



## 3<sup>RD</sup> WORKSHOP ON:



# “INTRODUCTION TO FOREST RESTORATION - GENERAL CONCEPTS AND SKILLS”

## FOR KEY STAKEHOLDERS IN THE DOI MAE SALONG REFORESTATION PROJECT

<b>Date</b>	9 <sup>th</sup> – 11 <sup>th</sup> September 2008
<b>Location</b>	Department of Biology, Faculty of Science, Chiang Mai University, Thailand
<b>Sponsored by</b>	IUCN - The World Conservation Union, Bangkok, Thailand
<b>Organized by</b>	Forest Restoration Research Unit (FORRU), Department of Biology, Faculty of Science, Chiang Mai University

### Introduction

FORRU was approached by the IUCN to host a 3<sup>rd</sup> workshop for participants in the Doi Maesalong reforestation program. FORRU-CMU hosted this 3<sup>rd</sup> workshop, entitled “Introduction To Forest Restoration - General Concepts And Skills” from 9<sup>th</sup> – 11<sup>th</sup> September 2008. The objectives of this workshop were the same as for the first two workshops: to pass on the concepts and technical methods developed by FORRU-CMU, and also improve the current situation and special technical training needs from FORRU to enable the key persons to plan and carry out effective forest ecosystem restoration at Doi Mae Salong. The participants and workshop program are presented in the next pages.



### Participants lists

No.	Name	Position / Organization
1	Coln. Songsak Kanchanaudom	Vice Head of Doi Mae Salong Forest Restoration Project, Doi Mae Salong, Chiang Rai
2	Second lieutenant Witsanoo Puttirak	Army communication, Military radio station, Mae Chan, Chiang Rai
3	Mr. Thodsaphol Lamdual	Teacher, Rajpattana school
4	Mr. Sompichai Wullmae	Head of Ar-bare village, Doi Mae Salong, Chiang Rai
5	Mr. Tanyathorn Thammawong	Teacher, Muang school
6	Mr. Ar-kual chermuae	Head of Paka Samakree village, Mae Chan , Chiang Rai
7	Warrant Suraphol Arunjiti	Army inspector, Doi Mae Salong Forest Restoration Project, Doi Mae Salong, Chiang Rai
8	Sergeant Boonsom Namchai	Provincial police, Mae Fah Luang Police Station, Mae Fah Luang, Chiang Rai
9	Mr. Weerapong Pimarn	Director, Ban Mai Santi school
10	Mr. Ar-sare Luaeyual	Head of village assistant , Mae Chan Luang village, Doi Mae Salong , Chiang Rai
11	Mr. Ar-sa Pinituksom	Head of village assistant , Lor Yo village, Doi Mae Salong , Chiang Rai
12	Mr. Ar-yual Meualare	Head of village assistant , Mae Tuar village, Doi Mae Salong , Chiang Rai
13	Mr. Pinit Yaowarat	Teacher, Ban Panasawan school
14	Mr. Yothin Sitiprasert	Head of Youth group, Doi Mae Salong , Chiang Rai
15	Mrs. Sasiprapa Sarachai	Teacher, Doi Mae Salong Nonformal education school

## Workshop Program

Date/Time	Session/Activity
<b>9/9/08</b>	<b>CMU Biology Department</b>
8:30	Registration
8:45	VDO - Introduction to FORRU - (PTT)
9:00	Welcoming remarks - Biology Dept. and IUCN
9:15	Introduction to FORRU-CMU; Basic Concepts - ANR and the framework species method forest restoration
10:30	Break
10:45	Planning time, labour and costs of forest restoration projects
	Questions and Answers
12:00	Lunch
13:00	Tree species selection and seed collection schedules – participatory exercise. Participants prepare seed collection charts for their selected species.
14:15	Break
14:30	Participants make short presentations with photos about current progress of planted sites at DMSL - particularly FWSPP demo plot, planted this year.
15:00	General discussion of applying methods to DMSL
16:00	Close
19:00	Welcome Dinner
<b>10/9/08</b>	<b>FORRU Research Nursery, Doi Suthep-Pui National Park</b>
8:30	Leave for Doi Suthep nursery
9:00	Building and running a tree nursery for forest restoration - look around nursery, then nursery planning in Sala.
9:45	Phenology - voucher specimens, seed collection.
10:45	Discussion - Refreshments
11:00	Nursery Work Stations -practical work in 2 groups of 10 alternating
	Seed preparation and germination
	Potting – media and containers
12:00	Lunch
13:00	Nursery Work Stations - care of planting stock, watering, fertilizer, disease/pest control, root pruning, grading and hardening off.
14:45	Break
15:00	Group Discussion - focusing on production scheduling. Participants complete their production schedule charts started on Day 1 in seed collection session.
16:00	Visit to Doi Suthep Temple

