

TREE, SKILLS AND KNOWLEDGE FOR FACILITATING FOREST RESTORATION AND AGROFORESTRY IN NORTHERN THAILAND

INTRODUCTION

Since the disastrous floods in Thailand in 2011, interest in restoring forest cover to the northern watersheds, to increase their capacity to absorb rainwater, has increased. In addition, the role of forests in sequestering carbon, the development of other PES schemes (payments for environmental services) and the promotion of forests as “Green Supermarkets” for villagers have all contributed to increasing demand for native forest trees, as well as the provision of skills and knowledge needed by stakeholders to grow them.

Since 1994, Chiang Mai University’s Forest Restoration Research Unit (FORRU-CMU) has developed a “framework species” approach to rapidly restore indigenous and diverse forest ecosystems, matching the above criteria. The technique involves accelerating natural forest regeneration and enriching it, by planting native forest trees species, selected for their ability to shade out weeds and attract seed dispersing wildlife. Animals and birds, attracted to the planted trees, disperse in the seeds of most other tree species, resulting in rapid biodiversity recovery, litter accumulation (which increases water absorption) and development of a complex root matrix (which prevents soil movement). The unit has successfully applied this approach to restore evergreen forest to upper watershed areas and demonstrated both its effectiveness (Blakesley et al., 2002; Elliott et al., FORRU 2006, 2008) and its acceptability to local communities (Elliott et al., 2012; Elliott, Blakesley and Hardwick in press).

This project is therefore to provide training, technical support and a supply of framework tree seedlings (based on FORRU-CMU’s scientific experience) to facilitate and support the current upsurge in reforestation projects in N. Thailand.

AIM

To provide training, technical support and seedlings of proven framework tree species to organizers and participants in forest restoration and agro-forestry projects in northern Thailand.



OBJECTIVES

To maintain and improve two model tree nurseries (one community nursery and one research nursery) to provide the following services:

- Training, technical support (site assessments, species selection, monitoring etc.) and trees to staff and participants in forest restoration, agro-forestry and PES projects in northern Thailand, based on FORRU-CMU research results.
- Research to further improve tree seedling production and to generate new knowledge for educational materials (species database etc.) to make forest restoration and agro-forestry more practicable.

PROJECT ACTIVITIES

NURSERY SUPPORT AND TREE PRODUCTION

Funding from ICRAF contributed to the operation of two model tree nurseries (a research nursery on Doi Suthep and a community nursery at Ban Mae Sa Mai) and provided payments for labour required to run one of them. The nursery teams collected seeds from 61 indigenous forest tree species during this reporting period (Table 1). They sowed the seeds into plastic trays and monitored them weekly, until 4 weeks without further germination. Once the seedlings had at least 2 pairs of fully expanded true leaves, 37 species were potted into 9" x 2½" plastic bags (totally 21,014 trees) during this reporting period, appropriate fertilizer, pruning and pest control measures were applied. Production was summarized in monthly production reports delivered by the nursery to FORRU's nursery manager (Dr. Panitnard) each month (available on request. By optimum tree planting time (mid June 2013), a total of 34,289 trees of 57 species had been grown to a plantable size in both nurseries (Table 2).

Furthermore, our research nursery near Wat Prathat, Doi Suthep, was maintained as a research facility, for both FORRU staff and CMU students, to develop improved methods for tree production. Techniques developed were tested for their practicability by local people (Hmong hill-tribe villagers) at the community nursery at Ban Mae Sa Mai. Both nurseries were used as venues for education and training events.

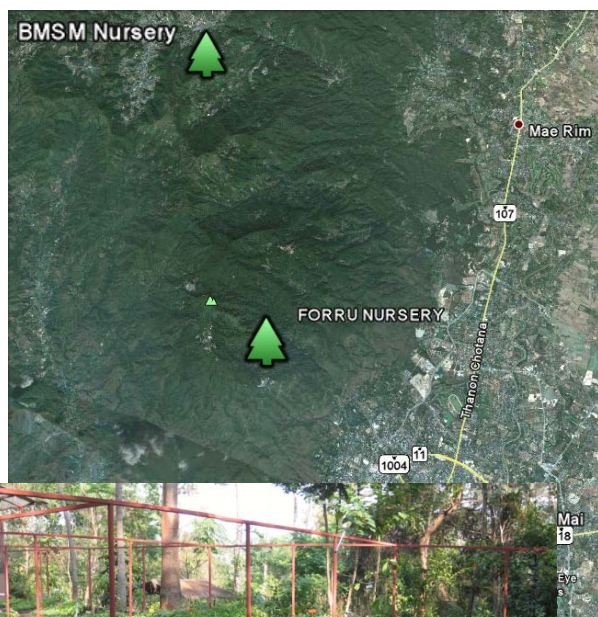


Table 1 - Tree species from which seeds were collected, November 2012 – May 2013. (DS=Doi Suthep Research Nursery; BMSM=Ban Mae Sa Mai Community Tree Nursery)

Collection Month	Botanical Species Name	Common Name	Nursery
NOV/2012	<i>Azelia xylocarpa</i>	มะค่าโมง	DS
NOV/2012	<i>Cinnamomum iners</i>	อบเชย	DS
NOV/2012	<i>Dalbergia oliveri</i>	เกิดแดง	BMSM
NOV/2012	<i>Dalbergia oliveri</i>	ชิงชัน	DS
NOV/2012	<i>Diospyros glandulosa</i>	กล้วยถาษี	DS
NOV/2012	<i>Elaeocarpus lanceifolius</i>	พีพาย	DS
NOV/2012	<i>Garcinia xanthochymus</i>	มะตะหลวง	DS
NOV/2012	<i>Hovenia dulcis</i>	หมอนหิน	DS
NOV/2012	<i>Manglietia garrettii</i>	มณฑาแดง	DS
NOV/2012	<i>Mastixia euonymoides</i>	ชิบะดู่	DS
NOV/2012	<i>Prunus cerasoides</i>	นางพญาเสือโคร่ง	DS
NOV/2012	<i>Sapindus rarak</i>	มะขี้ก	BMSM
NOV/2012	<i>Sapindus rarak</i>	มะขี้ก	DS
NOV/2012	<i>Spondias axillaris</i>	มะกัก	DS
NOV/2012	<i>Toona ciliata</i>	ยมแดง	BMSM
DEC/2012	<i>Bischofia javanica</i>	เดียม	BMSM
DEC/2012	<i>Ficus sp.</i>	มะเดื่อขน	BMSM
DEC/2012	<i>Ficus sp.</i>	มะเดื่อขน	BMSM
DEC/2012	<i>Hovenia dulcis</i>	หมอนหิน	BMSM
DEC/2012	<i>Phyllanthus emblica</i>	มะขามป้อม	BMSM
DEC/2012	<i>Prunus cerasoides</i>	นางพญาเสือโคร่ง	DS
JAN/2013	<i>Albizia lebbeck</i>	พฤษกษ	DS
JAN/2013	<i>Albizia lebbeck</i>	พฤษกษ	DS
JAN/2013	<i>Cratoxylum cochinchinense</i>	ตัวเกลี้ยง	DS
JAN/2013	<i>Ficus semicordata</i>	เดือปล่องหิน	DS
JAN/2013	<i>Ficus sp.</i>	ไทร	BMSM
JAN/2013	<i>Ficus sp.</i>	ไทร	BMSM
JAN/2013	<i>Oroxylum indicum</i>	เพกา	DS
JAN/2013	<i>Phyllanthus emblica</i>	มะขามป้อม	DS
JAN/2013	<i>Terminalia bellirica</i>	สมอพิเภก	DS
FEB/2013	<i>Artocarpus lanceolata</i>	ขนุนป่า	DS
FEB/2013	<i>Cassia bakeriana</i>	กัลปพฤษกษ	DS
FEB/2013	<i>Cassia javanica</i>	กัลปพฤษกษ	DS
FEB/2013	<i>Diospyros ehretioides</i>	ด้บเต่าตัน	DS
FEB/2013	<i>Ficus benjamina</i>	ไทรย้อย	DS
FEB/2013	<i>Ficus sp.</i>	เดือขนทอง	BMSM
FEB/2013	<i>Ficus sp.</i>	มะเดื่อขน	BMSM
FEB/2013	<i>Glochidion kerrii</i>	ไคร้	DS
FEB/2013	<i>Melia toosendan</i>	เสียน	DS
FEB/2013	<i>Millingtonia hortensis</i>	กาสะลอง	DS
MAR/2013	<i>Alseodaphne andersonii</i>	ทังใบช่อ	BMSM
MAR/2013	<i>Alstonia scholaris</i>	ดินเบ็ด	DS

