European Commission

# Science for Environment Policy

## New flood simulation tool improves collaboration on flood management

5 November 2015
Issue 434

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**Source:** Leskens, J., Kehl, C., Tutenel, T., Kol, T., Haan, G., Stelling, G., & Eisemann, E. (2015). An interactive simulation and visualization tool for flood analysis usable for practitioners. *Mitigation and Adaptation Strategies for Global Change*. 1-18. DOI: 10.1007/s11027-015-9651-2

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**To cite this article/service:** "Science for Environment Policy": European Commission DG Environment News Alert Service, edited by SCU, The University of the West of England, Bristol.

**A new tool for flood simulation and visualisation** is accessible for both experts and practitioners, allowing them to collaborate better on flood planning and relief. Among other features, the new system includes 3D simulations, rainfall simulation and water flow data.

**With a vast majority of its population at risk** from heavy floods and storms, the European Union has developed a risk management approach to reduce the risk from flooding, through its Floods Directive. It has devised a multilayered approach which includes protection, prevention and preparedness. Those involved in this approach include everyone from scientists, engineers and policymakers to the police departments, hospitals and utility companies in communities at risk for flooding.

The traditional workflow is for scientists and engineers (domain experts) to use complex computational tools to create flood models of landscapes, taking into account their topography and hydrology to predict how a flood would affect an area. These are then passed on to policy analysts or decision makers (practitioners) who decide mitigation strategies. However, this process often results in a disconnect between these two groups and causes problems with interpretation and understanding, the scientists say. Issues occur because experts often do not help the practitioners understand the data and practitioners are sometimes unable to let experts know what they need to make decisions.

To address this problem, researchers set out to create and evaluate an analytical tool that facilitates better collaboration between experts and practitioners. The tool they designed does not require complicated software and takes advantage of highly detailed, aerial 3D images with a spatial resolution of 0.5 metres by 0.5 metres. It also allows the user to view and easily comprehend complex attributes, such as water flow, velocity and depth, property, natural landmarks, and paved or unpaved areas. Water can be added at a specific location, to simulate a levee or dam breaking, or over a larger scale to simulate rainfall.

After the tool was made, a sample of non-expert practitioners were asked to use it. The majority (five of seven) thought it was better for estimating damages and loss of lives than a more conventional tool with a 2D simulation that can only be viewed from above and usually requires more expertise to interpret.

Lastly, the researchers organised a case study in the flood-prone West Friesland area of the Netherlands. They brought together 35 stakeholders, both experts and practitioners, to try out the tool in a real-world setting. The participants were able to use the tool to come up with flood mitigation strategies for the region and test their effectiveness collaboratively. For example, a popular strategy in the case study was establishing dry dikes in the area. The 3D simulations and ability to test different strategies in a direct way made the new tool useful, the participants reported.

While the Netherlands case study did not account for time pressure or political consequences, participants found the flood tool easy to use and understand. This is the first project to help flood experts and practitioners collaborate to better protect the environment, property and lives. The researchers say their new tool offers new possibilities to experts and practitioners who participate in flood modelling and decision making.

More information about the interactive modelling tool can be found at www.3di.nu. Currently, the tool is used in various projects in Grenada, Kenya, Saint Lucia, South Africa, the Netherlands and Zambia.