

ECOLOGICAL MANGROVE RESTORATION (EMR) TRAINING REPORT

KRABI, 27TH-28TH MARCH 2012



I. BACKGROUND

- MAP-Asia (Thailand) supported by GNF to implement an Ecological Mangrove Restoration (EMR) training synchronously with NGOs from other three Asian countries, namely Cambodia, India and Sri Lanka. During the discussion with GNF for planning the project MAP suggested the idea of including an EMR training at the beginning of the four year project, which would help partners improve the success of their planting projects and encourage them to incorporate an EMR demonstration site in their restoration projects. GNF agreed and decided to have the EMR Training Workshop in conjunction with the kick-off meeting hosted by MAP in Thailand.
- EMR in simple terms involves working with nature, and understanding the natural mangrove ecosystem in the area where restoration is planned. EMR principles should be used during planting mangroves as it follows the logic of nature.
- Due to the post tsunami (2004) high percentage of mangrove planting failures (70-90%), MAP adopted EMR develop by Robin Lewis of Florida, USA as a tool that would be more successful and also could be applied by grassroots organizations and communities with training.

II. OBJECTIVES

The main objectives of the EMR training were:

- To introduce Ecological Mangrove Restoration to project partners.
- To have EMR partners apply the EMR methodology and thinking to their own mangrove planting projects and to undertake an EMR demonstration project to compare with planting.
- To promote using EMR as a way to increase biodiversity of species in the restoration project as one of the overall goals of the GNF in biodiversity conservation.
- To provide an opportunity for partners to get to know each other and learn from each others restoration experience. This training experience will also help build up the project partners' network to facilitate working together in the future.



III. METHODOLOGY



All participants from 4 countries were invited for a 3 day workshop in Krabi town, southern Thailand, nearby one EMR demonstration study site. Indoor training was done during 2 days, providing key concepts of EMR approach, and an introduction to some easily-used fieldwork tools. This was combined with field trips to put into practice what had been learned. During the whole meeting participants were asked to contribute with their previous knowledge and participate in discussions.



IV. AGENDA

The original agenda was adapted to the current needs of participants. Final output:

Day 1 (Tue)	EMR Training	Who
9:00 – 9:35	Welcome, Logistics, participant What are your greatest problems when restoring / planting mangroves?	Jim
9:35 - 10:10	MAP > Mangrove loss > Protection #1 Priority - Mangrove Planting Failures	Jim
<i>10:10 - 10:15</i>	<i>Quick break</i>	
10:15 - 10:35	Introduction to EMR Q&A	Dom
<i>10:35 - 11:00</i>	<i>Coffee-Tea</i>	
11:00 - 11:15	EMR Objectives Q&A	Dom
11:40 - 11:50	EMR: Do your homework > Preparations, Community Participation	Jim
11:50 - 12:30	Tides Water, Hydrology, Salt, Soils	Dom
<i>12:35 – 13:35</i>	<i>Lunch break</i>	
13:35 – 14:00	GNF website section	Udo
14:00 – 14:30	Zoning - Field trip preparation	Dom Jim
14:30 – 14:45	Measuring heights relative to mean sea level	Dom
<i>14:45 - 15:00</i>	<i>Coffee-Tea</i>	
15:15 - 18:00	Field Study Trip to Lang Da Village, Krabi	
<i>19:30</i>	<i>Dinner</i>	
Day 2 (Wed)	EMR Training	
9:15 – 10:00	Ban Lang Da review > What did we do and what did you learn?	All
10:00 - 10:30	TRANSECTS: Reference Site PLANNING AND IMPLEMENTATION: Mapping & implementation examples	Dom
<i>10:30 - 11:00</i>	<i>Coffee-Tea</i>	
11:00 - 11:40	Ban Tale Nok Case Study video with an emphasis on Community Participation	Jim
11:40 - 11:50	Large Scale EMR	Dom
11:50 – 11:55	Poor hydrology kills mangroves	Dom
11:55 - 12:15	Monitoring a restoration site	Dom
<i>12.30 – 14.00</i>	<i>Lunch break</i>	
14:00 - 14:30	Monitoring (cont)	
14:30 – 15:00	Video Indonesia EMR	Jim
15:00 – 15:30	Fishbone pattern restoration discussions	Dom
<i>14:45 - 15:00</i>	<i>Coffee-Tea</i>	
15:00 - 15:30	Questions and wrap-up	Jim
15:30 - 16:00	Workshop Evaluation – written	Jlm
16:00 - 16:30	Krabi River Estuary PowerPoint Presentation as background to the field study trip.	Donnapat Tamornsuwan formerly with Wetlands Int. and now Raks Thai (CARE – Thailand)