Collection Month	Botanical Species Name	Common Name	Nursery
MAR/2013	<i>Aphanamixis polystachya</i>	ตาเสือ	DS
MAR/2013	<i>Bauhinia purpurea</i>	เสี้ยวดอกแดง	DS
MAR/2013	<i>Bauhinia sp.</i>	เสี้ยวใหญ่	BMSM
MAR/2013	<i>Betula alnoides</i>	กำลังเสือโคร่ง	DS
MAR/2013	<i>Erythrina subumbrans</i>	ทองกลางป่า	DS
MAR/2013	<i>Eugenia sp.</i>	หว่า	DS
MAR/2013	<i>Ficus benjamina</i>	ไทรย้อย	BMSM
MAR/2013	<i>Ficus callosa</i>	มะเดื่อกวาง	DS
MAR/2013	<i>Ficus microcarpa</i>	ไทรย้อยใบทู่	DS
MAR/2013	<i>Ficus microcarpa</i>	ไทรย้อยใบทู่	DS
MAR/2013	<i>Glochidion acuminatum</i>	ไคร้มด	BMSM
MAR/2013	<i>Gmelina arborea</i>	ซ้อ	DS
MAR/2013	<i>Holoptelea integrifolia</i>	กระเข้	DS
MAR/2013	<i>Lagerstoemia tomentosa</i>	เสลา	BMSM
MAR/2013	<i>Phyllanthus emblica</i>	มะขามป้อม	BMSM
APR/2013	<i>Acrocarpus fraxinifolius</i>	สะเดาข้าง	DS
APR/2013	<i>Anacolosia ilicoides</i>	ก้อแซะ	DS
APR/2013	<i>Artocarpus lanceolata</i>	ขนุนป่า	DS
APR/2013	<i>Castanopsis calathiformis</i>	ก้อหมุดออย	BMSM
APR/2013	<i>Castanopsis tribuloides</i>	ก้อใบเลื่อม	DS
APR/2013	<i>Dillenia aurea</i>	ส้านใหญ่	BMSM
APR/2013	<i>Dipterocarpus costatus</i>	ยางปาย	DS
APR/2013	<i>Duabanga grandiflora</i>	ลำพูป่า	DS
APR/2013	<i>Erythrina subumbrans</i>	ทองกลางป่า	BMSM
APR/2013	<i>Ficus benjamina</i>	ไทรย้อย	BMSM
APR/2013	<i>Ficus variegata</i>	ผูก	BMSM
APR/2013	<i>Gmelina arborea</i>	ซ้อ	BMSM
APR/2013	<i>Horsfieldia thorelii</i>	เสือดม้า	DS
APR/2013	<i>Hovenia dulcis</i>	หมอนหิน	BMSM
APR/2013	<i>Quercus semiserrata</i>	ก้อดาหมูหลวง	DS
APR/2013	<i>Toona ciliata</i>	ยมหอม	DS
MAY/2013	<i>Archidendron clypearia</i>	ไคร้ย้อย	BMSM
MAY/2013	<i>Eugenia albiflora</i>	มะห้ำ	DS
MAY/2013	<i>Ficus altissima</i>	กร่าง	BMSM
MAY/2013	<i>Ficus fistulosa</i>	มะเดื่อปล้อง	DS
MAY/2013	<i>Prunus cerasoides</i>	นางพญาเสือโคร่ง	DS

Table 2 - List of species and numbers of trees currently under production (up to end May 2013)
(DS=Doi Suthep Research Nursery; BMSM=Ban Mae Sa Mai Community Tree Nursery)

No.	Botanical Species Name	Common Name	DS	BMSM
1	<i>Adenantha microsperma</i>	มะกล่ำตาไก่	356	140
2	<i>Azelia xylocarpa</i>	มะค่าโมง		1,040
3	<i>Alangium kurzii</i>	ฝาละมี	31	
4	<i>Alstonia scholaris</i>	สัตตบรรณ		20
5	<i>Anacolosia ilicoides</i>	ก่อแฉะ	119	
6	<i>Antidesma bunius</i>	มะเมาดง		760
7	<i>Artocarpus lakoocha</i>	หาด	55	
8	<i>Artocarpus lanceolata</i>	ขนุนป่า	720	500
9	<i>Bauhinia variegata</i> Linn.	เสี้ยวดอกขาว		1,270
10	<i>Bischofia javanica</i>	เด็ม	1,116	2,050
11	<i>Castanopsis acuminatissima</i>	ก่อเด็ย	482	570
12	<i>Castanopsis calathiformis</i>	ก่อหมุดอย		570
13	<i>Castanopsis tribuloides</i>	ก่อใบเลื่อม	946	560
14	<i>Cinnamomum caudatum</i>	จวงหอม		20
15	<i>Cinnamomum iners</i>	อบเชย	432	
16	<i>Cryptocarya amygdalina</i>	หมากขี้ไต้	733	
17	<i>Dalbergia oliveri</i>	ชิงชัน	91	340
18	<i>Diospyros glandulosa</i>	กล้วยถาผี		80
19	<i>Duabanga grandiflora</i>	ลำพูป่า		650
20	<i>Erythrina subumbrans</i>	ทองหลางป่า		70
21	<i>Eugenia cumini</i>	หว่าขี้แพะ	1,036	
22	<i>Eugenia tetragona</i>	หว่าป่า	777	
23	<i>Ficus auriculata</i>	เดื่อใบใหญ่	979	339
24	<i>Ficus benjamina</i>	ไทรย้อย		10
25	<i>Ficus callosa</i>	มะเดื่อกวาง	212	
26	<i>Ficus glaberrima</i>	เดื่อไทร		20
27	<i>Ficus hispida</i>	มะเดื่อปล้อง	208	
28	<i>Ficus racemosa</i>	มะเดื่ออุทุมพร		130
29	<i>Gmelina arborea</i>	ช่อ	39	
30	<i>Heynea trijuca</i>	ดาเลื้อยทุ่ง	216	1,160
31	<i>Holoptelea intergrifolia</i>	กระเชา	180	
32	<i>Hopea odorata</i>	ตะเคียนทอง	42	
33	<i>Hovenia dulcis</i>	หมอนหิน	36	590
34	<i>Irvingia malayana</i>	กระบก		50
35	<i>Litocarpus sootepensis</i>	ก่อหัวหมู		360
36	<i>Litsea salicifolia</i>	พะโล้	45	
37	<i>Macaranga denticulata</i>	ตองแตบ	36	
38	<i>Machilus bombycina</i>	???	1,810	
39	<i>Mammea siamensis</i>	สารภี	77	
40	<i>Manglietia garrettii</i>	มณฑาแดง		130
41	<i>Measua ferrea</i>	บุนนาค	1,055	200
42	<i>Melia toosendan</i>	เสียน	7	
43	<i>Michelia baillonii</i>	จำปีป่า	176	
44	<i>Michelia champaca</i>	จำปา		180
45	<i>Nephelium hypoleucum</i>	คอแลน	44	

