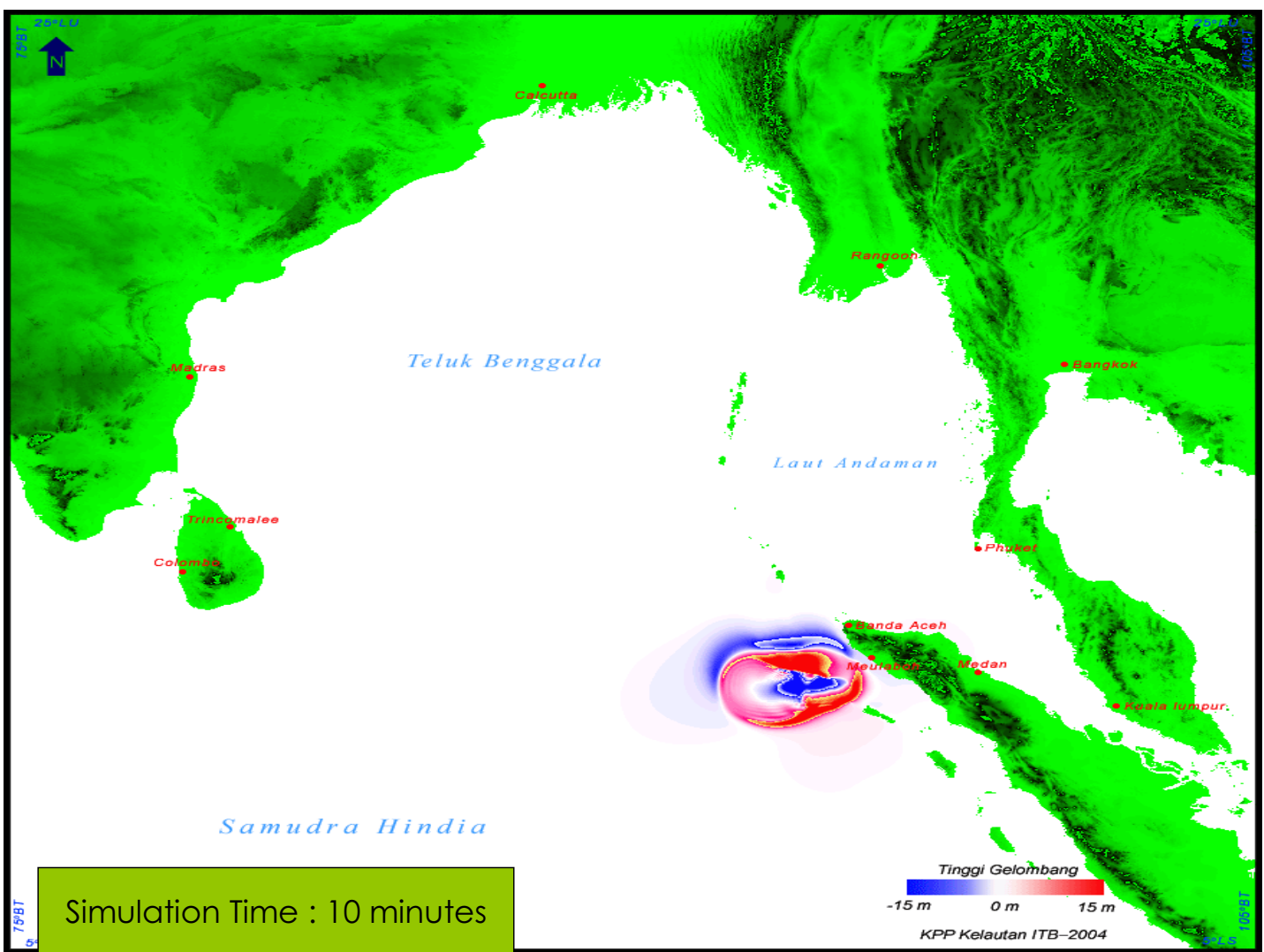
