

**PROMOTING COMMUNITY PARTICIPATION IN FOREST LANDSCAPE
RESTORATION: MAINTENANCE OF A FOREST RESTORATION EDUCATION
AND TRAINING SITE IN DOI SUTHEP-PUI NATIONAL PARK**

BY DR. STEPHEN ELLIOTT, FOREST RESTORATION RESEARCH UNIT

SUMMARY

In collaboration with WWF Thailand Program and with financial support from King Power, Chiang Mai University's Forest Restoration Unit successfully implemented the project "Promoting Community Participation in Forest Landscape Restoration: Maintenance of a Forest Restoration Education and Training Site in Doi Suthep-Pui National Park" from 1st June 2006 until 31st May 2009. The main aim of this project was to develop a forest landscape restoration (FLR) demonstration site to promote the concept to visiting groups. This involved developing and maintaining a tree nursery to produce 40,000 framework species trees and planting them to add 60 rai of restored forest to a wildlife corridor, linking two forest remnants in Doi Suthep-Pui National Park. In terms of education, the demo site has been a great success, attracting a very wide range of groups interested in forest restoration, from international workshops to local school children. Visitor numbers have grown exponentially over the project period.

The main achievements are summarized below: -

Year 1 (1/6/06 – 31/4/07)

- 1) Construction of the nursery/education facility was completed near Ban Mae Sa Mai and the unit was opened.
- 2) A 20-rai plot was prepared and planted with framework tree species, including a separate sub-plot for testing rare or endangered tree species.
- 3) Post-planting monitoring indicated low tree mortality during planting.
- 4) The project hosted visits from NGO's (People's Development Association and Plant a Tree Today Foundation), as well as a field trip for the international expert consultation on "Biodiversity in forest restoration: tree diversity in reforestation in the Asia-Pacific Region", organized by Bioversity International.
- 5) Thirty-three tree species were propagated in the nursery for planting in 2007.
- 6) End-of-first-rainy-season monitoring of 2006-planted trees was completed.
- 7) A fire prevention plan was implemented and successful.
- 8) WWF-Thailand Program officer Kuhn Naksit was trained at the site.
- 9) Latest technology (GIS computer model) and participatory techniques were used to select sites for planting in 2007-08.
- 10) The project was presented at an IUFRO conference in Seoul – promoting international importance of the area as FLR demo site.
- 11) Several education events were run on-site for both local and international students.

Year 2 (1/5/07 – 30/4/08)

- 1) Nursery/education facility maintained and expanded with educational trail.
- 2) Sixty-seven tree species (about 16,000 plants) were propagated in the nursery.
- 3) International Visiting Schools Program started to use the nursery for field trips.
- 4) Site used as FLR model to establish other FORRU groups throughout Indochina (China, Cambodia and LaoPDR), for a major Darwin Initiative workshop and for 3 workshops for the Doi Mae Salong reforestation project, resulting in significant inputs into several major regional restoration projects.
- 5) Twenty-rai plot planted in June; post-planting monitoring carried out and weeding and fertilizer application to enhance tree performance.
- 6) The plot planted in 2006 was maintained by weeding and fertilizer application, resulting in excellent tree performance.
- 7) Publicity for project in several newspaper articles and one TV broadcast.
- 8) Fire prevention program over the 2007/2008 dry season was successfully concluded with a religious ceremony and joint meeting among FORRU, villagers and Doi Suthep NP HQ Officers.

Year 3 (1/3/08-31/5/09)

- 1) An additional 20 rai was planted in June 2008 and a TV documentary made of the event.
- 2) Three 20-rai plots, planted 2006, 2007, and 2008 were maintained by weeding and fertilizer application and monitored.
- 3) The nursery/education facility produced saplings of 29 tree species to be used to continue expanding the demo plot systems in June 2009.
- 4) The fire prevention program 2008/2009 was also successful.
- 5) The visiting schools program was augmented with “Trees for a Cooler Climate” camps for 10 Chiang Mai schools organized by British Council, a visit by Swiss forestry students, and visits by Australian students and participants of the World Without Walls program, in association with Asian Oasis.
- 6) The plots and nursery were used for the field trip of the Association for Tropical Biology and Conservation – SE Asia Chapter Conference, an ICRAF workshop, as well as visitors from the Royal Botanical Gardens, Kew.
- 7) During the first half of the year, the nursery and demo plots were used intensively during workshops for the Doi Mae Salong reforestation project, EW Siam Travel Himapan Project, WWF-Greater Mekong BCI project (Vietnam) and Elephant Conservation Network restoration project in Salak Pra Wildlife Sanctuary.
- 8) Thus, the project begins to provide significant inputs into several major regional forest restoration projects.

