How to design and implement Nature-based Solutions (NBS)

Taiwan International Water Week 2021
October 15th, Taipei

Tom Wilms MSc

How to design and implement Nature-Based Solutions (NBS)

- Introduction
- Building with Nature approach

  Methodology to design and implement Nature-Based Solutions
- Case study: city at the river
- Background information
- Key messages

Introduction

Tom Wilms MSc

Expert Nature-Based solutions and ICZM

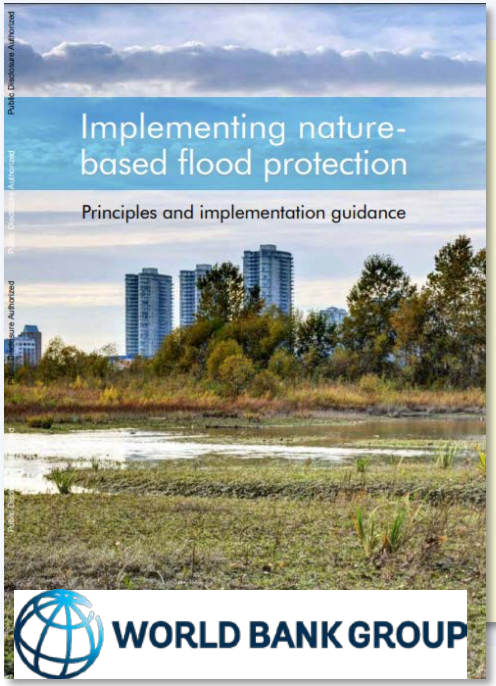
15 years experience (4 years in Indonesia)

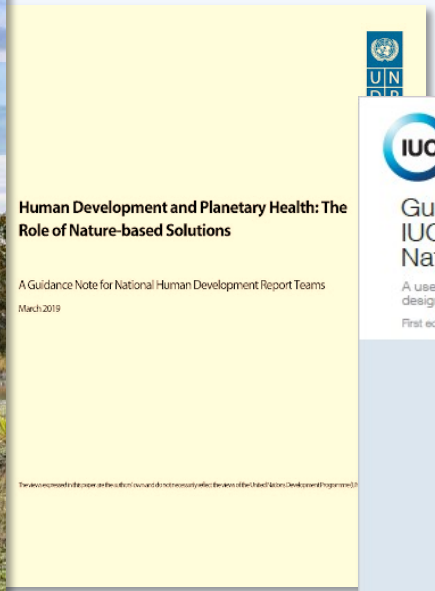
Witteveen and Bos 1946

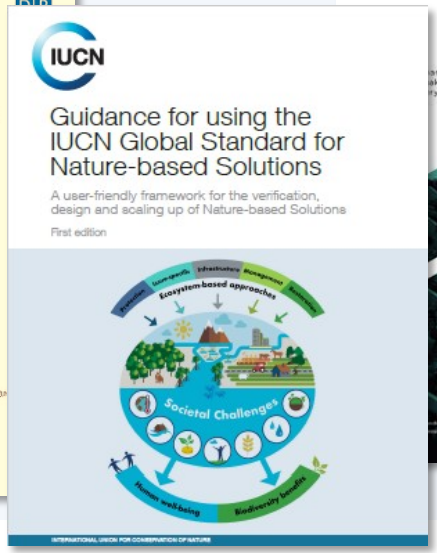
- Witteveen (54): director GW Rotterdam
- Bos (37): civil engineer at GW Enschede
- Consulting engineering company Witteveen+Bos
- First project: Prins Bernhard lock Deventer
- Growth:
  - 1994: 500 employees
  - 2014: 1.000 employees
  - 2021: 1.350 employees
- Independent and 100% ownership
- 9 offices in the Netherlands
- 13 offices international
- Sustainability and innovation

