

# Water-sensitive urban planning – How can heavy rain and storm water be better managed?

Results of the Connective Cities dialogue event from 6 to 8 December 2022 in Cologne in cooperation with Stadtentwässerungsbetriebe Köln (StEB Köln) and United Cities and Local Governments (UCLG)



Inside a pumping station in Cologne: insights into the urban drainage strategy in Cologne city centre.

## How can the risks of heavy rain and storm water events for people and municipal infrastructure be minimised?

 41 experts

 from 16 cities

 in 8 countries

Heavy rain and storm water events, such as those in Germany's Ahr Valley in 2021 or this year in Pakistan, Australia and South Africa, cause streams to swell into raging torrents. They flood roads, destroy houses and bridges, as well as important infrastructure. Yet not only do they cause damage worth billions – they also lead to loss of life. They occur suddenly, and can only be predicted at short notice. Due to climate change, these events will continue to increase in frequency and severity worldwide. Connective Cities organises opportunities for local government experts in Germany and worldwide to dialogue on relevant and current topics, in order to deepen development cooperation.



# Keynote speeches

## [Integrated Water Resources Management](#)

Betül Türkeri, Fellow at the Mercator-IPC (Istanbul Policy Center)

Integrated Water Resources Management (IWRM) analyses the interaction of surface water, aquifers and coastal waters, with a view to managing them sustainably in order to promote social and economic development, and ensure ecosystem functionality. However, the active participation and cooperation of various societal and private actors and stakeholders in the planning and decision-making processes is essential. IWRM can make a crucial contribution to achieving Sustainable Development Goal 6 – Clean Water and Sanitation. One challenge for the coming years is to reduce land sealing, so that heavy rainfall can infiltrate and groundwater resources can recover.

*'In view of stronger temperature and precipitation patterns, cross-system collaboration is essential, but this is also an opportunity.'*  
Sarah Höfllich, UCLG

*'The experiences of the past no longer apply. We need to tune into the emerging future.'*  
Martin Cassel, StEB Köln

## ['Catalysing' water-sensitive urban planning](#)

Julie Perkins, Global Water Operators' Partnerships Alliance (GWOPA)

Water Operators' Partnerships (WOPs) are non-profit partnerships between two or more operators of water supply and/or sanitation facilities, designed to strengthen their capacity to deliver quality services sustainably. The potential for this is large, and should be further supported. There are already 435 WOPs worldwide, about half of which are between partners from the Global South.

So far, water supply and sanitation services are far from reaching all people. The quality of services is often low, irregular, unreliable and non-gender-specific. Capacity is often the largest constraint for utilities. Peer consulting in WOPs can be a crucial lever to improve capacity here. Learning works best when it is not profit-driven. Urban metabolism, which takes into account material and energy flows within cities, and building densification, open up new possibilities for more cost-effective interventions.

*'Interdisciplinary and interregional cooperation among professionals is becoming increasingly important.'*  
Betül Türkeri, Mercator-IPC

*'Ecological modernisation, urban metabolism and building densification – the architecture and urbanisation of the future.'*  
Julie Perkins, GWOPA



# Best practices

## [Flood protection in Banjul](#)



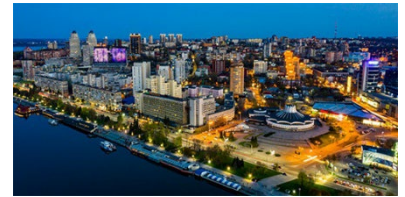
Ensuring the drainage of rainwater and storm water from all collection points in the city centre via the sewer system to the sea

## [Cologne: flood prevention](#)



Resilient redesign of vulnerable zones against heavy rain using a multi-stakeholder approach and early citizen participation

## [Dnipro: flood prevention](#)



Reconstruction and clean-up of drainage networks and structures up to the River Dnipro in the Amur Nyzhnodniprovskiy District

## [The green city of Kigali](#)



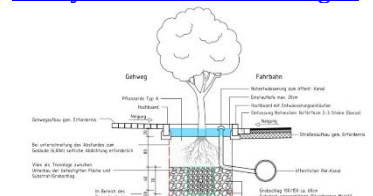
16 ha pilot project to provide green infrastructure and affordable housing that addresses storm water issues

## [Metro Campus in Düsseldorf](#)



Development of a new urban, lively, low-car urban district for 1,300 residential units near the city centre on an area of around 9 ha

