Building with Nature Indonesia
~ Opportunities for CC adaptation & mitigation ~

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Cover photo from Mc Ivor et al (2012)
• Mangroves for climate change adaptation
  – Science: coastal protection, sea level rise
  – Practice: Building with Nature

• (Mangroves for climate change mitigation)
Wetlands International mission:

to sustain and restore wetlands, their resources and biodiversity
MANGROVE CAPITAL partnership

Practical solutions

Scientific Evidence

Enabling policies
THE PROBLEM

When the mangroves are gone...

+ soil subsidence + sea level rise + hard infrastructure
Mangroves & climate change adaptation

- Coastal protection
- Sea level rise
Mangroves can reduce everyday waves by 13 – 66% in 100 m. The more obstacles the better, preventing erosion.
Mangroves can reduce peak water levels during storms… but role in tsunami reduction erratic
Reduction of storm surge level by 5 – 50 cm/km

AND: surface wind waves reduced by 75% per km
Mangroves can strengthen, bind and build soils

- Preventing erosion
- Keeping pace with sea level rise?
- Depends on sediment & organic matter input
Mangroves occur:

- Above Mean Tide Level
- Below High Tide Level
Adapting to sea level rise

Mangroves can NOT keep up with sea level rise … if soil input is lacking
Adapting to sea level rise

Mangroves keep up with sea level rise
... if sediment inputs are sufficient
Adapting to Sea level rise

• Mangroves able to adapt to sea level rise (in some circumstances)
  – Mangroves build up: 1 - 10 mm per year
  – Global mean sea level rise: 3 mm per year

• Management implications:
  – Allow space to move land inward
  – Ensure sediment supply
THE PROBLEM

Waves
- Erodes sediment

Tide
- Brings in sediment

Mangrove

Hard structures
- Erodes much sediment
- Brings in little sediment
The problem

Conventional solutions

• ‘Static’ protection only
• Can damage ecosystems (affecting C stock)
• Leave out invisible costs and benefits
Building with Nature

Solution

Mangrove

Permeable structure

same function
Building with Nature

Permeable Structure

Wave reduction

Stillwater = sedimentation

Mud passes through
Land reclaimed from the sea
Need for sustainable land use (ecosystem services)
BUILDING WITH NATURE

Thinking, acting and interacting differently

- Ecoshape consortium
- Initiated by Van Oord & Boskalis
- Building with Nature program
Continuum of concepts

- **Soft solutions**
  - More space, no dike
  - Flexible and cost-effective

- **Hybrid solutions**
  - Continuum of concepts

- **Hard solutions**
  - Less space, dike
  - Less flexible, extra investment
• Comparing GHG footprint of Building with Nature solutions to conventional engineering

• Incentive: CO2 performance ladder for climate friendly procurement

• Synergy adaptation & mitigation

• Exploring opportunities for Building with Nature Indonesia case
Mangroves for Climate Change adaptation

- **Offering coastal protection**
  - Managing expectations: protection against what?
  - Building with Nature solutions

- **Keeping pace with sea level rise**
- **Ensure healthy mangroves!**

- **Other ecosystem services:** CC mitigation, fisheries enhancement, tourism, timber, fuel, biodiversity
Thank you! Questions welcome