No.	Botanical Species Name	Common Name	DS	BMSM
46	<i>Phoebe lanceolata</i>	ตองหอม		1,740
47	<i>Phyllanthus emblica</i>	มะขามป้อม	216	
48	<i>Podocarpus neriifolius</i>	พญาไม้		400
49	<i>Protium serratum</i>	มะแฟน		220
50	<i>Prunus cerasoides</i>	นางพญาเสือโคร่ง	2,583	1,110
51	<i>Reevesia pubescens</i>	โมลี		180
52	<i>Sapindus rarak</i>	มะขี้ก	105	25
53	<i>Sarcosperma arboreum</i>	มะยาง		650
54	<i>Scleropyrum wallichianum</i>	เหมือดคน	478	
55	<i>Spondias axillaris</i>	มะกัก	350	370
56	<i>Spondias lakonensis</i>	มะห่อ	127	180
57	<i>Styrax benzoides</i>	กำยาน		1,690
Total		15,915	18,374	

Where will the trees go?

We have received requests for trees from the following organizations and the trees have already or will shortly be delivered to these sites by the end of July.

Table 3 – Tree supplied to tree planting projects thus far. We expect more requests will follow.

Organization	Location	No. Trees provided
FORRU/Rajapreuk Foundation	Ma Sa Upper Watershed	4,800
Royal Project	Mon Cham	10,000
Warm Heart	Phrao (Agroforestry Project)	570
Prem International School	Mae Rim Campus	30
Ban Mae Ter	Doi Mae Salong (Agroforestry Project)	2,174
Siam Cement	Muang Poon Mine	200
TOTAL		17,774

At Doi Mae Salong, Chiang Rai Province, FORRU-CMU has been investigating the efficacy of the accelerated natural regeneration (ANR) approach to restoring forests, under a major international project, headed by FAO. Although that project has now officially ended, the villagers requested enrichment planting of the ANR site with useful or economically valuable species. We are, therefore, able to provide them with most of the species that they requested in village meetings (run as part of the FAO project). We were also fortunate in receiving a grant from WWF-US to cover much of the planting costs.



Table 4 – Useful or economic tree species supplied from FORRU’s nurseries provided to Ban Mae Ter for enrichment planting of an ANR site.

<i>Cinnamomum caudatum</i>	20	Lauraceae	Bark used as spice
<i>Sapindus rarak</i>	50	Sapindaceae	Fruits for soap
<i>Ficus callosa</i>	50	Moraceae	Edible leaves
<i>Eugenia tetragona</i>	100	Myrtaceae	Edible fruits
<i>Phoebe lanceolata</i>	100	Lauraceae	Edible fruits
<i>Castanopsis acuminatissima</i>	150	Fagaceae	Edible fruits
<i>Phyllanthus emblica</i>	204	Euphorbiaceae	Edible fruits
<i>Styrax benzoides</i>	250	Styracaceae	Valuable resin
<i>Cinnamomum iners</i>	300	Lauraceae	Bark as spice
<i>Prunus cerasoides</i>	450	Rosaceae	Ornamental
<i>Castanopsis tribuloides</i>	500	Fagaceae	Edible fruits
	2,174		

Our other contribution of trees towards an agroforestry initiative is with the Warm Heart Foundation, located in Phrao District, Chiang Mai. The villagers there want enrichment planting of native forest tree species into coffee plantations to diversify their current agricultural systems, which comprises monocultures of corn and coffee. The foundation is developing a demonstration plot to integrate the framework species technique with agricultural systems and act as a learning centre for villagers.

Table 5 – Useful or economic tree species supplied from FORRU’s nurseries to Warm Heart Foundation for integration with agricultural systems in Phrao

Species	Family	Thai name	No. trees	Notes
<i>Alstonia scholaris</i>	Apocynaceae	สัตตบรรณ	20	Excellent fast growing pioneer. Resists chopping and burning.
<i>Gmelina arborea</i>	Verbenaceae	ซ้อ	30	Fast growing hardy and dense shady crown.
<i>Holoptelea intergrifolia</i>	Ulmaceae	กระเซา	40	Very rare tree species. Good for conservation
<i>Hopea odorata</i>	Dipterocarpaceae	ตะเคียนทอง	40	Excellent wood used to make boats. Plant along a gully or stream side.
<i>Ficus hispida</i>	Moraceae	มะเดื่อปล้อง	50	Excellent for soil structure. Evergreen survives well through first dry season. Figs attract seed dispersing birds.
<i>Eugenia cumini</i>	Myrtaceae	หว่าขี้เเพะ	50	Good fast growing hardy. Survives well through first dry season.
<i>Spondias lakonensis</i>	Anacardiaceae	มะห้อม	50	Fast growing. Fruits attract wildlife.
<i>Adenantha pavonina</i>			50	Fixes nitrogen. Improves soil. Fast growing.
<i>Dalbergia oliveri</i>	Leguminosae(P)	ชิงชัน	50	Fixes nitrogen. Improves soil. Fast growing.
<i>Bauhinia variegata</i>	Leguminosae (c)	เสี้ยวดอกขาว	50	Fixes nitrogen. Improves soil. Fast growing. Flowers/fruits within 2-3 years.
<i>Ficus racemosa</i>	Moraceae	มะเดื่ออุทุมพร	50	Excellent for soil structure. Evergreen survives well through first dry season. Figs attract seed dispersing birds.
<i>Azelia xylocarpa</i>	Leguminosae (C)	มะค่าโมง	70	Very high value timber.

FORRU is also contributing large numbers of native forest tree species to the Royal Project Agriculture Centre at Nong Hoi. This project is concerned with watershed rehabilitation directly to support agricultural production on lower slopes. Finally FORRU provided a workshop for the PUR Project in Mae Tang on growing native forest tree species. This project already has its own tree nursery, which was set up last year using FORRU expertise so required only further training support rather than donations of trees. The project is establishing a community forest as “green supermarket” for the local villagers, so emphasis is on NTFP’s.

All these initiatives represent substantial support for agroforestry in northern Thailand, as a direct result of this ICRAF grant. Funds or support in-kind, provided by other organizations, (e.g. WWF at Doi Mae Salong, PUR Project, Warm Heart, Royal Project etc.) can legitimately be viewed as “leverage”.