INTRODUCTION

Since 1996, FORRU-CMU, in collaboration with Doi Suthep-Pui National Park HQ, has developed a close working relationship with a local community in the north of the park. FORRU has worked with the villagers of Ban Mae Sa Mai (BMSM) and the national parks authority to establish trial plots for the demonstration of the framework species method of forest restoration. The site has been recognized as a successful example of Forest Landscape Restoration (FLR); a concept now being promoted by the IUCN and WWF (Mansourian et al., 2005).

In order to maintain and enhance the value of the site, both as a demonstration area to promote FLR, and as wildlife habitat within the national park, it was recognized that further forest restoration was required to restore the deforested areas that remain between the research plots. This would create a “wildlife corridor” to facilitate movement of seed-dispersing wildlife between two remnants of forest and around the watershed. It was also necessary to help maintain the enthusiasm and commitment of the local community. In order to do this, establishment of a better community tree nursery to produce trees for planting and which could also be used for education/extension purposes was identified as a priority. To assist with this, WWF- Thailand Program and King Power Duty-free kindly offered to sponsor the planting and maintenance of framework forest plots over three years (2006-9) and the building and maintenance of a nursery/education facility near the village.



Opening day of the project was attended by King Power staff, WWF officers, Tambon Administration officials, FORRU staff and the villagers of Ban Mae Sa Mai.



PROJECT AIM

To strengthen and expand a forest restoration program in Doi Suthep-Pui National Park for demonstrating the concept of forest landscape restoration (FLR) and for education and training in forest restoration methods.



SPECIFIC OBJECTIVES

- 1) To maintain and expand a community tree nursery and experimental forest restoration plots at the Hmong village of Ban Mae Sa Mai in Doi Suthep-Pui National Park
- 2) To provide an educational facility for forest restoration concepts and methods.
- 3) To act as a demonstration and teaching site for visiting groups from both northern Thailand and regional countries and thus encourage adoption of appropriate techniques for FLR over a wide scale.



The WWF King Power 2006 plot. Top right: planting day June 2006. Mid right: trees growing well by December 2007. Above: the same plot, closing canopy in November 2008, with visiting senior officials from the Royal Society for the Protection of Birds, The Royal Botanic Gardens, Kew and the Bird Conservation Society of Thailand. FORRU-CMU is now involved in joint projects with all these organizations, sponsored by the UK's Darwin Initiative

BAN MAE SA MAI COMMUNITY NURSERY AND EDUCATION CENTRE

During the first year of the project the new nursery/education facility was constructed on about 1 rai of land about 1.5 km north of the village. In addition, a nursery sign and interpretive board in one of the planted plots was constructed and installed, under the direction of Kuhn Surapol from the WWF-Thailand office. The new facility was officially opened on 11th April 2007 by the sponsors WWF and King Power. The facility is serving two functions: 1) producing trees for planting to restore the upper Mae Sa watershed and 2) acting as an education centre to promote forest restoration to a wide range of visiting groups.

TREE PRODUCTION

One of the founding members of the Ban Mae Sa Mai (BMSM) Natural Resources Conservation Group, Kuhn Naeng Siwapattarawong and his daughter Kuhn Busaba Siwapattarawong were employed by the project to carry out all basic nursery operations. They collect tree seeds from local forest remnants, germinate the seeds, pot out seedlings and prepare trees for planting, occasionally helped by other villagers and school children. FORRU-CMU staff member, Kuhn Kwankhao Sinhaseni oversees the nursery operation, providing monthly production reports and dealing with other administrative matters.

Over the 3-year project period, the Ban Mae Sa Mai nursery has performed the impressive task of propagating more than 100 different framework tree species (Table 1) from seeds collected from local forest, and producing at least 50,000 trees for extending the framework tree species plot system by a total of 64 rai (10 ha).



More than 50,000 trees of more than 100 species were grown in the project nursery over 3 years.



