

WATERWORKS 2017 RDI FUNDED PROJECTS BOOKLET

Title of the project: Mind the Water Cycle Gap: Innovating Water Management Optimisation Practice

Acronym and LOGO: IN-WOP

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Abstract:

Optimisation is what you do if you run out of on innovative ideas. Current practice in integrated water management predominantly use multi-objective optimisation approaches with aggregated objectives. This biases results towards the status quo and against innovative solutions, can foster stakeholder resistance when they do not recognize their values and objectives in the optimization formulation, while also raising ethical concerns related to the inclusion of undesirable and/or hidden trade-offs¹. In contrast, many-objectives optimisation approaches can consider many non-aggregated objectives, which has the potential to enrich the solution space with alternative courses of action that better reflect the diverging perspectives of stakeholders, and align better with ethical concerns. From the viewpoint of ethics, disaggregated assessment criteria are preferred as these may avoid undesirable and hidden trade-offs. Water resources management increasingly relies on integrated models to analyse the socio-economic benefits of the scarce resource. These integrated models offer great potential in enabling more sustainable management of water resources. Currently these advances in modelling are however in many cases not exploited because their outputs are evaluated using multi-objective optimization on pre-maturely aggregated objective functions that cancel out the potential advantages of these integrated models in unpredictable ways. In the context of Integrated Water Resources Management (IWRM), many-objective approaches offer greater opportunities for handling the many non-aggregated objectives that arise from sectoral integration. In the face of climate change and growing water scarcity the expansion of the solution space and the identification of innovative strategies for water management issues that many-objective approaches have on offer is of great relevance. The virtues of many-objective approaches have barely reached current practice in water management in Europe and beyond. To realize their promise, this research operationalizes many-objective approaches for water management and contrasts them to existing practices. This project develops, operationalises, and incorporates many-objective optimization in existing regional water management models in close collaboration with local stakeholders and water managers. We apply both existing multi-objective methods, and, collaboratively with local stakeholders, develop many-objective approaches and compare and contrast the strategies that emerge from both as a concrete contribution to practice.

Project structure (WPs description):

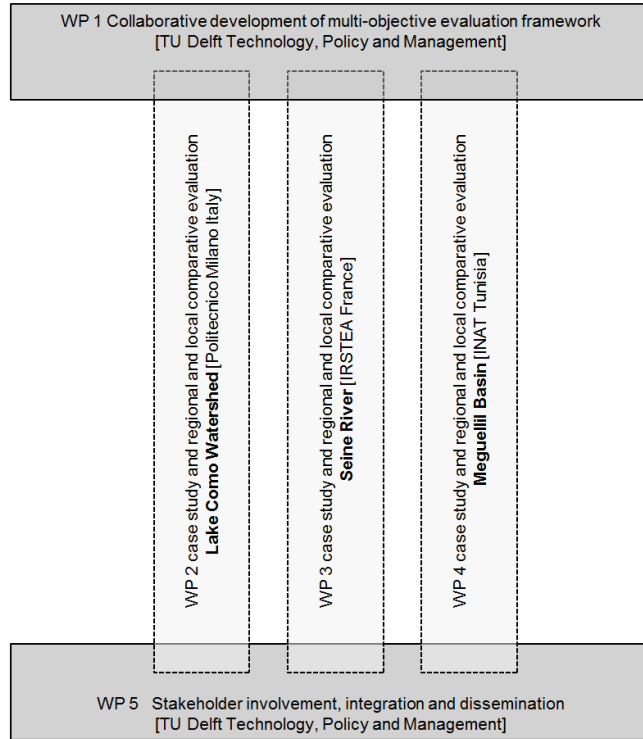


Figure 1 Overview of the proposal and project structure