NURSERY RESEARCH

FORRU nursery staff initiated seed germination trials for 28 species; some species were collected and tested at both nurseries. Germination data are collected weekly to assess total germination per cent, dormancy and synchrony of germination (Table 6). Seedling growth rate measurements were started on 24 potted species. Seedling height, root collar diameter and crown expansion measurements are made on samples of 15 potted seedlings of each species every 45 days (Table 7).

Table 6 - List of species sown under seed germination trials

No.	Botanical Species Name	Collection Date	Sowing Date
1	<i>Acrocarpus fraxinifolius</i> ²	21/1/2013	21/1/2013
2	<i>Azelia xylocarpa</i> ²	30/11/2012	21/1/2013
3	<i>Albizia lebbek</i> ¹	24/12/2013	8/3/2013
4	<i>Alseodaphne andersonii</i> ²	16/3/2012	22/3/2012
5	<i>Artocarpus lanceolata</i> ¹	28/2/2013	11/3/2013
6	<i>Bauhinia purpurea</i> ¹	29/3/2013	3/4/2013
7	<i>Bauhinia purpurea</i> ²	30/3/2012	2/4/2013
8	<i>Cassia bakeriana</i> ¹	28/2/2013	22/2/2013
9	<i>Cassia javanica</i> ¹	23/2/2013	4/4/2013
10	<i>Dalbergia oliveri</i> ¹	30/11/2012	11/3/2013
11	<i>Dalbergia oliveri</i> ²	25/11/2012	21/1/2013
12	<i>Diospyros ehretioides</i> ¹	27/2/2013	11/3/2013
13	<i>Diospyros glandulosa</i> ¹	15/11/2012	3/12/2012
14	<i>Erythrina subumbrans</i> ¹	27/3/2013	3/4/2013
15	<i>Erythrina subumbrans</i> ²	22/4/2012	23/4/2012
16	<i>Eugenia tetragona</i> ¹	16/3/2013	2/4/2013
17	<i>Ficus racemosa</i> ²	24/12/2012	21/1/2013
18	<i>Ficus semicordata</i> ²	14/1/2012	27/1/2013
19	<i>Garcinia xanthochymus</i> ¹	15/11/2012	3/12/2012
20	<i>Gmelina arborea</i> ¹	29/3/2013	19/4/2013
21	<i>Heynea trijuca</i> ¹	8/10/2011	28/10/2011
22	<i>Heynea trijuca</i> ²	26/11/2012	28/11/2012
23	<i>Holoptelea integrifolia</i> ¹	29/3/2013	4/4/2013
24	<i>Hovenia dulcis</i> ¹	27/11/1012	3/12/1012
25	<i>Hovenia dulcis</i> ²	10/12/2012	21/1/2013
26	<i>Manglietia garrettii</i> ¹	27/11/2012	30/11/2012
27	<i>Mastixia euonymoides</i> ¹	15/11/2012	3/12/2012
28	<i>Oroxylum indicum</i> ¹	28/1/2013	11/3/2013
29	<i>Phyllanthus emblica</i> ¹	18/1/2013	11/3/2013
30	<i>Quercus semiserrata</i> ¹	27/4/2013	7/5/2013
31	<i>Sapindus rarak</i> ¹	16/11/55	3/12/2012
32	<i>Sapindus rarak</i> ²	26/11/2012	28/11/2012
33	<i>Spondias axillaris</i> ¹	27/11/2012	3/12/2012
34	<i>Terminalia bellirica</i> ¹	28/12/2012	4/1/2013

¹ At Doi Suthep Research Nursery

² At Ban Mae Sa Mai Community Tree Nursery



Table 7 – Final germination percentage and MLD for experiments terminated during the project period (MLD=median length of dormancy)

No.	Botanical Species Name	Final germination (%)	MLD (days)
1	<i>Albizia lebbbeck</i>	90.00	6
2	<i>Artocarpus lanceolata</i>	93.00	27
3	<i>Bauhinia purpurea</i>	57.67	12
4	<i>Cassia bakeriana</i>	45.00	7
5	<i>Cassia javanica</i>	45.33	5
6	<i>Dalbergia oliveri</i>	78.66	24
7	<i>Diospyros ehretioides</i>	21.67	37
8	<i>Diospyros glandulosa</i>	11.67	92
9	<i>Erythrina subumbrans</i>	30.00	12
10	<i>Eugenia sp.</i>	71.33	41
11	<i>Garcinia xanthochymus</i>	73.67	99
12	<i>Gmelina arborea</i>	41.67	6
13	<i>Holoptelea intergrifolia</i>	83.67	13
14	<i>Hovenia dulcis</i>	23.67	90
15	<i>Manglietia garrettii</i>	13.67	67
16	<i>Oroxylum indicum</i>	91.33	21
17	<i>Phyllanthus emblica</i>	44.33	20
18	<i>Sapindus rarak</i>	52.67	29
19	<i>Spondias axillaris</i>	42.33	66
20	<i>Terminalia bellirica</i>	45.33	87

Table 8 - List of species under seedling growth monitoring

No.	Botanical Species Name	Collection Date	Sowing Date	Potting Date
1	<i>Adenantha microsperma</i>	30/10/2012	6/10/2012	6/11/2012
2	<i>Anacolosa ilicoides</i>	26/6/2011	28/6/2011	11/11/2011
3	<i>Artocarpus lanceolata*</i>	12/10/2012	12/10/2012	12/10/2012
4	<i>Bischofia javanica</i>	9/11/2011	16/12/2011	10/5/2012
5	<i>Castanopsis acuminatissima</i>	11/10/2012	12/10/2012	13/3/2013
6	<i>Cinnamomum iners*</i>	5/11/2012	5/11/2012	5/11/2012
7	<i>Cryptocarya amygdalina</i>	24/9/2012	26/9/2012	19/12/2012
8	<i>Eugenia cumini</i>	28/6/2012	16/7/2012	8/11/2012
9	<i>Eugenia tetragona*</i>	21/9/2012	21/9/2012	21/9/2012
10	<i>Eugenia tetragona*</i>	25/10/2012	25/10/2012	25/10/2012
11	<i>Ficus auriculata</i>	25/4/2011	29/7/2011	6/9/2012
12	<i>Ficus callosa</i>	4/3/2011	29/7/2011	6/9/2012
13	<i>Ficus hispida</i>	15/2/2012	1/3/2012	7/9/2012
14	<i>Gmelina arborea</i>	10/6/2012	29/8/2012	6/11/2012
15	<i>Heynea trijuca</i>	8/10/2011	28/10/2011	11/1/2012
16	<i>Hopea odorata</i>	29/4/2011	30/4/2011	12/1/2012
17	<i>Measua ferrea</i>	13/9/2012	14/9/2012	18/12/2012
18	<i>Michelia baillonii</i>	25/7/2011	23/8/2011	14/12/2011
19	<i>Phyllanthus emblica</i>	28/12/2011	10/2/2012	5/6/2012
20	<i>Podocarpus neriifolius</i>	23/8/2011	23/8/2011	24/11/2011
21	<i>Prunus cerasoides*</i>	16/11/2012	16/11/2012	16/11/2012
22	<i>Quercus brandisiana</i>	30/4/2012	30/8/2012	5/11/2012
23	<i>Scleropyrum wallichianum</i>	21/9/2011	23/9/2011	3/9/2012
24	<i>Spondias lakonensis</i>	8/10/2011	11/10/2011	12/1/2012