Business lines

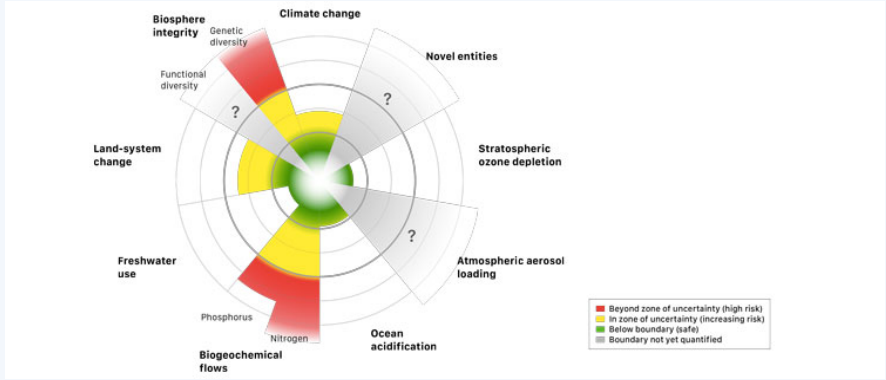
Global trend: Nature based Solutions for climate resilient infrastructure







Meeting the Global Goals within the planetary boundaries



Nature Based Solutions are

… dynamic

… multi-functional

… innovative for dealing with water issues

… local and context-specific

You need to **think, act** and **interact** differently!

EcoShape | Building with Nature

Since 2008:

- Sectors *collaborating* with a shared ambition
- Test and implement NbS concepts in practice
- Supported with fundamental knowledge
- Translated to practical design guidelines
- Aimed at upscaling and mainstreaming

EcoShape
building with nature

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- Building with Nature approach
  - Methodology to design and implement Nature-Based Solutions
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- Background information
- Key messages

How to design and implement Nature-Based Solutions (NBS)

- Building with Nature approach

  Methodology to design and implement Nature-Based Solutions

  - Landscapes and concepts
  - Enablers
  - 5 step approach

Building with Nature: Landscapes and concepts

Sandy Coasts

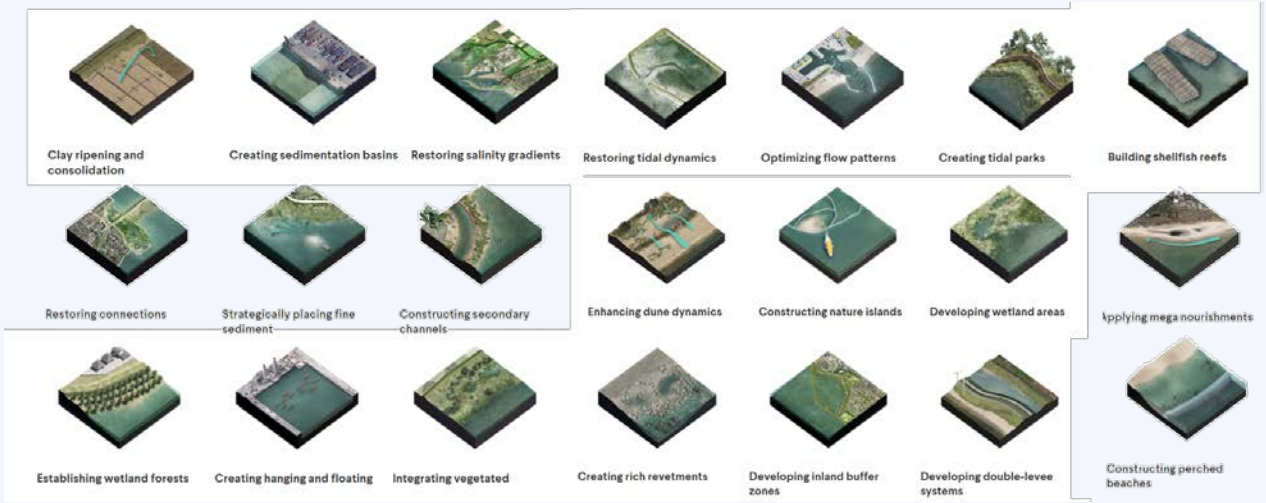
Muddy Coasts

Rivers & Estuaries

Cities

Lowland Lakes

Ports



Enablers for Building with Nature implementation

1. Technology and system knowledge
2. Multi-stakeholder approach
3. Adaptive management, maintenance and monitoring
4. Institutional embedding
5. Business case
6. Capacity building

BwN - 6 enablers

- Technology and system knowledge
  - Large-scale system analysis, comprehension of driving natural processes and natural dynamics.
  - Various Building with Nature instruments that suit different landscapes.
  - Building with Nature design approaches and assessment tools.

