

# World Wetlands Day

2 February

**Wetlands  
for Disaster  
Risk Reduction**



Susanna Tol, Wetlands International, Brussels, 2 February 2017

# Contents

- Importance of Wetlands for disaster risk reduction
- Why wetlands are disappearing rapidly
- What Wetlands International is doing on DRR

# ...all play a vital role in DRR / CCA

## Regulating services:

Reduce and mitigate the impact of hazard events

- Buffers against storms and salt water intrusion
- Store large quantities of water, regulate flood waters
- Release stored water, helping to mitigate droughts

## Provisioning services:

Support and sustain livelihoods: timber, fruit, fish, fresh water, agriculture, income



# mangroves

- Coastal buffers: protection against storms and floods
- Protect from sea level rise (to some extent)
- Prevent erosion & salt water intrusion

A sunset over a wide river. The sun is low on the horizon, casting a golden glow across the sky and reflecting on the water. In the distance, there are silhouettes of hills and trees. A small boat with two people is visible on the water in the foreground.

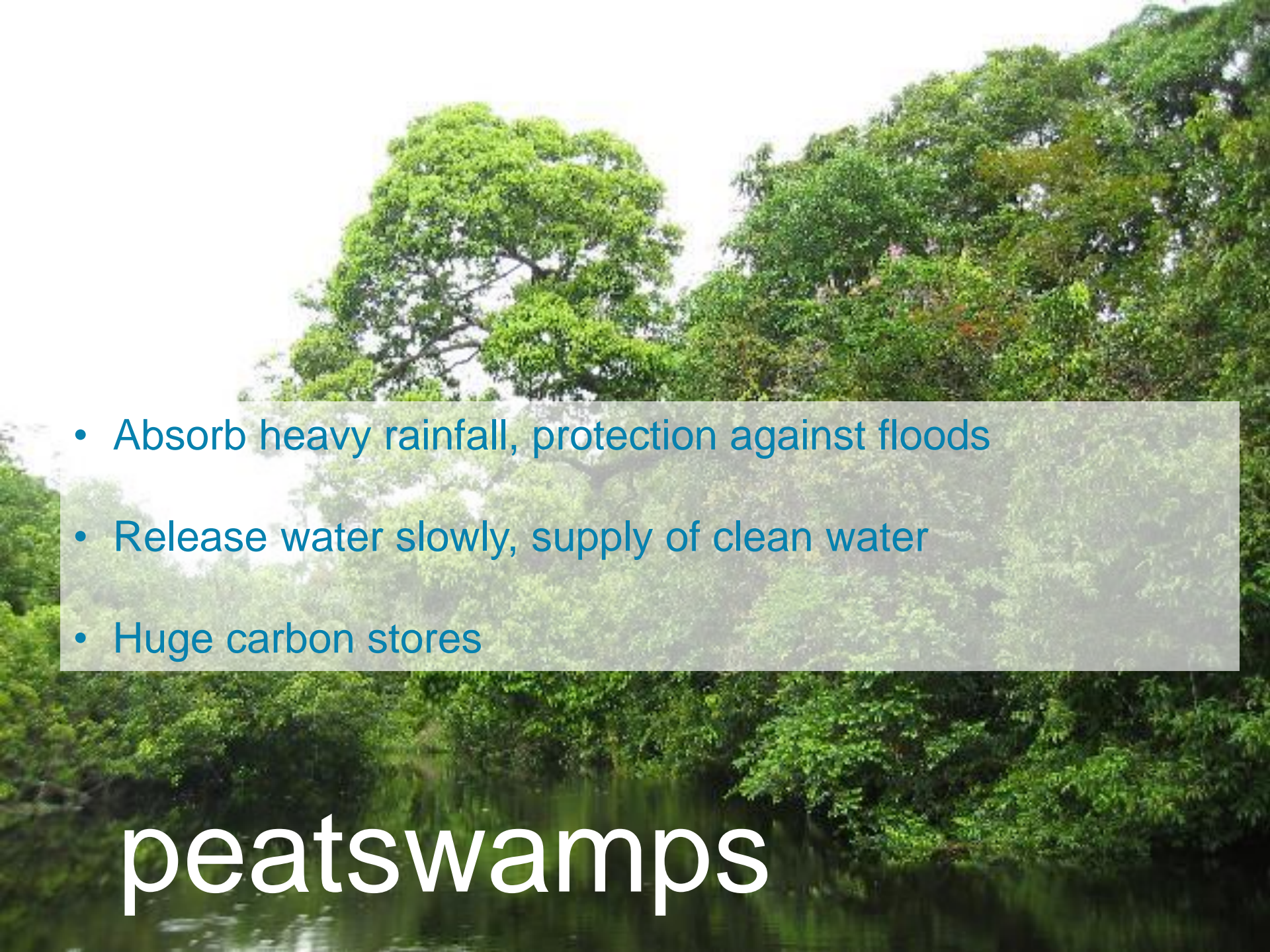
# rivers and deltas

Lakes

Floodplains

Marshes

- Act as a giant reservoir for flood water
- Sources of drinking water, food and irrigation

