



### Project

### Theme 8 | Optimal timing, cost benefit analysis and adaptation strategies

#### Description of research

Efficient implementation of adaptation requires a detailed assessment of the costs and benefits. The project aims at developing detailed methods that can be applied in various case studies in a consistent manner, considering the future climatic change, based on the scenarios of KNMI and other meteorological offices. In a first paper, we study optimal dike height under an uncertain rate of the structural increase of the water level, and we extend this case with probabilistic learning about this rate. In a second paper, we develop a methodology to determine cost-effective compliance with national flood frequency standards for non-riverine flood risk. To demonstrate the practical relevance of the methodology, we aim to evaluate the storage capacity of a recently created detention facility.

#### Research question

- How can optimal timing of adaptation measures be determined in a setting of decision making under uncertainty and what are the implications for developing an adaptation strategy for climate change at the regional level?

#### Conclusions so far

Paper 1 (in preparation)

- Dike heightening strategies can be adapted over time when new information is received.
- Ignoring flexibility leads to overestimation of total expected costs.
- The possibility of receiving information tends to reduce investment in dikes, in contrast to the effect of uncertainty in isolation.

Paper2 (under construction)

- National flood frequency standards for 'high probability' flooding events are associated with economic inefficiencies.
- The cost-structure of individual hydraulic structures may motivate overcompliance with current regulations.
- A tool is needed combining meteorological data, climate change prospects, statistics, hydrology and economics to determine optimal investment sizes of specific measures.

#### Possible applications from the project

- Increased understanding of dike heightening under uncertainty and learning may support policy makers to make informed decisions.
- The methodology developed to analyse cost-effective compliance with flood frequency standards may be used by local water authorities to analyse for which measures it may be inefficient to strictly comply with minimum standards.

#### Bottlenecks of the project

- We have experienced a number of technical problems with the first paper which we are currently resolving.

#### Opportunities for the project

- A calibrated hydrologic model (SOBEK) for our case study area could support the numerical analysis.

#### More information

For more information about this project please contact:

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