19:30	Dinner	
Day 3 (Thu)	Fieldtrip	
Whole day	Field trip to the villages of Koh Klang and Klong Pra Song villages on Klang Island in the Krabi River Estuary.to view successful and unsuccessful plantations (planting sites, erosion issues, community utilization of mangroves, fisheries livelihoods and natural mangroves)	All

V. PARTICIPANTS

A total of 15 participants from several Asian and European countries attended the training.

No	Name	Position	Organization	Country
1	Mr. Savath OM	Executive Director	Fisheries Action Coalition Team(FACT)	Cambodia
2	Mr. Nith Chum	Project Officer for Coastal Region	Fisheries Action Coalition Team(FACT)	Cambodia
3	Mr. MEERASA Silar Sahib	Project Coordinator, Pulicat Lake	CRenIEO	India
4	Mr. Ekanayake Mudiyansele (EM) Abeyratna	Director	EMACE Sri Lanka	Sri Lanka
5	Mr. Manathunga Aratchige Don Ranjit Lorence	Field Assistant	EMACE Sri Lanka	Sri Lanka
6	Mr. Manoj Prasanna	Manager at Ministry of Environment	Nagenahiru Foundation	Sri Lanka
7	Mr. Lal Emmanuel	Director	Nagenahiru Foundation	Sri Lanka
8	Mr. Prasanna Samarasinghe	Project Officer	Nagenahiru Foundation	Sri Lanka
9	Mr. Udo Gattenlöhner	Executive Director	Global Nature Fund	Germany
10	Mr. Roger de Freitas	Advisory Board	Global Nature Fund	England
11	Mr. Jim Enright	Asia Coordinator	Mangrove Action Project	Canada
12	Ms. Jaruwat (Ning) Enright	Thailand Field Coordinator	Mangrove Action Project	Thailand
13	Mr. Dominic Wodehouse	Trainer	Consultant	England
14	Ms. Alba Saray Pérez Terán	Volunteer	Mangrove Action Project	Spain
15	Ms. Piyapat Nakornchai	Volunteer	Mangrove Action Project	Thailand



VI. OUTPUTS

A. OUTPUTS FROM FIRST FIELD TRIP – GROUP 1: AUTOLEVEL

1. Set up tripod
2. Adjust height (1,50m)
3. Level/Balance platform (oil bubble in center of ring)
4. Focus
5. Read heights -> find high tide mark ->measure all heights in relation to this marker.
6. Place these heights on your map of the area/pond
7. Identify places in the area/pond and recording highest and lowest points
8. Also record heights of identified mangroves species nearby for reference
9. Zoning (hydrology) (Now compare your spot heights in the proposed restoration site to your reference mangroves and this tell you what species should grow at what level or if soil grading is required to obtain the reference forest heights.



Another technology (by Lal): “Appropriate level technology” “A” frame: take 2 vertical wooden sticks and 1 horizontal making an “A” form with an oil bubble on the center. Use it as a compass moving one span at a time to determine the zone. See: [http://www.hesperian.net/test/index.php/Contour Barriers](http://www.hesperian.net/test/index.php/Contour_Barriers)

B. OUTPUTS FROM FIRST FIELD TRIP – GROUP 2: IS THIS POND AN APPROPRIATE RESTORATION SITE?

1. Find a mangrove area: surrounding species. There were mangroves present before.
 - a. *Avicennia officinalis*
 - b. *Excoecaria. agallacha*
 - c. *Scphiphora. hydrophyllacea*
 - d. *Rhizophora sp.*
2. The area is an abandoned shrimp pond and it is far from other shrimp ponds currently in use.
3. Size: 30x60m
4. People in the area have conservation awareness (mainly related to livelihood production/preservation)