11/9/08	<b>Ban Mae Sa Mai community tree nursery and experimental field plots</b>
8:30	Check out from UNISERV and depart for Ban Mae Sa Mai
10:00	Explore demonstration plots - WWF 2007: plantation design, site prep., spacing, species mixes etc.
10:30	Coffee break
10:45	1998 plot: control vs planted plots, forest structure, seed dispersal, biodiversity recovery.
11:15	WWF 2006 - 2 year old plot development
11:45	Travel down to nursery
12:15	Lunch
13:00	Discussion with BMSM Conservation Committee Community motivation, organization and implementation Fire prevention and suppression
14:30	Depart for Doi Mae Salong - Rendezvous with DMSL minibuses, transfer luggage and drive to DMSL.

## Day 1 : 9<sup>th</sup> September 2008

### Opening Remarks



Associate Professor Dr. Narit Sritasuwan, Head of Biology, Faculty of Science, Chiang Mai University, welcomed the participants and thanked the IUCN and workshop organisers. Each participant then briefly introduced themselves and the work of their organisations.

### Accelerated Natural Forest Regeneration (ANR) and the Framework Species Method of Forest Restoration – Basic Concepts

**Dr. Suthathorn Chairuang斯里**, head of FORRU-education section, introduced the research work of the Forest Restoration Research Unit by PowerPoint. She outlined the principles of ANR, which techniques can be employed under what circumstances, and the site conditions where ANR may be suitable and explained the principles of Framework Tree Species Method, focusing on high land tree species that presented the advantages and drawbacks of the method and described the activities needed to implement it.



Dr.Suthathorn Chairuang斯里 presented the FORRU technique for restore the forest.



Participants from Doi Mae Salong

**Question from the floor:** Should the native trees that we select have all 5 characteristic of framework species in every tree?

**Answer (Dr. Sutthathorn):** Not necessary that the trees that we select have all 5 characteristic of framework species, but it should have some characteristics such as

*Prunus cerasoides* or *Phyllanthus emblica* can grow very fast but they don't have too big crown/dense to shade out weeds etc. This is why we suggest to plant in 1 rai about 20 – 30 species to make sure that all species selected in combination have all 5 characteristics of framework species.

**Question from the floor:** Why do we need to weeding and applying fertilizer? Can we let trees to grow naturally and compete with weeds themselves?

**Answer (Dr.Suthathorn):** We need to prevent our planted trees from competition with the weeds. Especially in rainy season the weeds can grow very well and fast. So, clearing the weeds around planted trees to allow the trees to have time for growing without competitive with applying fertilizer will activate tree's growth rate in order to grow bigger than weeds. If we let trees growing by natural, maybe the trees can't grow very well and have high mortality rate, which was found from our many years of research. That's why FORRU suggest to do weeding and applying fertilizer every 4-6 weeks after planting until the end on rainy season for 2 year until the canopy become closer and shed out weed.

### **Planning your Forest Restoration project**

**Dutsadee Nilubol**, FORRU education officer, presented a PowerPoint on planning and logistics of forest restoration – time, labour and costs. She explained about the main types of stakeholders, usually involved in forest restoration projects, all stages of project planning and implementation, timeline for preparing for planting events, outlined maintenance and monitoring activities, and ran a participatory exercise to allow the participants to practice calculating costs of reforestation. From this it was found that the estimated cost for the restoration on Doi Mae Salong project in 2009 is quite similar FORRU's cost (10,000 – 12,000 Baht/rai) because they have a lot of voluntary labour.