- 
- Absorb heavy rainfall, protection against floods
  - Release water slowly, supply of clean water
  - Huge carbon stores

# peatswamps

- Reduce droughts
- Essential for cattle, fish, growing plants and trees

Rivers

Swamps

Lakes

Springs

wetlands in dry regions



- Store water from rain and glacial melt and groundwater
- Reducing landslides, floods and droughts

# High altitude wetlands





# Most vulnerable people rely on wetlands!

How we manage wetlands is central to DRR, and should suit a context of climate variability



# 64% of wetlands are already lost

- Impacts from climate change..., population growth...
- **But main cause of degradation:** Ill-informed spatial planning & development (dykes, dams, irrigation) degrading natural capital
  - putting people's lives at risk

# Many disasters are man-made...

- 90% of hazards are water related and often become disasters due to ecosystem loss (e.g. mudslides, floods etc)
- Climate conditions contribute to the challenges
- We need ecosystem smart development investments & solutions that work in a context of climate variability!
- Responsibility of government, finance institutes, businesses

# IPCC 5th Assessment Report



***“We don’t know what we get, so we should have a system that is resilient to various scenarios”.***



# What we do on DRR

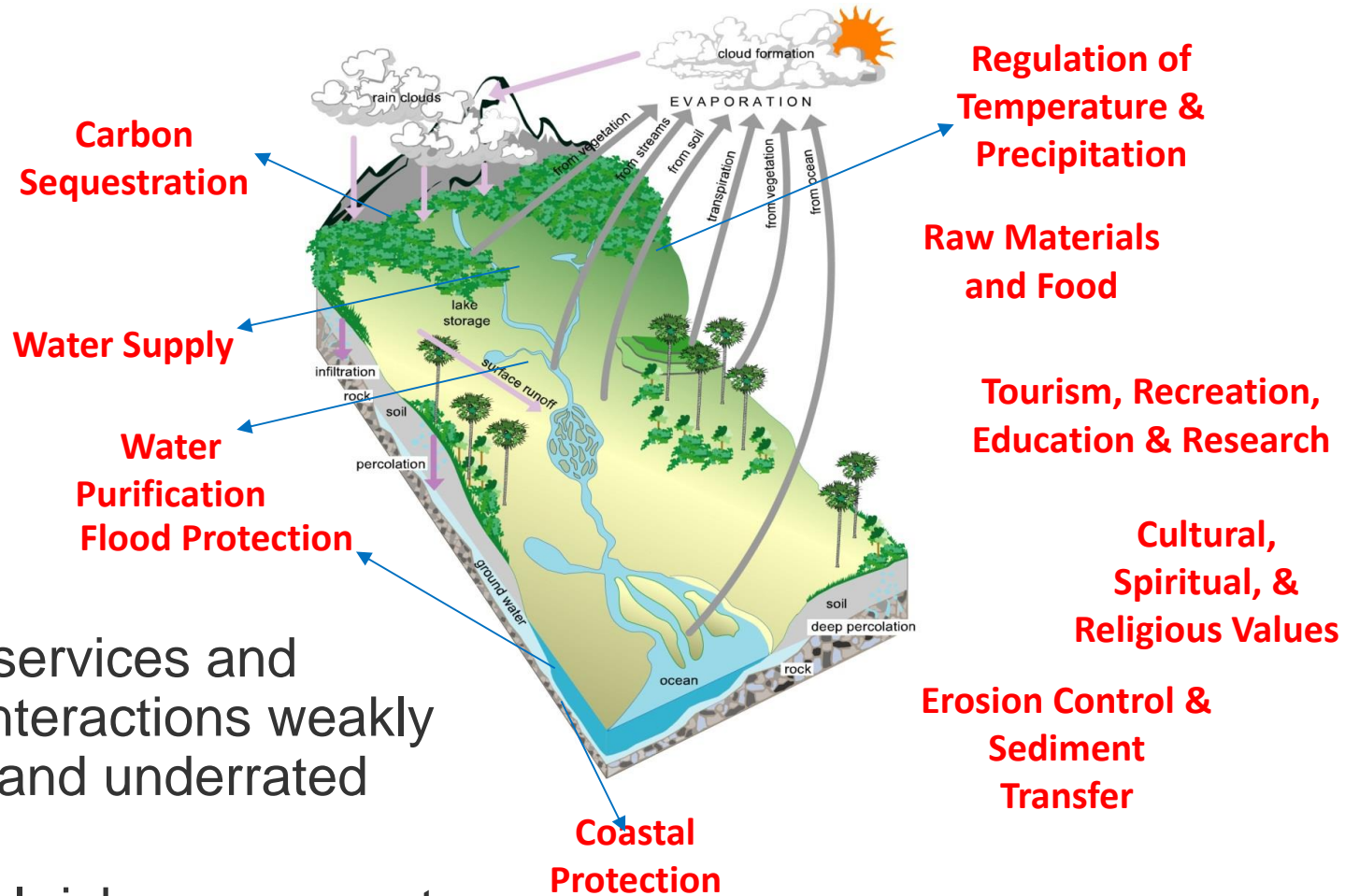


# Our DRR objective



Community resilience  
through reversing wetland degradation  
in (transboundary) watersheds, coastal areas and drylands

