

Workshop Training for Nursery establishment and seedlings production

General Introduction on the Training Workshop

BTEH hosted this 1st workshop, entitled “Workshop for Nursery establishment and seedlings production” on Saturday 13 December 2008. The aim of the workshop is introducing the concepts and some of the technical methods developed by FORRU-CMU, to increase the capacity of local villagers in area nearby the planting sites for forest restoration for elephant rehabilitation project in Burirum, to plan and carry out effective forest restoration for elephants in a 60 rai area with 30,000 seedlings. A diverse range of local community members joined the workshop. These included 2 PDA officers, 3 local community representatives (25 people), 20 students from government schools, 1 staff from Plant a Tree Today and 2 BTEH staff members.

Opening Remarks

Antoinette van de Water, director of Bring the Elephant Home, welcomed the participants and explained about the Bring the Elephant home foundation and trees for elephants projects and then thanked the PDA, a co-organizer. Each participant then briefly introduced themselves and the work of their organisation.



Antoinette van de Water, director of Bring the Elephant Home, welcomed all the participants

The participants joined the training >>>



The Objective of workshop training: To pass on the forest restoration concepts and technical methods to enable the local villagers to plan and carry out effective forest

ecosystem restoration for “ Trees for Elephants Project” in 2009 aim to forest restoration for elephants rehabilitation at Lammas water park (open zoo island), Lamplaimas, Burirum.

Workshop for Nursery establishment and seedlings production

13 December 2008

PDA (Lam Plaimas office), Burirum

Time	Nursery Training	Location
8:00 A.M	Welcome and introduction	PDA meeting room
8:10 A.M	Forest restoration concept & technique and framework tree species method	"
8:45 A.M	Nursery Establishment	"
9:30 A.M	Phenology, seed collection and seed collection timetable	"
11:00 A.M	Break	"
11:15 A.M	Nursery Work Stations -practical work in 2 groups(1 hr/group) Seed preparation and germination Potting – media, containers and techniques	"
12:30 A.M	Lunch	PDA
1:30 P.M	Nursery Work Station – caring of planting stock, watering, fertilizer, disease / pest control, root pruning, grading and hardening off.	PDA nursery
2:30 P.M	Break	"
2:45 P.M	Seedlings production schedule	"
4:00 P.M	Q&A and Discussion	"
4:30 P.M	Agreement for nursery establishment	"
5:00 P.M	Closed Workshop	"



1. Framework Species Method of Forest Restoration – Basic Concepts

Dutsadee outlined the principles of Framework Tree Species Method, presented the advantages and drawbacks of the method and described the activities needed to implement it.

Framework species method

The “framework tree species method” was applied and developed from FORRU-CMU, Chiang Mai and uses suites of local tree species that promote more rapid natural succession, especially in degraded land. It has the greatest potential where substantial tracts of forest and remnants still exist. In particular this method uses species that attract seed-dispersing animals.

(1) Identification of Framework Tree Species

- Rapid growth with high survival rates.
- Easy seed germination and seedling care in the nursery.
- Dense spreading crowns shade out weeds and “re-capture” the site.
- Attractive to seed-dispersing animals.
- Resilience after fire.

(2) Planting and caring for framework tree species

- Start by surveying forest characteristics and indigenous trees in the local forest.
- Potting preparation in the nursery.
- Prepare area to be planted about 6 weeks before planting.
- Plant seedlings (taken from the nursery) at about 20 – 30 species per rai with a density of about 500 trees per rai and apply fertilizer after planting (50 – 100 g per seedling).

- Weed around trees and apply fertilizer, 3 times during the rainy season, for at least 2 years after planting.
- Undertake fire prevention activities during the hot, dry seasons.

How to restore forest in FORRU planted plots

When planting indigenous forest trees species in deforested areas, mix up the pioneer trees species (with characteristics such as they are fast growing, have broad and dense crowns, have rapid fruiting and are attractive to seed-dispersing animals) and climax tree species (with characteristics such as they have slow growth but are stable for a long time). Plant about 20 – 30 species per rai, with density 500 trees per rai, all at the same time. This method should be sufficient to restore tree cover the area and full recovery of biodiversity.

2. Building and running a nursery for growing native forest trees

The 3 groups of participants brainstormed to create their own community nursery plan. Furthermore, they also had to allocate the responsibilities among themselves for nursery work.



