

# Ecological Mangrove Restoration

Post Tsunami Living Lakes Conference in Sri Lanka  
Restoration of Mangroves and  
Reestablishment of Livelihoods in Sri Lanka

23-26 April 2007  
Bentota, Sri Lanka



By *Jim Enright*, Asia Coordinator  
**Mangrove Action Project**

# MANGROVE ACTION PROJECT



## **Mission Statement :**

*...Partnering with mangrove forest communities and grassroots NGOs in the South to conserve mangrove forests and promote the sustainable management of coastal resources...*

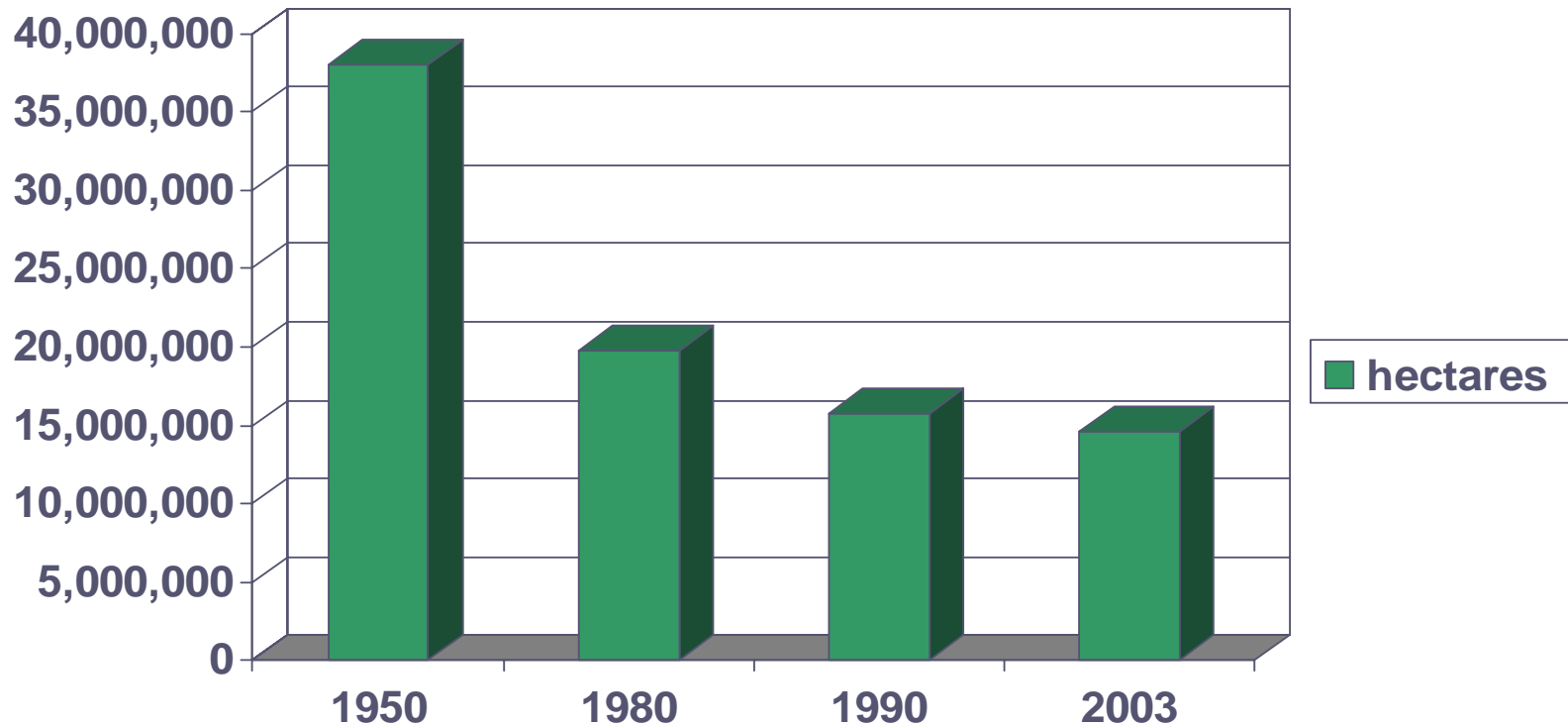
**MAP** is implementing a pro-active five-pronged approach to long-term conservation



