

## Abstract Template

**Martine Beuken-Greben**

**Organisation :** Municipality of 's-Hertogenbosch,  
The Netherlands

**Short description:**

's-Hertogenbosch is situated in the south of the Netherlands. It is a city of 137.000 inhabitants. 's-Hertogenbosch is well known for its rich cultural history. In recent decades it has positioned itself as a modern, dynamic and vibrant city. It is a city with a strong identity as the capital of the province of North Brabant, an industrialised and economically important region.

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**Presentation title:** Coping with the growing threat of flooding due to climate change while situated in a river water basin.

**Executive Summary of your Abstract:**

Models predict that due to climate change more rain will fall in the winter and heavier rain will fall in the summer. The innovative plans to limit flood risk, by integrating technical water retention measures with the other urban functions, are dealt with in this presentation. How can 's-Hertogenbosch maintain an attractive city environment and simultaneously achieve economically acceptable solutions for retention of rainwater?

**Abstract:**

's-Hertogenbosch is situated in the delta of two regional rivers (the Dommel and the Aa) and alongside the Meuse, an international rainwater fed river. 's-Hertogenbosch was formed by water; as friend and foe. In the 1100's the marshes surrounding the city were an impenetrable fortress, protecting the city. However, in more recent history (until the 1920's) the development of the city outside the original city walls was stunted because of the need for raising the land and polders to reduce the risk of flooding. The threat of flooding is still quite real considering the flooding that has occurred in the southern part of the city as recently as 1995. The chance of inconvenient or disastrous flooding of low-lying areas such as 's-Hertogenbosch is growing because of climate change. 's-Hertogenbosch anticipates these changes by creating water storage capacity in and around the city.

The national campaign "Room for the river" for all national rivers was started after the troublesome flooding in 1995. This campaign led to measures for rainwater retention further upriver and redevelopment of meandering bends in the rivers to reduce the flow velocity. With these measures the peak discharge of the water in the Meuse is reduced, so that the regional river water can flow to the Meuse. To the south of the city an inundation area was created which can be flooded to store water in exceptional situations (once every 100 years). Another adjacent area, allocated to being inundated when high water occurs, is being developed at this time. This project is called the Green River. Political and local support for such measures can only be achieved because of the risk of repetition of flooding is still tangible.

's-Hertogenbosch has the ambition to realise economic development, residential real estate projects, nature and recreational development and large scale renewal of sewerage systems, while the safety of city citizens needs to be ensured. Combining these developments with the water retention objectives in a creative and clever way is the best way to achieve support for these measures. In 's-Hertogenbosch the following developments have been achieved or are planned:

1. New suburb "De Groote Wielen" where a lot of surface water was created and surface water is treated with helophytes and a number of floating houses were realised.

2. Nature development “The Green Delta” which combines nature development and creating water storage capacity;
3. An alternative waterway for freight ships on the eastern side of ‘s-Hertogenbosch to curb freight ship traffic through the city centre. In the city a new sluice-gate will be realised that can accommodate recreational ships and can drain water;
4. Subsidies for stimulation of water retention on green roofs, city squares and in private gardens.

By integrating project development, nature development and the conservation of historical features with technical water retention measures ‘s-Hertogenbosch has achieved a sustainable city environment, which is safe to live in and attractive to visit. This has improved the image of the city and thereby strengthened the economical position. The developments that are planned in the near future will keep water attractive and reduce flooding problems.

**Resumé:** Martine Beuken-Greben is the water manager of the municipality of ‘s-Hertogenbosch. She is responsible for the implementation of many projects to achieve a cleaner, healthier and safe surface water system within the old city and the suburbs. Martine advises the alderman of the city council about water issues and climate change. In her previous position at the Waterboard in Amsterdam she was research leader of innovative projects for wastewater treatment. Martine studied wastewater technology at the University in Wageningen and completed marketing and communications degrees during her career.

**Recommended reading:** [www.denbosch.nl](http://www.denbosch.nl), <http://english.s-hertogenbosch.nl/index.cfm>,