

Optimal timing, cost-benefit analysis and adaptation strategies

Project of Knowledge for Climate

Theme 8: Decision support tools for climate adaptation WP 6

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Efficient dike height

Introduction

Maximum expected water levels are crucial to determine dike heights. Predictions about maximum expected streamflows and sea level rise, however, are highly uncertain. We explore the impact of the resolution of uncertainty on dike investment and total costs.

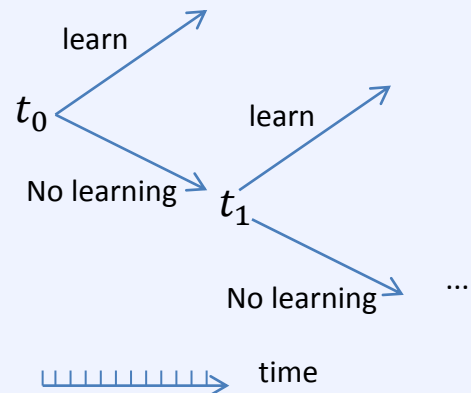
Method

We use a cost minimisation model of Van Dantzig (1956) and Eijgenraam et al. (2010) and dynamic programming.

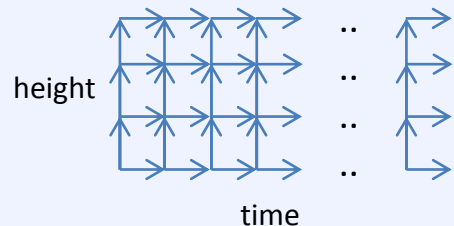
Preliminary results

- The total value of (perfect) information on the structural increase of the water level is in the order of 1-2% of total expected costs.
- The original base case solution does not remain periodic under an uncertain rate for the structural increase of the water level.
- Uncertainty in isolation tends to increase dike heightening effort in contrast to the effect of possible future learning.

Probabilistic learning

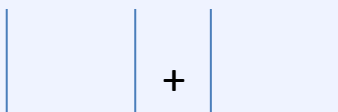


Dike height as a network



At
once?

Or..



If
needed

Cost-effective water storage

Introduction

Flood frequency standards can be applied to assure minimum protection against flooding related to extreme precipitation and insufficient discharge or storage capacity of the local water system. However, economic inefficiencies may arise when flood frequency standards are generic. The cost structure of individual measures determines cost-effective compliance.

Method

Meteorology: simulation of future rainfall (KNMI climate scenarios and transformation of original rainfall series, bootstrap and interpolation).

Hydrology & Economics: under discussion.