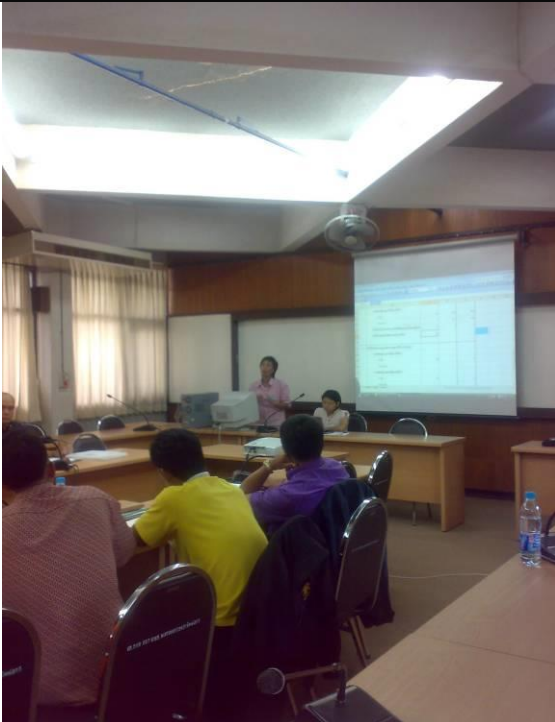
**Question from the floor:** Next year the Supreme Command will plan to plant about 2,000 rai, so how we will find big grant/support for these (about 22 million Baht) and we can't produce a large number of trees by ourselves on time for next year?

**Answer(Dr.Suthathorn) :** To save cost and time, you can take some tree species that the nurseries of the RFD usually produce. Besides that we can ask local schools in Doi Mae Salong to help to produce other framework tree species for this project by letting every school plant different species also. Digging up wildlings from the forest is another way to cut down on nursery production time.

### **Framework Tree Species Selection and Seed Collection Scheduling**

**Dr.Suthathorn Chairuangsrri** - provided a list of 10 main indigenous framework tree species recommended for highland forest, which occur in the project area. After that the FORRU team assisted the participants to prepare seed collection schedules to plan the seed collection work needed for their nurseries, by letting them discuss and make a list of their own favoured species which have the characteristics of framework species and grow locally. The activity was run by dividing them into 2 groups, and guiding them to organize their own seed collection charts for about 20 selected species. The chart specified when and where to collect seeds in and nearby

their communities or villages. The book “Forest Trees of N. Thailand” , flora in Doi Suthep, FORRU poster and staff experience were all used to construct the charts. Villagers’ local knowledge was used to determine where seeds might be found near the villages.



Dutsadee showed the participants how to apply FORRU technique for calculate budget for DML forest restoration project in 2009



Colonel Songsak and his group discussed for selected framework tree species in DML and produced seed collection scheduling

### **FORRU Experimental plots in Doi Mae Salong**

**Mr.Ar-sa Pinitsuksom**, a representative of Ban Lor Yo village, where FORRU established the experimental plot in July 2008 presented a summary of progress with the framework species demo plots established at DMSL in June 2008. FORRU and the local villager helped to plant the trees on 3 rai, 1500 trees of 28 framework tree species taken from FORRU research nursery in Chiang Mai. He presented that the villagers surveyed the planting site 1.5 months after planting and found that most of planted trees are look very healthy and some species were growing very fast and the trees are very tall (about 150 – 160 meter in 4 months), particularly *Prunus cerasoides*, *Melia toosendan*, *Ficus spp.*, *Gmelina arborea* and *Erythrina subumbrans*.

**Question from FORRU :** How frequently do you care for the trees after planting?

**Answer (Ar-sa):** After planting time until now (about 4 months) we did weeding and applied fertilizer 2 times because the weeds did not grow very fast.



**Question from the floor:** For the 2,000 trees planted by the Army, we don't have enough labor for caring after planting and budget for fertilizer application. So we only did weeding 1 time at the end of rainy season, is it suitable or not?

**Answer (Dr.Suthathorn):** As I told you, we need to do weeding and applying fertilizer at least 3 times after planting during 1<sup>st</sup> and 2<sup>nd</sup> rainy season to make the planted trees to grow faster and prevent from competition with weeds. Otherwise they will not grow a root system capable of finding water in the first dry season after planting. However if the weeds at Doi Mae Salong grow slowly we can reduce weeding and applying fertilizer to 1 – 2 times in rainy season.

**Question from the floor:** Can we plant other tree species for economic aspects?

**Answer (Dr.Suthathorn) :** Yes. You can mix framework tree species with trees that have economic value for sale as non-timber product, such as fruit trees and for herbal medicine etc. but we don't recommend to use the trees as timber product or cut the trees later for construction. Actually the framework trees species that FORRU suggested to plant for 20-30 tree species also have economic value such *Phyllanthus emblica*, *Spondias pinnata*, *Eugenia fruticosa* etc.

