



# Building with Nature

## NbS Conference Oxford 2022

Henk Nieboer

# The need for a transition

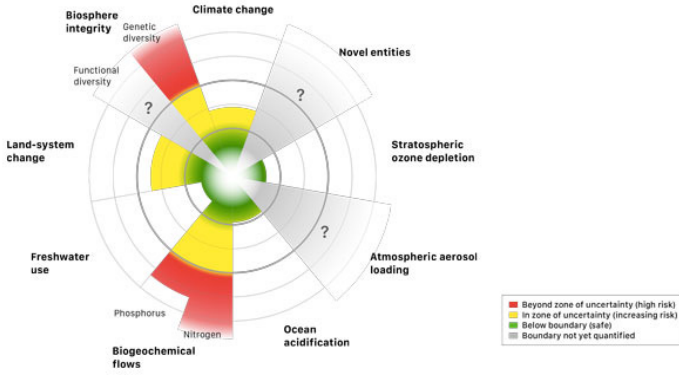
Better solutions for societal challenges are needed



# Meeting the Global Goals within the planetary boundaries



(Source: <http://www.globalgoals.org/>)



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# Nature is part of the solution

- Building with Nature
- Nature-based Solutions
- Ecosystem-based Adaptation
- Ecosystem-based Disaster Risk Reduction
- Nature inclusive design



EcoShape

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# What are Nature based solutions?

**Nature-based Solutions (NbS)** are defined by **IUCN** as actions to protect, sustainably manage, and restore natural or modified ecosystems, that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits

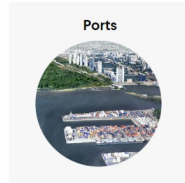
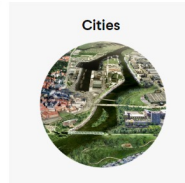
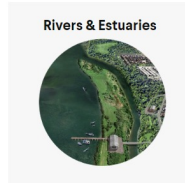
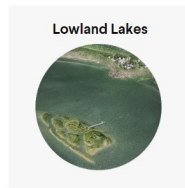
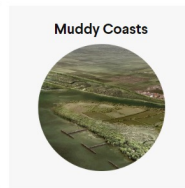
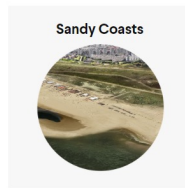
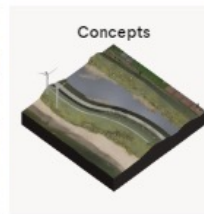
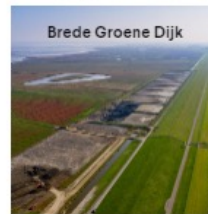
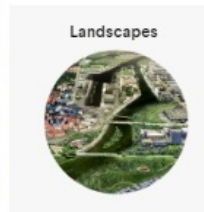
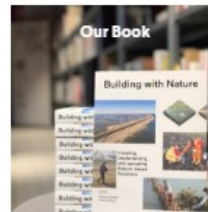


# What is Building with Nature ?

Building with Nature is the approach to creating, implementing and upscaling Nature-based Solutions for water-related infrastructure

“The Building with Nature approach starts with understanding how the natural and societal systems function, using natural materials, forces and interactions while creating opportunities for nature to develop” (De Vriend 2015).

# What is EcoShape?



## Latest News



Building with Nature in Indonesia: Restoring an eroded coastline and inspiring action at scale  
March 16, 2022



Annual Review EcoShape 2021  
January 21, 2022

[Show all News](#)



[EcoShape.org](https://www.ecoshape.org)