* Wildling collection

Table 9 - Relative growth rate for experiments terminated during the project period (RRGR=relative root collar diameter growth rate; RHGR=relative height growth rate)

No.	Botanical Species Name	RRGR		RHGR	
		Mean	SD	Mean	SD
1	<i>Adenanthera microsperma</i>	214.43	76.76	237.95	77.88
2	<i>Anacolosa ilicoides</i>	19.40	67.27	6.25	35.58
3	<i>Artocarpus lanceolata</i> *	156.27	41.52	175.15	76.35
4	<i>Bischofia javanica</i>	69.32	92.60	65.50	67.61
5	<i>Cinnamomum iners</i> *	366.88	156.95	170.48	95.67
6	<i>Cryptocarya amygdalina</i>	217.06	84.68	139.17	68.74
7	<i>Eugenia cumini</i>	11.38	134.00	239.54	92.03
8	<i>Eugenia tetragona</i> *	163.89	76.64	93.16	109.20
9	<i>Heynea trijuca</i>	3.39	105.78	76.04	130.65
10	<i>Measua ferrea</i>	168.82	61.97	89.63	32.25
11	<i>Podocarpus neriifolius</i>	28.47	50.16	11.88	49.71
12	<i>Prunus cerasoides</i> *	205.47	168.61	265.08	104.00
13	<i>Quercus brandisiana</i>	6.65	35.68	43.69	84.67
14	<i>Scleropyrum wallichianum</i>	77.98	43.37	35.30	53.71

* Wildling collection

These data can be used to predict when seedlings will be ready for planting and to distinguish between fast growing pioneer species and shade tolerant climax species. Furthermore, phenological data are collected from mature forest trees, to monitor reproductive and leafing phenology, monthly (since February 2013) at Doi Suthep (Table 8).

Table 10 - List of selected species and amount of each species for phenology study at Doi Suthep

No.	Botanical Species Name	Common Name	Amount of selected tree(s)
1	<i>Acrocarpus fraxinifolius</i>	สะเดาข้าง	4
2	<i>Acronychia pedunculata</i>	กะอวม	5
3	<i>Actinodaphne henryi</i>	ดองลาด	2
4	<i>Adenanthera microsperma</i>	มะกล่ำตาไก่	5
5	<i>Adinandra integerrima</i>	พิกุลป่า	6
6	<i>Afzelia xylocarpa</i>	มะค่าโมง	6
7	<i>Aglaiia lawii</i>	ประยงค์ป่า	6
8	<i>Alangium kurzii</i>	ฝาละมี	4
9	<i>Alseodaphne andersonii</i>	ทังใบขอ	4
10	<i>Alstonia glaucescens</i>	ดินเบ็ด1	2
11	<i>Alstonia scholaris</i>	ดินเบ็ด2	4
12	<i>Anneslea fragrans</i>	สารภีป่า	4
13	<i>Antidesma bunius</i>	มะเมาดง	5
14	<i>Aphanamixis polystachya</i>	ดาเสื่อ	6
15	<i>Aporusa wallichii</i>	ตานโดน	1
16	<i>Aquilaria crassna</i>	กฤษณา	2
17	<i>Artocarpus lakoocha</i>	หาด	3
18	<i>Artocarpus lanceolata</i>	ขนุนป่า	4
19	<i>Baccaurea ramiflora</i>	มะไฟ	6
20	<i>Balakata baccata</i>	สลีนก	9
21	<i>Berrya mollis</i>	เสียงฝ้าย	6
22	<i>Betula alnoides</i>	กำลังเสือโคร่ง	6
23	<i>Bischofia javanica</i>	เดียม	7
24	<i>Bridelia glauca</i>	สีวละที	7
25	<i>Callicarpa arborea</i>	ขำแป้น	5
26	<i>Cassia bakeriana</i>	กัลปพฤกษ์	5
27	<i>Castanopsis acuminatissima</i>	ก่อเดือย	5
28	<i>Castanopsis diversifolia</i>	ก่อแป้น	3
29	<i>Castanopsis tribuloides</i>	ก่อใบเลื่อม	5
30	<i>Cinnamomum caudatum</i>	จวงหอม	5

31	<i>Cinnamomum iners</i>	อบเชย	6
No.	Botanical Species Name	Common Name	Amount of selected tree(s)
32	<i>Cleidion spiciflorum</i>	ดีหมี่	5
33	<i>Colona floribunda</i>	ปอมีน	3
34	<i>Cratoxylum cochinchinense</i>	ตีว	5
35	<i>Crypteronia paniculata</i>	กะอาม	5
36	<i>Cryptocarya amygdalina</i>	หมากขี้ฮ่าย	4
37	<i>Dalbergia cultrata</i>	เกิดเขาควาย	5
38	<i>Dillenia parviflora</i>	มะसानแขวง	3
39	<i>Dillenia pentagyna</i>	ล้านช้าง	2
40	<i>Diospyros ehretioides</i>	ดัมเตาตัน	4
41	<i>Diospyros glandulosa</i>	กล้วยถ้ำ	4
42	<i>Dipterocarpus costatus</i>	ยางปาย	8
43	<i>Duabanga grandiflora</i>	ลำพูป่า	7
44	<i>Dysoxylum procerum</i>	ตาเลื้อขาว	2
45	<i>Eriobotrya bengalensis</i>	จำปัดง/ตะเกราน้ำ?	5
46	<i>Erythrina subumbrans</i>	ทองหลางป่า	4
47	<i>Eugenia albiflora</i>	มะห้า1	8
48	<i>Eugenia albiflora</i>	มะห้า2	4
49	<i>Eugenia fruticosa</i>	หว่าชี่กว้าง	6
50	<i>Eurya acumminata</i>	ปลายสาร	4
51	<i>Ficus altissima</i>	กร่าง	3
52	<i>Ficus microcarpa</i>	ไทรย่อยใบหู	9
53	<i>Ficus semicordata</i>	เตือปล้องหิน	5
54	<i>Garcinia hombroniana</i>	พะวา	1
55	<i>Garcinia mckeaniana</i>	มะตะ	3
56	<i>Garcinia merguensis</i>	นวล	1
57	<i>Garcinia xanthochymus</i>	มะตะหลวง	6
58	<i>Glochidion kerrii</i>	ไคร้	3
59	<i>Gmelina arborea</i>	ช้อ	6
60	<i>Heynea trijuca</i>	ตาเลื้อทุ่ง	2
61	<i>Holoptelea intergrifolia</i>	กระเข	2
62	<i>Hopea odorata</i>	ตะเคียนทอง	5
63	<i>Ilex umbellulata</i>	เนาใน	5
64	<i>Iringia malayana</i>	กระบก	6
65	<i>Lithocarpus garrettianus</i>	ก้อกำงด้าง	7
66	<i>Macaranga denticulata</i>	ดองแตบ	6
67	<i>Magnolia liliifera</i>	มณฑาขาว	7
68	<i>Mangifera sylvatica</i>	มะม่วงชี่ได้	5
69	<i>Manglietia garrettii</i>	มณฑาแดง	5
70	<i>Markhamia stipulata</i>	แคหางค่าง1	3
71	<i>Markhamia stipulata</i>	แคหางค่าง2	6
72	<i>Mastixia euonymoides</i>	ชี่บาด	1
73	<i>Measa ramentacea</i>	ข้าวสารหลวง	1
74	<i>Measua ferrea</i>	บนนาค	8
75	<i>Melia toosendan</i>	เลี่ยน	6
76	<i>Metadina trichotoma</i>	ขมมันตัน	3
77	<i>Michelia baillonii</i>	จำปีป่า	11
78	<i>Michelia floribunda</i>	จำปาป่า	5
79	<i>Micromelum hirsutum</i>	หัสคุณ	4
80	<i>Morus macroura</i>	หมอนหลวง	4
81	<i>Nephelium cuspidatum</i>	ลำไยป่า	4
82	<i>Ostodes paniculata</i>	มะคังดง	1
83	<i>Phoebe cathia</i>	แหลคางคาก	2
84	<i>Phyllanthus emblica</i>	มะขามป้อม	2
85	<i>Picrasma javanica</i>	กอมขน	1
86	<i>Podocarpus neriiifolius</i>	พญาไม้	6
87	<i>Prunus arborea</i>	แดงชิ่ง	1
88	<i>Reevesia pubescens</i>	โมลี	5
89	<i>Rhus rheticsides</i>	กอกกั้น	6
90	<i>Sapindus rarak</i>	มะซึก	3
91	<i>Sarcosperma arboreum</i>	มะยาง	7
92	<i>Schima wallichii</i>	ทะเล้	5
93	<i>Scleropyrum wallichianum</i>	ชี่หนอน	6
94	<i>Semecarpus cochinchinensis</i>	รักขาว	6
95	<i>Shorea roxburghii</i>	พะยอม	6