Table 1: Framework tree species propagated in the Ban Mae Sa Mai nursery during 2006 to 2009

<i>Acer laurinum</i>	<i>Dillenia parviflora</i>	<i>Michelia baillonii</i>
<i>Acrocarpus fraxinifolius</i>	<i>Dipterocarpus costatus</i>	<i>Michelia champaca</i>
<i>Adenanthera microsperma</i>	<i>Duabanga grandiflora</i>	<i>Millettia macrostachya</i>
<i>Afzelia xylocarpa</i>	<i>Elaeocarpus hygrophilus</i>	<i>Morus macroua</i>
<i>Aglaia grandis</i>	<i>Elaeocarpus sp.</i>	<i>Myrica egaulenta</i>
<i>Aglaia lawii</i>	<i>Erythrina stricta</i>	<i>Nothaphoebe umbelliflora</i>
<i>Alangium kurzii</i>	<i>Erythrina subumbrans</i>	<i>Nyssa javanica</i>
<i>Albizia chinensis</i>	<i>Eugenia albiflora</i>	<i>Oroxylum indicum</i>
<i>Albizia lebeck</i>	<i>Eugenia Formosa</i>	<i>Ostodes paniculata</i>
<i>Alstonia scolaris</i>	<i>Eugenia fruticosa</i>	<i>Phyllanthus emblica</i>
<i>Antidesma acidum</i>	<i>Ficus auriculata</i>	<i>Podocarpus nerifolius</i>
<i>Antidesma bunius</i>	<i>Ficus benghalensis</i>	<i>Polyalthia asteriella</i>
<i>Antidesma sootepense</i>	<i>Ficus benjamina</i>	<i>Polyalthia viridis</i>
<i>Aphanamixis polystachya</i>	<i>Ficus callosa</i>	<i>Protium serratum</i>
<i>Apodytes dimidiata</i>	<i>Ficus fistulosa</i>	<i>Prunus cerasoides</i>
<i>Aquilaria crassna</i>	<i>Ficus glaberrima</i>	<i>Pterocymbium macranthum</i>
<i>Archidendron clypearia</i>	<i>Ficus hirta</i>	<i>Quercus aliena</i>
<i>Artocarpus lakoocha</i>	<i>Ficus microcarpa</i>	<i>Quercus kingiana</i>
<i>Baccaurea ramiflora</i>	<i>Ficus racemosa</i>	<i>Quercus brandissiana</i>
<i>Balakata baccata</i>	<i>Ficus semicordata</i>	<i>Rhus rhetoides</i>
<i>Bauhinia variegata</i>	<i>Garuga pinnata</i>	<i>Rhus succedanea</i>
<i>Betula alnoides</i>	<i>Glochidion sphaerogynum</i>	<i>Sapindus rarak</i>
<i>Bischofia javanica</i>	<i>Gmelina arborea</i>	<i>Sarcosperma arboreum</i>
<i>Brassiopsis ficifolia</i>	<i>Heynea trijuca</i>	<i>Saurauia roxburghii</i>
<i>Bridelia glauca</i>	<i>Hiptage benghalensis</i>	<i>Schima wallichii</i>
<i>Callicarpa arborea</i>	<i>Horsfieldia thorelii</i>	<i>Schleichera oleosa</i>
<i>Canarium subulatum</i>	<i>Hovenia dulcis</i>	<i>Sorbus granulose</i>
<i>Carallia brachiata</i>	<i>Lithocarpus elegans</i>	<i>Spondias axillaris</i>
<i>Cassia bakeriana</i>	<i>Lithocarpus garrettianus</i>	<i>Spondias lakonensis</i>
<i>Castanopsis acuminatissima</i>	<i>Lithocarpus polystachyus</i>	<i>Spondias pinnata</i>
<i>Castanopsis calathiformis</i>	<i>Litsea monopetala</i>	<i>Sterculia pexa</i>
<i>Castanopsis tribuloides</i>	<i>Macaranga denticulata</i>	<i>Styrax benzoides</i>
<i>Cinnamomum caudatum</i>	<i>Magnolia littifera</i>	<i>Syzygium cinereum</i>
<i>Cinnamomum inner</i>	<i>Mahonia nepalensis</i>	<i>Terminalia bellirica</i>
<i>Cycad pectunata</i>	<i>Mangifera sylvatica</i>	<i>Toona ciliata</i>
<i>Dalbergia culrata</i>	<i>Manglietia garrettii</i>	<i>Trevesia palmate</i>
<i>Dalbergia oliveri</i>	<i>Markhamia stipulata</i>	<i>Vitex quinata</i>
<i>Debregeasia longifolia</i>	<i>Melia toosendan</i>	<i>Ziziphus nummularia</i>

Each year, trees in excess of those needed for the wildlife corridor were donated to Doi Suthep National Park, to the Doi Mae Salong reforestation project (organized by IUCN and Thailand's Supreme Command) or to other tree planting projects in N. Thailand. In 2008, Doi Suthep-Pui National Park selected a 600-rai site in the upper watershed for a tree-planting project. The national park authority had sufficient confidence in the BMSM nursery team to produce some of the trees in that nursery. So the nursery is now producing trees for the national park authority. Thus, funding from WWF/King Power has helped the villagers attract some "matching funds" to support additional nursery staff and tree production for the national park's project.