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# Pilot Project Overview

## Nature Based Flood Defences



Houtrib Dike Pilot Project



Sand Motor Delfland Coast



Hondsbossche Dunes



Sand engine lake IJssel



Interreg VB North Sea Region project Building with Nature



NatureCoast

## Resilient Delta Cities



Werven Park Dordrecht



Tidal park Rotterdam



CityDeal Klimaadaptatie

## Sustainable Port Development



Living Lab for Mud



Clay Ripening Pilot Project



Building with Nature in Indonesia



Salt marsh development Marconi Delfzijl



Mud Motor Koehoal salt marsh development



Marker Wadden KIMA

## Ecosystem Restoration



# Restoring eroding coastlines: Demak Indonesia



# Everything is connected

Wave regimes

Sediment  
budgets

Subsoil-  
conditions

Long shore  
currents

Ecological  
conditions

Water quality

Hydrologic flows

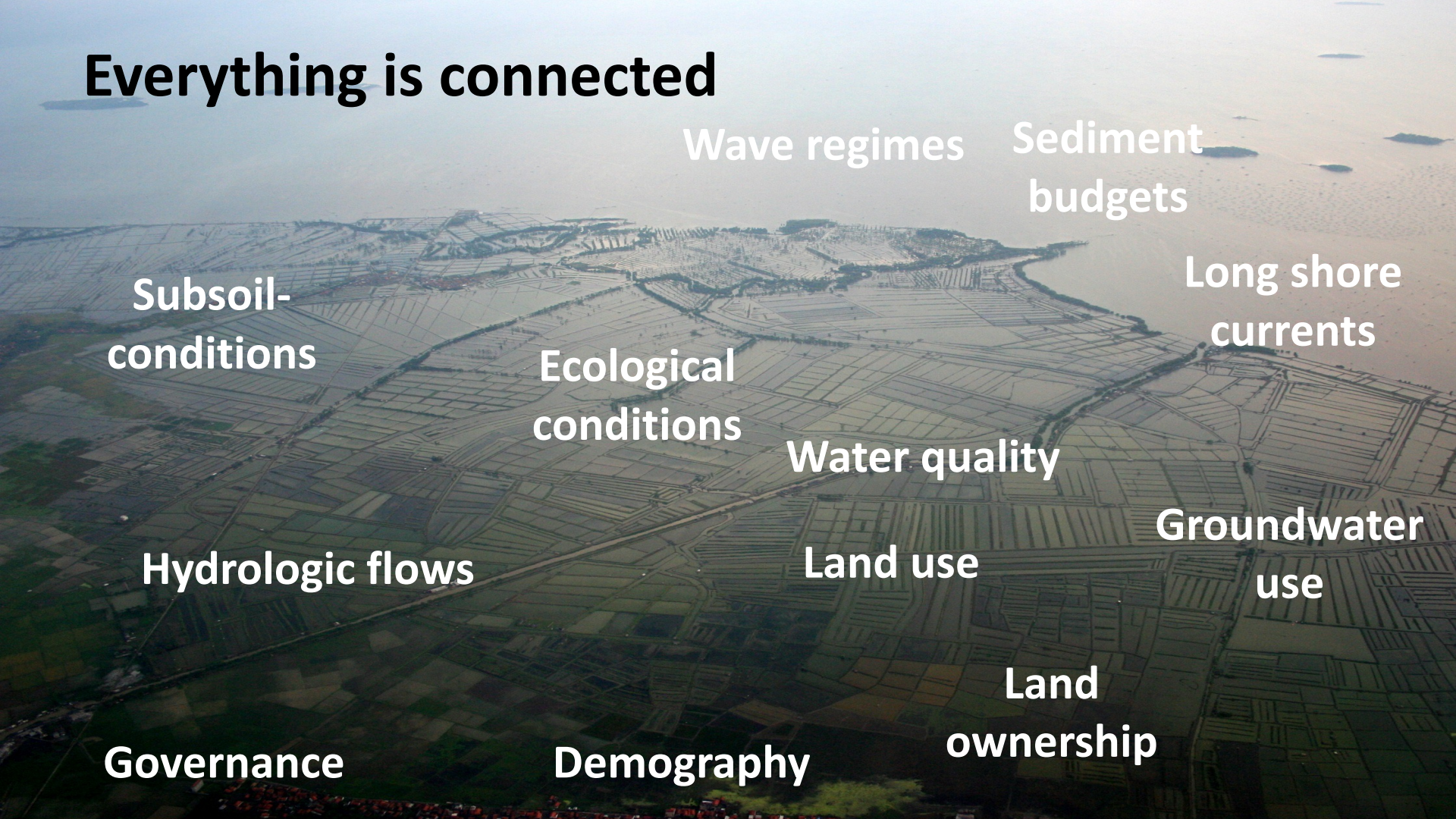
Land use

