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MANGROVE PLANTING FOR COASTLINE PROTECTION – TO PLANT OR NOT TO PLANT

by

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Protective Role of Mangroves

Environmental News Network
06-01-2005

Loss Of Mangrove Forests Contributed To Greater Impact Of Tsunamis!

Mangroves Could Have Reduced Tsunami Damage, U.N. Official Says

January 07, 2005 — By Sam Cogg, Associated Press

GENEVA — Damage from the Indian Ocean tsunami could have been reduced if more coastal areas had maintained their protective shields of mangrove swamps and coral reefs, a key U.N. official said Friday.

Mangroves had helped against tsunami
By The Staff Writers

PHOTOGRAPHY: PLOTT, D. R. / AP/WIDEWORLD. Mangroves, some people believe, could have helped reduce the damage from the tsunami and other coastal disasters. Mangroves and coral reefs are a natural barrier against tsunamis and other coastal disasters.

Tsunami calamity highlights key protective role of coral, mangroves
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The Dilemma

- Destruction and degradation of mangroves – blamed for loss of lives and properties after the tsunami
- Action: (Re)planting mangroves to protect the coasts from tsunami !

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The Complications

Mangroves no barrier to tsunamis

Jacques van Ypersele
ABC Science Online

Mangroves and coastal forests offer little or no protection against tsunamis, says a new research that debunks earlier findings.

Last year researchers studied 17 coastal villages in the Tamil Nadu region of India in the months after the 2004 Boxing Day tsunami.

They concluded that death rates were lower in villages shielded by mangroves.

But when researchers including those from the **Japanese Research Center for Coastal Earthquake and Coastal Hazards** analyzed the data they found a very different view.

"The most important dimensions of the number of people that died (in the Tamil Nadu region) were the distance of the village from the coast and its height above sea level," says co-author and lead researcher, ecologist Dr. Andrew Baird.

"In effect, there was no protective function of these coastal forests."

Baird says while the hypothesis of the original research was reasonable, it was not borne out by their findings, published in the April issue of the journal *Estuaries and Coasts*, ABC Science.

- Kathiresan & Nadarajan, Finn Danielsen et al, UN agencies, NGOs, media, meetings, etc – mangroves provide protection
- Baird, Campbell & Kerr – mangroves & coral reefs provide no protection
- Green belts vs coastal structures



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Priority Complications

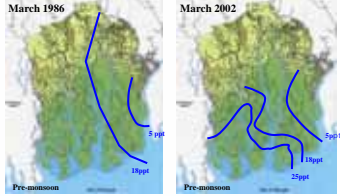
- Protection of existing mangroves vs mangrove planting along coastlines
- Rehabilitation of abandoned shrimp ponds?



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Sink or Swim Together !

- Climate change and sea level rise
- Coastal erosion
- Can the existing mangroves migrate inland? Changes in species?
- Remove coastal bund?
- Research?
- Why planting along coastlines?



IUCN, 1994 and IWM, 2002


- 10cm SLR inundates 15%
- 25cm SLR inundates 40%
- 45 cm SLR inundates 75%
- 1m SLR the Sundarbans would be lost (IPCC 2003)



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Our Assessment

- Coastal vegetation as well as coastal structures – provide some form of protection
- Coastal sand dune

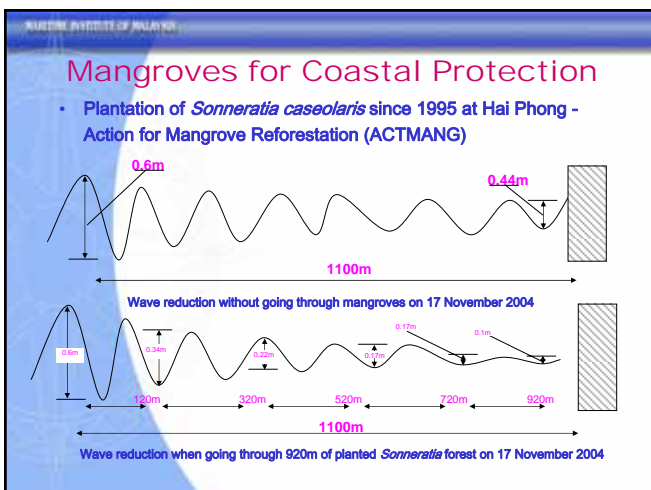
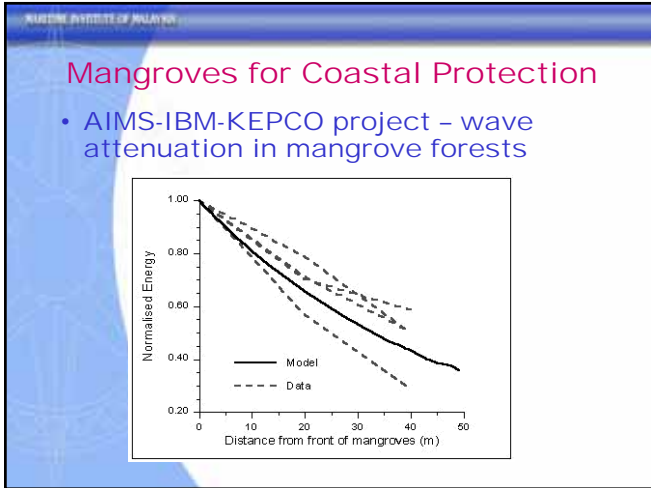


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Our Assessment

- High casualty areas – estuary areas (river mouth), open beaches
- People choose to live near the coast and river mouth
- Opportunity - rebuilding for better tomorrow?





