

Method Brief

Mainstreaming adaptation into coastal protection in Northern Germany

The Approach

The German State of Schleswig-Holstein mainstreamed adaptation needs into its revised 'Master Plan for Coastal Protection' by pursuing an approach for maximal flexibility to different future climate change scenarios.

Scope and entry points

The flood-prone German State of Schleswig-Holstein, located between two seas (North Sea, Baltic Sea) revises its 'Master Plan for Coastal Protection' approximately once every 10–15 years. During the most recent revision, which was adopted by the Cabinet in 2012, there was recognition of the need for adapting to climate change, which led to a generally different construction of dykes.

How it works

In preparation for revising the 'Master Plan for Coastal Protection', existing projections and scenarios for sea level rise on the German coasts were analysed, based mainly on the condensed indications in the 2007 IPCC Report. More recent and specific research studies for the German Bight led to projections with a much higher range: from 0.4 to 1.4 m by 2100 (see Figure 1).

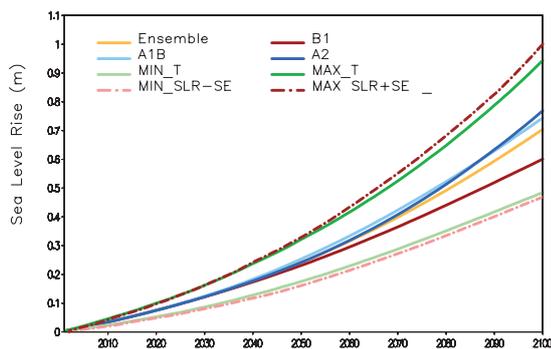


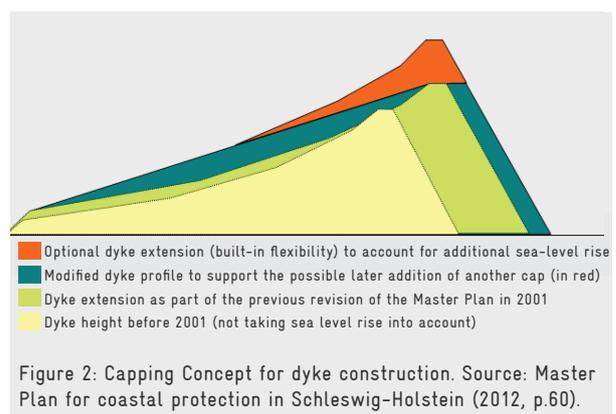
Figure 1: Projected Sea Level Rise in the German Bight. Source: Horton et al., 2008.

The new findings pose challenges with regard to the development of a coastal protection concept that is both safe and flexible. Due to the large range of different projections, it was not economically efficient to use the worst-case scenario to determine the need for reinforcing or raising the dykes. Therefore, the new coastal protection strategy is based on the following principles:

- Dyke construction concepts with an inherent flexibility; and
- No-regret measures, which are also justifiable if the worst-case scenarios do not materialise.

The result was a construction concept that broadens the dyke's base (dark green profile in Figure 2) and, therefore allows for an additional 'cap' on top to be built later if sea level rise becomes more serious than under average scenarios. This capping (marked in red in Figure 2) is much cheaper than a potentially new construction towards the end of the century.

In addition, the Master Plan sets a stronger focus on improved disaster response and on integrating flood protection into land use planning to reduce flood-related vulnerability.



On behalf of



Federal Ministry for the Environment, Nature Conservation and Nuclear Safety

of the Federal Republic of Germany

Specifics of application

Stakeholders and institutional set-up

The lead agency for the development of the revised Master Plan for Coastal Protection was the Department of Water Management within the Ministry for Energy Transition, Agriculture, Environment and Rural Areas of Schleswig-Holstein. The lead agency also involved other concerned government agencies, and a comprehensive public consultation process was conducted based on a draft version of the Master Plan. It included five regional conferences and the collection of written comments. The draft was finally debated within an advisory council to the Minister, and the concept was harmonised among the North German coastal states.

Input

The main expertise was provided by the Ministry and State Agency responsible for coastal protection. During the revision process, the findings of recent scientific studies were assessed, but no new studies were commissioned in the context of developing the Master Plan.

Output

The main output is a revised comprehensive Master Plan for Coastal Protection including various stipulations on construction concepts, priority actions, consequences for land-use planning etc. The Master Plan includes various maps and technical specifications.

Capacity required and ease of use

The revision process can be considered ambitious and resource intensive. Government institutions undertook most of the planning activities within the scope of their regular duties. Strong technical expertise is required concerning dyke construction, coastal protection mechanisms and planning instruments.

Conclusions for future application

Outcome and added value

The Master Plan constitutes mandatory guidance for all coastal protection measures in Schleswig-Holstein. The new concept will gradually be implemented over the coming

years, and the Master Plan specifies a range of initial priority measures. A particular added value of the new dyke construction principle is that it provides **flexibility for reacting to possible higher levels of sea-level rise in an economically beneficial way**, as possible later needs for reinforcing or raising of the dykes are being planned for in current dyke construction activities so that future costs at a later stage remain significantly lower.

Cost-benefit ratio

Since Schleswig-Holstein's population (approximately 350,000) and material assets will be potentially threatened by sea floods, there is no alternative to undertaking ambitious coastal protection measures. The capping concept illustrated in Figure 2 helps to limit additional costs for adaptation measures.

Potential for replication

The approach is transferable to countries pursuing a coastal protection plan based on dyke construction.

References

The Master Plan for Coastal Protection can be accessed (in German only) under:

http://www.schleswig-holstein.de/MELUR/DE/Service/Presse/PI/PDF/2012/vorl_Generalplan_Kuestenschutz_blob=publicationFile.pdf

Horton, R., C. Herweijer, C. Rosenzweig, J. Liu, V. Gornitz and A. Ruane (2008): Sea level rise projections for current generation CGCMs based on the semi-empirical method. *Geophysical Research Letters*, Volume 35, No. 2.

Reference person for further information

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