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## Visions et besoins des parties prenantes européennes pour les futurs systèmes de gestion des eaux pluviales urbaines

### European stakeholders' visions and needs for stormwater in future urban drainage systems

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## RÉSUMÉ

La transition de nos systèmes actuels de gestion des eaux pluviales urbaines vers des territoires eau-responsables nécessite la mobilisation de différentes disciplines et parties prenantes. Cependant, tous ces groupes ont des visions et des besoins différents concernant ce processus de transition, qui varient en outre selon les régions et les pays. Une tâche du projet Co-UDlabs financé par l'union européenne consiste à identifier les liens et les conflits entre les parties prenantes et à proposer des stratégies d'adaptation pour soutenir la transition des systèmes de gestion des eaux pluviales urbaines en Europe. Nous avons recueilli les besoins à partir des documents de politique nationale et de la législation de sept pays européens, ainsi qu'auprès des participants au projet et de personnes engagées dans la communauté de l'hydrologie urbaine. Les résultats montrent que, s'il existe un consensus sur les défis à relever, les visions sur la manière de faire sont très diverses. Cela implique une plus grande interaction entre les différents groupes de parties prenantes pour rendre possible un consensus. En outre, les structures organisationnelles et législatives semblent souvent ralentir les processus de changement. Les rôles et responsabilités dans le secteur de l'eau doivent être clarifiés pour permettre une planification plus intégrée.

## ABSTRACT

Transitioning from our current urban drainage systems to a water-smart society requires the involvement of different disciplines and stakeholders. However, all these groups have different visions and needs on such a transitioning process, which additionally vary between regions and countries. Within the EU-

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funded project Co-UDlabs, one task is to identify the connections and conflicts between stakeholders and to propose adaptation strategies to support the transition of European urban drainage systems. Concrete needs formulated for a successful implementation were collected from national policy papers and legislation in seven European countries as well as from project participants and individuals involved in the urban drainage community. Results show that whilst there is consensus on the challenges, the visions on how to transition are very diverse, indicating that more interaction between the different stakeholder groups is required to develop consensus. Additionally, organisational and legislative structures often seem to slow down necessary change processes. Roles and responsibilities in the water sector need to be clarified to enable more integrated planning.

## **MOTS CLÉS**

Acteurs, Europe, Réglementation, Stratégie, Transition

## **1 INTRODUCTION**

Collaborative Urban Drainage research labs communities (Co-UDlabs) is an EU-funded project aiming to integrate research and innovation activities in the field of Urban Drainage Systems (UDS) to address contemporary public health, flood risks and environmental impacts. The innovation "starting community" provides transnational research, with the aim to influence European regulations and practices to deliver a more sustainable management for UDS in the face of climate change and ageing of drainage infrastructure. The main objective of the project is to provide a transnational multidisciplinary collaborative Research Infrastructure (RI) that will allow stakeholders in the urban drainage sector to come together, share ideas, co-produce project concepts, and then deliver those project concepts with the benefit of access to 17 top-class large research facilities, thereby building a collaborative European Urban Drainage innovation community.

One of the first tasks in Co-UDlabs is to identify the connections and conflicts between disciplines and stakeholders in the ongoing process of transitioning from discrete examples of blue-green infrastructure to a holistic approach of integrating stormwater in the urban environment, and to propose adaptation strategies in order to support the transition of urban drainage systems (UDS) within Europe. The aim of this abstract is to present the results of the evaluation on the visions of the different disciplines and stakeholders involved in this development – academic researchers, industries, small and medium enterprises (SMEs), non-governmental organisations (NGOs) and decision-makers in administration and politics for the future of UDS. This evaluation does not claim to be representative; however, the aim of this work is to identify and examine areas where stakeholders express needs to be fulfilled to enable this transition. The full report is available online (Tondera *et al.*, 2022).

## **2 METHODS**

Three different sources were consulted: (i) public documents from governmental institutions and NGOs, which define or are related to a "roadmap" towards transitioning to a water smart society from the seven countries involved in the project; (ii) opinions of the researchers involved in Co-UDlabs, and (iii) opinions from individuals interested in using the RIs as offered by the Co-UDlabs project. The information gathered was entered into an evaluation grid based on the themes of interest within the project was developed. This evaluation grid serves to identify the needs in different sections, and therefore contains need-based criteria and categories, which are presented in Table 1.

