



## Urban rainwater harvesting from niche to mainstream: challenges and opportunities for planning

This is a preliminary Policy Brief, as the “UrbanRain” project is still in its early stages. The brief presents the aim, key objectives, scientific approach as well as policy implications and the social value of the project. The project is coordinated by the Royal Institute of Technology (KTH) in Stockholm and funded by Formas, The Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning ([www.formas.se](http://www.formas.se)). UrbanRain comprises a consortium of researchers from different academic institutions in European Countries.

### SUMMARY

#### Introduction

Conventional urban water management approaches are struggling to meet the emerging challenges required for sustainability, which are multidimensional in character and derived from factors that often lie outside the control of water managers. New discourses on urban water management emphasize the need for a transformative change by moving to a system that manages a diversity of water sources and scales of infrastructure, through an integrative planning approach.

#### Aim and key objective of the research

The aim and main objective of UrbanRain is to examine the opportunities and challenges regarding planning for the up-scaling and expansion of rainwater harvesting (RWH) systems as socio-technical devices in order to enhance sustainable water management in European urban areas.

#### Scientific approach /methodology

The research will use case study methodology and apply a mixed methods approach, which will combine qualitative and quantitative tools. Conceptually UrbanRain draws on transition theory, planning theory, urban political ecology, polycentric governance and public goods, which are all relevant to fulfilling the aim of UrbanRain and its specific objectives.

#### New knowledge and added value

Up-scaling and extending urban RWH has great potential to promote sustainable water management and planning, but the transition of RWH in Europe – from the current status of isolated, small-scale projects to more larger-scale applications – raises a number of questions with regard to planning and policy-making, which have only been marginally analyzed in the academic literature. This is a major research gap that this project addresses by using the exemplar of RWH in the cases of Stockholm, Barcelona and Berlin.

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**Key messages for  
policy-makers,  
industries, and civil-  
society actors**

The project promises high social and economic value, with benefits for urban environments. UrbanRain has the potential to increase institutional capacity at different planning levels in order to manage urban water resources, water use efficiency, and to provide urban amenities while reducing costs for wastewater treatment and disposal, and the maintenance of green spaces. The integrated planning approach is likely to build up reflexive and governance capacity for adaptation to climate change and the management of flood/drought events, and to fulfil requirements for sustainable urban development.

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## POLICY BRIEF

### Introduction

Conventional urban water management approaches are insufficient to meet the current global dynamics and challenges, given trends in water scarcity, demographic growth, pollution, climate change, and extreme weather events. Traditional urban water management can be characterized by large-scale, centralized, and highly engineered infrastructures. These large systems are typically based on a technocratic management approach, and on the assumption that key variables (such as rainfall and water demand) can be predicted and controlled under the principles of linearity and efficiency, and under a strict regulatory framework. However, this approach is not only acknowledged to be inadequate to respond to some uncertainties and complexities of current contextual conditions, but it can also erode urban resilience.

New discourses on urban water management emphasize the need for a transformative change by moving to a system that manages a diversity of water sources and scales of infrastructure in an integrated way. Such an approach requires the capacity of the whole water governance system to cope with, and respond to, contemporary challenges, respecting processes of social learning and plural sources of knowledge and perspectives.

There is consensus about the need for more comprehensive urban planning and integrated urban water management in relation to freshwater, wastewater and stormwater, as links within the resource management paradigm. However, it is also recognized that important aspects affecting them lie outside the control of water managers, mostly because the ultimate drivers are governance, politics, ethics and society (values and equity), and climate change. These factors and drivers operate on different spatial and temporal scales, acting within systemic conditions and constraints that are often intractable for urban planners and very often downplayed if not altogether neglected in policy and action.

The project responds to the aforementioned challenges and discourses, and aims to examine the opportunities and challenges regarding planning for the up-scaling and expansion of rainwater harvesting (RWH) systems as socio-technical devices in order to enhance sustainable water management in European urban areas; although, its lessons and recommendations are expected to have a wider, global impact.

In technical terms, RWH is a raft of technologies used for collecting and storing rainwater from rooftops, land surfaces, road surfaces or rock catchments by using either simple devices such as pots, tanks, and cisterns or more complex technical solutions such as underground dams.

Increasingly, RWH systems are being used for a wide range of urban functions, from providing alternative water supplies and water saving, to stormwater control, groundwater recharge and greening of residential areas. The transition of RWH in Europe from isolated, small-scale pilot projects (socio-technical niches) to more extensive, inter-connected and (in part) larger-scale applications raises a number of relatively new questions regarding planning and policy-making, since up until now RWH was restricted to a small number of enthusiastic stakeholders working in self-contained or isolated contexts. It is here where the project's most significant contribution lies.

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## Specific objectives of the research

Within the overall aim of the project, UrbanRain will pursue the following specific objectives:

- 1) Conduct a strategic review of empirical cases of transitions towards up-scaling and mainstreaming RWH systems in Europe, with a focus on the role of planning (urban planning, water management planning, infrastructure planning)
- 2) Identify the key multi-dimensional constraints, drivers, factors, and thresholds for evaluating the sustainability of urban RWH
- 3) Produce a state-of-the-art study of the current position and prospects of planning and implementation of up-scaled/extended urban RWH in Europe.

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## Scientific approach / methodology

The research will use a case study methodology and apply a mixed methods approach, which will combine qualitative and quantitative tools. The main work will comprise a systematic comparison of three case studies from Germany, Spain and Sweden. These case studies will be complemented with bibliographic and documentary research, and secondary data collection and analysis. In addition, a state-of-the-art study of European and international experiences will be delivered.

Conceptually UrbanRain draws on transition theory, planning theory, urban political ecology, polycentric governance and public goods, which are all relevant to fulfil the aim of the UrbanRain project and its specific objectives. However, no particular theory (or theories) has (have) been pre-selected to analyze the collected data. UrbanRain is open to apply the more appropriate and relevant theories to the context of each case study and for the comparative study of the three cases in order to achieve an integrative analysis and a deepening of knowledge.

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## New knowledge and added value

Up-scaling and extending urban RWH has great potential to promote sustainable water management. However, related planning and policy-making issues have occupied a secondary position in academic literature. This major research gap will be addressed by this project by taking the cases of Stockholm, Barcelona and Berlin as examples.

*On the academic side*, of particular importance to this project is the role of planning in the re-ordering of socio-technical relations between a growing number and range of social actors involved in, or affected by, the up-scaling and mainstreaming of urban RWH systems. This promises new knowledge perspectives and academically significant contributions.

*On the social side*, an integrated planning and management approach for urban water that manifests in interactions between landscape, citizens, experts, and government agencies has potential for addressing the tension between nature, technology and society. This can open up opportunities for businesses and technology innovation, promoting new forms of political organization that engages citizens in social and democratic processes for sustainable urban development.

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## Key messages for policy-makers, industries, and civil society actors

The project promises high social and economic value to policymakers, users/citizens, industries, and society as a whole through the fulfilment of long-term sustainability goals. In particular the research will:

- Promote new forms of political organization that open up opportunities for innovation and participation;
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- Help build reflexive governance capacity for socio-technical transformation for adaption to climate change, the management of flood/drought events, and ecological sustainability;
- Promote learning on innovative forms of RWH between cities/communities;
- Help reduce costs for wastewater treatment and disposal (e.g. reducing heavy investment in stormwater retention basins) and create opportunities for low-cost maintenance of green spaces, gardens etc.;
- Open up opportunities for innovative business potential for low-cost technical design, and competitiveness of RWH systems

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## Recommended Literature

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Project Identify	
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