Kennis voor Klimaat
Knowledge for Climate

Project   **Theme 1 | Designing interactive software to support the quest for the 'best' flood risk reduction strategy**

Project description

One way to express the flood safety policy objective would be to discover those flood risk-reducing investments that have the best balance between costs and benefits, for a certain period into the future. The simplest way to do this compares dike strengthening costs (in euros) to the flood risk reduction (also in euros) obtained, per dike ring. A step further includes other flood risk reducing measures, such as space for rivers, storm surge barriers or consequence-reducing measures, and again find the 'optimal' mix, possibly for multiple dike rings. A next step considers the extent to which measures serve or hinder additional water infrastructure or other functions (a dam can for example support fresh water supply, block a shipping or fish migration route, and connect two shores like a bridge). Risk-reducing strategies also serve more elusive objectives: landscape quality, wanting to innovate, 'country-branding', power play between regions, or fitting in a grand appealing vision such as 'people planet profit', 'moving along with nature', or 'having the most sophisticated water system in the world'. These objectives are more subjective but are nevertheless real and relevant. Finally, the time-factor plays a part: which investments to make first and which to hold in store as future options, given various uncertainties (expressed by scenarios).

This thesis approaches the above objective as a policy problem, where designs and decisions are made as a result from interactions within a community of modelers and creative people on the one hand, and stakeholders on the other. In the thesis, a system (software) will be designed that organises and supports this interaction with internet-based interactive graphic maps and interactive media. This system is preliminarily called SimDelta.

Design objective and scientific quality

The project objective is *not* to find the best flood risk reduction investments or strategies, but to design a system (SimDelta) that
1) Maps available modeling and design studies in an interactive web-based software environment (organisation);
2) Enhances understanding of the interplay between the water system (with a focus on flood risk) scenarios, problems and solutions (education);
3) Registers user input: interests, comments and choices, to inform decision-makers on the preferences of the people they represent (stakeholder polling).

The thesis is a scientific approach to designing this system, rather than a scientific answer to a research question. It will use the guidelines recommended by the Royal Netherlands Academy of Arts and Sciences as stated in their 'quality assessment in the design and engineering disciplines' (2011).

Possible practical applications

- When SimDelta works as intended, the flood risk and water system community (contributors and stakeholders) can use it to view existing modeling and design contributions and submit their own ones (organisation), to enhance their system understanding (education), and to register and view preferences (stakeholder polling).
- SimDelta will also be a framework to illustrate the historical development of the Dutch flood risk system.
- The thesis will present the state-of-the-art of modeling and design work on the Dutch flood risk system in general and the Rhine-Meuse estuary in particular.

Bottlenecks of the project

The shift from the 'research question' to the 'design objective' approach is not yet formalised and agreed on by the thesis mentors, but it is expected to solve the main conceptual issues the project currently faces.

More information

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