# Integration challenges



- Ecosystem services and landscape interactions weakly understand and underrated
- Conventional risk assessments focus on household level

# Build capacity:

**On dynamics of the landscape and their influence on risk  
e.g:**

- How water & soil 'behave'
- How (eco)systems interact
- The impacts of development on the water resources & flow
- The importance of biodiversity for a resilient system



# Mainstream wetlands, incl root causes of loss in:

- Risk assessments
- DRR interventions
- Water management, spatial planning, sectoral development
- DRR, adaptation and mitigation plans
- Investments in natural infrastructure

# Global advocacy on Eco-DRR



**United Nations**  
Framework Convention on  
Climate Change



**United Nations**  
Convention to Combat  
Desertification

# Pilots together with experts and stakeholders in the landscape



To develop shared understanding and acceptance of risk, root causes, capacities, approaches, interventions and trade-offs, governance

# Partnerships



# PARTNERS FOR RESILIENCE



**Collaboration** humanitarian, development & environmental actors, an many local partners, **complementing** each other in building resilient communities

## Climate smart and ecosystem smart DRR

# Climate smart & ecosystem smart DRR:

- Investments & solutions that work in a context of climate variability!
- Address root causes of risk, e.g. ecosystem degradation
- Landscape to household level solutions
- Collaboration with all stakeholders and across sectors (landscape approach)



# Mahanadi Delta, Odisha

**Landscape fragmented** for water resources development projects

**Different hazards** across the landscape



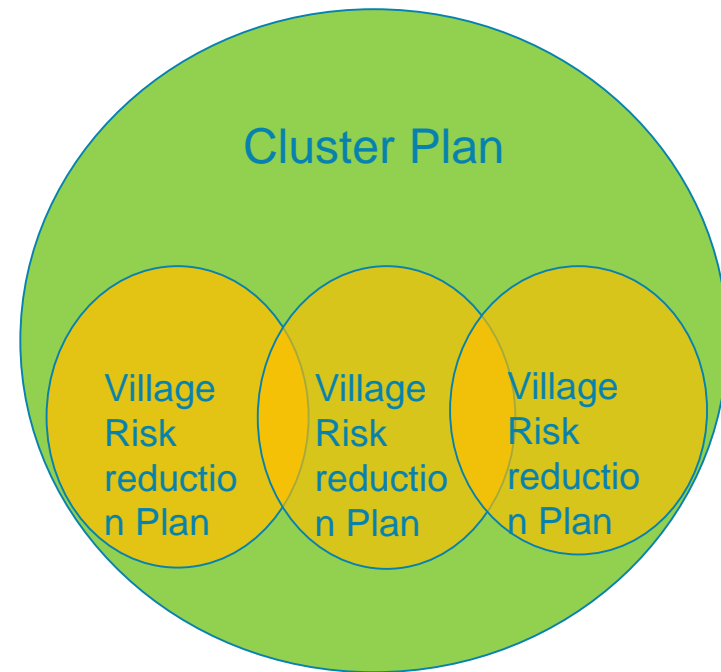
**PARTNERS FOR RESILIENCE**

# What we do: Cluster villages in same risk context

Scaling up successful DRR work of individual villages is not good enough to reduce risk, because ecosystems work at higher levels

- Coastal zone: cyclones, saline intrusion
- Central delta: floods, waterlogging
- Delta head: floods and droughts

- Synergize DRR plans
- Joint advocacy for better protection





# What we do: Strategies in the field

## Together with communities:

- Restored ecosystems
- Introduced sustainable livelihood options

<b>Intervention</b>	<b>Purpose</b>
Restored water bodies	Ensure water availability
Restore hydrological connectivity	Reduce water logging
Plant vegetative buffers	Control soil erosion from river banks
Restore mangrove belts	Create coastal buffer

# What we do: planning



- Participatory risk assessment & planning → 126 DRR plans
- Formation of village DRR committees
- 15 model villages
- Leveraged € 3,3 mln from government



# What we do: dialogue, investments

- Natural infrastructure in local water management decision
- Extension of wetland management to river-basin level
- Dialogue on downstream water needs and DRR in dams
- Read more in [Downstream Voices](#)