- Multi-stakeholder approach
  - Cooperation between stakeholders and comprehensive, multifunctional approaches.
  - Coalition building, co-creation and public participatory approaches to create shared ambitions.
  - Stakeholder assessment and engagement.

BwN - 6 enablers

- Adaptive management, maintenance and monitoring
  - Balancing initial efforts/investments (over-dimensioning) against adaptivity and resilience.
  - Making maintenance strategies an integral part of the development process.
  - Organisation and techniques for adaptive management and monitoring to deal with natural dynamics at various temporal and spatial scales.

- Institutional embedding
  - Fitting Building with Nature in the existing context, norms, and regulations.
  - Creating a policy environment that enables conservations laws and formal instruments to be addressed.
  - Connecting with international enabling policies, including the Paris Agreement, Sendai Framework, AICHI targets, CBD, Ramsar and UNCCD resolutions and SDGs.

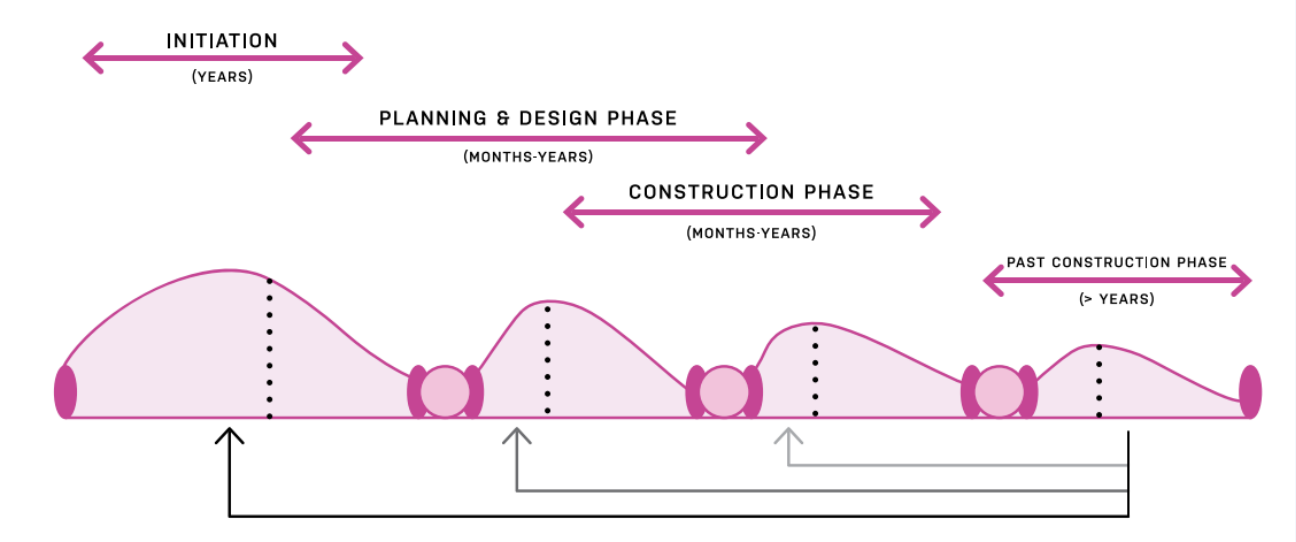
BwN - 6 enablers

- Business case
  - Defining an optimum business model by integrating conventional engineering and nature conservation expertise with financial knowledge.
  - Improving estimates of maintenance costs and the additional services and benefits (including coastal access, fish production, carbon sequestration).
  - Financing arrangement and pre-requisites (bankable value creation streams).

