using only indigenous trees and plants the local biodiversity in form of local animals and plants, including pest controlling animals like birds, frogs and some insects are also coming back to the area and region.

Some examples of organisms from the island of Java and Sulawesi:



Tarsius sp.



Wevil Larva



Green Frog



Red Dragonfly

Local water resources are improved in quantity and quality with local plants including orchids getting a chance to survive and grow



Freshwater creek at Gunung Sumbing in Central Java



Local Javanese Orchid

Organic Rainforestation Farming and International Certification Procedure for Organically Produced Spices

■ What is Organic Farming?

Organic means coming from or related to organic production.

Organic production is an overall system of farm management and food production that combines best environmental practices, a high level of biodiversity, the preservation of natural resources, the application of high animal welfare standards and a production method in line with the preference of certain consumers for products produced using natural substances and processes.

Organic production therefore shall pursue the following general and specific objectives:

- a. Establish a suitable management system for agriculture that:
 - Respects nature's systems and cycles and sustains and enhances the health of soil, water, plants and animals and the balance between them;
 - Contributes to a high level of biological diversity;
 - Makes responsible use of energy and the natural resources, such as water, soil, organic matter and air;
 - Respects high animal welfare standards and in particular meets animal's species-specific behavioral needs
- b. aim at producing products of high quality
- c. aim to produce a wide variety of foods and other agricultural products that respond to consumer's demand for goods produced by the use of processes that do not harm the environment, human health, plant health or animal health and welfare.
- d. the maintenance and enhancement of soil life, natural soil fertility, soil-stability, soil biodiversity preventing and combating soil compaction and soil erosion with the nourishing of plant primarily through the soil eco-system
- e. the recycling of wastes , by-products of plant and animal origin as input in plant and livestock production.
- f. the maintenance of plant health by preventive measures such as the choice of appropriate species and varieties resistant to pests and diseases, appropriate crop rotations, mechanical and physical methods and the protection of natural enemies of pests.

Some basic rules and regulations

Genetically modified organisms (GMO's) and products produced from GMO's are incompatible with the concept of organic production and consumer's perception of organic products. They should therefore not be used in organic farming or in the processing of organic products

Organic farming should primarily rely on renewable resources within locally organized agricultural systems. In order to minimize the use of non-renewable resources, wastes and by-products of plant and animal origin should be recycled to return nutrients to the land.

Organic plant production should contribute to maintaining and enhancing soil fertility as well as preventing soil erosion. Plants should preferably be fed through the soil eco-system and not through soluble fertilizers added to the soil.

■ Why Organic Farming?

The organic production method plays a dual societal role, where it on the one hand provides for a specific market responding to a consumer demand for organic products and on the other hand delivers public goods contributing to the protection of the environment and animal welfare as well as assisting rural development.

Special labeling of organic products

Processed food should be labeled as organic where all the ingredients or agricultural origin are organic.

In order to create clarity for consumers throughout the European Union for example, the EU logo is used to indicate an organic product. The EU logo does not prevent the simultaneous use of national or private logos.

■ Necessities for International Certification of Organic Farming

Conversion Period

- o For annual crops the conversion period is 24 months prior to sowing of crops eg. For rice 24 months + Life Cycle
- o For perennial crops the conversion period is 36 months before the first harvest of the produce
- o The conversion period can be reduced or extended based on the prior land use

Parallel Production

The same crops grown by a farmer as organic and conventional in the same area is not allowed

Planting Material

- o When organic planting materials (seeds, cuttings/buds/ grafts) are available they must be used
- o When certified organic planting materials are not available chemically untreated conventional materials must be used
- o The use of genetically engineered seeds is not allowed

Diversity in Crop Production

- o Crop rotation shall be followed for annual crops
- o Leguminous crops shall be included in the annual rotation plan
- o Intercropping shall be encouraged in the case of perennial crops