# Inner Niger Delta, Mali

One of the largest seasonal floodplain wetlands in the world

**Developments upstream for irrigation and hydropower:**

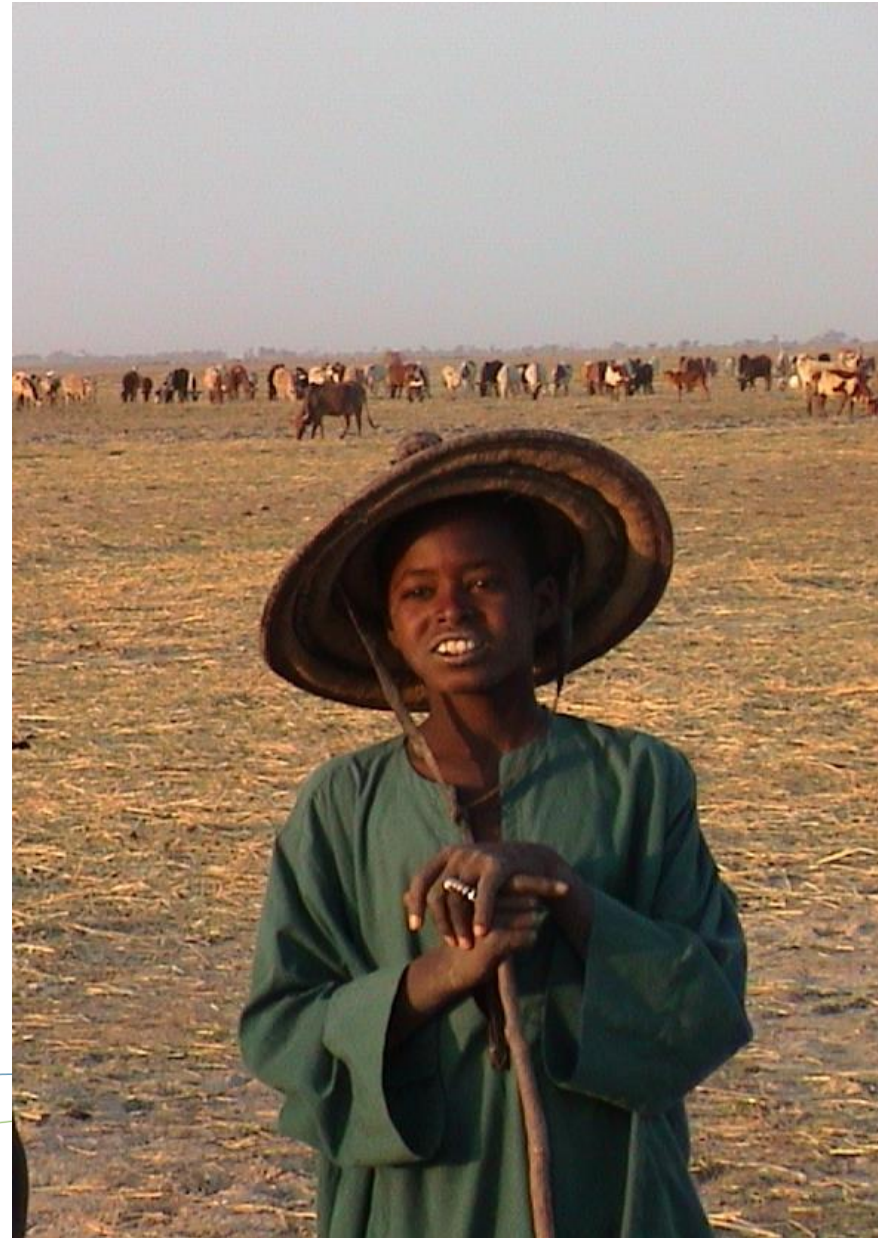
- Impact flow and peak discharges to the Inner Niger Delta
- Affect agriculture and fish production of 2 mln people downstream

**Further dams → constant droughts and humanitarian disasters**



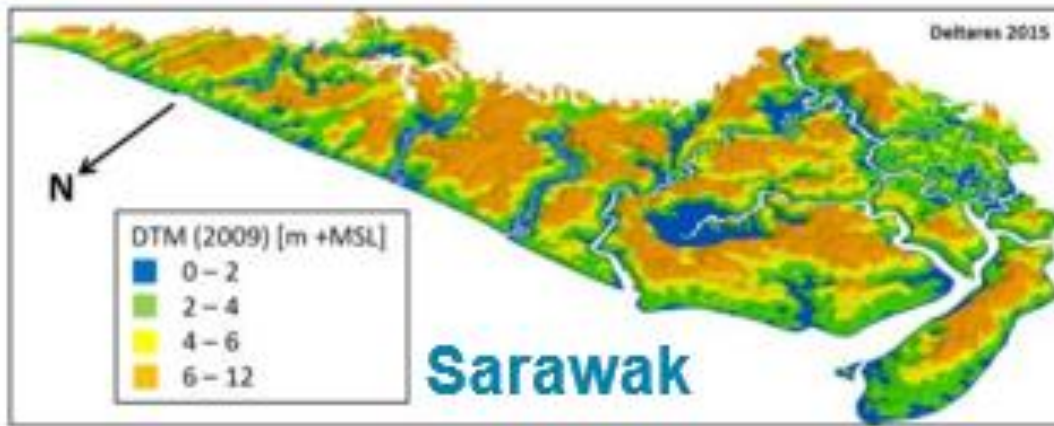
# What we do: Build knowledgebase for informed decisions

