

# When the wave recedes

## Solid waste issues in post-tsunami Sumatra

Dennis Kalson, REHS  
Global E H Consultant

# Solid waste after the wave

- Aceh province before December
- The earthquake, a disaster in itself
- The sudden impact of the tsunami
- Acres of rubble
- Solid waste issues
- The long road back
- Priorities and opportunities













# "Gempa" -- Earthquake

- Epicenter 250 k SW of Banda Aceh
- Richter 9.2 – 9.5
- Second largest quake measured
- Shook a long, long time
- So violent that some thought it the end of the world



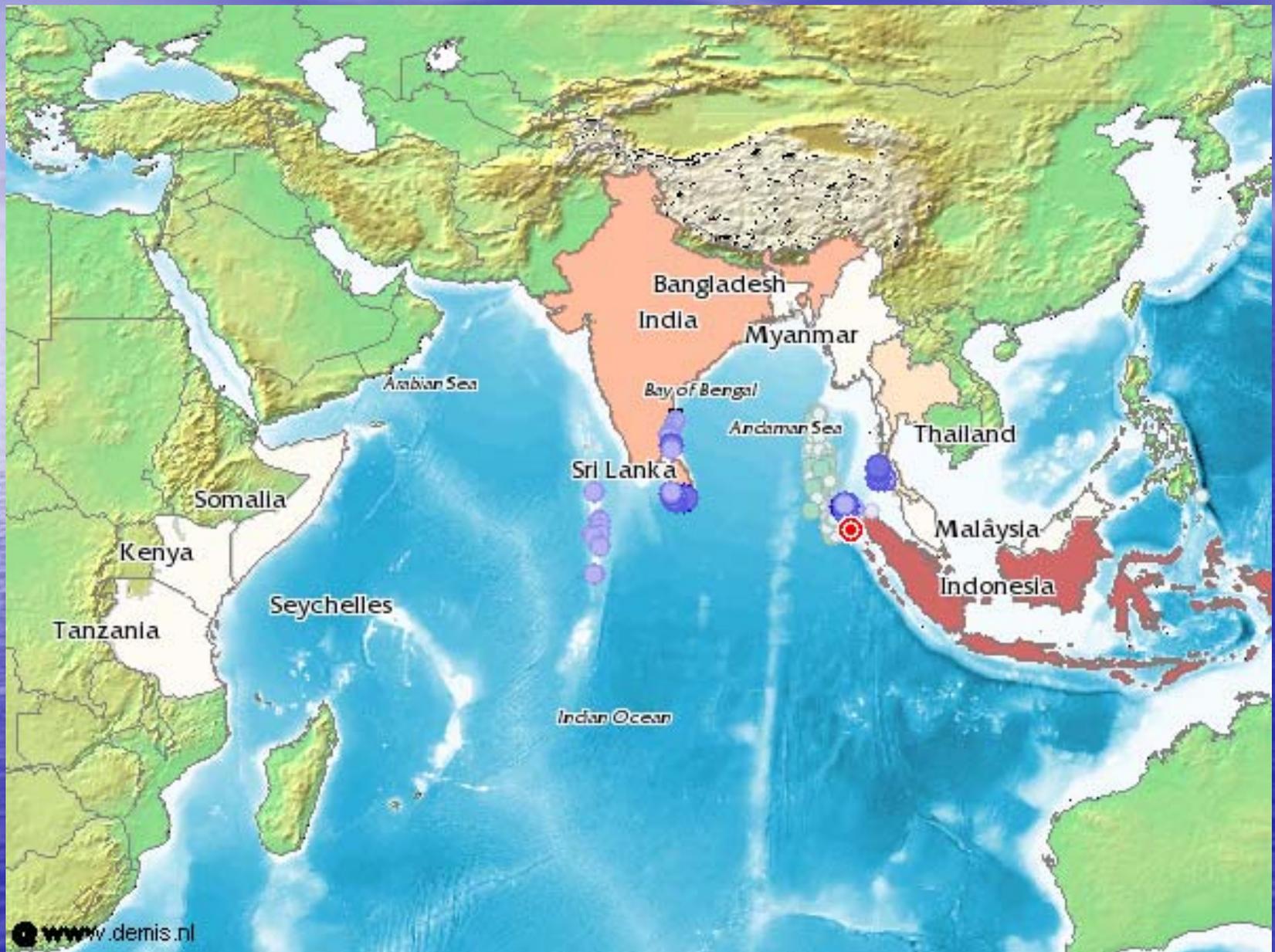


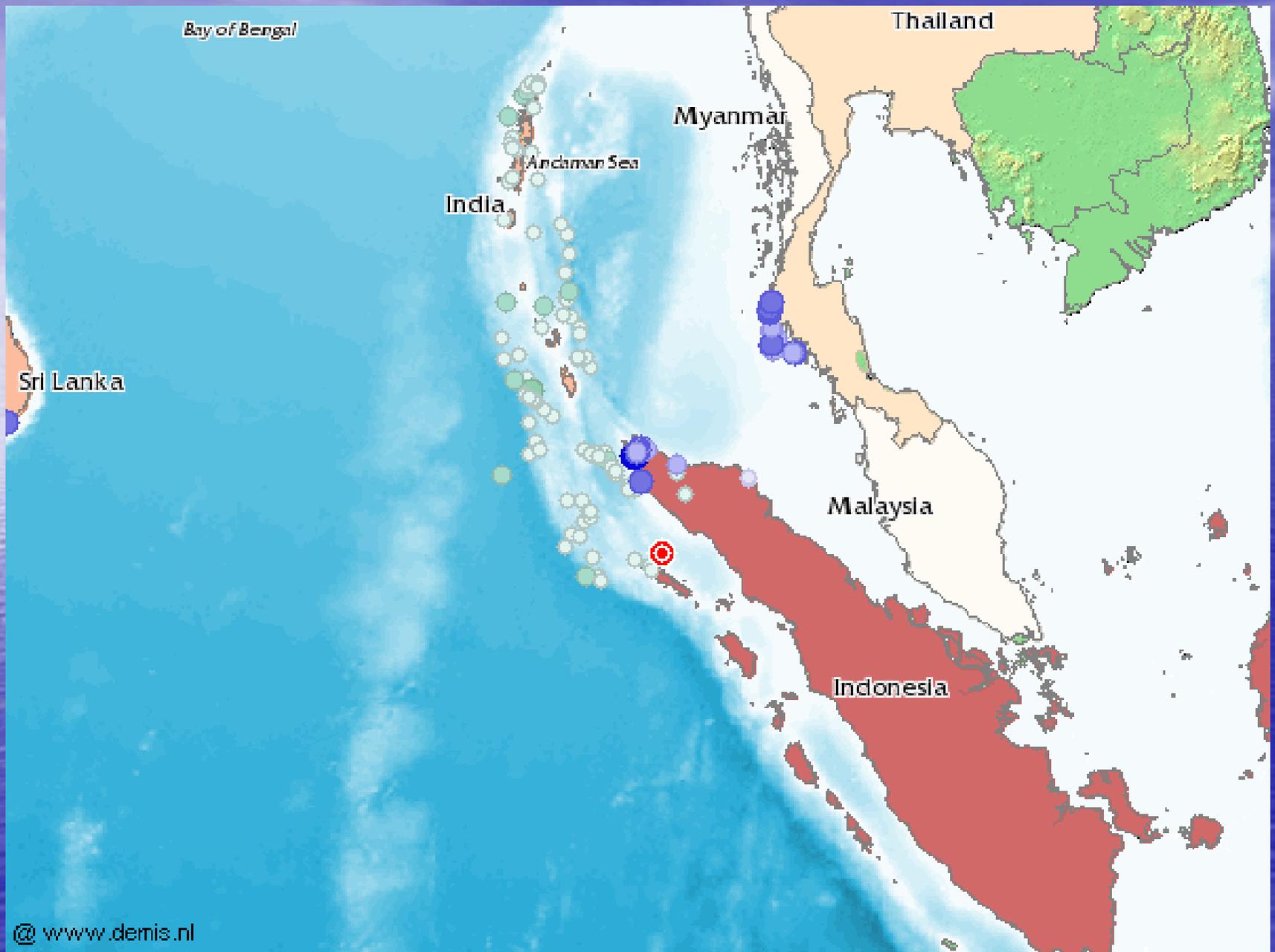




# Tsunami of incredible size

- 200,000 killed in Indian Ocean rim
- Millions homeless
- 150,000 (?) deaths in Aceh province
- Moving water + debris = momentum









A serene blue seascape with a bright sun on the left and a horizon line. The sky is a deep blue with wispy white clouds. The water is a vibrant blue with gentle ripples. The sun is positioned on the left side of the horizon, creating a bright glow and a reflection on the water's surface.

Rafly

A music video























# Where would you start?

- Some issues:
  - 40 of the 42 truck garbage fleet destroyed
  - The landfill was in the TIZ ; 2/3 flooded
  - Roads impassable because of debris
  - Debris mixed with corpses
  - remaining households burning garbage
  - Spontaneous dumps
  - Heavy equipment; mostly destroyed
  - Heavy equipment; competing demands
  - Public service personnel: -40%

# Where do you start?

- Some more issues