Fertilization Policy

- o All biodegradable plant and animal materials can be used e.g. F.Y.M, bonemeal, cow dung slurry, vermicompost
- o Any minerals shall be applied in its natural forms e.g. rock phosphate, sulphate of potash
- o Bio-fertilizers are allowed eg. Azetobactor, Azospirillum, PSB etc.
- o Soil conditioners like lime and gypsum are allowed
 - Chemical fertilizers are not allowed eg. Urea, DAP, SSP, NPK mixtures etc.
 - Manures containing human excreta and urine not allowed
 - Nitrogenous minerals are not allowed eg. Chilean Nitrate.
 - Potassium minerals with high chlorine content not allowed eg. Chloride of Potash or (Murrate of Potash)



Pest, Disease and Weed management

- o Plant, animal & microbial products produced in the farm are allowed, except tobacco-tea eg. Neem products, cow urine, trichoderma
- o Any brought in materials of plant, animal or microbial preparations shall be certified by a Certification Body (CB) eg. Commercial products
- o The use of synthetic weedicides, fungicides, insecticides and other pesticides are prohibited eg. Gramaxone, Round-up (herbicide), contaf, tilt (fungicide), Ekalux, Furadan (insecticide)
- o Use of synthetic growth regulators prohibited; eg. IAA, IBA, NAA
- o Use of genetically engineered organisms or products are prohibited for pest control e.g. BT cotton or BT maize

Soil and Water Conservation

Burning crop residues for clearing the land is not allowed

Clearing of primary forest is prohibited

Soil erosion shall be controlled Excessive exploitation and depletion of water resources shall not be allowed

Contamination Control and Buffer Zone

Buffer zone shall be provided between organic and conventional farms

Buffer zone shall be adequate enough to prevent any possible contamination to organic farms eg. Hedges, Diversion ditch, vacant space etc.

Options for Organic Certification

Individual Certification

Individual farm or processing facility comes for certification on their own accord

Merits

- No social commitments
- Individual certificate of compliance in hand
- Independent trade possible

Demerits

- Disproportionately high cost of certification
- Small quantities of organic products for trade in hand
- Lack of market intelligence
- Lack power of collective bargaining
- No technical support or advice regarding organic farming and processing

Group Certification

A group of farmers or processors come for certification with a documented internal control system (only applicable for small farmers and processors)

Merits

- Cost of certification is shared
- Sizable quantity for export
- Organized marketing and hence collective bargaining power
- Technical support regarding farming by the group to its member farmers
- Support from funding agencies possible

Demerits

- No certificate for individuals
- No organic marketing allowed for individuals

Basic Requirement of a Group Certification System

Internal Control System (ICS)

What is an ICS?

It is a documented quality assurance system that allows an external certification body to **delegate the annual inspection** of individual group members to an identified body within the certified operator.

The certification body will then evaluate whether the ICS is working well and efficiently.

The evaluation includes

- **checking the ICS documentation system**
- **staff qualifications**
- **re-inspecting some farmers**

Minimum Requirement of an Internal Control System

- Registered legal entity of a farmers group.
- Definite organizational structure with clear roles and responsibilities.
- Qualified and well trained personnel.
- ICS manual (policies, procedures, documents and formats)
- Records



Training for qualification of ICS personal

Organizational Structure with Roles and Responsibilities

- **ICS chief (name)**
 - Overall management
 - External certification
- **Approval committee (name)**
 - Approval/sanctions
 - Dealing appeals if any regarding approval decisions
- **Marketing manager (name)**
 - Procurement from farmers
 - Finance control
 - Processing and labeling
 - Export
- **Internal Inspectors (name)**
 - Internal inspections
 - Reporting
 - Yield estimation & marketable surplus
- **Farm advisors and trainers (name)**
 - Extension service to farmers
 - Farmer trainings
 - Staff training sessions



Training of farmers in ICS procedures

Procedures

- **Registration of new farmer**
 - Applies to the group for membership in prescribed format (farm entrance form) with field history (last 3 years)
 - Scrutiny of the application by the ICS chief
 - Formal admission of farmer to the group with a code number
 - Farmer signing a contract with the group
 - Farm diary and other relevant information are made available to the farmers for completion by farmer
- **Internal farm inspection**
 - All registered farmers are inspected twice a year against a set of internal regulations
 - Inspection will take place before the harvest
 - Internal inspection will be done on areas like...