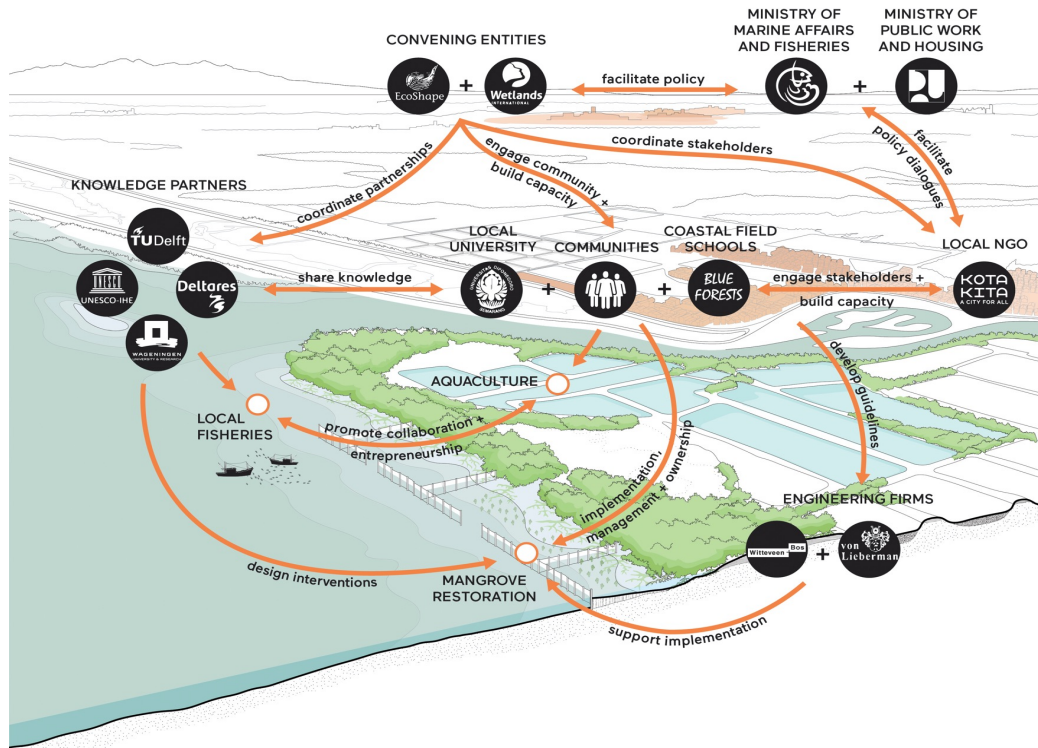
Groundwater  
use

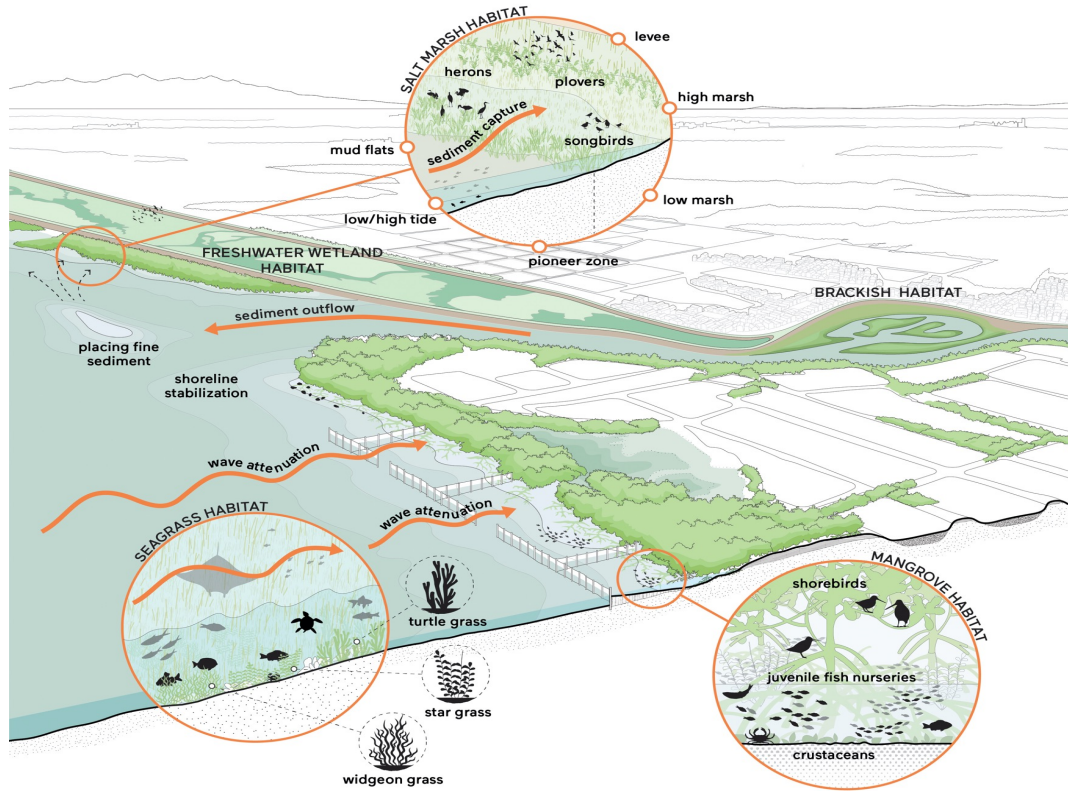
Governance

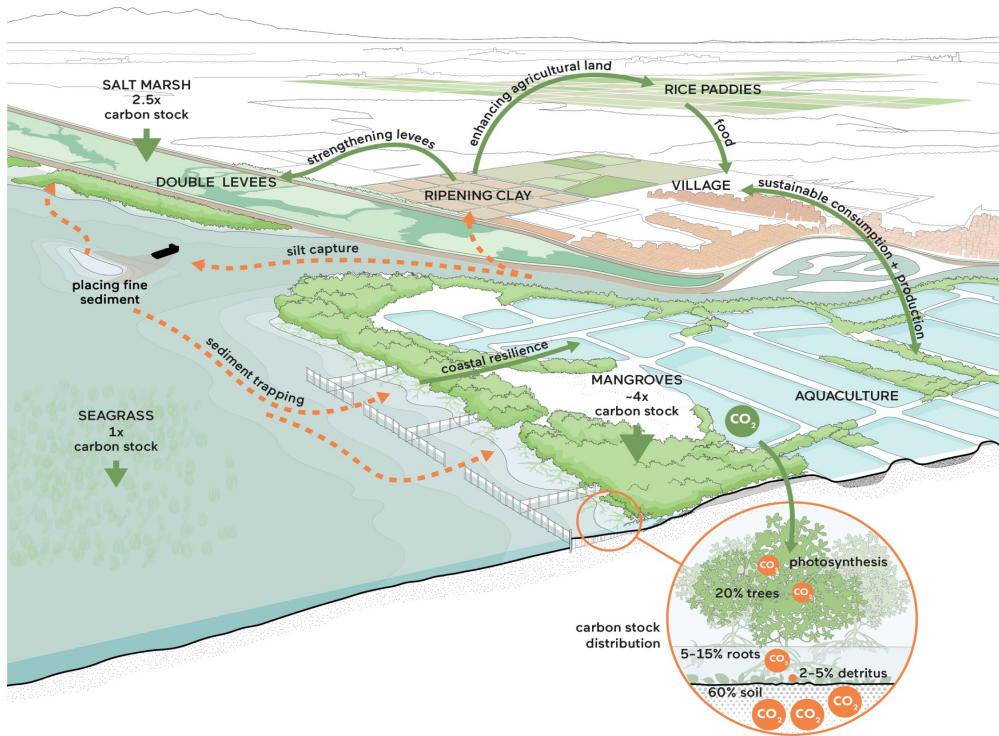
Demography

Land  
ownership

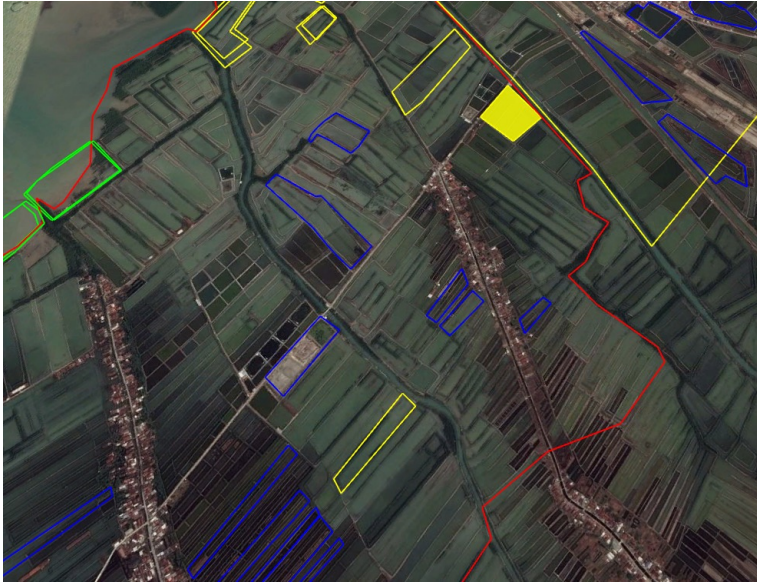












**Bund and sluice relocated. Natural filling up of sediment, natural recruitment of mangroves in former pond area.**

# Integrating Mangroves into Brackish Pond Aquaculture

Mangroves have many functions:

- Keep mud
- Create food
- Remove nutrients
- Provide shading (reduces stress and disease)
- Provide shelter during moulting
- Increase survival and yield
- Firewood, wood
- Forage for the goats





- **Implementation of LEISA: Average shrimp yield 3 - 20 x => income: 3 to 9 x**
  - The average shrimp yield was about 259 kg/ha (baseline of 43 kg/ha).
  - The average milkfish yield was more than 700 kg/ha (baseline of 192 kg/ha).
- **Voluntary replication in > 100 ha**