- e.g. for Fomi dam
- [Analysis](#) of the impacts of dam infrastructure in combination with climate change scenarios.
- [Study on water sharing in the Upper Niger Basin](#)
- [Forecast](#) the flooding of the IND

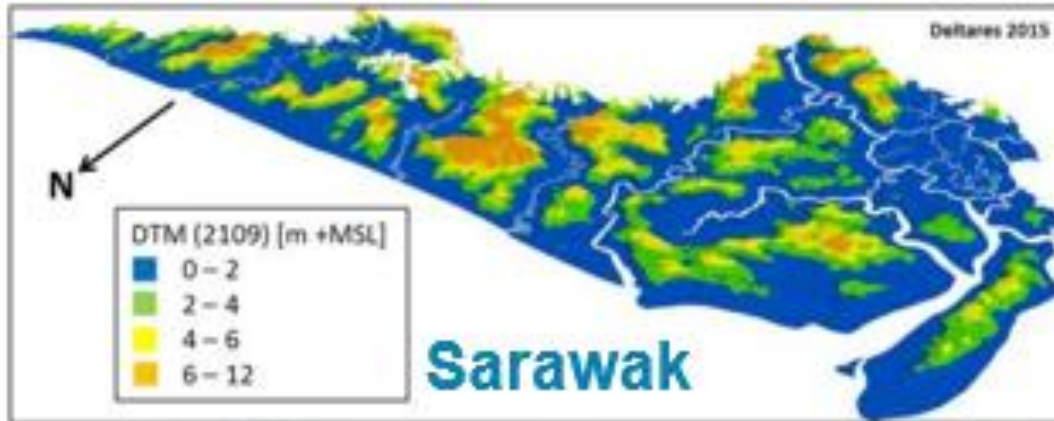


# Peatland loss SE Asia

Peatlands drainage → oxidation → subsidence → flood risk



- 2009: most of the delta lies above mean sea level



- 2109: subsidence will have brought most of the peatland down or just above mean sea level



# What we do: research to peatland subsidence

**Globally a problem:** Somerset, Everglades, Germany, Denmark, NL

**Sarawak, Sumatra, Borneo:** drainage for palm oil or pulp wood

In tropics:

- 5 years after drainage → 1 to 2 m.
- After that 3 to 5 cm p/yr: 2-3 m in 25 yrs; 4-5 meters within 100 yrs.

**Will affect millions of people, e.g. 12% of Sumatra**

Flooded palm oil plantation due to peat soil subsidence. Photo by Deltares

# What we do: peatland restoration, advocacy, capacity building



## Rewetting

- Stops oxidation & emissions
- Restores biodiversity

- **Replanting** with communities
- Advocacy work at RSPO
- Workshop for palm oil growers
- Advising the government