96	<i>Spondias axillaris</i>	มะกัก	5
No.	Botanical Species Name	Common Name	Amount of selected tree(s)
97	<i>Stereospermum colais</i>	แค	1
98	<i>Strychnos nux-vomica</i>	แสลงใจ	3
99	<i>Styrax benzoides</i>	กำยาน	5
100	<i>Terminalia mucronata</i>	มะเกลือเลือด	4
101	<i>Terminalia myriocarpa</i>	ช่าง	1
102	<i>Toona ciliata</i>	ยมหอม	6
103	<i>Turpinia pomifera</i>	มะกอกฟาน	5
104	<i>Vitex quinata</i>	อีแปะ	4
105	<i>Xanthophyllum flavescens</i>	???	1

EDUCATION ACTIVITIES

A list of educational activities carried out in the nurseries is provided in the table below (DS = Doi Suthep Nursery, BMSM = Ban Mae Sa Mai Nursery). More details of each event are provided in the Appendix. For most events, the organization visiting the nursery covered the additional expenses of actually running these events (and other events were covered from FORRU savings fund), so costs of education are *not* included in the accounts of spending of the ICRAF grant. In addition, two of the organizations made donations for the purchase of nursery materials. This additional income *was* initially indicated in the project accounts, since it demonstrates how ICRAF core funding to maintain these nurseries has helped to facilitate “leverage” of other funds (but was later removed at the request of the ICRAF accountant). ICRAF funding supported the core costs of maintaining the nursery facilities and staff, which could then be used for the educational events listed below.

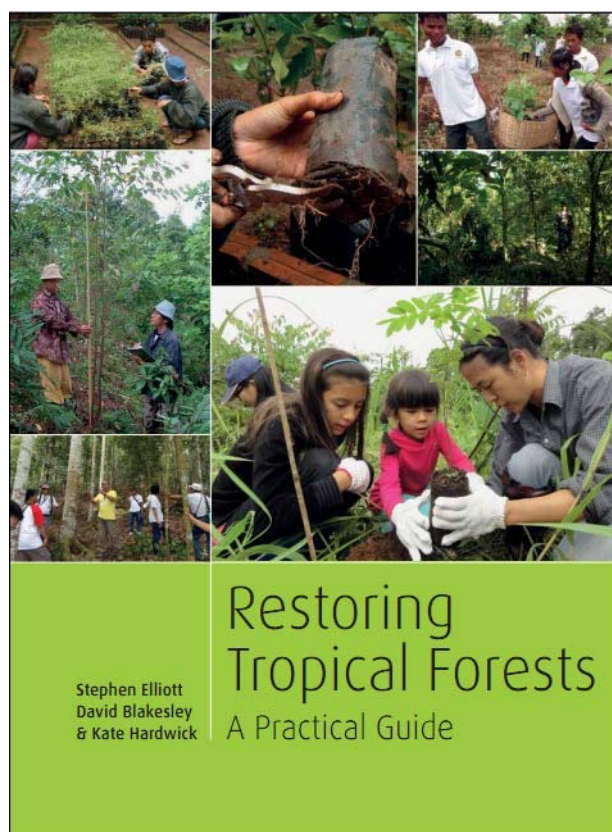


Table 11 – Education/training events during the project period

Date	Group	Activities	Stakeholder Group	Nursery Venue
22/11/12	Cultural Canvas Thailand (NGO)	Brainstorming day for mural painting	School teachers and Ban Mae Sa Mai officials	BMSM
29/11/12	Prem Tinsulinonda International School	Camp- Learning how to pot up trees	School children 14-16 years old	DS
6/12/12	Bangladesh, Ministry of the Environment and Social Research Institute, CMU	Demonstration of native tree growing techniques for government policy in Bangladesh	Bangladesh Government Officials	DS
29/1/13	Rajapruek Foundation (NGO), Lowering Emissions from Asian Forests (International Project), HAPPEN (NGO)	Discussion of tree production for forest restoration above Ban Mae Sa Mai and corridor site	NGO and international project staff	BMSM
25/2/13	Yew Chung, Shanghai International School	Community service - tree propagation.	School children 14-16 years old	BMSM
19-21/3/13 (3 sessions)	Stamford International School, Singapore	Learning how to pot up trees	School children 14-16 years old	DS
20/3/13	International Sustainable Development Studies Institute (Academic)	Introduction to forest restoration and tree growing	University Students	DS
21/3/13	Siam Cement Group (Private Sector)	Developing a model nursery for mine rehabilitation.	Mine rehabilitation officers	DS
25-26/3/13	Thailand Environment Ministry (Chiang Mai Office)	Learning tree propagation methods for PES programs	Villagers, government and NGO officials	DS
30/3/13	Yangon International School	Community service - tree propagation	School children 16-18 years old	BMSM
3/4/13	Prem Tinsulanonda International School Summer Project	Host for School's Summer Project	School children 10-11 years old	DS
4/4/13	CCT workshop for conservation comics books	Conservation techniques through art way	School teachers and Ban Mae Sa Mai officials	BMSM
5/4/13	PUR workshop	Nursery techniques to maximize their abilities	Don Jiang Villagers	DS
1/5/13	Hong Kong International School Camp	Community service - tree propagation	School children 14-15 years old	BMSM
6,8/5/13	Qatar Academic School	Community service - seedling potting	School children 14-15 years old	DS
2/6/13	ACE Singapore School	Community service - seedling potting	School children 10-11 years old	DS
13-15/6/13	BCST, FORRU-Krabi, RFD and HDRI	General workshop on forest restoration concepts and practices, including nursery activities	6 Project Officers	DS
26-19/6/13	Bring the Elephant Home	Workshop on growing/planting trees to implement elephant conservation corridors in Sabah, E. Malaysia	5 project officers	DS and BMSM