- Capacity building
  - Increasing awareness of the philosophy and possibilities of Building with Nature.
  - Involving the upcoming generation in Building with Nature through training and educational programmes.
  - Creating Building with Nature communities around your project.

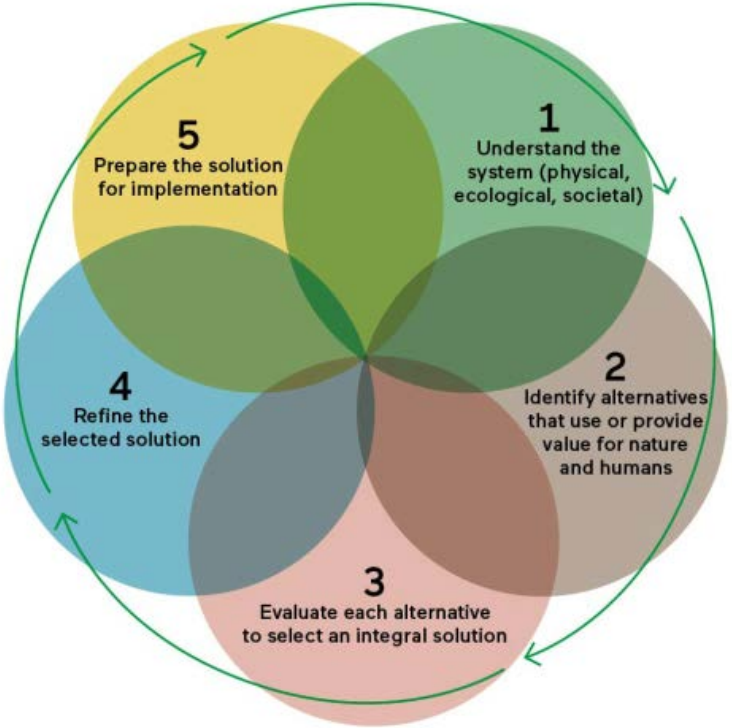
BwN – 4 project phases

1. Initiation
2. Planning and design
3. Construction
4. Past construction



BwN – 5 steps

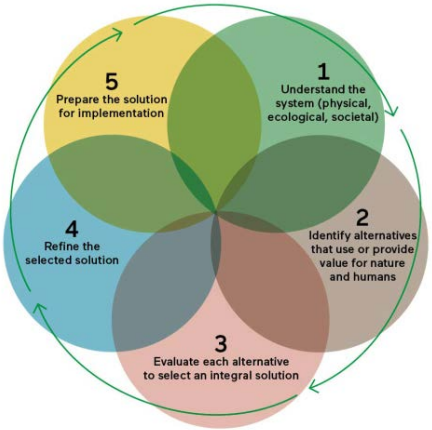
1. Understand the system
2. Identify alternatives
3. Evaluate each alternative
4. Refine the selected solution
5. Prepare the solution for next phase

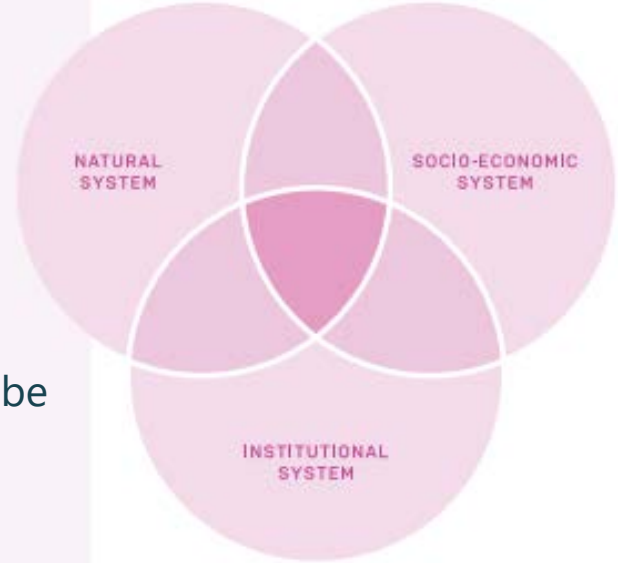


BwN – 1. Understand the system

- What are the problems
- Consider the system:
  - natural,
  - socio-economic
  - institutional system