5. Appropriate salinity: 25 ppt
6. Ownership: private
7. Human activities: cattle grazing
8. Soil: clay – fit for the mangroves because it can hold water
9. Hydrology: open to tides but the water gate is too small (not good as once the area is flooded, water might take too long to drain out, and therefore the ground stays too wet for too long). Some areas in the pond are too high and invaded by grass which will compete with the mangroves.
10. Conclusion: it can be easily restored



C. GLOBAL OUTPUTS FROM THE TRAINING



- The philosophy of the training was that we are all teachers and we are all students
- There are some time constrains for this training. It would normally take 3-4 days. But since the group is small it's much easier to interact in a shorter time. Also groups had a good mangrove knowledge base to start with
- During presentations many issues where discussed. Summary of outputs is shown below.

EMR training: Quick assessment: What are the 3 main problems that your mangrove planting have had?

- Very limited tidal range
- Bush fires during dry season



- Weeds out-competing with mangroves
- Flooding season with long period of standing water
- Slow growth
- High percentage of mortality but not knowing why
- Choosing a good restoration site
- Lack of monitoring and evaluation

- Seaweed and algae on the seedlings and the lack of post-planting care to remove it
 - Human activities: people not aware of conservation
 - Project length: funding period is usually too short, 1-2 years
 - Monkeys and insects eating or destroying parts of the mangrove
 - Low salinity results in growth of thick high grasses

EMR training: Examples of problems of mangrove planting from Powerpoint slide photos.

- Monoculture plantations (i.e. a lack of biodiversity)
- Inappropriate hydrology
- Wrong ecosystem (mudflats or above high tide mark or too low in lagoon)
- Livestock grazing
- Planting when not required i.e. *Rhizophora sp.* under *Avicennia marina* natural forest canopy
- Lack of involvement of local people (where do they carry out their economic activities, etc)

Participants: How do you determine what is an autochthonous species when the ecosystem has been modified? Would the introduced species out compete the original native species?

EMR training: Why do communities restore mangrove in your areas?

- Fish productivity (e.g. mud crab production)

- Eco-tourism
- Soil erosion
- Resource Production: charcoal, cigarette papers from Nypa palm leaves,

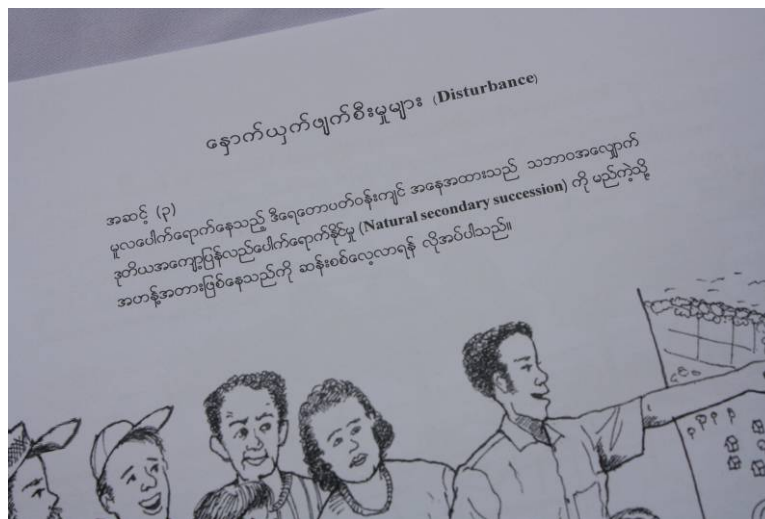
Participants: in some areas there is weed growth (low salinity), what do we do?

- If you are close to the sea, re-establish/improve hydrological connection
- If not, local community may need to help with weeding if minimal; Remember we don't want to complete with nature, trying to force mangroves into a freshwater habitat
- Mangrove can grow in fresh water but they will be out competed by freshwater species; They have an advantage over other plants in salty environments as they're adapted to deal with salt.
- When there is poor tidal exchange, like in lagoons and there are high levels of nutrient runoff from agriculture, livestock and human wastewater this facilitates a high growth of algae, seaweed in marine environments or grasses and algae in low salinity situations which effects mangroves, especially seedlings

Participants: in some areas we have very isolated areas, how to apply EMR?