## [Heavy rain resilience in Hagen](#)



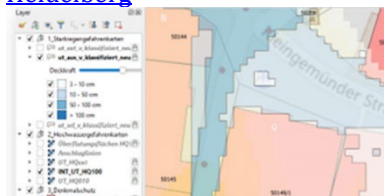
Measures for sustainable rainwater management using tree trenches, which can be realised without complex technology

## [Sponge city concept in Hamburg](#)



Continuous dialogue between stakeholders, identifying needs, developing pilot projects, changing rules and laws

## [Heavy rainfall management in Heidelberg](#)



Support for citizens through on-site consultation and two-stage promotion of protective measures

## [Land-use planning at 'Am alten Angerbach' in Duisburg](#)



Development of an agricultural area of 17 ha based on the water-sensitive drainage planning model

## [Heavy rain hazard map and communication in Mannheim](#)



Public events, a brochure and a dedicated website are used to inform residents about risks

## [Pilot study 'Decentralised flood protection in the Ahr Valley'](#)



Research for improved flood protection through decentralised retention measures at the tributaries of the Ahr

## ['Bairro Maravilha' in Rio de Janeiro](#)



Paving of roads, restoration of sewage systems to prevent flooding

## Peer consulting

### How can storm water management be financed from public revenues? (Kigali)

The Rwandan capital Kigali is in the process of building an improved water supply and sanitation system, including storm water management. Water meters to measure water consumption are planned. Now Kigali faces the challenge of introducing a system of charges to cover the costs of running the new system. As a first step, conducting an economic study was suggested in order to better estimate the total costs. Furthermore, it was recommended that the city should establish an operator as part of a public-private partnership, and begin introducing fees in best-suited areas and then gradually extend the system to other districts.

*'We all have the same problems, no matter where we come from. We were a swarm intelligence. We are all working on the same topic, so we were able to get deep into it right away. Everyone has their own ideas and perspectives and I was able to take a lot from that.'*

Pascale Rouault, Hamburg Wasser

### How can the drainage infrastructure in Mwanza be improved?

Mwanza is the second-largest city in Tanzania, situated on the southern shore of Lake Victoria and surrounded by hills and boulders. The soil is stony. During storms and heavy rain, flooding often occurs. To solve the problem, proposed measures include deepening drainage ditches, installing sanitary water storage, especially in informal settlements, and reducing the flow velocity in the ditches through improved use of roads and by planting special trees.

*'The high level of experiential knowledge for solving challenges that really burden our communities is impressive. The technical assistance is very practical and easy to implement.'*

Erick Mvati, Mwanza City, Tanzania

### How can others be convinced to implement a pilot study on decentralised flood protection (Ahr Valley)?

The flood protection strategies to date mainly focus on areas in the Ahr Valley itself. The decentralised pilot study focuses on the tributaries to the River Ahr, and through protective measures there can thus make an important contribution to reducing and slowing down any rise in water levels in the Ahr Valley. However, the approach is new, and decision-makers and landowners need to be convinced. Suggested solutions included using stakeholder mapping to gain greater clarity concerning all the groups involved, approaching farmers and landowners in a targeted manner, and reaching out to the local population and officials, e.g. through further events and well-prepared information materials.

*'When I get home to the Gambia, we will launch a pilot project using the lessons we have learned here.'*

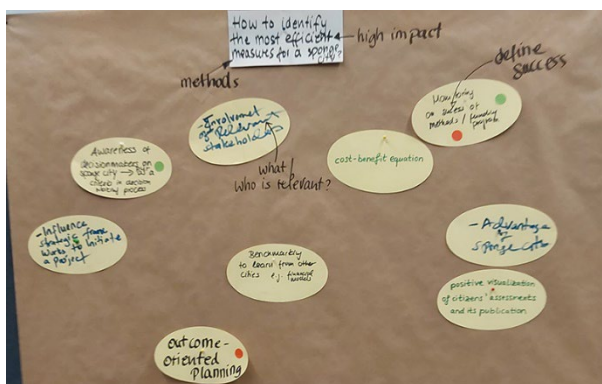
Abdouile Krubally, Banjul City

## Peer consulting through to the development of project ideas

How can 'flood amnesia' be prevented in the future?

Once a generation that has experienced a severe flood disaster dies, the associated risks disappear from the collective memory. The discussion revealed that in order to prevent this 'flood amnesia', a number of smaller measures are needed on a regular basis. These include information campaigns, early education in schools, memory trails, information materials with pictures showing flooding in the region, 'scouts' who keep flood plains clear, and prize competitions for the best flood protection measures.