# Building with Nature Indonesia

## Halting coastal erosion



UNESCO-IHE  
Institute for Water Education



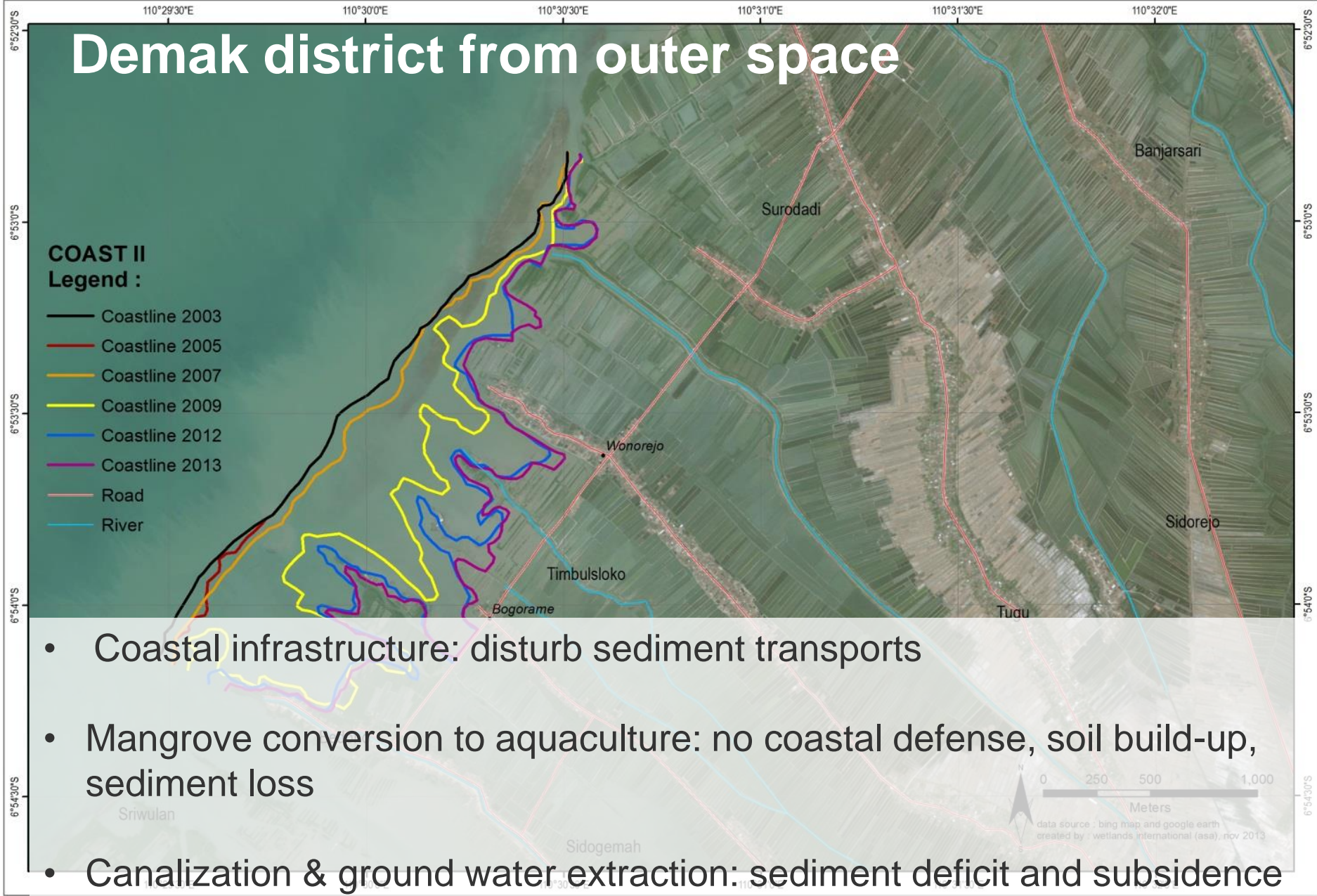
Witteveen + Bos



# Coastal erosion Central Java



# Demak district from outer space



- Coastal infrastructure: disturb sediment transports
- Mangrove conversion to aquaculture: no coastal defense, soil build-up, sediment loss
- Canalization & ground water extraction: sediment deficit and subsidence