# Importance of mangroves today widely appreciated

Timber & fuel wood

Coastal protection

Carbon sequestration

Aquaculture products

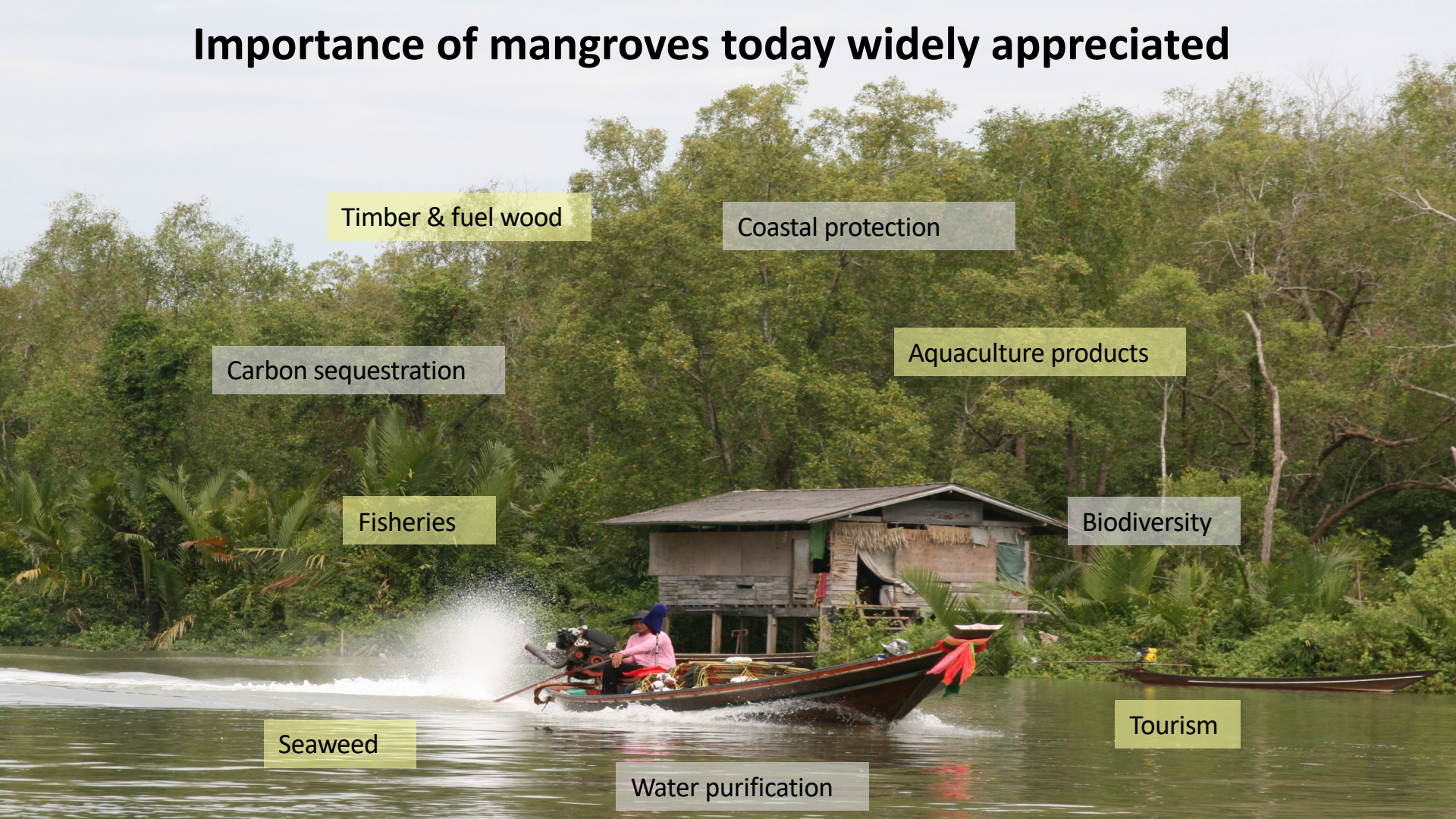
Fisheries

Biodiversity

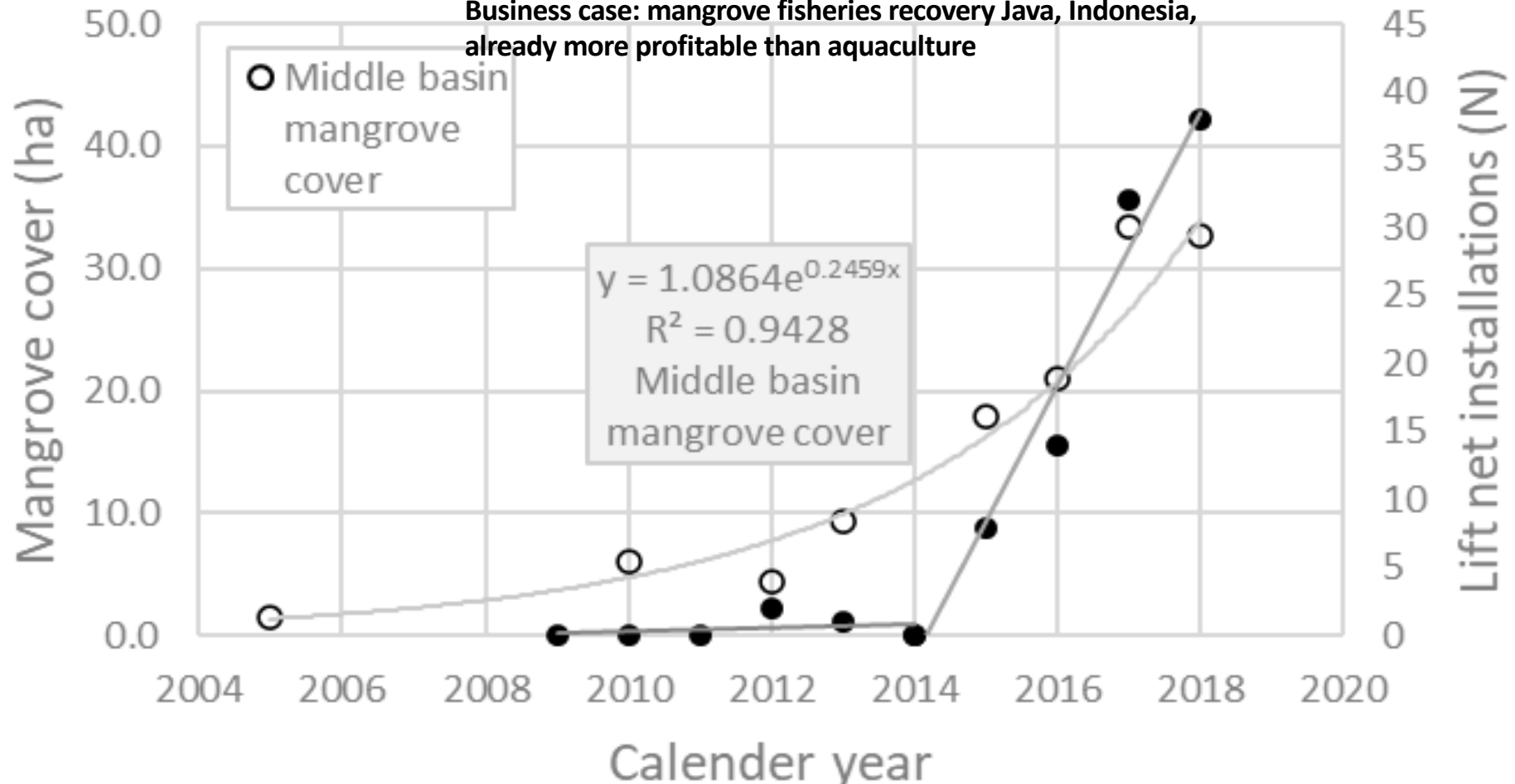
Seaweed

Tourism

Water purification



Business case: mangrove fisheries recovery Java, Indonesia,  
already more profitable than aquaculture




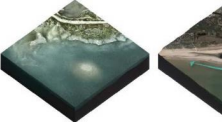


# Societal Cost Benefit Analysis

Table 2: Balance per alternative of Coast I/II (million USD)

	Business as Usual 0.0 - Without project	I/II.1 - Protection of the highway with a mangrove green belt	I/II.2 - Establishing a Mangrove and Fisheries park
<b>Costs</b>			
staff + socio-economic measures	0	1.5	2.5
permeable structures	0	2.3	3.5
costs of mangrove fisheries park	0	0	33.1
<b>Total costs</b>	<b>0</b>	<b>3.8</b>	<b>39.1</b>
<b>Benefits</b>			
tourism and recreation	0	0	41.4
prevented loss of built-up areas	-25.2	-25.2	0