## **3 RESULTS**

Only a small number of the needs were identified by all three sources – i.e. national roadmaps, Co-UDlabs participants and (potential) RI users. These are presented in Table 1.

### **3.1 Evaluation of national "roadmaps"**

The organisation and legislative structure of stormwater management and treatment in the seven countries represented in Co-UDlabs (i.e. Denmark, France, Germany, Netherlands, Spain, Switzerland and United Kingdom), is quite different due to historical development, climatic and geographical conditions, as well as economic situation, resulting also in different degrees of private/public involvement.

Table 1: Guiding topics derived from the expressed needs in the three evaluated sources, which require (near) future activity

Criteria		Scientific knowledge		Techniques and technologies		Non-technical solutions		Knowledge transfer – training of practitioners	
Categories									
Technical Objects	Performances	Data collection and quality		Sewer infiltration		Integrated stormwater management		Standardisation	
		Maintenance and long-term evolution		Adaption of sewer systems		Multi-stakeholder governance		Network creation	
		Standardise assessment		Soil infiltration					
		Treatment of highly variable flows							
	Assets deterioration	Sewer processes		Data collection and analysis		Management of assets		Training of professionals	
		Performance and resilience				Costs and investment			
		Big data							
	Digital water solution	Advanced monitoring		Advanced monitoring		Citizen involvement		Training for monitoring devices	
		Data management and modelling		Data management		Organisational issues			
				Modelling					
Processes, impacts, risks	Urban flooding	Predictive models and risk maps		Predictive models and risk maps		Predictive models and risk maps (support)		Case-studies and demonstration-scale projects	
								Preventative flood management	
	Runoff pollution	Monitoring of contaminants		Data collection and model development		Financial aspects		Training on metrology	
		Impact of pollutants		Runoff management		Sustainable stormwater solutions			
		Pollutant dynamics				Integrated planning			
		Modelling							
Urban services, urban planning	Waterwise Cities	No common topic could be identified.		Design approaches and strategies		Governance structure		Tailored training activities	
						Local responsibilities		Available research infrastructures	
						Boosting innovation		Information for the public	
Water cycle	Water resources	Impact of wet weather dischargers on receiving waters		Predictive models		Adaptation of legislation to an integrated water resources management		No common topic could be identified	
		Prevention and restoration of surface waters							
	Adaptation to climate change	Integrated and holistic models		Make technical choices and regulations climate-proof		No common topic could be identified.		No common topic could be identified.	
		Anticipating the effects of global change on existing sewer systems							

number of needs found in the national "roadmaps" referring to this topic  
 number of needs named by different Co-UDlabs participants or in the proposal  
 number of needs named by (potential) RI users

The way national regulations and frameworks have been structured and implemented results in different degrees of competences and interdependences at a local level. In Denmark and the Netherlands, the general responsibilities seem to be well defined between the different actors on the national, regional and local level, whereas the situation in the other five countries is more complex. The management of stormwater and the implementation of Sustainable Urban Drainage Systems (SUDS) are not always clearly defined. Overlapping responsibilities between municipalities, specific catchment-based organisations (Germany, Switzerland, England, Spain) or municipal clusters (France) and/or undefined allocation of competences lead to conflicts or neglecting of these tasks. Varying legislation in the administrative divisions (e.g., the 16 states in Germany, 17 autonomous communities and two autonomous cities in Spain, 26 cantons in Switzerland, or the four countries of the United Kingdom) add to the overall complexity. However, there is an awareness of a required change towards more sustainable development in the water sector in all countries, although the implementation into the legal framework remains on different levels and is not always clearly defined in each country.

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### 3.2 Evaluation of Co-UDlabs perspectives

The Co-UDlabs perspective was obtained from the response of six project participants to the survey on the revision of the EU Urban Wastewater Treatment Directive and needs formulated in the project proposal. With respect to the survey, the project partners believe in line with the objectives of Co-UDlabs that the most important topics of the regulatory review are integrated approaches to better manage stormwater overflows and urban runoff. All six individuals gave the highest importance to using nature-based solutions in urban wastewater management whenever possible.