If you don't get enough natural seeds you need to plant or broadcast seeds onto the incoming Spring tide, always trying to obtain propogules from local areas. It is not a good idea to bring seeds from outside the area.

Participants: does isolation cause a negative effect of mangrove quality? What about local exchange?



- Better to use local seeds when ever possible
- Sometimes when you introduce an exogenous species it blocks the way to local species and it prevents the natural regeneration from happening. It depends on what species is being planted.

Participants: is there scientific evidence of natural spreading? How far do propagules disperse?

- It depends on what species, currents and tides but on average 1 km. Another issue is damage on the way.

Participants: if we start from the replanting process we can introduce EMR training at the same time. Is that ok?

How to deal with soil quality?

- Keep some trees to ensure a minimum soil quality before replanting. Plus ensure good hydrological connection and fresh water input to keep salt levels down and to wash away build ups in other harmful chemicals.
- In terms of fauna, some species increase soil quality. Allowing these creatures to come (i.e. mudlobster) can increase mangrove quality. Crabs are very effective in improving soil conditions through burrowing, and burial of leaf litter.

EMR training: When you are planting what info do you gather??



- Existing plants
- Tidal conditions
- Stakeholders
- Local knowledge and history of site
- Mangrove planting failures
- Local exploitation of mangroves
- Freshwater input into the site

Participants: Do you have a checklist?

- Yes, in the EMR manual. We will print a checklist before going to the field

Participants: Have you been to the site in Ban Tale Nok to monitor the situation?

- MAP doesn't have the human or budget resources to do proper monitoring. One thing we need to look at is long term funding to enable monitoring for at least 5 years and follow-up.
- But we are in contact with the community (and could provide cameras and other things). Ideally the community should do it, or become involved, but they need to have the capacity and time to be able to do it.

Participants: Is the site been used by the community for awareness?

- Yes for local community visitor groups, for home-stay tourists and IUCN for study tours. We coordinate with local people to take these groups to the site.

Participants: Are universities involved?

- Sometimes it's difficult to involve them in the field activities as they prefer to stay in the office. But it's definitely a good idea to try to involve research students in data collection.

EMR training: problems/conflicts with monitoring?

- have problems with flooding (sometimes intentionally) which disturbs the balance
- sand intrusion from upland deforestation
- land tenure issues / many abandoned ponds are held by individuals legally and illegally

EMR training: why monitor?

- Most important reason is to improve your success by learning from mistakes early as possible
- Correct problems early
- Donor wants to see the results
- Involve people in the long term protection
- Check the survival rate of the plants and make further changes to the hydrology if necessary



EMR training: how do you monitor?

- Looking for damage
- Make note of maintenance required, such as broken fences or signs, debris or algae removal, hydrology correction etc....
- Numbering trees and measurements over time
- Transects
- Measure survival rate, heights, leaf numbers, DBH, BD achieved etc
- Monitoring method selected such fit your needs, time, capacity and budget

Participants: What happens to the second generation of plants?

- Varies by site. Much research posted on the internet. See Walters. Or Kairo...

VII. CONCLUSIONS

- Emphasis should be on protection (90 % vs 10 % planting) because of time, effort and failure of planting. Presence of trees might also be the only reason why the soil is good enough to sustain mangrove life as the mangroves roots do several things to improve the soil quality.
- Sometimes planting can be used as an approach to raise local awareness, involve students, be a visible sign of restoration to outsiders and raise funds. Sometimes planting is used to claim an area and to stop encroachers by showing people are actively carrying for the area.
- Promoting the 'biodiversity' concept to communities and private sector is difficult. It's a complicated concept. We may need to have other more tangible benefits to promote restoration while still promoting that all species have an ecosystem value while some have a greater economic value.
- The process needs to find a common point between scientists, engineers, local community, government regulations (e.g. paid human labor instead of big machinery can be a win-win for building local engagement and keeping project funds in the community)
- It's important to give the feeling of ownership to the participants/community
- EMR concepts can be used as an approach to improve planting success. Planting might be needed in some very difficult situations.

