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Published in:
6th Annual Meeting of DWRP - Abstracts

Publication date:
2012

Document Version
Publisher's PDF, also known as Version of record

[Link back to DTU Orbit](#)

Citation (APA):
Arnbjerg-Nielsen, K. (2012). Water in Urban Areas in a Climate Change Perspective: Challenges and Research Needs. In 6th Annual Meeting of DWRP - Abstracts Copenhagen.

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Water in Urban Areas in a Climate Change Perspective. Challenges and Research Needs

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Abstract

Climatic changes will influence the water cycle substantially. This will have an immediate impact on the performance of urban water infrastructure. A case study from Roskilde shows that assuming an increase in design intensities of 40 % over a 100 year horizon will lead to increased cost of individual very extreme events (e.g. more than 100 years) of approximately 70 % and a 900 % increase in the expected annual losses due to floods. Other case studies in Denmark show smaller impacts, but still very significant increased annual costs compared to the present state. This calls for systematic planning of adaptation to the anticipated climatic changes and research to identify optimal strategies. In other areas of the world droughts and/or water resource availability in general will also become increasingly important. As such the water cycle in urban areas will be controlled more extensively in the future as part of engineering design.

However, climatic changes are only one of a suite of time varying drivers of urban design. Other key drivers include technological and modelling capabilities, city planning, environmental considerations, increasing urbanization, and changes in social behaviour. There is a need to forecast all the changes that can be foreseen within the technical lifetime of city infrastructure, notably the water system and the impacts on other aspects of urban liveability.

Based on the projects in Partnership Water in Urban Areas (www.vandibyer.dk) these drivers will be discussed and research needs identified. The partnership uses 6 pillars to map the challenges associated with the drivers, see Figure 1. The partnership has so far identified 11 innovation projects that address specific challenges. The projects aim at closing knowledge gaps and disseminate current state-of-the-art solutions to provide better liveability in urban areas by considering urban water management in a broader context. The mapping also show that further research is needed to address the challenges in a sustainable way.

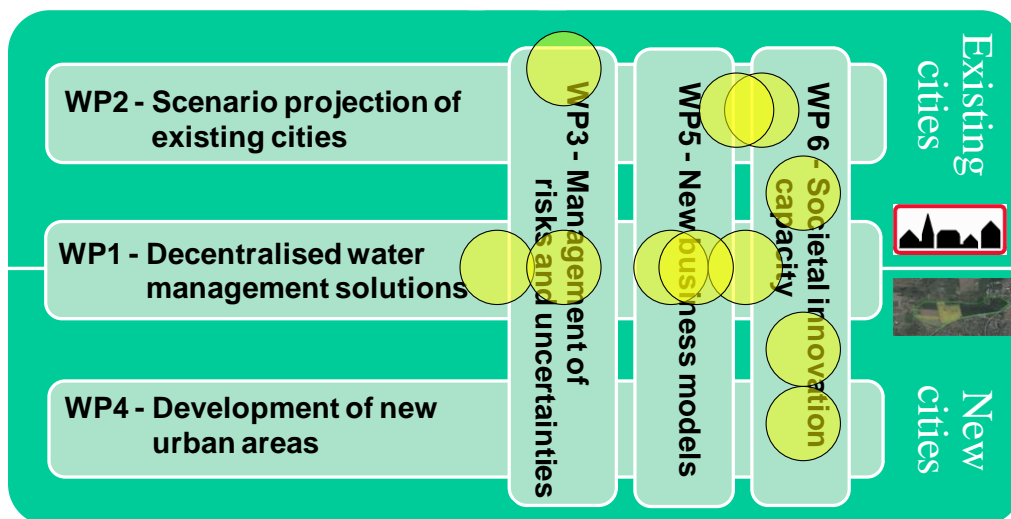


Figure 1. Visualization of innovation projects (yellow circles) and the corresponding work packages in the Partnership Water in Urban Areas.

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