

# Benefits of dikes outweigh costs—effective measures for reducing future flooding

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Flooding in Key Haven caused by hurricane Wilma on 10/24/2005. Credit: Marc Averette/Wikipedia

In the first study of its kind, an international team of scientists—including the University of Bristol—has concluded, on a global scale, that the economic and long-term benefits of building dikes to reduce flood damage far outweigh their initial cost.

They found that in many parts of the world, it is even possible to reduce the economic damage from river floods in the future to below today's levels, even when climate change, growing populations, and urbanisation are taken into account.

The authors also assessed how much [flood](#) damage could be avoided in the future per state, if new dikes are constructed or dikes that are already in place are heightened.

They then assessed how much it would cost to build and maintain these dikes, and whether the benefits would outweigh the costs using a range of hydrological and economic models.

The study, published today in the journal *Nature Climate Change*, was led by Dr Philip Ward from the Institute for Environmental Studies at Vrije Universiteit Amsterdam.

He said: "It is well-known that economic damages from floods are expected to increase over the coming decades due to climate change and an increase in population and assets in flood prone areas. "However, in this study we show that flood damages in the year 2080 can actually be reduced to below today's level, if we effectively invest in [flood protection](#) measures.

"This is important information for policy-makers; the results help to identify those regions where we could efficiently invest in flood protection, and also highlight those regions in which other adaptation strategies may be needed, like creating more room for rivers and constructing flood-resistant buildings."

Professor Paul Bates from the University of Bristol's School of Geographical Sciences and one of the co-authors of the research, said: "We've known for some time that in countries such as the UK and the

Netherlands the economic benefits of building flood defences far outweigh the costs.

"The main finding from this paper is to show that this is also true more generally across the globe. Investment in flood defences is an effective measure for a wide range of countries and this paper helps provide policy makers with the evidence they need to better protect their populations."

The researchers hope their findings will allow for more informed dialogue on [flood risk](#) management at an international level. Whilst past studies have shown that flood risk will increase in the future, this is the first study at the global scale to examine how this can be effectively addressed.

The results and methods will be integrated in the Aqueduct Global Flood Analyzer, a tool developed by the World Resources Institute (WRI) in Washington DC, together with Vrije Universiteit Amsterdam, Deltares, the World Bank, Utrecht University, and PBL Netherlands Environmental Assessment Agency.

Charles Iceland, Aqueduct Director at WRI, added: "In order to develop sound flood prevention strategies, decision-makers need reliable estimates of the costs of building flood protection infrastructure and the benefits of that infrastructure in preventing future damages.

"We are in the process of working with the World Bank to incorporate these new cost and benefit estimates into the next version of the Aqueduct Global Flood Analyzer. The World Bank will use the resulting cost-benefit assessment tool to inform strategic dialogues with developing countries facing significant flood risk."

**More information:** A global framework for future costs and benefits

of river-flood protection in urban areas, *Nature Climate Change* (2017).  
[DOI: 10.1038/nclimate3350](https://doi.org/10.1038/nclimate3350)

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