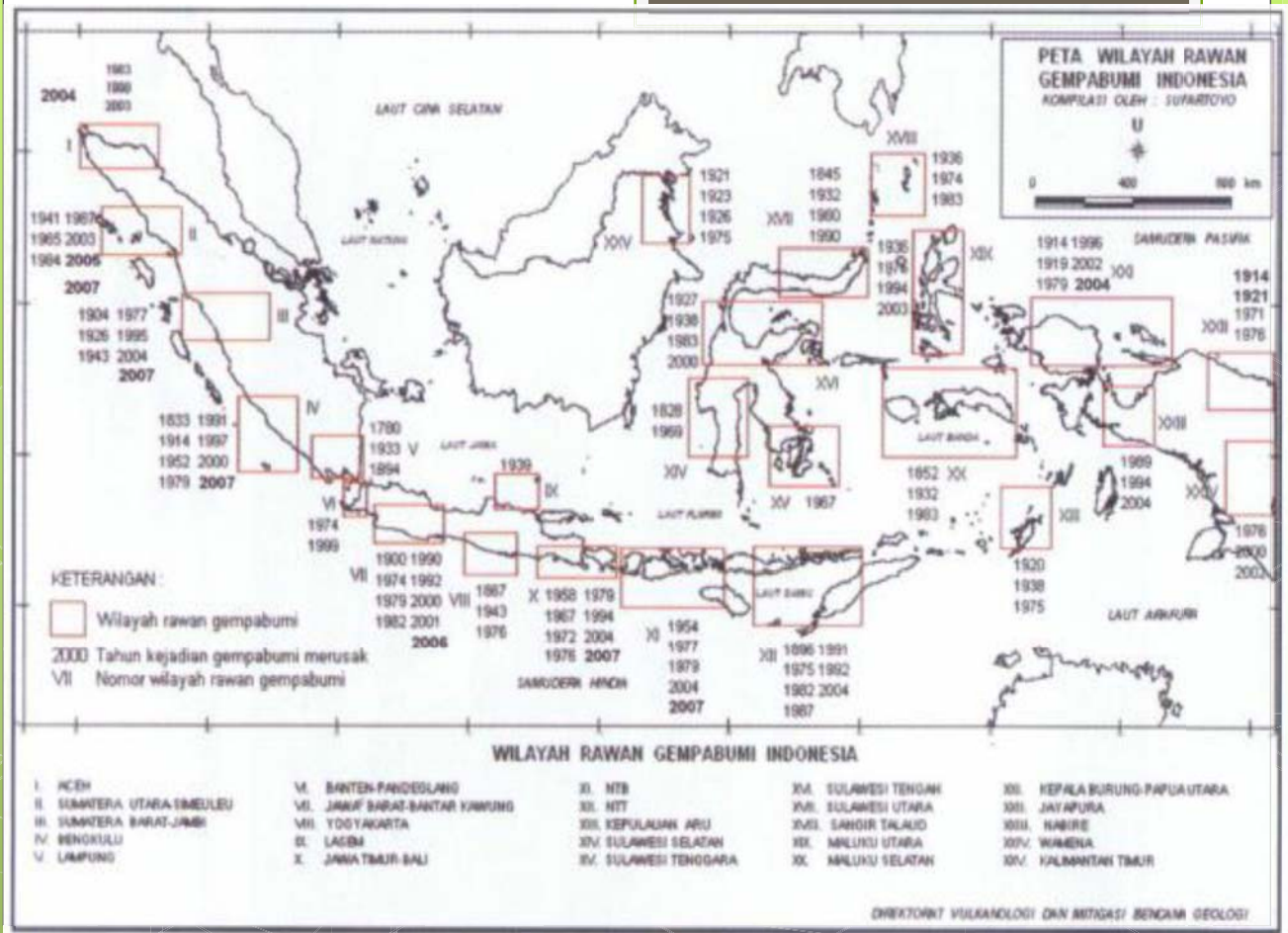