Technical solutions were also discussed, such as the use of drones to monitor flood protection measures, and the introduction of a 'flood passport' for landowners in cooperation with insurance companies.



What are the best interventions to initiate a sponge city?

Establishing measures for a sponge city in an existing infrastructure is not an easy undertaking, and requires a great deal of effort to persuade people. Solutions discussed were: results-based planning of pilot projects, defining goals in advance, measuring these continuously during implementation, and finally publicising the results, including the positive responses of citizens in the pilot districts. Ultimately, the aim is to raise awareness among decision-makers that the concept of the sponge city is, or should

become, an important criterion in all decisions concerning urban infrastructure development. Cost-benefit analyses can also help to demonstrate the benefits of certain measures.

How can public participation in the development of flood protection measures be organised? (Ahr Valley)

In the wake of the flood disaster in July 2021 in the Ahr Valley, the residents were poorly informed about planned flood protection measures. Also, they were not actively involved in their planning. Furthermore, the citizens are not organised, as most of them are more than busy with securing their livelihoods, renovating their houses or building new ones.

Against this background, it was recommended that a university be involved. Students would then be able to survey residents about their flood experiences, suggestions and wishes as part of a project. The results could be used to subsequently enter into a discussion process with those responsible in the state and local government, which should be moderated by an independent mediator. Furthermore, a flood protection plan has already been developed in the neighbouring district of Grafschaft with the participation of citizens. Their experience could also be used for the Ahr Valley.





## How can Zarqa be made more resilient to rainstorms?

Zarqa is a densely built-up city located in a hilly landscape in Jordan, northeast of Amman. The informal settlements have no drainage system, and natural waterways have been carved up by uncontrolled development. During heavy rainfall events, water runs off the surface in an uncontrolled manner, leading to flooding and destruction of buildings and urban infrastructure. A lack of seepage areas is also leading to a drop in

groundwater levels and a shortage of drinking water. To better manage these challenges, in the short term the plan of action envisages diverting rainwater from house roofs into newly installed collection tanks, and raising public awareness. In the medium term, higher building density is planned in order to generate more compensation areas and reduce land sealing. In the long term, the plan is to gradually create alternative living space for informal settlements based on the example of Rio de Janeiro presented at the event, then to rebuild these areas and connect them to the sewage system.

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## How can a pilot programme for tree trenches be developed in Banjul (the Gambia)?

At the Connective Cities dialogue event, delegates from the City of Banjul in the Gambia sought ways to improve the city's outdated and inefficient drainage infrastructure, which dates back to the British colonial era. Banjul is currently one of the cities most affected by sea-level rise anywhere in the world. This also affects its drainage infrastructure.



Thanks to the lessons learned from the presentations and the dialogue during the event, the delegates from Banjul decided to adopt an appropriate 'sponge city' approach. Banjul is currently implementing an EU-funded project to plant 50,000 trees in the city. Banjul city representatives believe that with the knowledge and new ideas gained during the event– the 'tree-trench' concept for planting trees – they will soon be able to reformulate their existing tree-planting strategy in order to implement this new approach on a city-wide scale. They appeared very confident that both the local authorities and the EU-funded project would be brought on board and help adopt this new strategy.

## Going forward

Connective Cities will continue to support the implementation of these project ideas according to individual needs and demand, e.g. through expert missions, delegation trips, local project workshops, virtual collaborative spaces, webinars and advice on funding opportunities. The aim will be to develop these ideas until the projects are ready for implementation. To achieve this Connective Cities will liaise continuously with the professional experts.

**At the end of 2023, a further virtual meeting of the participants is planned in order to share information on the developments achieved by then.**

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## Publication details

Published by  
Connective Cities – International Community of Practice for Sustainable Urban Development  
[www.connective-cities.net/en/](http://www.connective-cities.net/en/)

Text and images  
Burkhard Vielhaber

Editorial revision  
Alvaro Aguado Hernandez

Photo credits  
Connective Cities – Martin Magunia  
Photos of the best practices from the various cities

On behalf of the  
German Federal Ministry for Economic Cooperation and Development (BMZ)

Partner von Connective Cities



Im Auftrag des



Bundesministerium für  
wirtschaftliche Zusammenarbeit  
und Entwicklung