TREE PLANTING

Tree planting under this project added 60 rai of restored forest to a field trial plot system, which FORRU-CMU had established incrementally since 1997, to test the field performance of “candidate” framework tree species. Planting under this project filled in gaps in a *de facto* “wildlife corridor”, which will link two forest remnants in the upper watershed of the Mae Sa Valley. Areas planted were abandoned agricultural land or severely degraded forestland, selected by the BMSM villagers jointly with the national park authority. In 2007, the site selection process was facilitated by running a workshop to introduce the park staff and villagers to GIS and GPS technologies.

The annual planting events

Annual planting events were carried out in mid- June each year, during the early rainy season in northern Thailand. This gives the trees the maximum length of time to grow a root system to obtain sufficient water during the first dry season. Sites were cleared of weeds 3 weeks before planting, using hand tools, followed by glyphosate. The trees, fertilizer and bamboo poles were moved to the sites a few days before planting. The sites were staked out with bamboo poles placed 1.8 metres apart (500 trees per rai). On planting day, holes were dug and trees were planted in each hole, followed by fertilizer application and mulching with dead vegetation. Finally the sites were cleared of plastic bags and other garbage and monitoring for immediate post-planting mortality, due to transplantation shock, was carried out within two weeks after planting.

2006 Planting Event

On June 9th 2006, a total of 2,500 seedlings, grown in the community nursery at Ban Mae Sa Mai, were planted to celebrate the 60th Anniversary of His Majesty the King. Two weeks afterwards, on June 24th, 7,500 additional trees were planted, representing some 48 species, of proven value as framework species, plus 21 species considered to be rare species in the national park, planted for species conservation purposes. The tree planters included FORRU staff, villagers, about 50 national park staff, led by the park Chief, Khun Surachai Tuamsomboon and about 10 students led by Dr. Sutthathorn Chairuengsri from Biology Department, Chiang Mai University.

2007 Planting Event

A sloping, 20-rai plot, was selected using a GIS-based Forest Landscape Restoration model, being tested by Dr. David Pullar from the University of Queensland, during a participatory workshop for villagers and national park staff held in April. The site was planted during 2 events in June, which attracted more than 100 volunteers from Ban Mae Sa Mae, the Youth Volunteer group in Bangkok, CMU Environment Club, Huk Chiang Mai group, tourists, the army, and national park staff. The second planting event was attended by WWF-Thailand staff and King Power Chiang Mai personnel, as well as 13 newspaper journalists and a TV documentary crew. The event was subsequently featured in ten newspapers or magazines, including the Bangkok Post,

Dichan, Sarakadee, Petmania, Siamrath, Manager, Thai Post, Kao Sad and on the WWF website. A 25-minute TV documentary, which covered the planting event, “Knowledge is the Lamp”, was broadcast on Channel 11. The WWF logo was prominent in the documentary, as staff were wearing the T-shirts provided by WWF.

2008 Planting Event

In 2008, another 20-rai plot, this time severely degraded secondary forest, was selected for enrichment planting. The site was selected because the stream draining from it provides water into the village irrigation system. This event also generated good publicity for the sponsors. The family of the owner of King Power attended and was impressed with the projects achievements. Volunteer groups, joining the planting, included V4N from Bangkok, George Jensen Jewelry company, Chiang Mai university teachers and students, local government organizations and Ban Mae Sa Mai villagers. WWF’s youth ambassador, Kuhn Beam from the pop group D2B and TV personality, Khun Sanya Kunakorn jointly presented a TV documentary of the event, which was subsequently televised on Channel 7, as part of the “Teenee Morchit” program.



The 2008 planting event, with pop star, Kuhn Beam from D2B and TV personality Khun Sanya Kunakorn.

