



Building with Nature



IMARES
WAGENINGEN UR

Nature as problem solver

Declining biodiversity, vanishing intertidal zones, problems with freshwater supply... The growth of the world population and rising sea levels are causing increased pressure on coastal ecosystems. Low-lying delta areas are most vulnerable to the effects of increasing urbanisation and agriculture. IMARES, part of Wageningen UR (University & Research centre) has a leading role in the *Building with Nature* programme, which provides an innovative, sustainable and cost-effective method for intervention. The name of this initiative says it all: Natural processes are deployed as building blocks to solve ecological problems. A defining characteristic of the programme is that it is supported by a consortium of business, government and research institutions.

Projects

Our researchers often work on existing projects. One example is the *Zandmotor* (sand engine) off the Dutch coast, built by dredging companies Boskalis and Van Oord. This hook-shaped peninsula is comprised of 21.5 million cubic metres of sand, and is designed for wind, waves and currents to spread the sand along the coast, causing it to expand in a natural way. This means better protection for the land, while natural habitats get more breathing space and biodiversity increases.

Another example of a coastal protection project can be found in the Dutch province of Zeeland, where the construction of flood barriers in the Oosterschelde estuary is causing the tidal areas there to rapidly disappear. Researchers from IMARES are now investigating the possibilities to preserve and restore these areas by using a layer of dead oyster shells to create *new, natural oyster beds*. These subsequently stabilise the edges of the plateaus and counter erosion. The first test results are promising.

Further north, work is underway at full speed on the construction of Maasvlakte 2, a major expansion of the Rotterdam port. The project involves the extraction of lots of sand off the shore, which is having negative consequences for the relevant ecosystems. *Biodiversity and productivity* can recover much better if, instead of leaving the sea floor flat after sand extraction, irregular terrain is artificially created.

Another ongoing land reclamation project in Singapore is of a different nature: There, our researchers are looking at the *governance aspects* of marine projects. Specifically, they examine the reasons why projects there are executed so quickly and what the advantages and drawbacks of this approach are. IMARES is also carrying out experiments in Singapore into the effects of water turbidity on coral reefs.

Excellent research facilities

Our researchers are real field workers who go out both to sea and on land to take measurements and calculations. IMARES also has at its disposal excellent research facilities, including chemical and biological laboratories. Our 'mesocosms,' tools which represent an intermediate stage between an aquarium and actual bodies of water, allow us to carry out reliable research in controlled conditions. Research subjects include the effect of toxic substances released into the environment and opportunities for the cultivation of seaweed for the needs of the offshore industry.

Broad-based innovations

The 'golden triangle' – i.e. a balanced combination of business, government and research institutions – has proven to be a highly effective form of cooperation and is being imitated worldwide. The defining characteristic of this concept is its process-oriented approach – the choice of stakeholders to involve in a project and the method of communication are clearly defined in the initial phase. This prevents situations in which solutions are implemented that later prove to be unfeasible, or in which processes are made ineffectual through repeated compromises. Building with Nature is a typically Dutch form of cooperation which leads to genuinely broad-based and ground-breaking innovations.

The Building with Nature programme is carried out by the EcoShape consortium, which comprises the following participants and partners:

- Arcadis Nederland
- Royal Haskoning
- Royal Boskalis Westminster
- Rijkswaterstaat Bouwdienst
- Deltares
- Delft University of Technology
- DHV
- University of Twente
- The Dutch Ministry of Infrastructure and the Environment
- Van Oord Dredging & Marine Contractors
- Dordrecht Municipality
- Vereniging van Waterbouwers
- IHC Holland
- Wageningen UR
- NIOO-CEME
- NIOZ
- Witteveen + Bos
- Port of Rotterdam

Contact

IMARES, part of Wageningen UR
Martin Baptist
P. O. Box 167
1790 AD Den Burg, the Netherlands
T +31 317 487068
E martin.baptist@wur.nl
I www.imares.wur.nl