REFERENCES

- Blakesley, D., S. Elliott, C. Kuarak, P. Navakitbumrung, S. Zangkum, and V. Anusarnsunthorn, 2002. Propagating framework tree species to restore seasonally dry tropical forest: implications of seasonal seed dispersal and dormancy. *Forest Ecology and Management* 164: 31-38.
- Elliott, S., P. Navakitbumrung, C. Kuarak, S. Zangkum, V. Anusarnsunthorn and D. Blakesley, 2003. Selecting framework tree species for restoring seasonally dry tropical forests in northern Thailand based on field performance. *Forest Ecology and Management* 184: 177-191.
- Elliott, S., C. Kuaraksa, P. Tunjai, T. Toktang, K. Boonsai, S. Sangkum, S. Suwanaratanna and D. Blakesley, 2012. Integrating scientific research with community needs to restore a forest landscape in northern Thailand: a case study of Ban Mae Sa Mai. Chapt. 7 in *A Goal-Oriented Approach to Forest Landscape Restoration*, J. Stanturf (Ed.). Springer.
- Elliott, S., D. Blakesley and K. Hardwick, in press. *Restoring Tropical Forests: a Practical Guide*. Kew Publications, London
- FORRU, 2006. *How to Plant a Forest: The Principles and Practice of Restoring Tropical Forests*. The Forest Restoration Research Unit, Biology Department, Science Faculty, Chiang Mai University, Thailand.
- FORRU, 2008. *Research for Restoring Tropical Forest Ecosystems: A Practical Guide*. Chiang Mai University, Forest Restoration Research Unit, Thailand. 144 pp.



APPENDIX

SOME EXAMPLE EDUCATION

EVENT REPORTS

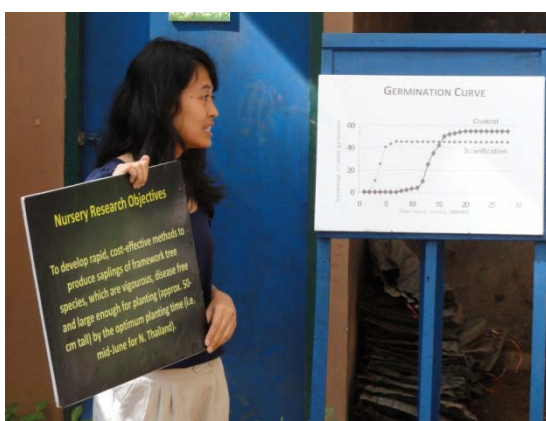
Report on FORRU Workshop Service

Training on Agro-forestry Project Planning (Social Research Institute - CMU)

1. **Type of event** : Workshop for Bangladesh Government Officers on agro-forestry project planning
2. **Date of Event** : December 6, 2012
3. **Duration** 1 day
4. **Location** : Biology Department, Faculty of Science, Chiang Mai University and Doi Suthep FORRU Research Nursery
5. **Main Contact Details of Organizations Participating:**
Meena, Social Research Institute (SRI), Chiang Mai University
Mobile : (085) 527 – 0304, (088) 411 - 5423
Email: christine_honey@hotmail.co.th
6. **Type of participants:** Senior Bangladesh government officers and foreign students.
7. **Number of participants:** 8 officers and 2 CMU students.
8. **Brief of summary of the event and comment**

The workshop began with a PowerPoint on “The principles and values of forest restoration and Global warming and forest restoration” by Dr. Stephen Elliott at Hong Prachum 2, Biology Department. Then, participants went to Doi Suthep – research nursery and had lunch there. In the afternoon, they received training about growing native forest tree species – germination trials, seedling growth experiments and productions schedules by Dr. Panitnard, focusing on economically valued species for agro-forestry. After that, they went to Huay Tung Thao to survey a deciduous forest restoration plot system and learn about plot establishment, maintenance and monitoring and biodiversity recovery. This activity was conducted by Khwankhao, with assistance from Farzana, our Bangladeshi MSc student (who provided some translation of technical terms).

9. **Staff** : Dr. Stephen, Dr. Panitnard, Khwankhao, Golf and DS team



Report on FORRU Workshop Service

Intro to forest restoration and potting trees Stamford International School, Singapore

1. **Type of event** : Environmental Education Events
2. **Dates of Events** : March 19 – 21, 2013
3. **Duration of Events** : 3 days; 2 h each
4. **Location** : FORRU Doi Suthep Nursery, Doi Suthep – Pui National Park, Chiang Mai, THAILAND
5. **Main Contact Details of Organizations Participating:**

Khun Panjanee (Ad) Suwanna, Tridhos Three-Generation Co.,Ltd.

234 moo 3 T.Huay Sai A.Mae Rim Chiang Mai 50180

Mobile : (053) 301 – 472 (School)
6. **Type of participants** : Grade 5 students from Stamford International School, Singapore, Prem Barge Program staff and teachers
7. **Number of participants** : 67 students, 19 Instructors
8. **Brief of summary of the event and comment**

We were asked to provide a short learning process on impact of small organization on the environment and demonstrate the importance of native forest tree species in environmental recovery. The events started by using the posters in the FORRU office to take the students through the forest restoration program in the upper Mae Sa Valley. Students observed the rate of restoration achievable through the framework species method. Next the children were taken through the potting procedures for young saplings and shown the importance of the correct potting technique and the how incorrect potting can lead to problems for trees long after they have been planted out. The students then joined in hands-on potting activity and wrote their names on the containers of the trees they had potted to identify them on planting day. The species used was *Mesua Ferrea* L. The event closed with a group photo in front of the nursery.
9. **Staff** : Golf and DS Nursery Team



Report on FORRU Workshop Service

Nursery practices and forest ecosystems for International Sustainable Development Studies Institute

1. **Type of event** : Environmental Education Event
2. **Date of Event** : March 20, 2013
3. **Duration of Events** = 1/2 day afternoon event
4. **Location** : FORRU Doi Suthep Nursery, Doi Suthep – Pui National Park, Chiang Mai, THAILAND
5. **Main Contact Details of Organizations Participating:**

Khun Rodjana Nasor, The Foundation for Experiential Learning
48/1 Chiang Mai – Lampang Rd. Muang Chiang Mai, THAILAND
6. **Type of participants** : undergraduate students mostly from US, Staff from Thailand and US
7. **Number of participants** : 12 students, 4 Instructors
8. **Brief of summary of the event and comment**

An introduction to the work of FORRU and both ANR and the framework species method of forest restoration were provided by PowerPoint at the lecture room of Doi Suthep HQ complex, by Golf. After that the students were taken along the nature trail where they learnt about forest ecosystems of Doi Suthep, ecotones and were introduced to characteristic plants of evergreen forest, including the importance of *Ficus* spp. to forest ecology and forest restoration. Finally, they returned to FORRU's research nursery to learn about the importance of proper potting techniques to the future growth of planted trees. They all participated in hands-on potting activity using, taught by Golf and Thongyod, using *Mesua ferrea* L. and write their names on the bag for identification on planting day. The event ended with a group photo in front of the nursery sign.