Farm Boundaries



Inspection of field boundaries and crop production by internal and external inspectors

- Crop production
- Personnel interviews
- Verification of farm documentation



Verification of farm documents by inspector

- Storage of inputs and produce
- On-farm processing facilities
- Risk assessment
- Report preparation in standard inspection checklist
- Avoiding conflict of interest during inspections
- **Internal approval/ sanctioning (punishments)**
 - A constituted approval system in place
 - A committee
 - Designated person
 - Approval independent of internal inspections
 - Approval/sanctions based on internal inspection reports and a set of guidelines (sanction catalogue)
 - Approval/ sanction is communicated to the farmer properly
 - Approval procedure lead to finalizing the approved and sanctioned farmers list
 - Avoiding any conflict of interest in the decision making process

- **Complaints and appealing procedures**
 - Farmer appeals handling procedure
 - Farmer complaints
 - Customer complaints
 - Any others
- **Procedure for yield estimation**
 - On what basis (number of plants, area, locality, climate etc.)
 - When it is done in an year
 - Who does it

Documents

Internal Organic Standard

- Describes the relevant organic farm production requirements
- Is a local interpretation of the applicable organic standards. What do our members need to do to become an organic farm?
- Takes into consideration all applicable standards and own quality expectations
- Is written in simple, practical language in order to be understood by farmers and ICS staff

Principles of Organic Production to be Included in the Internal Organic Standard

● **NOTE: highly dependent on the applied standard & the certifier's interpretation of the standard**



● Organic and Non-organic Production Unit

- The farm has to convert all crops & areas to organic farming OR ensure a clear separation of organic and non-organic fields.
- All crops on the organic field must be managed organically.
- The same organic crops may not be also produced in non-organic quality.
- Separation of input storage, prevent any contamination of organic fields.

Sustainable Soil Management

- crop rotation, green manure, cover crops, mulching
- use of compost (plant residues, livestock manure)
- restricted use mineral fertilizers (list in standard);
- no chemical fertilizer (e.g., no urea)

Plant Protection and Weed Management

- Control of pests, diseases, weeds by appropriate cultivation measures (incl. crop rotation), mechanical measures, protection/propagation of natural enemies
- Restricted use of organic pesticides (list in standard), no chemical pesticides
- No chemical herbicides, weed control by slashing/hoeing

Organic Seeds or Planting Stock

- Organic seeds/planting stock; conventional material only under certain conditions
- No GMO (Genetically modified organisms)

Animal Husbandry (if livestock not certified)

- Animal welfare
- Organic fodder where possible, no preventive medication, no contamination of organic fields

Harvest and Post-Harvest Procedures

- Separation of crops
- No contamination of crops



Organically grown ginger crop from
Kebupaten Karanganyar;
2 years old plant

Sanction Catalogue

Sanctions

- Written condition needed
- Possible Penalty :ICS will fine farmers
- Suspension for a fixed period until the farmer takes corrective actions requested (remains certified)
- Decertification of farmers --> Renewed conversion period of 36 months

Situation when Sanction Applies

- Minor deficiencies in record keeping, weak farm management. Minor violations of the standards or regulations
- Repeated written condition for similar problem
Not responding to conditions
Major deficiencies in record keeping
- Repeated minor violations
Clear violation of the standards but not threatening the organic integrity of the product.
- Clear violation of the standards threatening the organic integrity of the product.