artwork by Monica Gutierrez

# Mangrove Loss > 1% /year (FAO)

## Area of Mangroves Worldwide



**CURRENT RATE OF LOSS = 150,000 HA/YR**



# Benefits of Mangroves

## Goods:

- ✦ Seafood (fish, crabs, shellfish, shrimp etc.)
- ✦ Building materials for houses boats, and fishing traps
- ✦ Firewood & Charcoal for cooking
- ✦ Tannin for fishing nets / dye for cloths
- ✦ Medicinal plants
- ✦ Raw material for handicrafts
- ✦ Feed for livestock
- ✦ Income from Eco-tourism – sea kayaking, bird watching, boardwalks Recreation-sight seeing, fishing etc....

## Services:

- ✦ Fisheries nursery habitat and feeding grounds
- ✦ Storm protection
- ✦ Erosion control > seagrass > coral- reef protection
- ✦ Absorption of nutrient from landward side
- ✦ Buffer protection for agriculture land
- ✦ Protection of ground water from salinisation
- ✦ Detritus provide nutrients for marine animals
- ✦ Carbon Sequestration

# **Mangrove Tidal Creek, Koh Phra Tong, Phang Nga, Thailand, Before Tsunami (26 DEC 04)**



# **Mangrove Tidal Creek, Koh Phra Tong, Phang Nga, Thailand, After Tsunami (February 2005)**





# Great interest in mangroves following the tsunami



**Phang Nga, THAILAND**



# Mangroves Buffer from Tropical Storms & Tsunami



*From THE NATION*



# Tsunami Mangrove Destruction



Panama Lagoon, Ampara District, SRI LANKA



**ECOLOGICAL MANGROVE RESTORATION = EMR**



**MAP promotes the ecological restoration of mangroves using hydrologic restoration as the preferred method.**

**Work together with communities, organizations and local government to:**

- 1) Understand the unique ecology of each mangrove species found in the area**
- 2) Understand the normal hydrologic patterns**
- 3) Determine if there has been changes to the normal hydrology that prevents or inhibits natural secondary succession**
- 4) Select the restoration site / land tenure issues**
- 5) If the hydrology has been disturbed, first restore to normal hydrology and allow natural mangrove regeneration**
- 6) Only utilize *planting* if natural recruitment is not successful.**