Maintenance of Planted Plots

Weeding and fertilizer application in the first two years are vital to ensure survival and growth of planted trees, so that they begin to close canopy and shade out competing herbaceous weeds; a process known as site recapture. Each year, Ban Mae Sa Mai villagers were employed to carry out weeding and fertilizer application, in the research plots. These maintenance activities were carried out three times each year, typically in July/August (early rainy season), October/November (late rainy season) and December/January (early dry season). By 2008, trees in the 2006 plots were sufficiently established not to require further maintenance and the weed suppression effects of canopy closure were beginning to be seen in parts of the plot.

Fire Prevention

In the seasonally dry climate of N. Thailand, wildfires during the dry season are a major cause of failure of forest restoration projects. Therefore, the project supported the cutting of firebreaks and fire prevention patrols throughout the high-risk period. The villagers cut firebreaks around the plots in mid-January and from February till April they organized teams of 16 persons to carry out fire look-out and suppression duties 24 hours per day. The village committee imposed a rule that every family must contribute 1 family member for this activity or pay compensation. The WWF/King Power funding supported this activity by providing food for the fire prevention teams, plus a bonus if no fire entered the plots. In 2007, a fire encroached marginally into the 2006 plot in mid-April. However, the fire prevention team responded very quickly to the danger and the fire was put out with minimal damage to the plot. Apart from this minor incident, fire control was successful over the project period between 2006 and 2009.

At BMSM, forest fire prevention has been gradually incorporated in the community's culture. Each January when the fire breaks are cut, the villagers hold a ceremony to ask the guardian spirits of the village for a successful fire prevention program. If no fires burn the planted trees, another ceremony is held to thank the spirits in May. This involves sacrificing a pig, followed by a communal meal, attended by FORRU staff, the villagers and the national park officers. This social event provides an important opportunity to discuss project matters and build productive relationships with all stakeholders in an informal setting. Project management is reviewed and usually the planting sites are jointly selected and agreed upon in the afternoon.

Plot Monitoring

Monitoring of the planted saplings provides field performance data, needed to assess the extent to which each of the planted species matches previously established framework species standards (Elliott et al., 2003). Each year 20-30 individuals of selected species were labeled and monitored for growth and survival i) about two weeks after planting, ii) at the end of the first rainy season and ii) at the end of the second rainy season.

In 2006, 1 rai was planted with rare tree species, enabling these species to be tested for their potential as framework tree species. Monitoring of labelled sample trees was completed in December 2007. The V4N volunteer group helped with data collection. Most of the rare species had low survival rates, which perhaps explain the rarity of these species. However, the performance of several of the species approached or exceeded the minimum standards for their consideration as “acceptable” framework species including: *Artocarpus lakoocha*, *Bridelia glauca*, *Erythrina stricta*, *Ostodes paniculata*, *Styrax benzoides* and *Vitex quinata*. In 2008, initial results for labelled trees indicated that the post planting survival of most tree species was more than 90%. The full data will be prepared for publication, once the 18-month data from the 2008 plots have been collected at the end of 2009.

EDUCATION CENTRE DEVELOPMENT AND USE

Training and Workshops

Visits to the project site have become a central feature of training programs, provided by FORRU-CMU, to provide workshop participants with a firsthand demonstration of Forest Landscape Restoration and the Framework Species Technique. Trips usually involve a guided forest walk through the original 1998 plot, and the WWF 2006 and 2007 plots, to observe the framework species method of forest restoration, and biodiversity recovery. In the nursery/education centre, participants usually have a discussion session with leaders of the BMSM Natural Resources Conservation Committee about the socio-economic aspects of forest restoration. Participants regularly provided positive feedback about the field trip and the quality of the sites for demonstrating forest landscape restoration.

Local and Regional Workshops at Ban Mae Sa Mai

- In August – September 2007, FORRU-CMU hosted an intensive training program for three staff from Gaoligongshan National Nature Reserve, Yunnan, China, supported by ICRAF-China. The project site was used to teach tree planting methods, maintenance and monitoring, as well as demonstrating FLR and the Framework Species Method.
- Darwin Initiative workshop “*The Future of Forest Restoration Research Indochina*” Chiang Mai, March 2008. Fifty-two participants from Thailand, Cambodia, Lao PDR, Vietnam, Indonesia and the U.K. visited the research plots at Ban Mae Sa Mai.
- In September 2008, FORRU-CMU ran a 5-day training program in forest restoration methods for Vietnamese foresters, involved in the WWF - Greater Mekong “Biodiversity Corridor Initiative” (funded by ADB).



Participants in “The Future of Forest Restoration Research in Indochina” visit the WWF 2006 plot, May 2008.

