

## To guide territories toward a planned change of urban stormwater management practices

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### KEYWORDS

Stormwater management, collective, strategy, shared culture, vision, solution at the source, BMPs

### ABBREVIATIONS

SDGs: Sustainable Development Goals

NPO: non-profit organization

IWA: International Water Association

BMPs: Best Management Practices

### ABSTRACT

The management of urban stormwater is at the interface of different fields on which France is committed to respect the SDGs. Changing practices, such as stormwater management at the source, is one of the keys to adapt our territories.

The NPO, Graie, is an innovative initiative that connects public and private professionals' stakeholders (local authorities, companies and research laboratories) in order to develop a shared culture, based on the transfer of knowledge and the exchange of experiences, to improve practices on stormwater management. The Graie contributes to the appropriation of technical solutions and provides a collective and transversal vision of the thematic.

Its strategy about BMPs is based on the animation of different and complementary dynamics:

- the OTHU - Field Observatory for Urban Water Management,
- a regional working group based on scientific and technical networks,
- a regional observatory of exemplary operations for stormwater management,
- writing technical and awareness-raising supports
- regular regional or national meetings and the international Novatech conference, every 3 years in Lyon, since 1992,

- an animation of a regional dynamic about the IWA's Principles for Water Wise Cities of local authorities, which allows a progression in the policies and strategies implementations and technical responses.

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This transversal and co-constructed approach could be implemented in megacities to impulse collective synergies to face future challenges.

## 1 INTRODUCTION

In the face of global climate change, territories must take ownership of the issue of urban stormwater and the question the relevance of networks. Stormwater management practices “at the source” offer many benefits: recharge of groundwater; development of plants in the city, support to the biodiversity; combating the damaging effects of urban heat islands; management of extreme rain events ... Combined with soil sealing, these practices, which are increasingly supported and valued, draw a new and more responsible approach to the urban water cycle as mentioned in the Guide region Rhône Alpes de gestion des eaux pluviales.

However, in the urban parenthesis of the water cycle, stormwater are probably the most difficult part to control and manage. Indeed, there is no service totally dedicated to the stormwater management and no business model to build, as most of the solutions are pretty simple. It is based on services' collaborations (urbanism, urban green spaces, street community services...)(Cholin, 2020), collaborations with elected representatives...The integrated and optimum urban stormwater management involves rallying stakeholders from multiple skills and scopes of intervention, with diverse range of expertise, languages and working at different scales.

Difficulties are experienced on the technical, political, organizational, legal, social and economic plans (Deroubaix et al., 2010; Thorne et al., 2015; Dhakal et Chevalier, 2017). Most of them are due to a lack of collaborations between the different actors. (Cossais et al., 2019). Even if these practices are extending, them remain unusual. Therefore, the challenge is to make the unusual become common. A mediator/facilitator is essential to fulfill this goal.

To fill the need, the GRAIE (Research group, technical animation and information about water), NPO created in 1985, connects public and private professionals' stakeholders (local authorities, companies and research laboratories) to develop a water-shared culture, based on knowledge transfer and feedbacks.

One of the association aims is to contribute to a better scientific and technical knowledge for stormwater best management practices, to convince politic leaders of the legitimacy of this approach and the need to change, and to assist local stakeholders in the concrete implementation of strategies and solutions.

In this way, the GRAIE contributes to the technical solutions appropriation and ensures the link towards a collective and interdisciplinary vision of the thematic.

The Graie focuses its actions around 3 essential goals:

- 1 to share an integrated **vision** of stormwater management
- 2 to create **a frame of actions** in favor of an integrated water management
- 3 to show exemplary **operations**, share experiences in favor of an integrated stormwater management.

## 2 METHODS

- 1- **To share an integrated vision of the stormwater management**

*The Graie delivers its integrated stormwater management vision, by raising awareness among or by training the whole of interested parties through various plans. To do so, the Graie develops several tools and drives many dynamics, according to the targeted audience:*

- Animation of a regional dynamic about the IWA's Principles for Water Wise Cities to have local stakeholders and elected representatives network with solid common knowledge and able to spread the important messages about integrated stormwater management. The Graie invites all signatory cities to write their City Water Story as an actual state of play and beyond that to make a real white paper from these Principles. Thereby, they establish goals and a strategy going over sectoral planning politics.



