Optimal Dike Investments under Uncertainty and Learning about Increasing Water Levels

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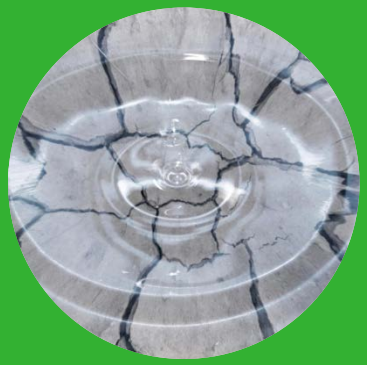
Water level extremes for sea or river are crucial to determine optimal dike heights. Future development in extremes under climate change is, however, uncertain. In this paper we explore impacts of uncertainty and learning about increasing water levels on dike investment. We extend previous work in which a constant rate of structural water level increase is assumed. We introduce a probability distribution for this rate, and study the impact of learning about this rate. We model learning as a single stochastic event where full information becomes available. Numerical solutions are obtained with dynamic programming. We find that the expected value of information can be substantial. Before information arrives investment size is reduced as compared to the deterministic base case, but investment frequency may be increased. The impact of learning on the initial investment strategy, however, is small as compared to the impact of uncertainty about increasing water levels by itself.

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