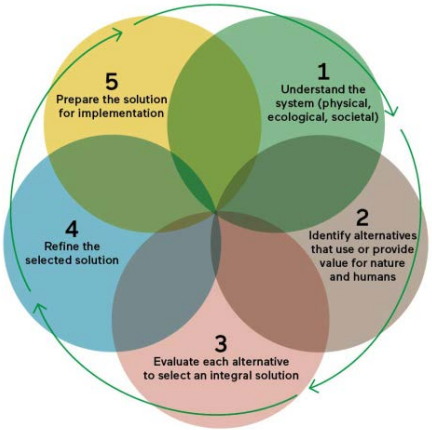
  at different scales
- Information about the system can be derived from various sources
- Think multi-functional





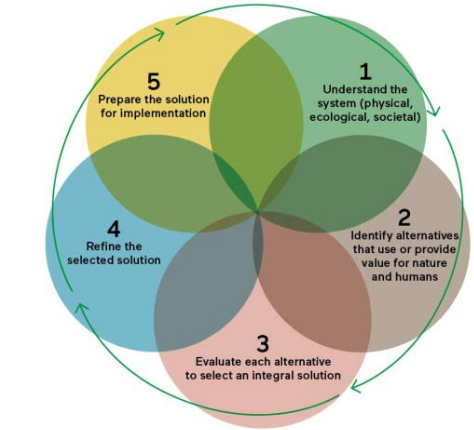
BwN – 2. Identify alternatives

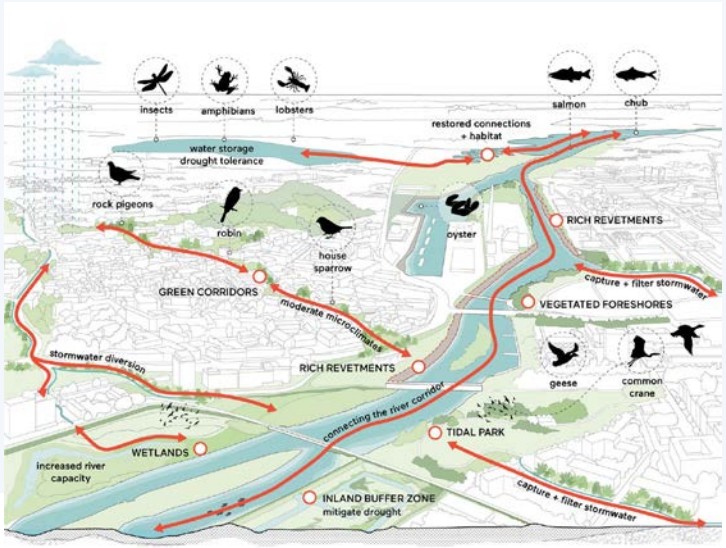
- Change your perspective
  - Supporting the ecosystem
  - Utilising functions of the ecosystem
- Think about transdisciplinary solutions from the start



BwN – 3. Evaluate each alternative

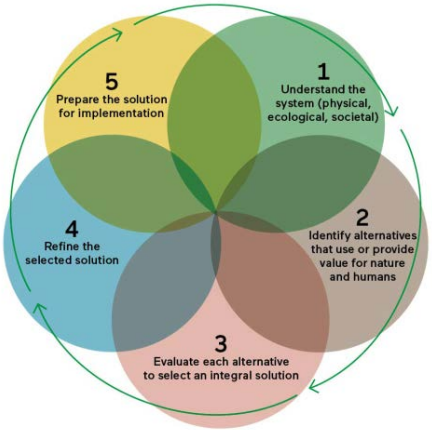
- Improve value without increasing construction cost
- Embrace creativity
- Identify and manage uncertainties
- Involve stakeholders in the evaluation and selection process
- Perform a (social) cost-benefit analysis