HYDROLOGY

Time Zero – July 1989



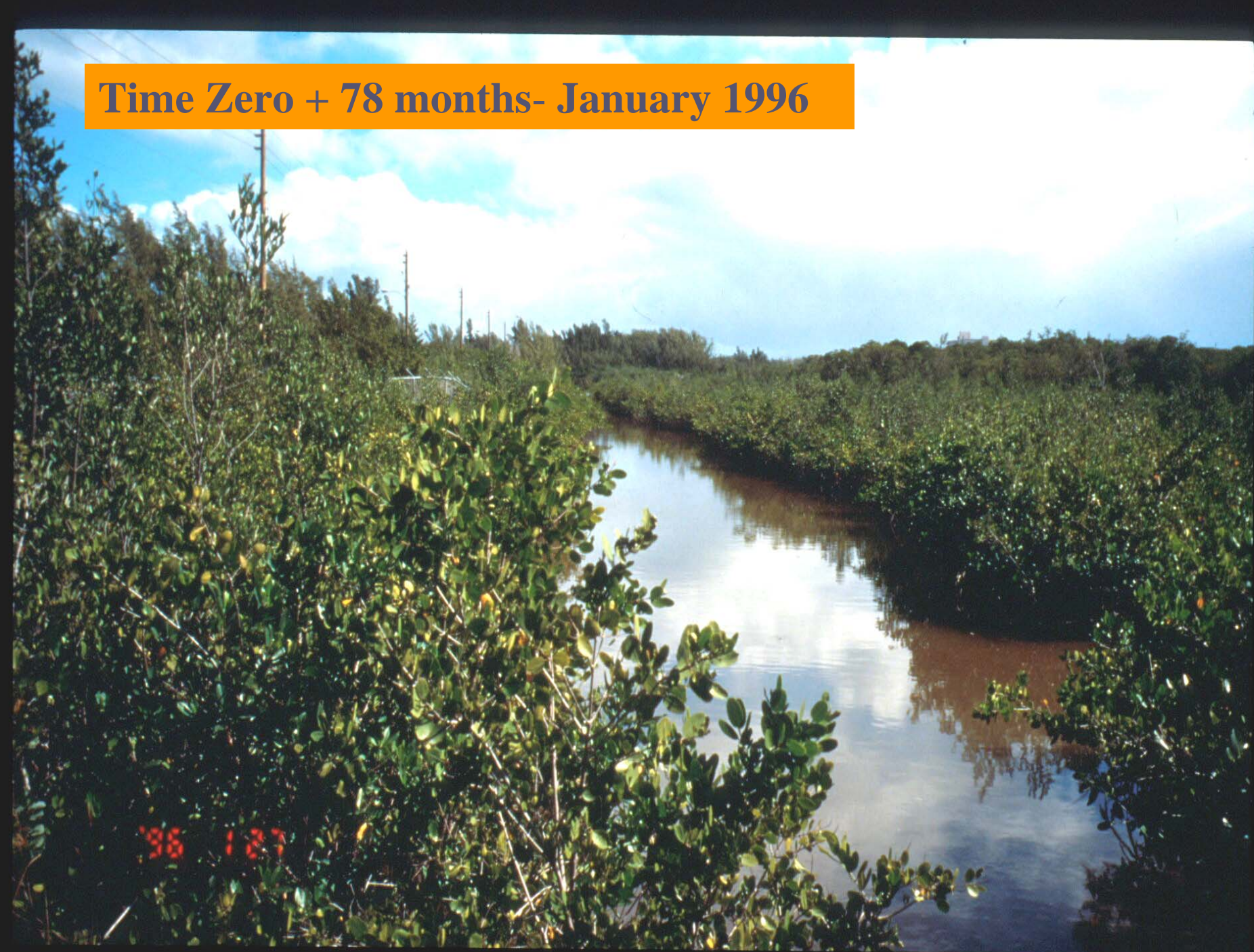


**Time Zero + 27 Months**





**Time Zero + 78 months- January 1996**



'96 127



**250,000 ha of abandon shrimp ponds in  
former mangrove areas worldwide**



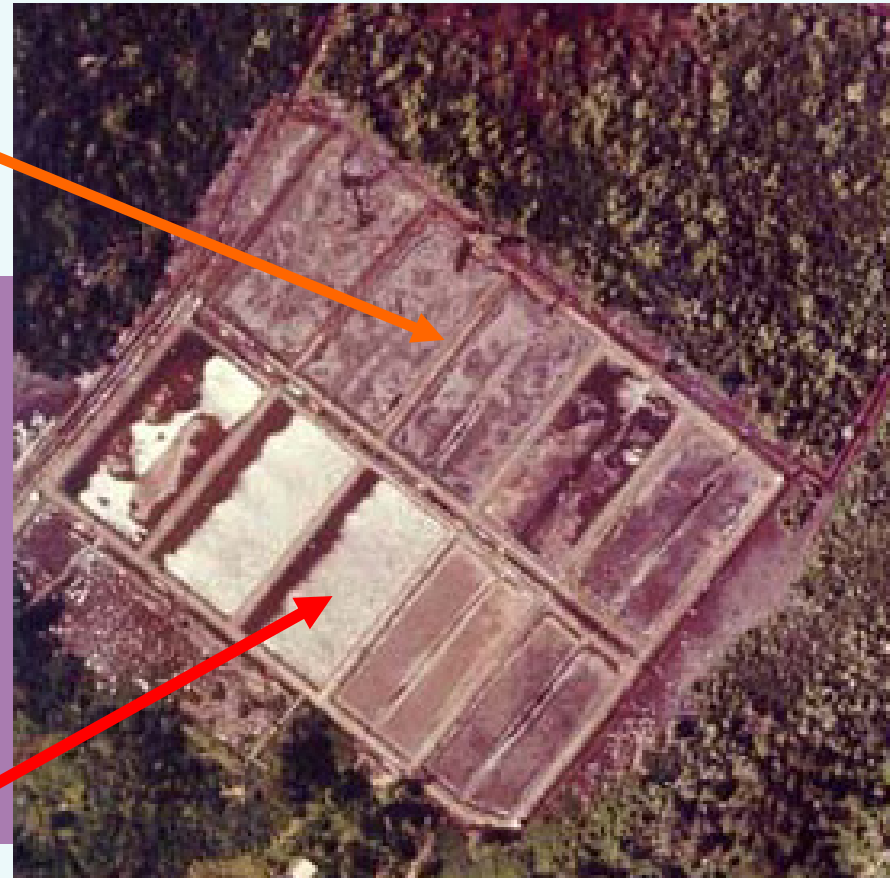


# Mangrove Rehabilitation



**A) Natural Revegetation:** The five ponds located nearest to the coast have exhibited excellent mangrove growth (2500 trees/hectare) due to the degraded condition of dike walls.