Situation When Farmers have to be Excluded

- Farmer banned from ICS membership either permanently or for a set time: Obvious fraud, intentional obstruction of the inspection process, refusal to respond to written requests

Example Non-compliance	Example Sanction / Reaction
Farmer has sprayed his/her organic crops	Farmer de-certified for 3 years (new conversion). Possibly expelled from organic program. Check whether products already bought.
Farmer has sprayed home consumption crops intercropped with organic crop	Farmer de-certified for 3 years (new conversion). Possibly expelled from organic program. Check whether products already bought.
Farmer has sprayed home consumption garden far away from organic garden but not allowed per internal regulation	Farmer suspended as punishment for 1 yr. Sprayed plot recorded on map as conventional. Additional training for farmer.
Farmer has neglected his farm and has not taken any soil improvement measures	Written/oral condition to farmer. Additional training. If repeatedly: discuss whether shall remain member.
De-certified coffee has been mixed with organic coffee of fellow farmers in village	Find out which lots are “contaminated”; mark these lots as conventional.
Farmer sells double his estimated harvest	Send field officer to investigate in the fields. If farmer has sold products of somebody else – expel from organic program.
Buying officer has bought from not certified farmers	Find where the conventional product is now, downgrade product to conventional. If already sold, inform certifier. Train buying officer (or dismiss him if fraud).

Formats

- Farm entrance form
- Internal farmer contract
- Internal inspection checklist
- Farm diary
- Risk assessment template

In case of a project involvement:

- Description of the project with activities

Useful additional information:

- Background history of the project area

- Description of climate and other agronomical features of the project area

Records

- Training records (staff & farmer)
- Buying records
- Sales records
- Stock records
- Risk assessment for current year
- Approved and sanctioned farmers list
- Updated overview map of the project



PPP Project Background Information

The Private-Public Partnership Project

“Restoration and Sustainable Eco-Spice Production and Processing in the Borobudur Region”

The organic Rainforestation Farming is a joint effort of different Non-Governmental Organizations to establish in cooperation and with the financial support of Government agencies a model project for the production of organically produced spices in the shade of indigenous trees

Main Goals:

- ◆ Sustainable improvement of the livelihood of subsistence farmers
- ◆ Integration of local culture and nature

These are the challenges the members of the Forum Borobudur are dealing with to reestablish their ecosystem and biodiversity.

The Indonesian Rainforest Foundation (IRF) the most important partners of the model project, sponsored by Kreditanstalt für Wiederaufbau(KfW)/ Deutsche Entwicklungs Gesellschaft (DEG) together with the Bäuerliche Erzeugergemeinschaft Schwäbisch Hall (BESH) and NatureLife-International (NLI) have joined to empower Forum Borobudur.

The local subsistence farmers produce organic spices following the International criteria of eco-production. These farms will be certified to open access to the European market for their products.

The strict adherence to organic growing and processing is following the Council Regulation (EC) for organic production (EC No. 834/2007).

The gained results of the project can be transferred to ensure improvements on the economical, ecological and social level by applying the Rainforestation Farming principles to other locations.

Project Objectives

1. The production, processing, certification and quality securing of spices produced under ecological conditions and marketing of these bio-spices under Fair Trade conditions.
2. To protect Punthuk Setumbuh, Karanganyar and surrounding areas from continual deforestation and encroachment by developing an economic buffer zone with a social and ecological border within the forested area and by these measures contribute to natural resource protection and climatological issues.
3. To provide sustainable income and improve agro-technology to the local villages in close proximity to the location to reach the overall goal of improvement the livelihood of rural families in the highly populated area of Central Java.
4. To assist with the preservation of biodiversity in the region by using indigenous tree species only and education for the village community in ecosystem preservation.

The base for the sustainable, integrated development in the project area is the rainforestation farming technology developed for over 20 years as a joint effort of the Visayas State University on Leyte in the Philippines and the

University of Hohenheim in Stuttgart, Germany with on-going support from NatureLife International.

Despite the fact that the regional conditions like topography, soil, vegetation and climate as well as cultural history and traditions are different, there is a way to support man and nature and to enable people to help themselves, if the relevant geological, botanical and socio-economic factors are taken into account.

Facing the big challenges like loss of biodiversity, soil erosion and therefore loss of the very base for a good livelihood, sustainable development is the only way possible forward.