Group 1 Nursery Model and duties of work



Group 2 Nursery Model and duties of work

Question: If we lack of water for watering a large number of seedlings, how we solve this problem? What about a sprinkle system?

Answer (Dutsadee): We don't need to water the whole day only twice per day (morning and evening) by watering can or water hose, if you place the seedlings in open nursery we don't need to water in rainy season also that made us to save time and cost for watering. Watering by hand is better than using sprinklers, since it allows a more precise estimate of the different requirements of different seedling species for water and allows nursery workers to assess the dryness of each batch of seedlings and adjust the amount of water delivered accordingly. For using sprinkle the seedlings don't receive water at the same amount and it waste water and electricity.

Question: Comparison with water from natural resource and tap water, which one is better?

Answer (Dutsadee): In my idea, water from any natural resource is better because water from water supply probably have chemical that can damage the seedlings.

3. Tree species selection

A participatory exercise was run by Dutsadee and Ms. Sudarat Sangkam, a forest restoration project manager from PATT, to encourage participants to discuss species selection for their areas, using the framework criteria and taking into consideration other local requirements. Participants listed a total of **75 species** which they would like to see included in the reforestation program.

The participants then divided them into 4 main groups according to the most prominent framework characteristic and economic needs i) rapid growth rate, ii) slow growth rate but long life, iii) attractive to wildlife, iv) having some economic benefits. The participants planned to select some of these tree species, collect the seed and grow them in the nursery for planting for trees for elephant project in 2008 or 2009. Here are some tree species selected by them include food for elephant such as banana, sugar cane, pineapple, elephant grass, bamboo, tufted fishtail palm etc. but will separate from the other planting sites for the conservation forest.

Question : The trees that we will select to plant should have all of 5 framework tree species characteristic in any tree?

Answer (Dutsadee) : The selected trees don't need to have all 5 framework tree species characteristic but each tree should have at least 3 characteristics of framework species such as *Ficus* sp., can grow very fast and much attractive to any wildlife but not resilience after fire. But *Prunus cerasoides* grows very fast but has short life, the crown is not too dense but it has high resilience after fire rate etc. That's why we suggest to plant 20 – 30 species per rai in order to various tree species can cover with all framework species characteristics.

3. Planning your Forest Restoration project

Sudarat presented a PowerPoint presentation on planning and logistics of forest restoration – time, labor and costs. She listed the main types of stakeholders usually involved in forest restoration projects and recommended involving all of them all stages of project planning and implementation, and carefully resolving any disagreements that may arise from differences of opinion. She provided an action timeline for preparing for planting events, outlined maintenance and monitoring activities, and explained how to calculate the costs of restoration.

Planning for trees planting

Time relative to planting event	Action
2 years before	<ul style="list-style-type: none">• Stakeholder consensus reached• First draft of project plan• Nursery establishment
18 months before	<ul style="list-style-type: none">• Seed collection and seedling production
12 – 18 months before	<ul style="list-style-type: none">• Finalize plots to be planted
6 months before	<ul style="list-style-type: none">• Check number of saplings ready for planting
2 months before	<ul style="list-style-type: none">• Begin hardening-off
6 weeks before	<ul style="list-style-type: none">• Demarcate plot boundaries• Mark natural resources of regeneration• Slash weed down to ground level
4 weeks before	<ul style="list-style-type: none">• Label saplings to be monitored• Prepare planting site
1 day before	<ul style="list-style-type: none">• Transport saplings, planting equipment and materials to planting plots
Planting Day	<ul style="list-style-type: none">• Planting event – early rainy season (June for northeastern Thailand)

Caring for planted trees after tree planting

1. Weed around the planted trees at least 3 times during the rainy season until the end of rainy season.
2. Applying fertilizer during the first two rainy seasons, about 50–100 g to each, immediately after planting and at 4-6 week intervals, in a ring about 20 cm from each tree stem.
3. Make firebreaks 10–15 m around planted site before the beginning of the hot, dry season.

4. Tree Phenology

Studies of tree phenology are essential for forest restoration. It aims to determine when fruit and seeds develop, ripen and are dispersed. They can be used to determine the effort required for seed collection throughout the year and optimal seed collection times for individual tree species. We suggest the villagers plan to go to the community forest for phenology observation at least 2 times per month (every 2 weeks).

Question: Why do you need to do every 2 weeks?