**Day 2 : 10<sup>th</sup> September 2008**

**FORRU Research Tree Nursery Visiting Program, at Doi Suthep–Pui National Park headquarters.**

**Nursery Establishment**

The 2 groups of participants from Mae Salong project brainstormed to create their own community nursery plan. Furthermore, they also had to allocate the responsibilities among themselves for nursery work.





Participants discuss about nursery model and duties of work



Participant presented about their nursery model

### Why do you established here (in Doi Suthep)?

**Answer (Dutsadee):** The nursery was built at an elevation of 800 - 1,200 a.s.l. It is at the transition between Mixed Deciduous Forest and Evergreen Forest, so the nursery can be used to experiment on native tree species from both types of forest. In addition, the National Park has more than 660 forest tree species to study; the nursery has a reliable water supply and is easy to accessible by motor vehicle for visitors and outreach activities. To establish nursery here, we save cost to build 2 nurseries in both evergreen forest and deciduous forest area.

**Question :** For producing large numbers of tree seedlings such as we plan to plant for 2,000 rai next year assign by Army or we need to produce 1,000,000 seedlings, right? So we don't have enough space for build a nursery for planting all trees?

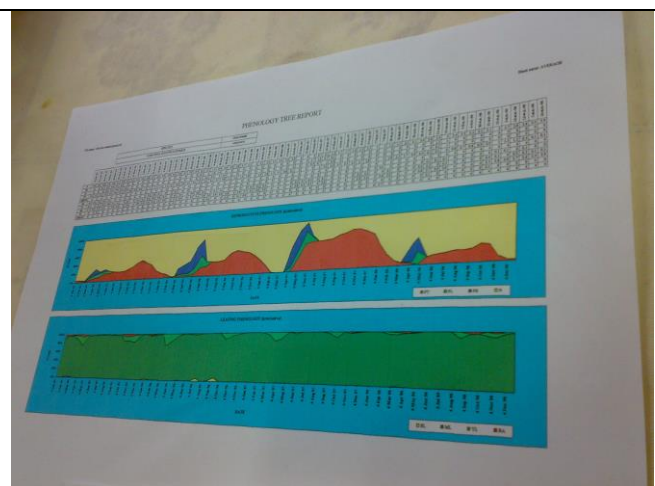
**Answer (Dutsadee):** To solve this problem, we can establish the nurseries in every school and village in Doi Mae Salong and assign every nursery to produce 20-30 seedlings for big trees planting in next year. Furthermore, you can reduce the number of seedlings production by asking tree seedlings supported by the forestry department's nurseries nearby Chiang Rai province.

### Phenology Survey

Ms.Parinyarat Jinto taked participants walked along the nature study trail and looked at the trees along the example trail, then observed trees with binoculars and gave scores for reproductive phenology and leafing phenology, which they recorded on a worksheet. Furthermore, she showed how to make a good specimen of any trees and dry them before take them to identify by botanists.



Parinyarat teaching about how to observe and give score for phenology survey



Example of phenology data of *Garcinia xanthochymus*

**Question: Why do you collect the data every 3 weeks?**

**Answer (Parinyarat):** Based on FORRU's experience, observations once per month often miss short flowering events, so intervals of 3 weeks record more flowering events. Once per week is a waste of time, since the trees don't change so fast.

**Question: Why do we need to observe from many trees as FORRU suggested to select same tree species at least 5 trees?**

**Answer (Dutsadee):** Because need to check the variability in time for fruiting and flowering of any trees species from many trees. For example the *Cinnamomum verum*, there are 2 *Cinnamon* trees grow next to each other (5 meters apart) but look very different of leafing phenology, so that why we suggest you to find at least 5 same tree species for study phenology.

**Question: If the leaf and the fruit in any trees that we observe are less than  $\frac{1}{4}$  of any quarter of the circle(crown), can we give 0 or 0.5 score?**

**Answer (Parinyarat):** for leafing phenology, if it less than  $\frac{1}{4}$  of any quarter we can give 0 score but for reproductive phenology, if we found fruits less than  $\frac{1}{4}$  of any quarter or found only 1 fruit we can't give 0 score but we should give the score at least 0.5 score because we need to collect the seed when the trees produce any fruit.

**Question: What time that is the most suitable time for collect the seed from any tree?**

**Answer(Cherdsak) :** When you observe seeds just beginning to be dispersed (animals attracted to them or blowing away in the wind). He also showed how to analyse the phenology using the graph of *Garcinia xanthochymus* for 3 years as example. This showed that the suitable time for seed collection of this species is September to November.