Workshops for Forest Restoration in Thailand

- The facilities at Ban Mae Sa Mai were used extensively during 3 workshops entitled “Introduction to Forest Restoration - general concepts and skills” run by FORRU-CMU for staff and villagers from the Doi Mae Salong (DMSL) Reforestation Project for the King’s 80th birthday. The objectives were to pass on concepts and techniques, developed by FORRU-CMU, to key stakeholders in the DMSL project, to assist them to plan and implement effective forest ecosystem restoration. The BMSM facilities were used intensively for these workshops. Participants learnt about restoration techniques, expected results and recovery of biodiversity in the plots. Tree propagation was covered in the nursery and socio-economic and cultural aspects of restoration were explored during joint discussions among the participants and the village conservation committee at the education centre. Following up on these workshops, FORRU assisted the Supreme Command and IUCN to establish a 20-rai demonstration plot at DMSL using the framework species method on 6th June 2008. Our education team is also assisting local school teachers at DMSL to establish 8 school tree nurseries.
- In March 2008, FORRU-CMU hosted a workshop for participants of FORRU’s “Trees for Thailand” project. The aim was to disseminate forest restoration techniques to 12 communities in N. Thailand. Activities in and around the nursery focused on species selection and seed collection. Participants stayed in the village overnight and on the second day trained in the planted plots and learned about FLR concepts.
- In August 2008, FORRU-CMU provided a 3-day workshop for staff of East-West Siam Travel, an eco-tour company, which is starting a 300-rai forest restoration project (Project Himapan), in which eco-tourists can participate. FORRU-CMU was asked to train the company’s staff in appropriate forest restoration methods, so that they can implement an effective project and pass on techniques to their volunteers.
- In October 2008, FORRU-CMU provided a 5-day training course for the Elephant Conservation Network (ECN) The ECN, Kanchanaburi Province, which aims to restore elephant habitat in and around Salak Pra Wildlife Sanctuary. Participants included NGO staff and some of the villagers with whom the NGO works. Once again the BMSM site was used for this training program. In addition to the usual program, BMSM nursery manager Khun Neang shared his experiences with the villagers of Ban Kaeng Prakob, who are building their own tree nursery in the buffer zone of Salak Pra WS.
- In April 2009, FORRU-CMU provided a 3-day training course for managers of WWF Greater Mekong – Thailand who are applying the principles of FLR and the Framework Species Method to restore lowland deciduous forests in the Nam Chee watershed, Khon Kaen.



Steve Elliott shakes hands with Coln. Chaluay from Thailand’s Supreme Command, during a workshop for his staff and villagers from Doi Mae Salong.

Visiting VIP's and foreign students

During the project period, many high-ranking representatives from some of the most important conservation organizations visited the site to see how FLR, using the framework species method, works in practice, including IUCN, WWF, , FAO, RECOFT, RSPB, RBG Kew, DNP, RFD, PDA, ICRAF and PATT. Many of these visits resulted in collaborative links, which have subsequently led to the development of joint projects. Exposure of visiting students, from both Thai and overseas universities and colleges, to the project site is also an excellent way of publicizing FLR methods to those who may play an important role in forestry and conservation in the future.



Table 2 - VIPs and Students Visiting Ban Mae Sa Mai.

Date	Visitors	Specific Interests
2006	Peoples Development Association	Organizing training for their staff in tree planting and care. Developing micro-credit facilities for poor rural communities through payment for villager participation in tree planting.
2006	Plant a Tree Today	Developing tree planting education packs for school children.
Mar 2007	Department of National Parks and Wildlife	Assess Ban Mae Sa Mai's value as a model for restoring degraded areas in other national parks in Thailand.
Nov-Dec 2007	Kuhn Naksit WWF-Thailand	Training program to help prepare implementation of WWF-Thailand Program's forest rehabilitation project in NE Thailand.
Feb 2008	IUCN	Senior officials determining how the Ban Ma Sa Mai might be used in the future to further facilitate more activities for the Doi Mae Salong Project
Feb 2008	Paul Donald, RSPB	FORRU is partners with RSPB, and the Bird Conservation Society of Bangkok for a second term Darwin Initiative helping restore southern lowland rain forests through the establishment of FORRU-Krabi.
July 2008	Zurich University Students	Student class interested in the social consequences of forest restoration.
Sep 2008	Bill Schaedla, WWF	To assess the success of WWF/King Power funding and discuss future options.
Nov 2008	Royal Forest Department (RFD) Study Tour	FORRU-CMU was responded to a request from RFD to show 12 high-ranking forestry officials from Vietnam, Burma, Cambodia and Thailand the FLR sites at Ban Mae Sa Mai as part of a 10-day study tour of forestry in Thailand.
Nov 2008	Ian Barber, RSPB and Paul Smith, Kew Gardens.	This joint visit to the project strengthened FORRU's relationship with RSPB, and resulted in planning of two Darwin projects with the Royal Botanical Gardens, Kew.
May 2009	Kate Blythe, Kew Gardens	Visited the project as part of a Kew sponsored project comparing forest restoration practices in Thailand and the Philippines.