Answer (Dutsadee): Based on our experience, observations once per month often miss short flowering events, so intervals of 2 weeks record more flowering events. Once per week is a waste of time, since the trees don't change so fast.

5. Seed Collection



We started with forest tree seed collection, which is related with the phenology study and seed collection for planting. We can't collect forest tree seed all year round, because each type of forest tree produces flowers and fruits at different time periods. Phenology data is very important for seed collection. The participants were shown how to collect fruits for nursery production.

Dutsadee explain about seeds collection

- **Time:** Collect fruits/seeds when the first truly ripe fruits begin to fall.
- **Where:** Collect fruits/seeds from several parent trees as much as possible to avoid inbreeding problem when we plant the trees later. The best way to prevent this is to collect seeds from at least 5 parent trees.
- **How:** If possible, cut fruits from tree branches rather than picking them up from the ground. But for very tall trees, collecting fruits from the forest floor is ok but do not collect any fruits or seeds with signs of fungal infection, teeth marks from animals or small holes made by seed-boring insects.

6. Seed preparation and germination

Each type of forest tree seed has a different dormancy period. In the nursery, we need to learn about the length of dormancy and try to fast track germination to produce seedlings quickly. We explained the concept and causes of seed dormancy and the five main techniques to use to break dormancy and accelerate and maximize germination. We train them by to tackle different kinds of fruits and seeds were demonstrated to the participants and then they practiced themselves. A lot of questions were raised concerning how to propagate some seedling species especially figs which are quite difficult to propagate.

7. Potting, media containers

After seeds are pre-treated, they are ready to sow into germination trays until the seedlings grow large enough to be pricked out. The participants all practiced potting seedlings into bigger container and they were so enjoy this activity.

Potting Mix: consists of forest soil (it has mycorrhizal fungi that help tree seedlings to grow), peanut shells, and coconut husk, mixed in the ratio of 2:1:1. The forest soil can be mixed with the other locally organic matter such as burnt rice husk charcoal, and other coarse material such as coarse sand etc. in the same ratio above.

Container: we suggest using black plastic bags (9x2.5 inches) because they are strong, lightweight, effective and cheap. These can be quite difficult to find in some areas though.

Potting techniques:

1. Fill the potting medium in the plastic bag and make a hole in the medium.
2. Pick a seedling from the germination tray with a spoon and lift it gently by the leaves.
3. Place a seedling in the container and fill in with medium until it is full.
4. Bang the container on the ground to settle the medium.
5. Top up with more medium and press it until the medium surface is 1-2 cm below the container rim.
6. Make sure that the plant is upright and centrally placed.



Participants help us to plant young trees

8. Seedling monitoring and maintenance/seedlings care

Dutsadee explained how to raise seedlings in the nursery, such as watering, fertilizer application, and also pest and disease control for better seedling production to meet the target number for tree planting. After transplanting seedlings into the black plastic bags and placing them under 50 % shade, water them in the morning or in the late afternoon every day and apply a low release fertilizer (osmocote) to accelerate growth (only 10 granules every 3 months).

9. Production scheduling discussion

Dutsadee raised the topic of how to produce seedlings of a wide range of different tree species, which all had different germination rates, growth rate, and also different seed collection periods. The aim is:

- i) Try to produce various species of seedlings of a plantable size (c.40 cm) at the same time, early in the rainy season for planting (the optimal planting time);
- ii) The time in the nursery for growing any seedlings not over 1 year.

A very fruitful discussion then took place among the participants and facilitators. This activity allows the participants to consider more deeply how to plan and manage their seedlings and nursery for better production.

10. Workshop Outcome

From this workshop the participants learnt a lot as follows:

- Learning about how to study forests and the ecosystem approach;
- Learning about the framework trees species method for forest restoration;
- Learning about how to propagate and produce seedlings for forest restoration project;
- Learning about community nursery design and establishment.

11. Workshop conclusion

The workshop ended with the participants resolving to use their new knowledge and techniques, learnt this training workshop, for developing forest restoration activities for elephants rehabilitation at Burirum in 2009 with assistance of Bring the Elephant Home and PDA. They will look for ways forward to start their own nurseries to produce the seedlings for "Trees for Elephants project" for next planting event in 2009. Furthermore, they need to increase cooperation among the local villagers for activities and their knowledge about elephant re-habitat and environment conservation awareness creation.