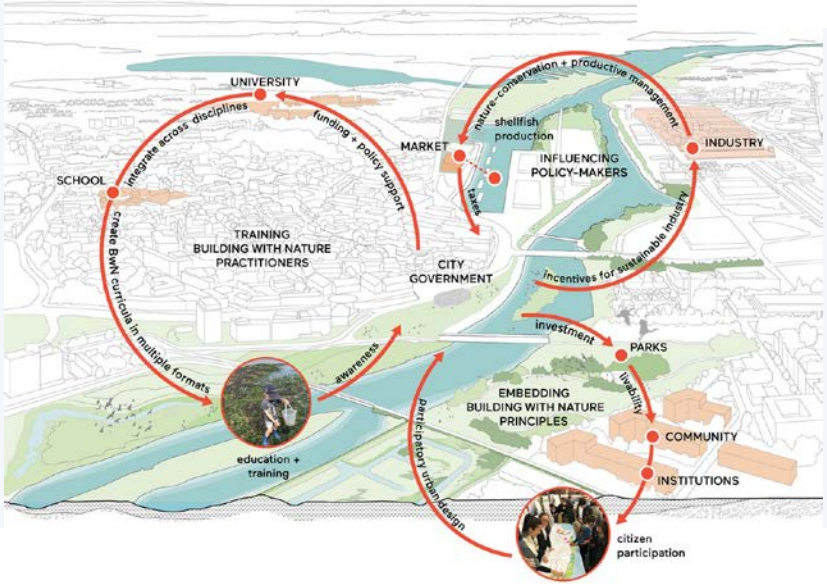




BwN – 4. Refine the selected solution

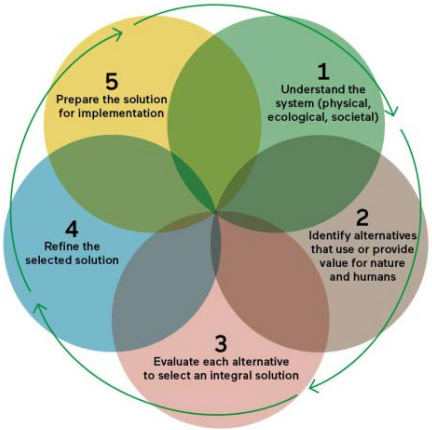
- Consider the conditions/restrictions of the project
- Improve your stakeholder network





BwN – 5. Prepare solution for next phase

- Translate solution to a technical design
- Translate solution to ‘request for proposals’ or contract
- Organise required funding
- Identify permit requirements
- Prepare risk analysis and contingency plans



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Building with Nature in a city at the river

Rotterdam (the Netherlands)

- Flood proof public squares
- Green roofs and walls
- Wadis
- Tidal parks in the river
- Natural embankments