Concerning the rainforestation farming method, the re-establishment of production forest ecosystems with the respective stabilization of still existing ecosystems is the base for sustainable agriculture. By this means the soil erosion is stopped, the water retention capacity improved and by an integrated multi-story agriculture with local plants, the provision for long term subsistence with a supported market.

Anticipated Planting Material

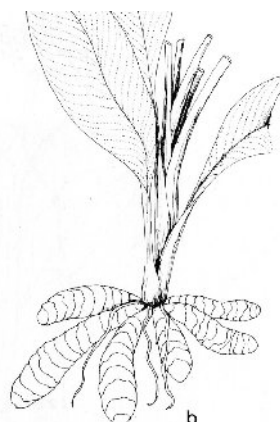
1. The area will be planted with herbs, spices and trees following organic agriculture principles:
2. Organic herbs and spices shall be planted in shade areas beneath the trees and will consist of tumeric (*Curcuma longa*, Family Zingiberaceae), and any other herbs or spices available in the areas as advised by NatureLife International experts in cooperation with the Indonesian Rainforest Foundation.
3. The trees to be planted shall include indigenous native timber trees and fruit tree.
4. The trees, herbs and spices must not be harvested unless it is agreed by all of the local stakeholders namely Indonesian Rainforest Foundation in co-operation with NatureLife- International and the Village Farmers' Cooperative.



Tumeric (*Curcuma longa*
Family Zingiberaceae



Tumeric flower



Drawing of the rhizome part (b)
of the turmeric plant



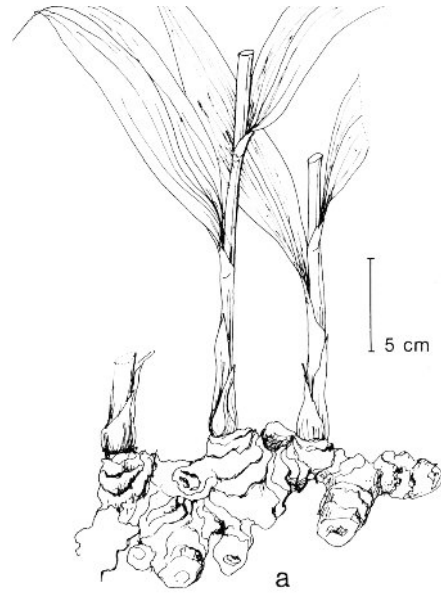
Tumeric Rhizom



Tumeric Rhizom Colour



Ginger (*Zingiber officinalis*) Family Zingiberaceae,



Drawing of the rhizome part (a) of a Ginger plant



Ginger Rhizom



Ginger Rhizom Colour (yellowstrain)

Lemongrass (*Cymbopogon citratus*, Fam. Graminaceae)