9. **Staff** : Aj.Steve, Golf, Mae Jo trainees and DS Nursery Team



Report on FORRU Workshop Service

Nursery Methods Training for Siam Cement Group (Muang Poon) Rehabilitation Officers

1. **Type of event** : Training for Professionals
2. **Date of Event** : March 20th to 22nd, 2013
3. **Duration of Event**: a 3-day workshop
4. **Location** : Chiang Mai University, Doi Suthep Nursery and Ban Mae Sa Mai
5. **Main Contact Details of Organizations Participating**:

Khun Supakit, Siam Cement Group 279 moo 5 T.Ban Saa A. Jae Hom, Lampang 52120. Tel (054) 271 501
6. **Type of participants** : SCG Staff, Mine Rehabilitation Section
7. **Number of participants** : 3 SCG staff, 5 miners
8. **Brief of summary of the event and comment**

On the first day, in CMU, participants were introduced to the framework species method of forest restoration with particular emphasis on the special problems of rehabilitation open cast mines. Ach. Steve (with translation by Ms Khwankhao) and Ach Sutthathorn provided PowerPoints. They then participated in a project planning exercise. In the afternoon, they learned about nursery research and design (by Khwankhao). On the second day, then were divided into 2 groups: Group A, SCG staff stayed in CMU to learn about species databases. They also carried out data analysis on the trees they had panted the previous year and in the afternoon visited examples of good nature education centres i.e. the Doi Suthep Study Center (CMU) and Huay Hong Krai Study Centre and Nature Trail (Royal Project). Group B, the rehabilitation staff went to the Doi Suthep nursery to review nursery techniques, and tree propagation, i.e. germination experiments, phenology, how to building and use a wildling chamber, covering both practical methods and data collection procedures. Exchange of ideas between the groups was done at a joint working dinner at Daily Restaurant with FORRU staff. On the last day, the whole group went to Ban Mae Sa Mai nursery and Mon Cham study plots. The BMSM nursery was the venue for participants to interact with local villagers and learn about the socio-economic aspects of forest restoration.

Staff : Aj.Steve, Aj. Suthathorn, Kimmim, Golf, Mae Jo trainees and DS Nursery Team



Report on FORRU Workshop Service

Environment Education Event for Hong Kong PTIS

1. **Type of event** : Environmental Education Event
2. **Date of Event** : April 30th and May 1st, 2013
3. **Duration of Events** : 2 full days event
4. **Location** : Mon Cham planting site and Ban Mae Sa Mai, Chiang Mai, THAILAND
5. **Main Contact Details of Organizations Participating:**

Mr. Michael Cumes, Tridhos Three-Generation Co.,Ltd.

234 moo 3 T.Huay Sai A.Mae Rim Chiang Mai 50180

Phone: (053) 301 – 472 (School) Email: michaelc@threegeneration.org
6. **Type of participants** : Grade 6 students from Hong Kong International School, Hong Kong, staffs and PTIS teachers
7. **Number of participants** : 20 students, 3 Instructors
8. **Brief of summary of the event and comment**
On the 30th of April 2013, 20 students and 3 instructors from Hong Kong International School PTIS joined our FORRU Environmental Education 2 days Event. On the 30th of April, they went to Mon Cham planting site to do weeding, mulching and fertilizing. We made an appointment to meet in front of the Botanic garden at 9:00 am and went up to Mon Cham together. They learnt about the FORRU's concept of restorations and worked on the real field. In the afternoon, they went to Royal project's nursery and learned about trees in the nursery. On the 1st of May, They went to our model community: Ban Mae Sa Mai and learnt about the collaboration between the village and the unit. They went on to the view point behind the village's bungalow to get the full picture of the village and then to the holy forest trail and learnt about the spiritual way of protecting the forest. In the late afternoon they had the chance to pot their own trees in the nursery, advertised the planting date and group picture.
9. **Staff** : Dr. Panitnart, Khwankhao, Golf, Trainees and Nursery Team



Report on FORRU Workshop Service

Environment Education Event for Qatar Academy PTIS

1. **Type of event** : Environmental Education Event
2. **Date of Event** : May 6th and 8th, 2013
3. **Duration of Events** : 2 half-day events
4. **Location** : Doi Suthep research nursery, Chiang Mai, THAILAND
5. **Main Contact Details of Organizations Participating:**

Mr. Michael Cumes, Tridhos Three-Generation Co.,Ltd.

234 moo 3 T.Huay Sai A.Mae Rim Chiang Mai 50180

Phone: (053) 301 – 472 (School) Email: michaelc@threegeneration.org
6. **Type of participants** : Students from Qatar Academy (age 13-15), Qatar, staffs and PTIS teachers
7. **Number of participants** : 29 students, 4 Instructors
8. **Brief of summary of the event and comment**

On the 6th (15 students) and the 8th (14 students) of May 2013 and 4 instructors from Qatar Academy PTIS joined our FORRU Environmental Education 2 days Event. On that day, they went to Doi Suthep research nursery to learn about the concepts of restoration, FORRU works and the nursery, and then we went to the fig trail and learnt about the nature and biodiversity along the way. We stopped at the biggest fig tree of Doi Suthep and learnt about the fig story, and then we went back to the nursery and took a break for 15 minutes. After the break, we instructed them about seedling potting and asked them to pot their own trees. They put their name on the bag to make it special for them. Golf announced about the planting event and then left around noon.

9. **Staff** : Golf, Trainees and Nursery Team



Report on FORRU Workshop Service

Environment Education Event For ACE group

1. **Type of event** : Environmental Education Event
2. **Date of Event** : April 30th and May 1st, 2013
3. **Duration of Events** : 2 full days
4. **Location** : Mon Cham planting site and Ban Mae Sa Mai, Chiang Mai, THAILAND
5. **Main Contact Details of Organizations Participating:**

Mr. Gao Linprasert, ACE Institute

8 Lane 1 Gor Muendamphrakot Rd., Chang Puak, Mueang, Chiang Mai 50300

Phone: (081) 884 - 0203 Email: gao.ace@gmail.com

6. **Type of participants** : M.2 Students from Singapore and 6 teachers, 3 ACE staff
7. **Number of participants** : 30 students, 9 Instructors
8. **Brief of summary of the event and comment**

The event began with an intro to the Framework Species Method of forest restoration, seed germination and potting seedlings. Participants were first introduced to of the background of FORRU and the Mae Sa Mai community and were taught about FORRU's approach to forest restoration. The group then hiked, with Golf along a forest trail during which they were introduced to key forest species. The hike ended at a large strangler fig with a presentation on the mutualistic relationship between wasps and fig trees. Then, students returned to the nursery for a snack, and were divided into two groups: 1) seed germination and 2) potting with hands-on activities. The groups were interchanged and the event wrapped up with a review of the morning and a spot quiz about forest fires, different forest types and species biodiversity. Students then had lunch at the canteen and returned home.

9. **Staff** : Kimmim, Golf, Trainees volunteer and Thongyod
10. **Any problems and improvements for next time?**



They are serious Muslim and they are afraid of eating anything that has no Halal sign on it even the break - should buy break from Muslim shop.