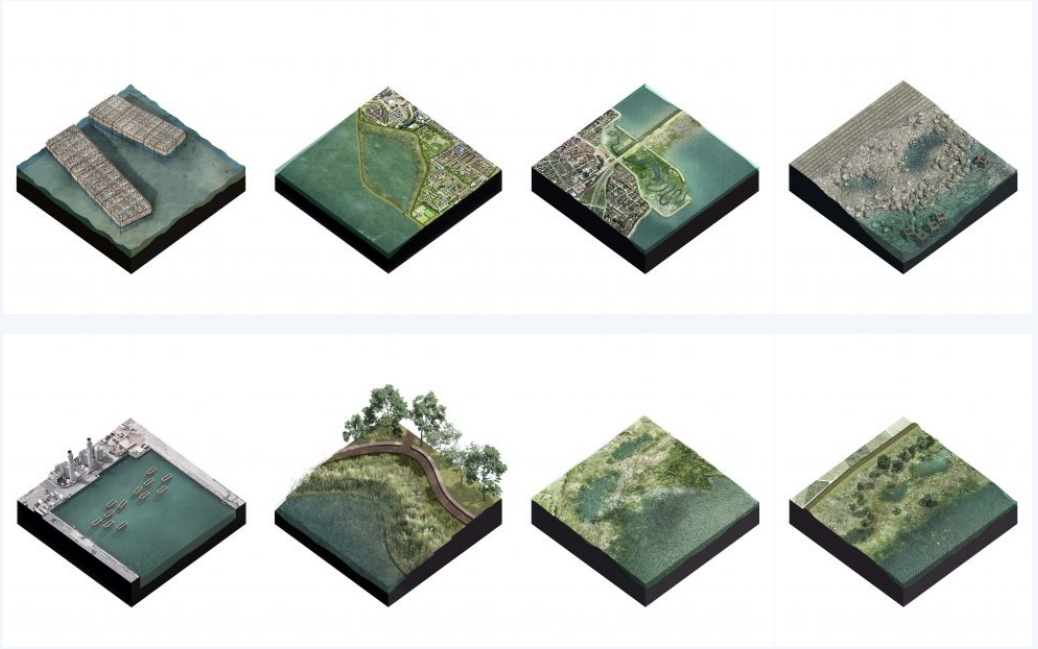
BwN – 1. Understand the system

- What are the problems
  - Flooding, heat stress, attractiveness
- Consider the systems:
  - natural,
  - socio-economic
  - institutional system

  at different scales
- Information about the system can be derived from various sources
- Think multi-functional

BwN – 2. Identify alternatives

- Change your perspective
  - Supporting the ecosystem
  - Utilising functions of the ecosystem
- Think about transdisciplinary solutions from the start
  - Environment
  - Society
  - Economy
  - Institutional
  - Technical, financial



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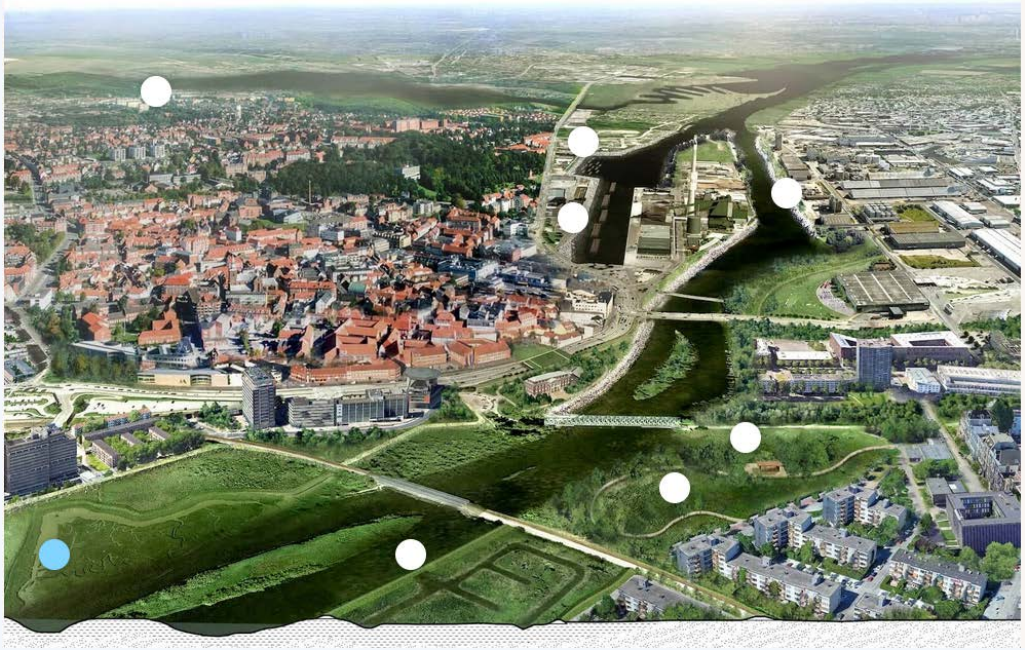