Bundle of Lemongrass ready for planting

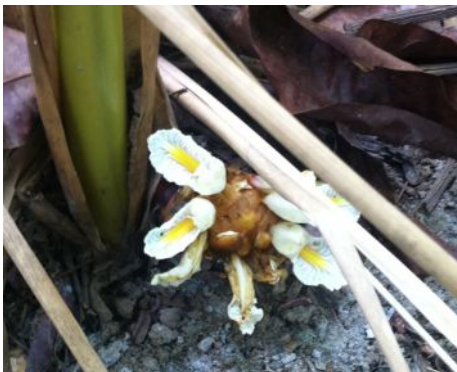


Freshly planted lemongrass

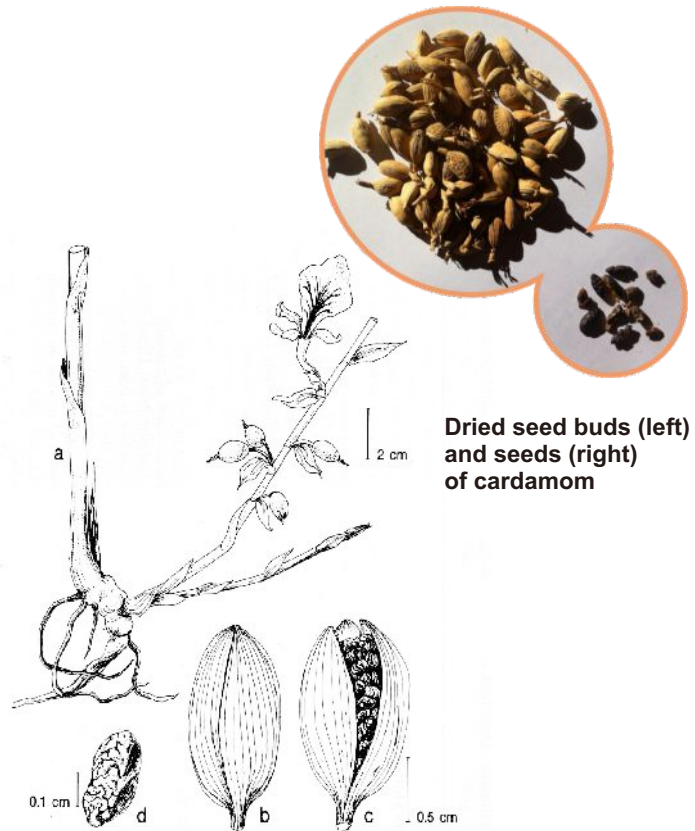
Cardamom (*Elettaria cardamomum*, Fam. Zingiberaceae)



Cardamom Bush under trees



Flower of cardamom



Dried seed buds (left) and seeds (right) of cardamom

Drawing of the flower (a), the seed containing fruit (b-c) and a single seed (d) of cardamom

Plant Nursery and Productions Facilities

1. IRF will prepare the technical Design Master Plan for the project area including, inventory and mapping of the existing coverage of the area, detailed architectural designs of the Plant Nursery Facility and Production Facility for agreement by NatureLife-International.
2. The budgetary details for both facilities will be defined based on the Technical Design Master Plan.
3. A detailed work plan for year 1 to year 3 will be developed by the parties, with technical advisory support on land clearance, nursery set up, processing unit, planting and maintenance be provided by NatureLife-International.
4. IRF will supervise the operation of the Plant Nursery, introduction of eco –agriculture and eco – processing, the Production Facility, the introduction of eco-certification according to EU standards and Ecoland Herbs & Spices necessities and supervise the training of the cooperating farmers and advisors, planting process and maintenance of all herbs, spices and trees, security of quality of the production, marketing and export process.

Social Education

Indonesian Rainforest Foundation and NatureLife-International in association with Forum Borobudur will implement social education programs for the community in the target villages to ensure:

1. Importance of the local ecosystem and the community environment.
2. Trees are not cut down for general use and herbs, spices are grown organically.
3. The village community and their children will understand the issues in relation to the protection of their ecosystems and the benefits of biodiversity.

References

- Frieser, P.,2006.Ginger** , the flavour and the flowers.Pebbles in the sky, Sunshine Plaza, Queensland, Australia: 96 pp
- Göltenboth, F.** , Subsistence Agriculture Improvement. Manual for the humid Tropics.Wau Ecology Institute Handbook No. 10. Margraf Scientific Publishers, Weikersheim, Germany: 228 pp.
- Göltenboth, F. & C.-P. Hutter** (eds.),2003. Paths to sustainable development. New experiences in the Philippines. Hirzel Verlag, Stuttgart, Germany: 80 pp.
- Margraf, J & P.P.Milan**,1996. Rainforestation Farming. A farmers guide to biodiversity management for the Philippines. Philippine-German Applied Tropical Ecology Program VISCA, GTZ-Publication: 35 pp.
- Milan, P.P.** 2009. Rainforestation Farming. A farmer's guide to sustainable forest biodiversity management. Foundation Philippine Environment, Quezon City, Philippines : 33 pp.
- Rehm, S & G.Espig**, 1991. The cultivated plants of the tropics and subtropics. Verlag Josef Margraf, Weikersheim, Germany: 552 pp

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Useful Addresses

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