# Situation in 2030 under BAU

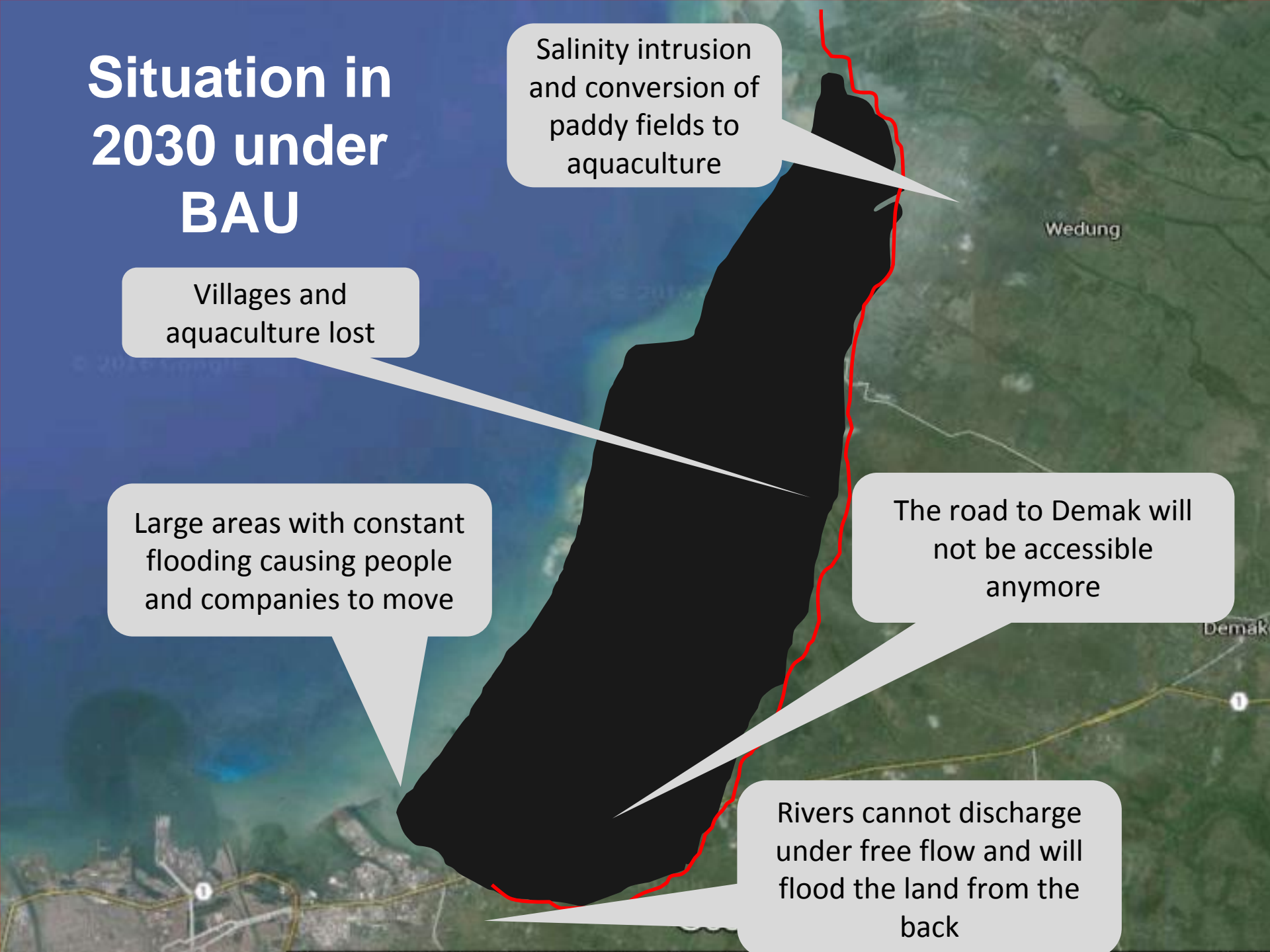
Salinity intrusion and conversion of paddy fields to aquaculture

Villages and aquaculture lost

Large areas with constant flooding causing people and companies to move

The road to Demak will not be accessible anymore

Rivers cannot discharge under free flow and will flood the land from the back



## Some facts and figures

- 70.000 people affected;
- Income loss: 60-80%
- 1000 ha already lost; 6 km inland flooding expected
- 30-65 cm sea level rise



# >1/3 of Java coastline vulnerable to erosion

30 million people at risk on long term

## Vulnerability Index

- Low
- Medium
- High
- Extreme

Central Java

East Java

# Traditional solutions make it worse

Waves reflect on hard structures, increasing eroding force

Hard structures disturb the sediment balance

Hard structures collapse

**Paradigm shift needed:**

From Building in Nature



**To Building with Nature**

*Using the forces of Nature*



# Bring back the mangrove greenbelt

Mangroves require a stable muddy coast to settle

- **Project aims to:**
  - Stabilize sediment balance
  - Address groundwater extraction
  - Reverse river canalization
  - Introduce sustainable aquaculture



