



## **The need for socioeconomic information in the projection of future flood risks**

L.M. Bouwer and J.C.J.H. Aerts

Vrije Universiteit Amsterdam, Institute for Environmental Studies, Amsterdam, Netherlands (laurens.bouwer@ivm.vu.nl, +31-20-5989553)

The risks of loss of life and damage to capital assets due to storm surges and river floods are likely to become larger in the future. This is because exposure, due to socioeconomic development, and the frequency of such events are projected to increase, with important implications for risk management and insurance. Here we discuss the influence of climatic change on storm surge risks, as well as the impact of changes in exposure. First, we show that historic loss records indicate that increases from natural disasters observed over the past around the world are primarily caused by increasing exposure and value of capital at risk. Anthropogenic climate change has not had a significant impact on economic losses so far.

Second, from two case study examples we show the impact of socioeconomic change on exposure, and consequent disaster risk. One case study is on potential fatalities due to storm surges and river flooding. The projected population growth in flood prone areas is expected to be higher than the average in the Netherlands between 2000 and 2040. This leads to an increase in potential fatalities of 68%. The combined impact of sea level rise and population growth shows that the expected number of fatalities could quadruple by 2040. The other case study is on projected economic losses due to flooding, in an urbanised area in the south of The Netherlands. Due to socioeconomic change, annual expected losses may increase by between 35 and 172% by the year 2040, compared to the baseline situation in the year 2000. A combination of climate and socioeconomic change may increase expected losses by between 96 and 719%.

Finally, we compare these results with other studies on projected impacts from storms and flooding disasters. This comparative analysis shows that for the period up to 2040, the contribution from increasing exposure and value of capital at risk to changes in economic losses is likely to be much larger than the anticipated impacts from anthropogenic climate change. Given the fact that the loss events are stochastic, and their occurrence varies over time due to natural climatic variations, the relatively small signal from anthropogenic climate change is likely to be lost among the other causes for increasing and varying losses. We conclude that more efforts are required to better incorporate the effects of changes in exposure, vulnerability and adaptation in impact studies. In particular quantification of these causes is necessary to indicate their contribution to changes in risk.