avoided costs of a revetment to prote highway	-54.6	0	0
traditional aquaculture	10.2	9.4	7.2
wild catch	0.6	4.1	19.5
biodiversity	0.3	2.0	9.4
timber and non-timber products	0.03	0.2	1.0
carbon sequestration	1.6	23.2	107.0
<b>Total benefits</b>	<b>-67.1</b>	<b>13.7</b>	<b>185.5</b>
<b>Balance</b>	<b>-67.0</b>	<b>9.9</b>	<b>152.4</b>
B/C-ratio	-	3.6	4.7

# EcoShape's book

## Building with Nature

**Creating, implementing and upscaling Nature-based Solutions**

**Editors**  
Erik van Eekelen  
Matthijs Bouw

EcoShape | One Architecture | naitir publishers

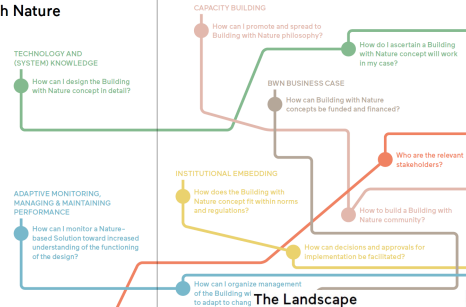
## Enabling Building with Nature

Building with Nature (BwN) has been successfully implemented in a range of landscapes using a variety of concepts. After over than a decade of learning-by-doing, intersectoral collaboration, fundamental research and pilot projects, EcoShape has derived various Enablers that are necessary to address the characteristics of Building with Nature.