### 3.3 Identification of needs by the users of Research Infrastructure

A central role in transitioning to more sustainable urban water management is apparent in the focus group targeted by the Co-UDlabs project due to their potential interest in using the available RI platforms. To get their opinions of the future developments in urban drainage, we developed a survey based on the needs and vision assessment from the national roadmaps and the Co-UDlabs participants. The survey was distributed online and was also presented during a conference in Rennes, France, in June 2022. Approximately 20 participants provided feedback in Rennes, and 12 people replied to the online survey. The most comments (7) were made concerning 'Technical Objects – Performance', with four for the criterion 'Techniques and technologies', targeting three different topics: creating structures for stormwater recovery and reuse for events with high return frequencies; promoting pollutant removal; and focussing on infiltration parameters.

### 3.4 Outlook

Overall, the evaluation shows that the particular needs for Urban Drainage Systems identified by the different stakeholders are quite diverse and could not be limited to major axes. In fact, there are numerous needs identified, which indicates what a great effort still needs to be made for transitioning to a sustainable urban drainage system. Only very few of them were mentioned by all three considered sources – country roadmaps, Co-UDlabs participants and (potential) RI users. Some of the identified needs are quite in line with the visionary documents of IWA (IWA, 2016) and Water Europe (Water Europe SIRA, 2016). Questions around (real-time) big data management and advanced monitoring and training in these technologies were mentioned quite often in the different sources, while Water Europe proposed these aspects in their Strategic Innovation and Research Agenda (SIRA) as “shorter to medium impact measures” for the years 2017-2021 (Water Europe SIRA, 2016). This shows that while awareness of the importance of these topics is developing at the different stakeholders, concrete actions in many cases still need to follow. The evaluation of the organisation and legislative structure in the countries represented in this project also can be a source of slowing down innovation in the urban drainage sector. Hence, integrated planning of the water sector should be implemented rather sooner than later.

## BIBLIOGRAPHIE

- BAFU (2018) *Hitze in Städten. Grundlage für eine klimaangepasste Siedlungsentwicklung*. <https://www.bafu.admin.ch/bafu/de/home/themen/klima/publikationen-studien/publikationen/hitze-in-staedten.html>.
- BAFU (2022) *Regenwasser im Siedlungsraum - Starkniederschlag und Regenwasserbewirtschaftung in der klimaangepassten Siedlungsentwicklung*. Bundesamt für Umwelt; Bundesamt für Raumentwicklung. Umwelt-Wissen Nr. 2201.
- BMU (2021) *National Water Strategy*, Draft of the Federal Ministry of Environment. Bundesministerium für Umwelt, Naturschutz und nukleare Sicherheit, Bonn. <https://www.bmu.de/en/download/national-water-strategy>.
- cNWP (2022) *Nationaal Water Programma 2022-2027*. Ministerie van Infrastructuur en Waterstaat, Ministerie van Landbouw, Natuur en Voedselkwaliteit, Ministerie van Binnenlandse Zaken en Koninkrijksrelaties. <https://www.helpdeskwater.nl/onderwerpen/wetgeving-beleid/nationaal/nationaal-water-programma-2022-2027/>.
- Eawag (2012) *Abwasserentsorgung 2025 in der Schweiz*. Schriftenreihe der Eawag Nr. 21. <https://www.lib4ri.ch/institutional-bibliography/eawag/schriftenreihe-der-eawag.html>.
- IWA (2016) *The IWA Principles for Water Wise Cities* (2nd edition). International Water Association (ed.), London, UK.
- Ministerio de Fomento (2018) *Spanish Urban Agenda*. Spanish Ministry of Development. <https://www.aue.gob.es>.
- MTE (2021) *Gestion durable des eaux pluviales : le plan d'action*. Ministry of Ecological Transition. [https://www.ecologie.gouv.fr/sites/default/files/Gestion\\_durable\\_des\\_eaux\\_pluviales\\_le\\_plan\\_daction.pdf](https://www.ecologie.gouv.fr/sites/default/files/Gestion_durable_des_eaux_pluviales_le_plan_daction.pdf).
- Tondera, Katharina, Fontanel, Fanny, & Brelot, Elodie. (2022). D1.1. Identification of RI users and UDS community needs. Zenodo. <https://doi.org/10.5281/zenodo.7261264>
- Water Europe SIRA (2016) *Water Europe Strategic Innovation and Research Agenda* (Water Europe SIRA) 2030. Water Europe, Brussels, Belgium, ISBN: 9789028362161.