# SHORE REHABILITATION TO CONTROLL THE IMPACT OF TSUNAMI

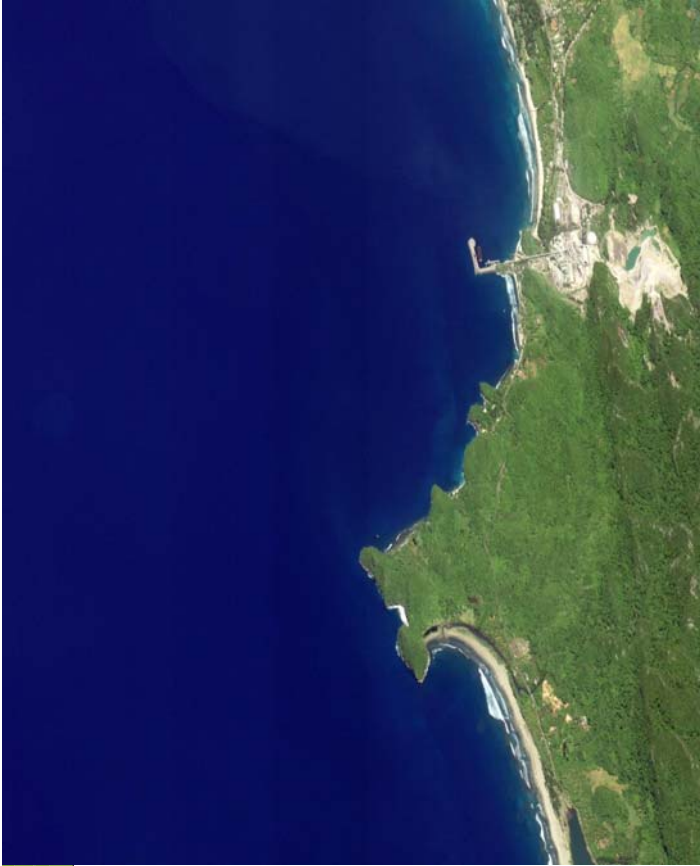
Indonesia country report  
By  
Ayu Dewi Utari (IMoF)