**B) Poor Re-growth:** The landward five ponds have experienced nearly no growth (10 trees/hectare) due to intact dike walls.



## 2. ABANDONED SHRIMP FARM RESTORATION – MISTAKE 1: PLANT PONDS WITHOUT RESTORING THE HYDROLOGY



**Arugam Bay, Sri Lanka, Feb. 2007**



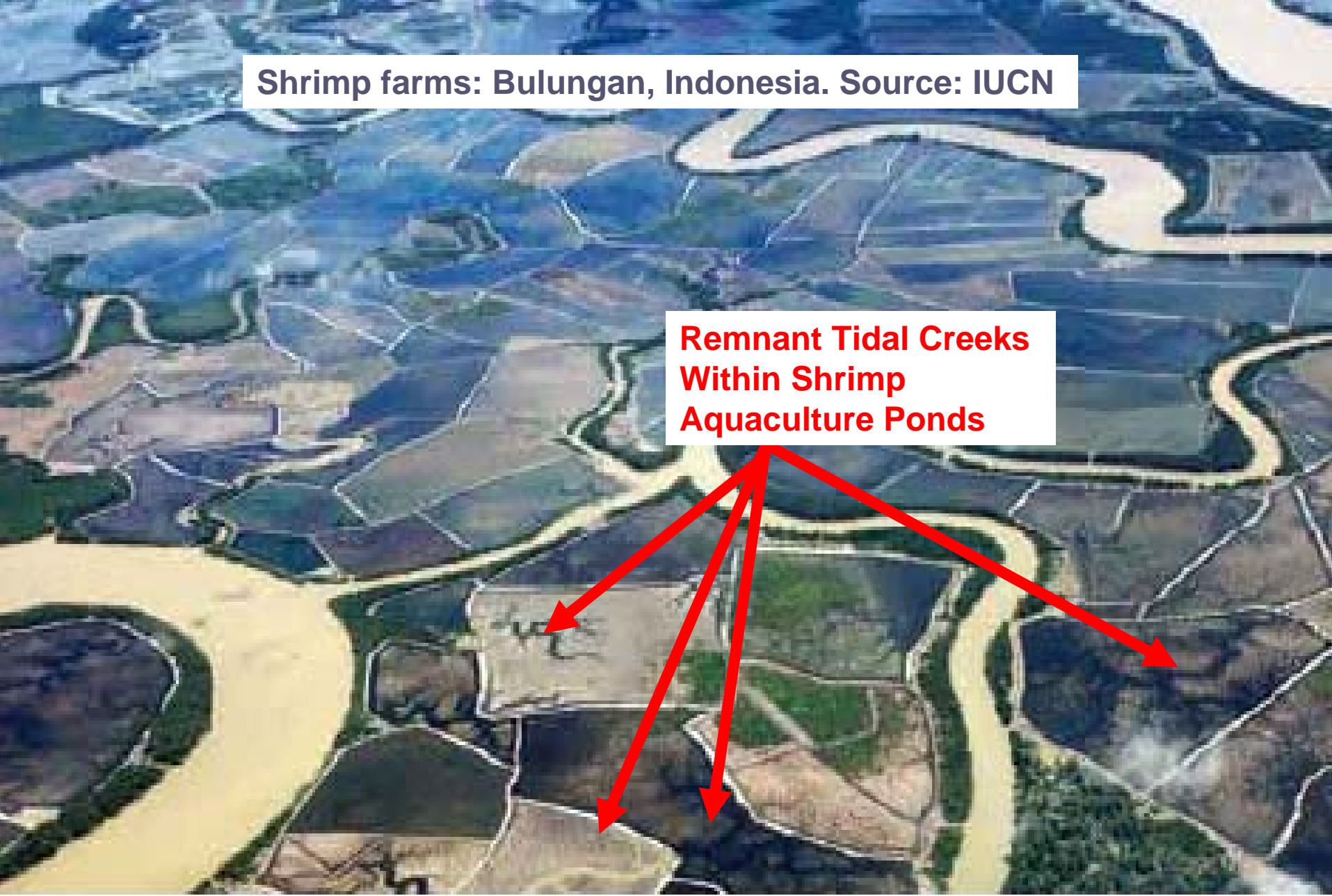
## 6. ABANDONED SHRIMP FARM RESTORATION – DO IT RIGHT!: CONNECT PONDS WITH THE SEA WITH A WELL DESIGNED TIDAL CHANNELS





