

LONG-TERM COASTAL MANAGEMENT STRATEGIES: USEFUL OR USELESS?

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Introduction

Climate change impacts are expected to increase pressure upon coastal defenses worldwide. However, most adaptation measures for coastal defenses (if any) are still triggered by today's local problems, rather than addressing the expected long-term climate change. This gives rise to the question whether long-term strategies might bring advantages over continuing present coastal management practice during the next 200 years. Comparing such long-term coastal management strategies is surrounded by both physical and sociological uncertainties, impeding these comparisons' straightforwardness.

Description of the research

A new assessment methodology has been set up, integrating Cost Benefit Analysis (applied to all monetary impacts) within a Multi Criteria Analysis framework for aggregating all incommensurable impact scores (see figure 1). Accounting for physical and socio-physical uncertainties in future impacts of the strategies is partly implemented by a comparative assessment method translating the incommensurable impacts into qualitative impact scores with respect to the impacts of the basic alternative. Next to that, a sensitivity analysis is applied to the uncertainties in all estimated monetary impacts, which are much more uncertain than the non monetary impacts. Random simulations covering all potential impact scores on each criterion have been applied to explore the uncertainties within the final MCA outcomes. Only those strategies that have no overlap with the score of the basic alternative (=0) in the 5th to 95th percentile range are considered to be significant differences.

Results and conclusions

As a case study, long-term coastal management strategies have been analyzed for the central part of the Dutch coast. We started by identifying the spatial extent of potential impacts on the coastal defenses for three climate change scenarios for the next 200 years. Subsequently, a number of strategies has been developed at four different spatial scales. The smallest spatial scale being representative for continuing present approach and the largest spatial scale matching the maximum spatial extent of climate change impacts. Applying the new assessment framework shows that assessments of long-term coastal management strategies differentiate sufficiently for comparison (see figure 2), despite all uncertainties involved. The case study also shows that coastal management strategies based on larger spatial scales might create better opportunities for long-term coastal management of the Dutch coast than their equivalents based on confined temporal and spatial scales.

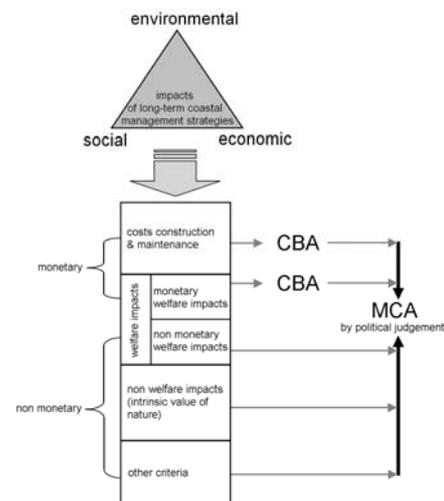


Figure 1: General set-up of the assessment method that is developed in this study. Partial results of CBA are integrated in a MCA framework.

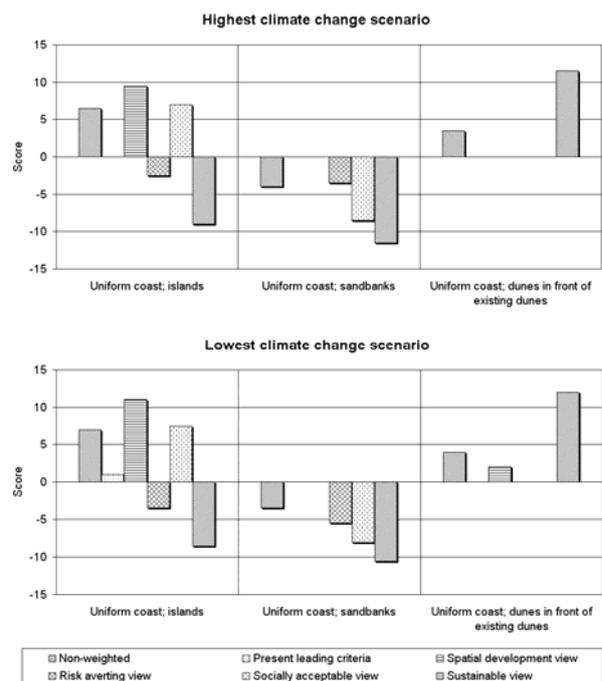


Figure 2: Assessment results for three 'uniform coast' strategies for the Dutch coast. The various views reflect a different importance of the applied criteria in the MCA. Only scores that differ significantly from the basic alternative score (=0) are shown.