BwN represents a paradigm shift by putting natural processes and systems understanding at the center of the approach. Moreover, Nature-based Solutions fundamentally differ from what we know as traditional, 'grey' solutions such as dikes and dams. Building with Nature approaches are inherently dynamic (employ natural dynamics), multi-functional (combine diverse goals and address multiple stakeholders), innovative (apply new techniques and approaches) and context-specific (use local system knowledge and experience). To successfully enable Building with Nature, one has to take these characteristics into account during the development process. The main question is "how?"

### MULTI-STAKEHOLDER APPROACH

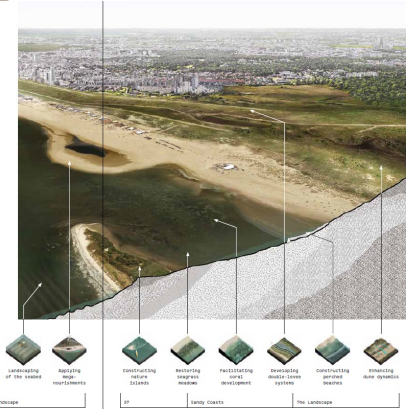
How can I engage multiple stakeholders throughout project development in designing, implementation, management and monitoring?



Since ancient times, sandy coasts have attracted human activity. They provide natural coastal defenses, form attractive living environments, protect potable water resources, and accommodate economic activities including ports, commercial fisheries, and recreation. Sandy coasts are highly dynamic environments with a unique range of habitats. They typically occur as beaches in enclosed bays between rocky headlands or as long stretches of sand within coastal dune systems. Waves, winds, and currents transport sand to the coast, while sea-level rise, subsidence, and interruptions in longshore drift create new demands for sediments. The morphological development of the coast thus depends on the balance between the supply and demand of sediment and contributes to their dune and foredune habitats.

Robust sandy coasts create a natural barrier to resist storm surges and enhance climate resilience. Yet many shores experience significant pressures from coastal squeeze: they lie in the shrinking zone between growing urban populations and retreating shorelines, impacted by sea-level rise and human interventions. Sustaining and supporting these places is an urgent issue, while in many locations fragmented beach management poses an additional hindrance to coordinated, regional coastal strategies.

Building with Nature in sandy coasts primarily concerns interdisciplinary collaborations to develop in sand nourishment strategies. These approaches focus on minimizing nourishment impacts and coastal management alternatives through preserving beaches, growing dunes as coastal barriers, and enhancing habitats, for instance with new techniques of sand borrow and placement.



# Get Connected



## EcoShape

EcoShape develops and shares knowledge about Building with Nature.  
Renewable Energy Semiconductor Manufacturing · Hendrik Ido Ambacht, Zuid Holland · 4,061 followers

**Building with Nature** : Building with Nature is a philosophy in the design & construction of water related infrastructure that harnesses the forces of nature for the benefit of nature & humans, thereby strengthening nature, economy & society.

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building with nature

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[linkedin.com/groups/2720008/](https://linkedin.com/groups/2720008/)



**EcoShape BuildingwithNature**  
2,608 Tweets

**Building with Nature** : Building with Nature is a philosophy in the design & construction of water related infrastructure that harnesses the forces of nature for the benefit of nature & humans, thereby strengthening nature, economy & society.

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@EcoShapeBwN

We develop and share knowledge about Nature-Based Solutions for water related infrastructure. Public-private collaboration.

📍 Hendrik Ido Ambacht, Nederland 🔗 [ecoshape.org/en](https://ecoshape.org/en)  
📅 Joined October 2011

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An underwater photograph showing a variety of marine life. In the foreground, several large, green and orange sea sponges with circular openings are prominent. To the right, there are smaller, pinkish-red sponges and some dark, branching coral. The background is filled with a dense, textured coral reef structure in shades of brown and grey.

# Thank you for your attention

For more info visit [www.ecoshape.nl](http://www.ecoshape.nl)  
EcoShape

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