Conference Exposure

Over the past three years, the results of the WWF/King Power sponsored Forest Landscape restoration system has been presented at several regional conferences:

- IUFRO International Conference on Forest Landscape Restoration in Seoul, South Korea. May 2007. Dr. Steve Elliott presented a 20-minute account of the project during the main conference session thus helping to promote the area as an FLR demonstration site. Dr. David Pullar's trial of his FLR planning software used at Ban Mae Sa Mai was presented at the same meeting, and formed the basis of a special side event at the conference on modeling tools for FLR. This emphasizes the international importance of WWF/King Power's support in helping to promote FLR on a wider scale.
- FAO Asia Pacific Forestry Commission International Conference "The Future of Forests in Asia and the Pacific: outlook for 2020" Chiang Mai, Thailand. October 2007. Twenty participants, from diverse backgrounds, joined a study session in the WWF 2006 and 2007 plots, to observe the framework species method of forest restoration, and the biodiversity recovery monitoring taking place. They met with leaders of the BMSM Natural Resources Conservation committee at the nursery/education centre to discuss the socio-economic aspects of forest restoration.
- Dr Steve Elliott presented the project at a meeting on Forest Landscape Restoration, organized by IUCN and the State Forestry Administration of China in Beijing, September 2008.
- Fifteen participants from the Association of Tropical Biologists Conference on "Assessing and Restoring Biodiversity in a Human Dominated Landscape" took part in a post-conference field trip to the site in February 2009. During the conference, Dr. Steve Elliott presented a keynote speech on the framework species method of forest restoration, using the Ban Mae Sa Mai site as an example.
- The project site was used by the ICRAF workshop on "The Science, Economics and Institutions of Managing and Paying for Eco-system Services", Chiang Mai, Thailand, April 2009



Participants in the FAO conference "The Future of Forests in Asia and the Pacific: outlook for 2020" visited the project site in October 2007.

International School Events

The nursery/education centre is used as a venue for school events, mostly arranged through the Prem Centre’s Visiting Schools Program (VSP). Events focused on training about fruit and seed structure, germination, seedling propagation, and tree planting techniques. Students then follow the Nursery Nature Trail, learning about framework species, different economic and environmentally significant tree species growing near the nursery, as well as appreciating the difference in habitat value, and economic value, between forest and orchards.



School children learnt the link between climate change mitigation and tree planting at “Trees for a Cooler Climate Camps,

Table 3 - International School Groups visiting the Ban Mae Sa Mai Education Facility

Date	School	Event
Apr 2008	Sekolah Global Jaya (Indonesia) VSP	75 students over three days learnt about tree propagation and went on the educational forest walk
Jan 2008	Prem International School, Chiang Mai	Grade 5 Camp (2 days). Students learnt about local Hmong culture, participated in forest walks and a wide range of different activities at the community nursery.
Aug 2008	Prem International School, Chiang Mai	94 students in two classes, years 6 and 9 learnt about tree propagation + educational forest walk
Feb 2009	International School of Bangkok	23 students visited the reforestation plots at Ban Mae Sa Mai as part of the Week Without Walls program; “socially responsible conservation”.
Feb 2009	Kardinia School (Australia) VSP	Students hiked up to the reforestation plots above Ban Mae Sa Mai, learning about Forest Restoration Landscape and the Framework Species Method along the way.

Education Events for Local Schools

With additional funding from the British Council, FORRU-CMU organized “Trees for a Cooler Climate Carbon Camps” for Chiang Mai children from 10 schools. The aim was to introduce school children to global climate change and the role that forest restoration could play in mitigation. Students spent a day at the Ban Mae Sa Mai nursery and plot system. The children first calculated their “carbon footprints” and then measured tree growth and estimated carbon uptake in the forest restoration plots.

