

The Netherlands: challenges for the 21st century

Marcel J.F. Stive (*Delft University of Technology, Delft the Netherlands*)

Mark van Koningsveld (*Van Oord, the Netherlands*)

Robbert Misdorp



Sand-nourishment along the Netherlands coast: a flexible answer to coastal erosion, a viable protection measure, now and for the future with uncertainties about the rate of accelerated sea level rise, and in the meantime sand nourishment schemes increase the resilience of the coastal zone. (photo: Van Oord)

Summary

Dealing with the challenges posed in the 21st century requires a paradigm shift in the approach to water and coastal management. This shift is needed to implement some of the far-reaching recommendations of the Second Delta State Committee (2008). It uses an integrated approach to planning with cross-sectoral strategies based on the two pillars of safety and sustainability. This vision helps strengthen the principle of 'Working with nature' for future flood protection in coastal environments.

Since 1990 annual sand nourishment, using this principle has become standard practice in the Netherlands. It is an economically viable way of protecting the mainly sandy coastline. It increases coastal resilience and provides a flexible response to the uncertainties of future sea level change.

A high rate of sea level rise of 1.3 m by the year 2100 has been taken as a worst case scenario. Sea level rise will increase the frequency of flooding, coastal erosion and salt water intrusion.

The Second Delta State Committee also developed a vision beyond 2100 for water management covering the entire country. Such a long-term vision will help prepare Dutch society for the increasing flooding risks associated with the impacts of climate change. In addition to the increased risks of flooding and coastal erosion, increased salt-water intrusion will threaten future drinking water supplies, and horticulture, agriculture and industry.

Combating these impacts is achievable using integrated solutions, such as significantly increasing the fresh water storage by raising the level of our largest fresh water lake and the surrounding dikes. This also combats salt-water intrusion and provides greater safety against flooding.

Long term, adaptive measures need special institutional arrangements and reserved funding.

The key to future prosperity for the inhabitants is to develop comprehensive management plans for the catchment, rivers, coast and sea - a challenging vision.

Contents

1. Introduction
2. Triggers for concern
3. Paradigm shift
4. Recommendations of the second Delta State Committee
5. Conclusions
6. References



Adaptive measures under the Delta Programme of the Second Delta Committee: Rivers, lakes, sea and coast, with coherence between the regions and combined in an integrated vision with concrete measures safeguarding livelihood for the future generation.



A winter storm eroding the beach and dune foot, in summer time the coastal zone accumulates again, however the yearly net sediment balance along the Netherlands coast over the long term is negative: i.e. there is more erosion than accretion. The rate of erosion and the risk of flooding will increase considerably with the anticipated impacts of climate change. There is a need for timely additional, flexible adaptive coastal and water management measures. (photo: //beeldbank.rws.nl, Rijkswaterstaat/Jan van der Broeke)