**Shrimp farms: Bulungan, Indonesia. Source: IUCN**

**Remnant Tidal Creeks  
Within Shrimp  
Aquaculture Ponds**



# Advantages of Hydrological Restoration

- Higher success rate
- Higher bio-diversity
- Rehabilitated area is closer to previous natural forest species composition
- Restoration costs can be much lower, especially for large areas
- Costly seed nurseries are usually not required
- Small scale planting can still be utilized to promote stewardship / ownership

# First EMR Training in 2003



**IHOF#9, SFFL Sri Lanka**

# 2nd EMR workshop for Bay of Bengal NGOs

Objective

20 participants are trained in the hydrological method of mangrove restoration

Instructor

Robin Lewis, Mangrove Restoration Expert with more than 30 years of experience

Date

Nov.7-12, 2005

Location

CCDP, Vijayawada,  
Krishna District, Andhra  
Pradesh, INDIA



# Illustrated Mangrove Restoration Guide

## 5 STEPS TO...



### ...Successful Ecological Restoration of Mangroves

# Technical Training on Ecological Mangrove Restoration (EMR)



Vijayawada, AP India

7-12 Nov. 2005



# Viewing restoration sites in the field



IHOF #11 Vijayawada, AP India



# Field Study at Machilipatnam, AP India

Johnson who  
planted all these  
mangroves ?





# 3<sup>rd</sup> & 4<sup>th</sup> EMR Workshops

**In Partnership with Sewalanka Foundation**



**Tangalle & Arugam Bay, Sri Lanka, Feb. 2007**



# 3<sup>rd</sup> EMR Workshop Field Study

Do your  
homework



**Rekawa Lagoon, Sri Lanka, Feb. 2007**



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I'm  
drowning !

I wonder where  
the "reference  
forest for this  
project was?



# 3<sup>rd</sup> EMR Workshop Field Study



**Rekawa Lagoon, Sri Lanka, Feb. 2007**



# 3<sup>rd</sup> EMR Workshop Field Study



**Rekawa Lagoon, Sri Lanka, Feb. 2007**



# 3<sup>rd</sup> EMR Workshop Field Study



I'm really stressed!

