Title of the project:
Urban water security – how to measure and what to do

Assignment no.: 26.18	**Internal/external:** External (Deltares)
Head graduation committee: Prof.dr.ir. Arjen Y. Hoekstra	**Daily advisor:** Ir. Kees van Ginkel (Deltares)
Name(s) of participating institutes: Deltares (Marco Hoogvliet, MSc), and possibly also National University of Singapore (Dr Olivia Jensen)	**Start of the project:** Flexible

Short description and objective of the project:
The earth is projected to undergo continued urbanization and climatic change. Cities are vulnerable places exposed to a variety of water-related threats, which may impact their water security. Recently, the National University of Singapore and the University of Twente developed the Urban Water Security Dashboard (UWSD) as a tool to assess urban water security, highlighting the different causal mechanisms leading to a certain degree of security (Hoekstra et al, 2018; Van Ginkel et al., 2018). In the past, some other frameworks to assess urban water management have been proposed, such as the City Blueprint (Van Leeuwen et al., 2016), the Arcadis Sustainable City Index (Arcadis, 2015) and more tailor-based approaches (Jensen and Wu, 2017). However, the overlap between different dashboards has been too small to substantially compare the impact of different approaches to assessing water security. Moreover, these types of indicator systems are criticized for lacking 'a perspective of action'; the mere analysis of a cities' security does not tell a policy maker what to do. At the same time, there is a growing demand from urban planners for sound advice on how to improve water security. Such an advice could very well start from a quick-scan using one of the proposed frameworks, complemented by site-specific information.

Objective
Assess the water security of a number of cities, using the UWSD, in collaboration with local authorities, in order to:

- Study the differences between the UWSD and the City Blueprint; does a difference in framing give different quantitative results?
- Find out which information should be added to adequately support local governments
- Find an appealing format to present this information to policy makers

We look for a student who is a strong conceptual thinker, likes to have a bird-eye view on water management issues, can work with local authorities in a professional setting and has affinity with design.

Literature
Arcadis (2015). Sustainable cities water index. Which cities are the best placed to harness water for future success? Centre for Economics and Business Research, Arcadis, Amsterdam.
Van Ginkel, K.C.H., Hoekstra, A.Y., Buurman, J. and Hogeboom R.J. (2018) Urban Water Security Dashboard: systems approach to characterizing the water security of cities, Journal

of Water Resources Planning and Management, 144(12): 04018075.
Hoekstra, A. Y., Buurman, J., & van Ginkel, K. C. H. (2018). Urban water security: A review. *Environmental Research Letters*, *13*(5), 53002.
Van Leeuwen, C. J., Koop, S. H. A., & Sjerps, R. M. A. (2016). City Blueprints : baseline assessments of water management and climate change in 45 cities. *Environment, Development and Sustainability*, *18*(4), 1113–1128.