

# KNOWLEDGE CONTINUUM FOR COASTLINE MANAGEMENT IN THE NETHERLANDS

Joost Stronkhorst<sup>1</sup>, Ankie Bruens<sup>1</sup>, Ad van der Spek<sup>1</sup>, Ranie Kapoerchan<sup>2</sup>, Harry de Loeff<sup>2</sup>, Quriijn Lodder<sup>2</sup> and Evelien van Eijsbergen<sup>2</sup>

<sup>1</sup> Deltares, PO Box 177, 2600 MH Delft, The Netherlands;

<sup>2</sup> Rijkswaterstaat, PO Box 17, 8200 AA Lelystad, The Netherlands

## Coastline Management

A good understanding of both the natural dynamics and socio-economic developments along the coast is crucial to conduct cost-effective and sustainable coastline management. At present, 60-70 million euros from the Dutch national treasury are spend annually on sand nourishments in order to protect the sandy coastline of the Netherlands from erosion and sea-level rise. These sand nourishments provide physical boundary conditions for beaches and dunes, which is important for coastal safety, recreation and freshwater reserves for the densely populated hinterland. Rijkswaterstaat is the agency responsible for coastline management.

## Knowledge continuum

The independent research institute Deltares supports Rijkswaterstaat on a regularly basis. A continuum is established in state-of-art knowledge of the Dutch coast through long-term research programs and simultaneously use for many short-term advices to coastline management. Policy makers and coastline managers are constantly involved in discussing results and formulating new research questions (joined fact finding). Besides Deltares, other research institutes are also involved.

## Coastal research

The research topics relate to three spatial layers:

- Base layer: Fundamental research of the natural coastal system, e.g. on morphodynamics of ebb-tidal deltas along the Wadden Sea coast. Knowledge on the behavior of long-term and large-scale coastal processes is essential in planning new sand nourishments in such areas,
- Infrastructure layer: Continuous evaluation of coastal erosion of the 'infrastructure' of dune embankments, beaches and foreshore, and the performance of recently conducted sand nourishments. Knowledge on the cost-effectiveness and sustainability of current practice is essential for new sand nourishment programs (learning-by-doing) as well of addressing new policy questions;
- Occupation layer: Policy analysis of socio-economic interests and future sand nourishments, e.g. to tackle increased sea-level rise in the 21<sup>st</sup> century or to support coastal developments. This might result in changes in the current coastline management, e.g. by increasing the sand nourishment volume.