Where Mangroves Provide Less/No Protection

1. Close to epicentre
2. Thin fringing mangroves
3. Degraded mangroves (low density)
4. Wave intensity is huge

Damage to Mangroves

Khao Lak, Thailand

Source: DMCR

Back to Nature

- Natural distribution of mangroves
- "Low energy" areas - estuary, lagoon, bay, basin

False Alarm!

- Tsunami affected areas - no significant mangrove areas along the coasts!
- Why blamed mangroves for the destruction caused by the tsunami?
- Why mangrove planting - fixing a broken coast?

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Back to Nature

- Study in west coast of Johor (Teh and Lim, 1993) – “Gain some, lose some”
- Dynamic coastal process - sediment deposition
- Kedah & Seberang Prai (Penang)

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Human Activities

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Back To Nature

- Natural Regeneration (self-repair)

Underestimate the nature!

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Back to Nature

- Tanjung Piai (Johor)
- Oil spill (1997)

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Pioneering The Coast

High salinity areas:

- *Avicennia marina*
- *Avicennia alba*
- *Rhizophora stylosa*
- *Sonneratia alba*
- *Aegiceras floridum*

Low salinity areas (i.e. delta-freshwater)

- *Kandelia candel*
- *Kandelia obovata*
- *Sonneratia caseolaris*
- *Sonneratia apetala*



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Rough, Rush &

- Malaysian Experience (Kedah)

June 2005

Feb 2006

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Rough, Rush & Harsh Reality

- Malaysian Experience (Kedah)

April 2006

July 2006

Dumping Money Into The Sea

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Dumping Money Into The Sea

- Malaysian Experience (Kedah)

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Dumping Money Into The Sea

- Malaysian Experience (Penang)

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Dumping Money Into The Sea - Indonesia (Aceh)



- Many projects have failed (Erika Check 2006; Sukristijono Sukadjo - pers.comm.)

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Seed Waiting & Wasting

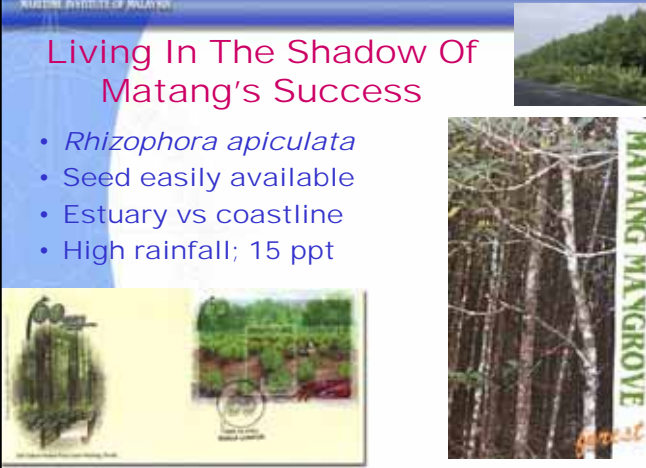


- Unnecessary increase in price of seeds
- Over-collection of seeds

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Living In The Shadow Of Matang's Success

- *Rhizophora apiculata*
- Seed easily available
- Estuary vs coastline
- High rainfall; 15 ppt



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Rehabilitation of Abandoned Shrimp Ponds



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The Philippines - Wrong Places; Wrong Species



Photo: JH Primavera

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Mangrove Planting on Mudflats?



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Doing It Right!

- **Critical steps for successful mangrove rehabilitation (Lewis, 1999)**
 1. Understand the individual species ecology (autecology)
 2. Understand the normal hydrologic patterns that control the distribution and successful establishment and growth of targeted mangrove species
 3. Assess the modifications of the previous mangrove environment that occurred that currently prevents natural secondary succession
 4. Design the restoration program to initially restore the appropriate hydrology and utilize natural mangrove recruitment for plant establishment
 5. Actual planting, after through Steps 1-4

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Mangrove planting along the coastlines in the Philippines



SEAFDEC/AQD
JH Primavera

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Mangrove planting along the coastlines in China (Hai Cang, Xiamen)

Xiamen ICM Programme

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Where Planting Is Not Possible

Serious Erosion Problem

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Other Alternatives / Options

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Other Alternatives / Options

Raising the Bar!

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Other Alternatives / Options

- Casuarinas (+ *Osbornia octodonta* + *Pemphis acidula*)



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Other Alternatives / Options



Installation of artificial reefs for coastal protection, fisheries enhancement and biodiversity conservation

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Conclusions

- Misleading information, poor utilisation of natural knowledge and scientific information
- Setting the priorities:
 - protect the existing mangroves
 - rehabilitation of abandoned ponds
 - (re)planting along coastlines
 - assessment & planning
 - hydrology (Lewis – 5 steps)
 - right (pioneer) species & right places
- Other options are available
- Doing-Nothing – Save money
- Fund – research, better coastal planning