Between 2006 and 2008, the FORRU-CMU Education Unit ran several educational events on bird watching and tree care for local school children from Ban Mae Sa Mai School. The aim was to discourage the village children from killing of birds and other seed-dispersing animals, which play an important role in natural forest recovery.

The funding provided by WWF and King Power supported the development of two education trails around Ban Mae Sa Mai as described below. The educational content provided by staff has been reviewed and updated throughout the project period.

Nursery Nature Trail Module Developed and Improved

To broaden the learning opportunities offered by the education centre to school groups, an educational walk was developed in 2007, and updated in 2008, close to the nursery and education centre. The trail passes through Lychee orchards, before entering naturally regenerating forest, and climbing to a small limestone cave. Students using the trail learn to recognize some framework tree species in the forest patch, as well as learning about different economic and environmentally significant tree species growing near the nursery. They can also observe differences in habitat value between forest and orchards, and consider the relative benefits for the community and natural services.

Development of a Forest Trail through the planted plots of Ban Mae Sa Mai

In 2007, a forest trail was developed in the watershed, starting at the WWF 2007 planting site, continuing up the road to the original 1998 planting site to look at biodiversity recovery nine years after planting. This site is then directly compared to the adjacent control plot where grasses and other weeds are still dominant and there is little forest regeneration. The walk continues through the WWF 2006 plot where very impressive tree growth rates have been recorded over this last rainy season. The walk then arrives at the WWF interpretive sign. The section of this walk passing through the 1998 and the 2006 plots to the WWF interpretive sign has been used to demonstrate the Forest Landscape Restoration and Framework Tree Species Method to almost every visiting group since its conception and will continue to be the focal point of visits to the restoration plots.

CONCLUSIONS

All of the goals of this project have been achieved or surpassed. The FLR demonstration site at Ban Mae Sa Mai is beginning to have a significant impact on the way in which forest restoration is undertaken not only in Thailand, but throughout the region, by i) providing training in forest restoration techniques and ii) by establishing links and developing projects with organizations that are implementing forest restoration projects.

For example, FORRU is now engaged with IUCN and Thailand's Supreme Command to build capacity at 8 community tree nurseries and manage demonstration plots for the Doi Mae Salong Reforestation Project and with the Elephant Conservation Network to restore elephant habitat in Salak Pra Wildlife Sanctuary. FORRU-CMU is also assisting BirdLife International with the Harapan Rainforest Project (restoring forest to 1,000 km² in Sumatra) and EW Siam Travel with their Himapan Forest Restoration Program. Perhaps most encouraging has been the interest from the national forestry agencies of Lao PDR, Cambodia and China to replicate the FLR demo site in their own countries.

In partnership with RBG Kew, FORRU-CMU is now helping the Cambodian Forestry Administration to establish a FORRU near Siem Reap, with funding from the Darwin Initiative. A fledgling FORRU was established by ICRAF-China at Gaoligaoshan NNR in Yunnan and we hope to move forward with the FORRU-Lao PDR proposal next year. All these links and new initiatives arose as a result of visits and training sessions at the WWF/King Power-sponsored FLR demonstration site, during the implementation period of this project.

The project also resulted in FORRU-CMU contributing to other WWF projects, such as the Nam Chi project, Khon Kaen and the regional Biodiversity Corridor Initiative. FORRU-CMU was asked to contribute to a major “think tank” in Laos to improve the BCI project, by advising on the establishment of forest corridors linking Laos, Cambodia and Vietnam. This was subsequently followed by training of the Vietnamese BCI project partners at the BMSM site.

In addition, the project enabled tree planting to be undertaken on a scale that would not have been possible without WWF/King Power funding with 3 main outcomes: i) helping the Ban Mae Sa Mai community’s to reforest their upper watershed; ii) helping Doi Suthep-Pui National Park authority to achieve reforestation targets and iii) extending FORRU-CMU’s research into species suitable for use as Framework Tree Species.

The nursery and education facility built during this project has become an important part of the Ban Mae Sa Mai community. Although some groups visiting the project have contributed small amounts of funds to the upkeep of the site, income from such transitory sources is insufficient to fully fund the project. Core funding is still needed to keep the site active and open as a training site, particularly the salaries of the nursery and field staff.

REFERENCES

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

Mansourian, V., D. Vallauri, and N. Dudley (eds), 2005. *Forest Restoration in Landscapes - beyond planting trees*. Springer 416 pp