## 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. The techniques used in FORRU nursery 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.

## 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.

## Seedling Care

Cherdsak 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.

## Production scheduling discussion

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

## Day 3 : 11<sup>th</sup> September 2008 – Field trials and community aspects of forest restoration

### Discussion with BMSM Conservation Committee

**Mr.Neng Tanomworakul**, a Ban Mae Sa Mai nursery manager and a conservation committee, explain about the background and history of Ban Mae Sa Mai village, general information of the village, plantation method and activities of the Ban Mae Sa Mai environmental conservation club from the past until now.

**How many households are there in Ban Mae Sa Mai and what is the population size?**

**Answer:** In the past there was only one village: Ban Mae Sa Mai. Now there are two, as we divided up the growing population all are Hmong. The new village is named Ban Mae Sa Noi. In total in both villages, there are now 210 households and about 1,950 people.

**What is the main occupation of the villagers and how much land area is allocated to each family?**

**Answer:** The main occupation is farmer. Other occupations include casual labor or trading. Most villagers work in the city (80%) especially the younger people. The other 20% have vegetable farms and orchards. In the past, almost all farmers had field crops uphill and litchi orchards downhill. Nowadays, new intensive agriculture is being introduced such as paprika or sweet pepper in nurseries. There are no land title deeds, because the area is in a National Park. The villagers have compromised with the park authority to collect some NTFPs, and some fallen branches for fuel woods. The farming area is about 10 – 15 rai per family. Due to the limited area for farming, many villagers have moved to work in Chiang Mai town.

**Why are the villagers interest to restore the forest? Do the national park authorities force you?**

**Answer:** We started by ourselves because of a critical problem about the lack of water for household and agricultural use. Especially in 1989, we had social conflict amongst water users. Some villagers established the conservation club to address this problem, and it was suggested to try to avoid using the upland areas for agriculture, and to restore and conserve forest in those areas to improve the water source. The national park allows us to live in this national park so we need to plant and protect the forest here also.

**What are the main supporting organizations?**

**Answer:** The main organization is FORRU because 10 years ago FORRU came here to do the research and establish a nursery for the village and hire local villager to take care the trees. Furthermore, FORRU take many group to visit a nursery and experimental plots many time per year like your group so we got the donation from the visiting group to operate the club's activities.

**Does the National Park provide any support?**

**Answer:** Doi Suthep-Pui National Park provides some labor on planting day and also supports the firebreak cutting activity and also some money to support the fire-lookout team.

## What is the usefulness of forest restoration?

**Answer:** After restoring the forest here for 10 years we found that:

- There is an increase in wildlife returning to the forest, such as civets, hog badgers, barking deer, wild boar etc.
- There is an increase in rainfall and more water and it flows all year.
- Better image to public and society towards environmental conservation

## Ban Mae Sa Mai Community Tree Nursery and Experimental Field Plots Visiting Program

### Experimental plot planted in 2007 (sponsored by WWF)

Kwankao and Dutsadee led a walk around the Experimental Field Plots planted in June 2007 (15-month old). They explained about how to select sites for planting and how to prepare the site and plant trees in a proper way. Aftercare techniques were also described and the participants viewed the effectiveness of these techniques by examining the trees in the plot.



Kwankao explain about forest regeneration process and biodiversity recovery of tree and wildlife species.



Coffee seedling grown in civet's dung dispersing (more than 10 km) shown the biodiversity recovery in this 10 year olds

### Experiment plot planted in 1998

After finishing 1.3 year old plot, we went to Experimental plot planted in 1998. The forest here are very much different from 1.3 year old plot and participants were amazed by the condition of 10 year old plot. The forest here looks like a natural forest the tree growth and also the biodiversity that had returned. The "control plot" plot next to the 98.3 plot was used for comparison. No tree planting had been implemented there and the plot was still dominated by tall grasses. Very few trees had established beneath the weeds.

## **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 study phenology survey, seed collection and plant specimens.
- Learning about how to propagate and produce seedlings for forest restoration.
- Learning about community nursery design and establishment.
- Learning about how to develop a community approach and also how to manage issues and conflicts among themselves and various stakeholders.

## **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 at Doi Mae Salong in 2008 with assistance of IUCN and FORRU-CMU. They will look for ways forward to find the big grant supporting, increase cooperation among the Thai Royal Army, the head of villagers and villagers for Doi Mae Salong forest restoration activities and their environment conservation awareness creation.