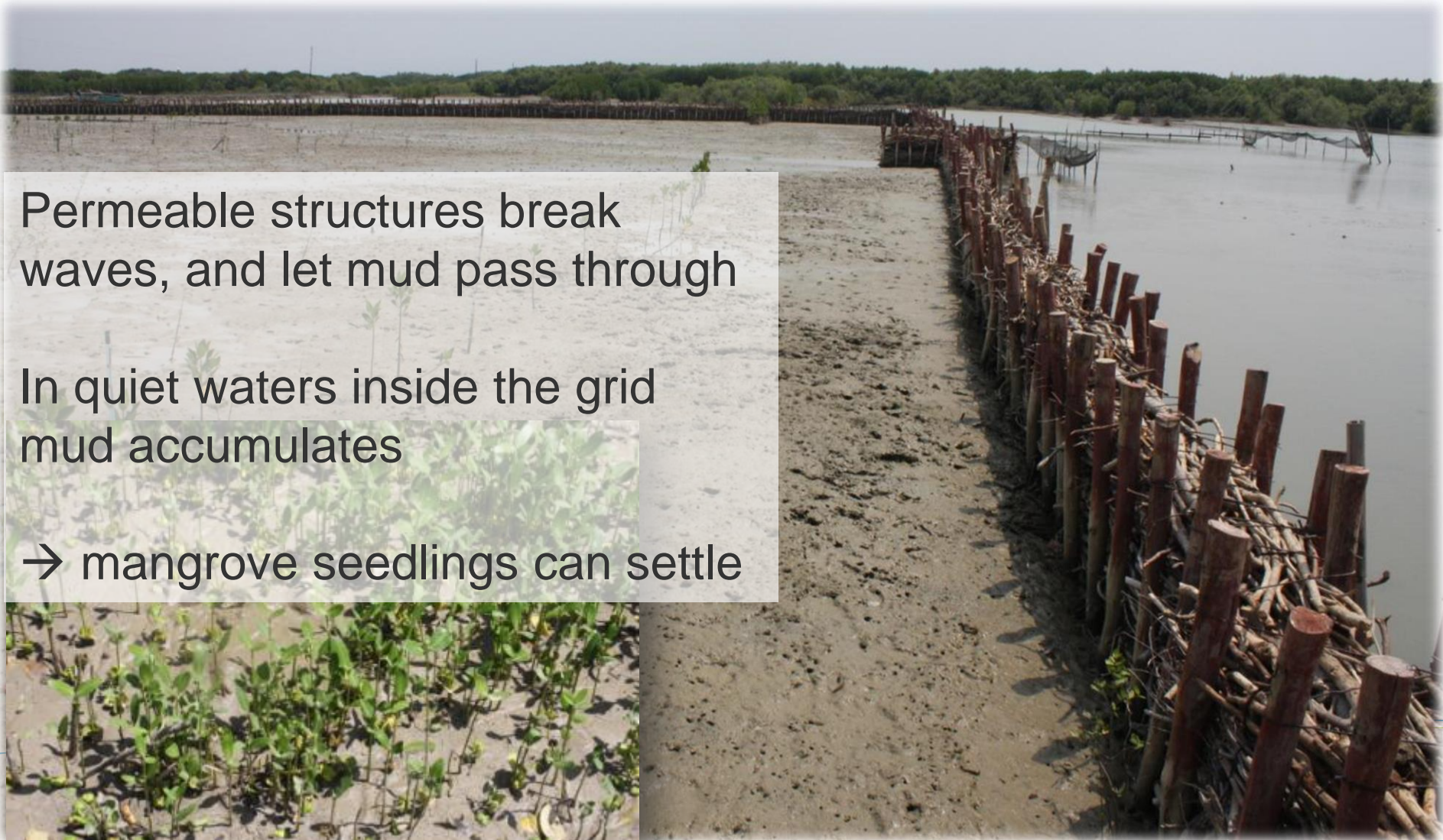


# What we do: bring back stable coastline!

Permeable structures break waves, and let mud pass through

In quiet waters inside the grid mud accumulates

→ mangrove seedlings can settle





# What we do: socio-economic measures!

## Establishment of community groups for:

- Permeable structure maintenance
- In return: support with aquaculture revitalization
- Development village regulations and plans



# What we do: capacity building

**Government staff, knowledge institutes,  
engineering firms and communities:**

- Systems understanding
- Permeable dams construction and maintenance
- Ecological Mangrove Rehabilitation
- Sustainable aquaculture



# What we do: integration into policy

- Demak Coastal Master Plan
- Demak Mid-term Development Plan
- Central Java Mangrove Working Group
- Demak spatial plan
- Central Java Spatial Plan
- Community development plan
- Village regulations



# Scaling up pilot

1. Pilot in one village in Demak
2. Pilot along 20 coastline in Demak district
3. Replication Building with Nature in other rural and urban coasts
  - Lol signed for scaling up in Central Java
  - Building with Nature platform in Indonesia will be developed
  - In dialogue for BwN solutions in Jakarta Bay
  - Connect Building with Nature to DRR and adaptation plans (PfR)
  - Replicate BwN solutions elsewhere (Surinam, Philippines, Panama)

# Dutch trade mission to Indonesia visited Building with Nature project area Nov 2016



# Upper Fafan Catchment, Ethiopia



**Wetlands**  
INTERNATIONAL



**ACACIA WATER**



The Netherlands  
Red Cross



**Horn of Africa**  
Regional Environment  
Centre and Network



# Drought risk

- Agricultural productivity is decreasing
- Gullies are encroaching into farmland
- Groundwater tables are dropping

More and more people depend on aid and safety net programs.



# What we do: landscape level risk assessment

## Assessment of challenges, opportunities

- Biophysical and socio-economic
- Land use and management
- Ecosystems and water resources



**Core problem:**  
Failing natural  
resources  
management

# Proposed interventions

Address the causes!

- Widespread regeneration of vegetation cover

**Goats eat the vegetation → zoning**

- Restore ecosystems to improve water retention capacity of landscape → in times of low rainfall

**Can be multi-year events**

- Livelihoods that are less dependent on water
- Community mobilization, capacity building, participatory decision-making, with experts

# Thank you

**For more information:**

Susanna Tol, [susanna.tol@wetlands.org](mailto:susanna.tol@wetlands.org)

Sr. Policy and Communications officer

Building with Nature, Disaster Risk Reduction

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