Figure 2. IWA signatories' network first meeting – July 2020

- Educational program development for training course for different publics, in particular for water non-experts, as part of a collaboration with the OTHU – Field Observatory for Urban Water Management and the INSA Lyon and fields stakeholders to mix scientific and operational approaches.
- Productions, publications, technical notes and reference guides, based on scientific and technical networks, and published on Internet and on social medias enables a large audience.
- Creation of a multimedia project "Méli-Mélo, démêlons les fils de l'eau" with videos, sketches and thematic educational summary sheets, in free access on a dedicated website. With humor, it deals with real questions about water, such as urban stormwater management, infiltration, water price and quality, environmental engineering. The humor touch makes the concepts appropriation easier, and usable by anyone in very different contexts from formal to public (the urban water video was rewarded with the Green Awards at the Deauville Film Festival in 2015 and broadcast during the COP 21 at the Grand Palais).



## **2- To create a frame of actions in favor of an integrated water management**

*The Graie allows stakeholders to establish their planning strategy in accordance with the water cycle, to adapt and limit their impacts on water.*

- The Graie publishes several notes to help local stakeholders to integrate the stormwater question in their urban planning documents. They are always based on advanced local authorities' feedbacks and built in order to question on lector's situation to adapt its frame of actions to its particular situation. This way of actions implicates an increase of abilities and a good appropriation of the thematic.
- It helps local authorities to define and frame the "GEPU" competence (meaning urban stormwater management in French), particularly their interactions with other services (planification, cleaning, green spaces...) and operators. The aim is to establish notes jointly,

recommend reference documents on technical, financial and organizational aspects, and to roll out useful arguments to lift obstacles to BMPs.

- The involvement to regulatory revisions and the animation of a national network of stormwater animators, to bring this Graie's vision, built and shared by all interested parties, to the national scale. Hope to contribute to a national resources center on stormwater management.

### **3- To show exemplary operations in favor of an integrated stormwater management**

*The Graie contributes to the development of new knowledge and to highlighting exemplary operations. The objective is to ease exchanges and the implementation of solutions based on strong scientific knowledge, in support of several animation instruments:*

- The Graie animates the research instrument OTHU - Field Observatory for Urban Water Management, the aim is to base multidisciplinary researches, meeting the operational stakeholders' expectations and to spread scientific messages allowing the optimization of technical solutions, for examples comparison on effectiveness and costs of integrated management.
- The regional observatory of exemplary operations for stormwater management: to highlight the multiplicity and diversity of operations and to favor experiences exchanges. It compiles data on motivation, technical aspects and choices, feedbacks (Graie, 2020).
- The working groups build technical notes to guide operational on tough subjects at operation scale in their day-to-day work (how to choose infiltration capacity to size an operation...), notes to support them to defend of integrated management against sceptics (mosquitos, cost, clogging, pollution...).

### **4- To organize transversal events:**

- A Sponge city annual conference is proposed to share knowledge and feedbacks at each step of stormwater management.
- Novatech Lyon – Water in the city - is an international conference to gather the scientific and technical community every 3 years on the urban stormwater management.



Figure 3. Picture from Novatech 2019

## **3 RESULTS**

The Graie guides and inspires local authorities to develop an integrated stormwater management for 30 years. Some indicators of its action are summed up:



Furthermore, most of the results of this strategy are not countable but concrete on the fields.

The Graie is a real bridge builder between various actors for examples between scientists and operational workers, as the CHEAP'Eau research project designs to answer to the need for low cost solutions to monitor stormwater at operation scale (survey, development of solutions, experimentation with Lyon Metropole).

The network of the Graie has got a shared culture and as the members increase their abilities they become ambassadors carrying the important messages through conference, mentoring to new members, self-organized formations to new members...

There is a local strong integration of BMPs for stormwater and news collaborations with the urbanism field (as in the next Sponge cityannual conference) or with other divulgation association will reinforce the circle of influence of the actions.

The example of *La Roannaise de l'Eau*, water manager for 42 municipalities, can perfectly illustrate the benefits of this kind of approach as they are guided by the Graie for more than 10 years and they are currently recognized as one of the most recent and advanced territories in France for stormwater management. IWA's ambassador, they spread the importance of an integrated stormwater management. On their territory, an appropriate legal framework was established and all the chain of stakeholders from elected representatives to companies to citizens are sensibilized and contribute to an integrated stormwater management.

## Conclusions

At a territory or megacity scale, to impulse and reach real changes in order to fight transversal environmental challenge (climate change or stormwater management), it is essential to involve at each step all the stakeholders concerned, not only water management:

- To obtain a collective shared vision
- To define an integrated frame of actions and propose tools and validated actions
- To innovate in the realization of operations based on previous exemplary experiences

A relevant change must be built on scientific based evidences. In the field, we also notice than changes are not possible without a strong political impulsion and support.

A unique actor varying meetings and sharing ways is an important and powerful tool at a territory scale to orient collaborations and actions promoting innovation and to enhance the network's members to become ambassador of messages, involving the decisions makers on the subject (urban planning for stormwater management for example).

## Thanks

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