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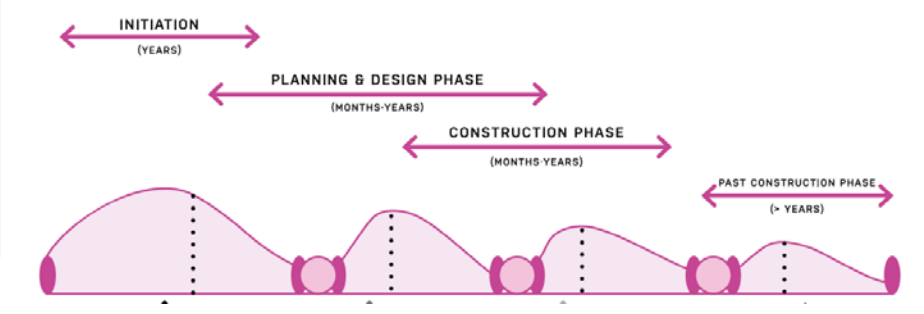

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Background information:

- https://www.ecoshape.org/en/
  - https://www.ecoshape.org/en/landscapes/cities/
  - https://www.ecoshape.org/en/concepts/

  - https://www.ecoshape.org/en/the-building-with-nature-philosophy/
  - https://www.ecoshape.org/en/enablers/
  - https://www.ecoshape.org/en/the-building-with-nature-philosophy/five-basic-steps-for-generating-building-with-nature-designs/

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Enablers

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5. Business case
6. Capacity building

5 step approach

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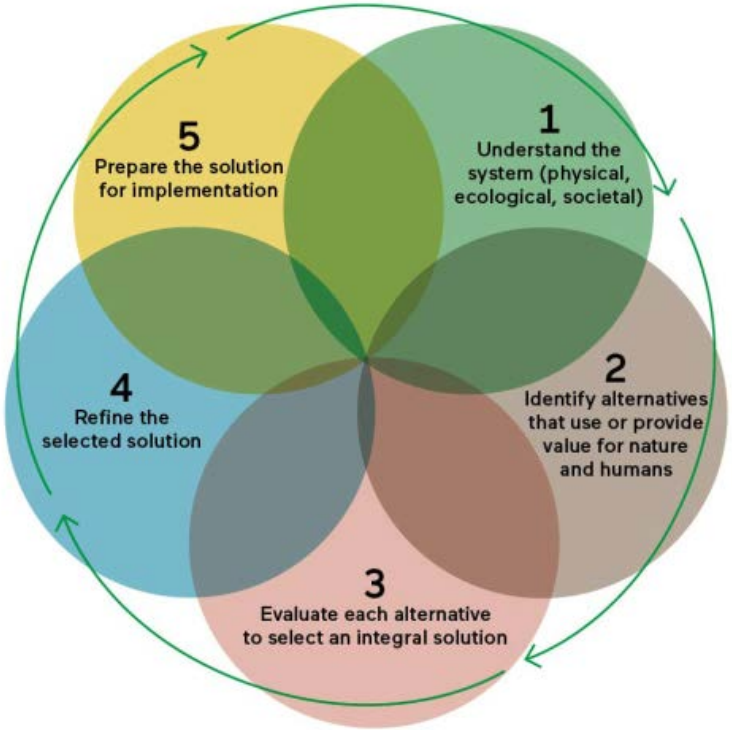

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PROJECTS

Projects as of 31 December 2016

The Netherlands 3,085 projects
Africa, Europe and the Americas 279 projects
CIS countries 33 projects
Middle East 21 projects
South East Asia and Australia 102 projects

1 - 4 · 4 - 10 · 10 - 20 · 20 - 50 · 50 - 80 · 110 - 140 · > 3.000 projects

Witteveen+Bos projects
Witteveen+Bos offices (19)
Region classification

Room for the River

- national plan river basin approach
- extra discharge capacity to cope with extreme volumes of water without flooding
- 30 projects in approximately 10 year program
- Witteveen+Bos was involved in 12 projects (since 2006)
- Full service – from assessment and strategy to procurement and supervision

New channel and adaptation of flood plain

- 2008 – 2015 multi stage project :
  - Master planning – Field surveys – Technical Design
  - Environmental Impact Assessment – Permits
  - EC Contract and Procurement – Supervision
- Stakeholder Management – water based companies
- Managed and provided all services (excl. surveys)
- 3 km river bank
  - Industrial estate – docking facilities, infrastructure
- First project realised in Room for the River program