## I. BACKGROUND

- Indonesia has some specific condition :
  - ✓ Between 3 main world tectonic plates Eurasia, Indo-Australia, Pasifik.
  - ✓ Archipelago country sorrounded with the sea
  - ✓ Has 8 seismic gap, when earthquakes happened, it will have tsunami effect to the shores area
  - ✓ Tsunami frequent has raised. In last 50 years there were 23 tsunami.
  - ✓ Tsunami impact : damage of ecosystem (lost of biodiversity)
- To eliminate the damaged, Indonesia need an effective, efisien n low price technology



## LHOK NGA (ACEH BESAR)

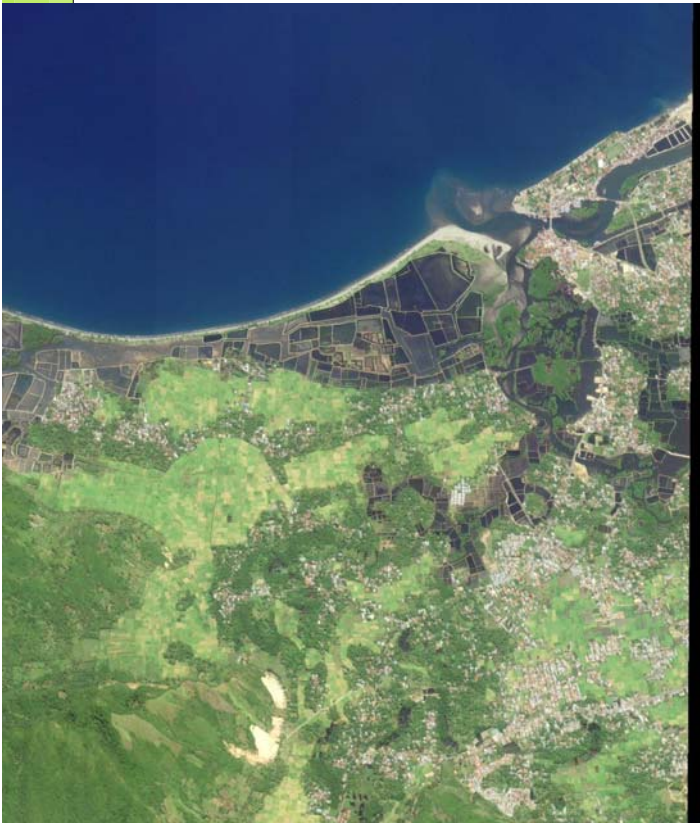


Before



After

## ULEE LHEU (BANDA ACEH)



Before



After

# CALANG (ACEH JAYA)

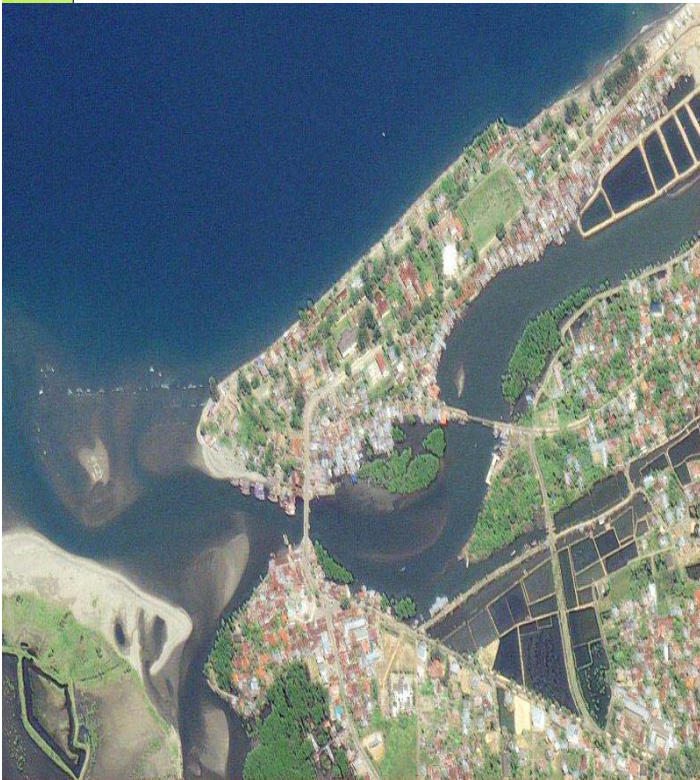


Before

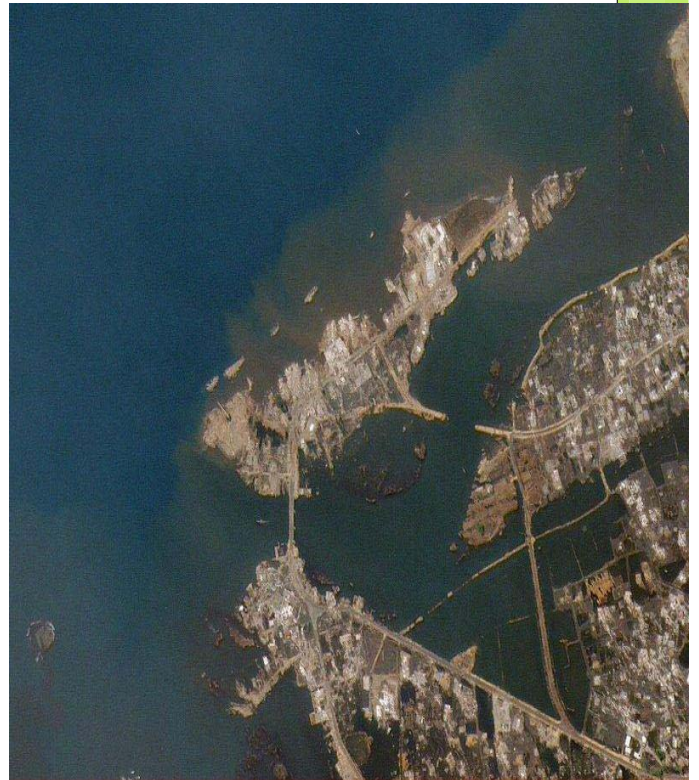


After

# ACEH BESAR



Before



After

## LESSON LEARNED

**Coastal areas are vulnerable to Tsunami**

**Need physical and vegetation barriers**

**Improper present land use**

## INDONESIA'S SHORES CONDITIONS

### 1. **Andhesit shores**

The materials of this shores are from the sea shell fauna fosils Acropora, Fungia and Porites (Filum Coelenterata). Or from the sea plant fosils Halimeda and Lithohamnion.