  - Land use, private property vs public lands
  - Future land use plans? Estuary, green space, reconstruction.
  - Rice field clearing
  - Personal possessions; valuables
  - Unexploded ordinance
  - Hazardous materials
  - Septage disposal
  - IDP camp solid waste management

# Week 1, rescue, corpse removal



Week 2, corpse removal, primary road clearing



# IDP camp garbage management



Week 3, drainage channel clearing, corpse removal  
critical infrastructure, debris fill areas established



Week 4: Corpse removal, secondary road clearing, drainage clearing, 2 refuse trucks arrive from Turkey, septage trucks en route



Week 5: new landfill siting process, heavy equipment compacting debris fills, dump truck fleet increases, septage in the river



Week 6: planning to formalize informal recycling, commercial zones clearing, some roadside dumps moved (thanks to Bill)





Week 7-9: corpse removal on-going  
clearing continues, expands out of city core, debris  
fills compacted (2meter lifts).



Weeks 10-12: Mass burial site filled, planted, debris fill areas expand, recycling of metals and plastic evident. Residents beginning to occupy slabs.



Week 13: Another quake. 8.5, Nias nearly destroyed



# Solid Waste Opportunities

- New landfill, sited and designed to global standards
- Growing fleet of equipment.
- Post-closure planning in debris fills
- Estuary redevelopment
- Monitoring and research.
- New septage facilities

Personal note:

A promise to Miss Ratna



# Miss Ratna Trust Fund

Public Health International  
PO Box 116  
Roseburg, Oregon  
97470



Terima kasih!