We're all naturals!



**Rekawa Lagoon, Sri Lanka, Feb. 2007**



# 4<sup>rd</sup> EMR - Community Based Workshop



**Arugam Bay, Sri Lanka, Feb. 2007**



# 4<sup>th</sup> EMR - Community Based Workshop



Arugam Bay, Sri Lanka, Feb. 2007



# 4<sup>rd</sup> EMR - Community Based Workshop

**Drowned Again >> Planted too deep**

Why did they plant  
way out here?



**Pottuvil Lagoon, Ampara District**



# 4<sup>rd</sup> EMR – Field Training



**Panama Lagoon, Sri Lanka, Feb. 2007**



## 4<sup>rd</sup> EMR – Field Training



**Panama Lagoon, Sri Lanka, Feb. 2007**

# Reasons for Planting Mangroves




- ✓ Preference for certain species ... i.e. for poles
- ✓ Develop sense of ownership / stewardship
- ✓ Community building activity
- ✓ Good way to involve children as part of EE
- ✓ A method to claim land under threat of development > visible presence
- ✓ Can be a form of employment creation (especially for women) to work in nurseries, maintenance, planting
- ✓ Can be income generating if selling seedlings
- ✓ Can be a avenue to receive funding > funders like nurseries > time restrictions



# **BUT the problem is with planting alone**

- × Often reasons why mangroves were destroyed/degraded is not corrected
- × Often hydrology is overlooked
- × Often wrong species planted in the wrong place at the wrong time
- × Planting where there were no previous mangroves i.e. planting on mudflats, seagrass beds, salt marshes etc...
- × Planting mono-culture plantations
- × Planting non indigenous species
- × No Monitoring > Need for correcting problems from lessons learned

# ALTERNATIVE APPROACHES TO MANGROVE RESTORATION

1. Understand **Species Ecology & Community Ecology**
2. Understand **Normal Hydrology**
3. Assess Modifications to Hydrology or Added Stress? 
4. Select the Restoration Site 
5. Restore or Create Normal Hydrology, or Remove or Reduce Stress 
6. Plant Mangroves Only As Needed

**SUCCESS !**



**6. Plant Mangroves  
(GARDENING)**

**OFTEN FAILURE !?!?**



# EMR can help ensure future coastal greenbelts



# **Ecological Mangrove Restoration**

## **Six Steps to Successful Mangrove Forest Restoration**

**Work together with communities, organizations  
and local government to:**

- 1.) Understand both the individual  
species and community ecology of  
the naturally occurring mangrove  
species at the site, paying  
particular attention to patterns of  
reproduction, distribution, and  
successful seedling establishment.**



# Ecological Mangrove Restoration

**Work together with communities, organizations and local government to:**

**2.) Understand the normal hydrology that controls the distribution and successful establishment and growth of targeted mangrove species.**

# Ecological Mangrove Restoration

Work together with communities, organizations and local government to:

3.) Assess the modifications of the mangrove environment that occurred and that currently prevent natural secondary succession.



# Ecological Mangrove Restoration

4.) Select appropriate restoration areas through application of Steps 1-3, above, that are both likely to succeed in rehabilitating a forest ecosystem and are cost effective. Consider the available labour to carry out the projects, including adequate monitoring of their progress towards meeting quantitative goals established prior to restoration. This step includes resolving land ownership/use issues necessary for ensuring long-term access to and conservation of the site.

# Ecological Mangrove Restoration

Work together with communities, organizations and local government to:

5.) Design the restoration program at appropriate sites selected in Step 4, above, to restore the appropriate hydrology and utilize natural volunteer mangrove recruitment for natural plant establishment.



# Ecological Mangrove Restoration

Work together with communities, organizations and local government to:

6.) Utilize actual planting of propagules or seedlings only after determining through Steps 1-5, above, that natural recruitment will not provide the quantity of successfully established seedlings, rate of stabilization, or rate of growth as required for project success.