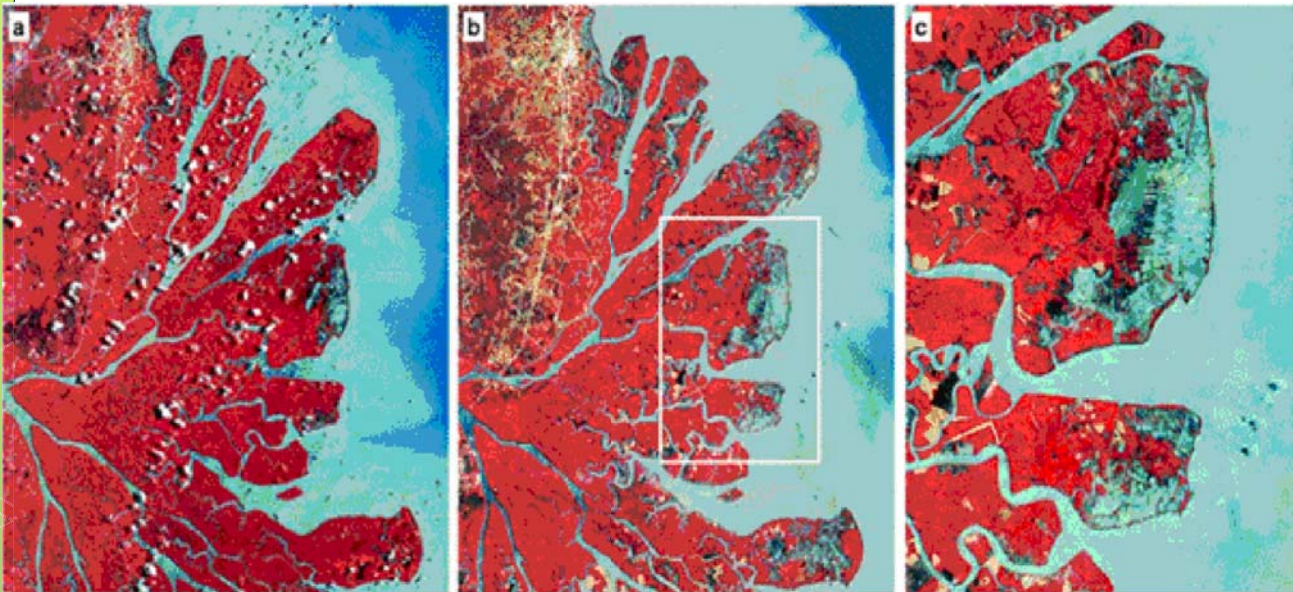


## 2. Sandy shores

- Sand dune as a form of the wind movement
- Main materials is sand, hot and dry at the surface, keep water at the beneath
- Mostly were used to cultivation
- Marginal soil
- Common plant character ; (1) Uninfluence by climate; (2) Dry land (sandy, andhesit, clay)); (3) low area; (4) Some times epyphit grow up at the trees; (5) Specially at south Java, west Sumatra n Sulawesi.

## 3. Muddy shores

- Specific characters (1) mud sedimentation on the bottom; (2) flat topography; (3) on the bay area; (4) weak waves
- Biologic characters (1) mostly fauna below substrat; (2) fauna build a hole, tunnel n more haemoglobin as adaptation on the low oxygent condition; (3) alga Diatomae on the mud surface; (4) a mangrove's habitat.
- Indonesia's total mangrove forests  $\pm$  7.758.410,595 ha
- Less 120.000 ha from 1980 - 2005 because of turn into cultivation land



**Delta Mahakam. Red colour indicate vegetation (a) 1992, shrimp ponds 4 % from total mangrove forests. (b). 1998, shrimp ponds grew up 41% from total mangrove forests . (c) Inset from the box showed shrimp ponds pattern expansion on the same area (Husein, 2006)**

## SHORE'S REHABILITATION IN INDONESIA

- At Dec 2004, area covered with dense mangrove forest had a little damage than area with broken mangrove forest
- Some studies shows that shore's forest effective to prevent the village from the impact of tidal waves n tsunami's
  - ✓ Pratikto et al (2002) , mangrove forests reduce force of tidal waves 0,734 joule
  - ✓ Utomo (2003), mangrove forest with height 5m and 50 m thickness reduce wave force 25%-30%
  - ✓ Istiyanto et al (2003), mixed species of mangrove forests reduce the energy of tsunami
  - ✓ Suryana (1998), mangrove forests with 100m width reduce the initial extent of the wave to 80%

# 1. Mangrove's rehabilitation

## a. On the tidal area's

- mangrove's planting on all tidal's area

*(reasons of Rhizophora as the main mangrove's sp plant; lot of mother plant, height of the seeds >20cm, foos breath roots and cattle likes the leaves)*

- variative density; 1 x 1 m, 3 x 3m  
width 50m – 100m to the beach
- to built a mangrove forest with a high density; rich of biodiversity; shelter of tsunami n abration, wind and wave breaker
- used to do at north Java, east Sumatra, Bali Kalimantan and Papua Islands

## b. On the ponds

- o Traditional sylvo fishery  
Mangrove's planted on the centre of the ponds
- o Komplangan  
Mangrove's planted on the special area of the ponds
- o Open ponds  
Mangrove's planted on the dike of the ponds
- o Kao-kao  
Mangrove's planted on the dike in the centre of the ponds
- o Tasikrejo  
Mixed Mangrove's, dry field rice, tea jasmine and ponds



## 2. Shore's regreenings

- 1985 - 1999 : Regreenings Inpres with *Accacia auriculiformis*, chasew nuts, *gliricideae* and coconuts in the shore area's. It was planted on the farmers fields borders
- 1999 – 2007 : Planted a *Casuarina equisetifolia*, *Accacia auriculiformis* and *gliricideae* with *untu walang pattern*. It was planted on the 100 meter from the highes tidal wave points
- 2007 - .... : Shores's reahabilitation with some shore's species. There were some patterns such as (a) systematic patterns; (b) strip patterns; (c) row patterns and (d) nelder/semi nelder patterns

### Areal Model Hutan Pantai





PENGHIJAUAN PANTAI SELATAN DIY-JATENG

