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# From urban drainage to rainwater management

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## Presentation based

- On an «International Report on Stormwater Management»
  - By B. Chocat and Jiri Marsalek for IWA (Berlin Congress, 2001)
  - Using 19 answers from 19 different countries
- On a «position paper» written by a WG of the IWA/IAHR Joint Committee on Urban Drainage
  - By B. Chocat (coord), R. Ashley, J. Marsalek, M.R. Matos, W. Rauch, W. Schilling, B. Urbonas
- On papers presented at the Novatech conferences which are held every 3 years in Lyon
  - Last one in June 2013, 550 participants, 210 presented papers

# Introduction

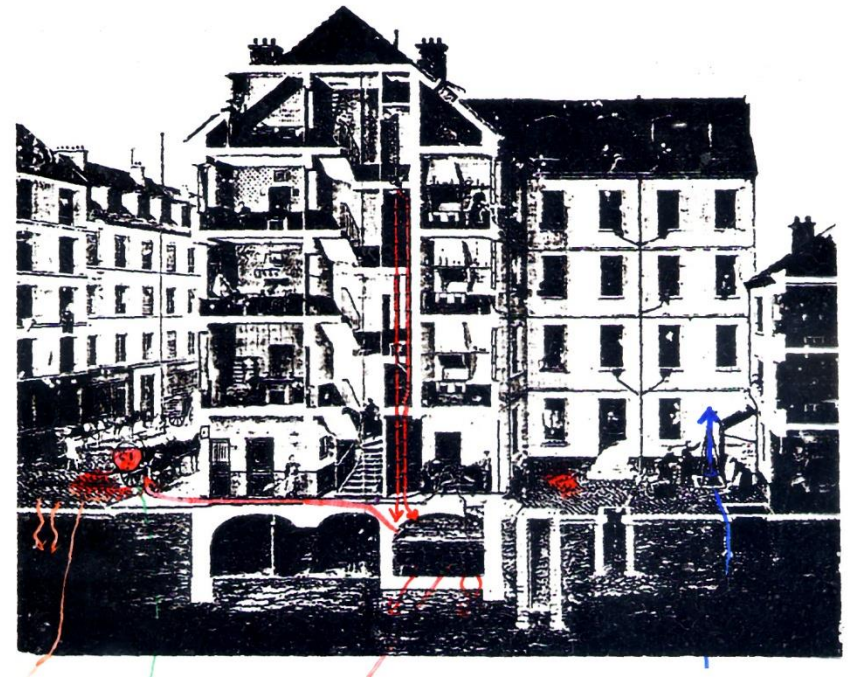
- **Adverse effects** of stormwater discharges include flooding, increase in CSOs, erosion, sedimentation, temperature rise, O<sub>2</sub> depletion, toxicity and reduced biodiversity
- **Stormwater management** mitigates such effects



# Problems origin

During the XIXth century in Europe, the **lack of public health and sanitation** is less and less accepted.

A **principle** for finding a solution: the **Sanitarianism**  
And a **solution** : **Networks** for managing all kinds of urban water



# A principle based on false ideas



*“The bowels of earth are full of causes of death prepared by secret agents in underground places. The matters that make them dangerous are not known but we can see their ravages. (...). The mankind itself often digs out miasms, which after mixing with air, poison animals that breathe them in and then die.”*

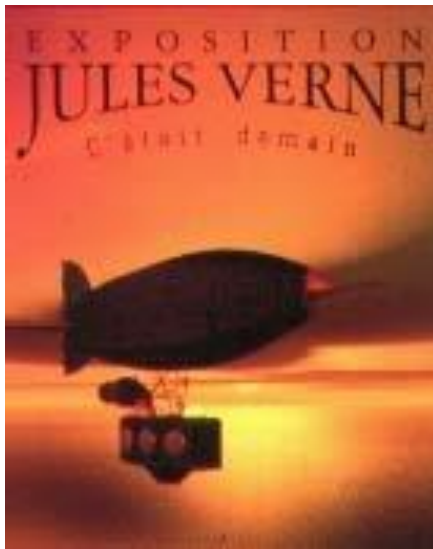
# A principle based on false ideas

*“We must link together the city and country by a vast tubular structure with two parts, one urban and one rural, each of them divided into an efferent or arterial system and an afferent or venous system, with both parts being driven by the same central heart. The system will operate on the basic principle of continual circulation of water that enters pure into the city, and the continual movements of wastes that must find their way out. Cisterns and tanks are the two forms of pestilential stagnation. »*

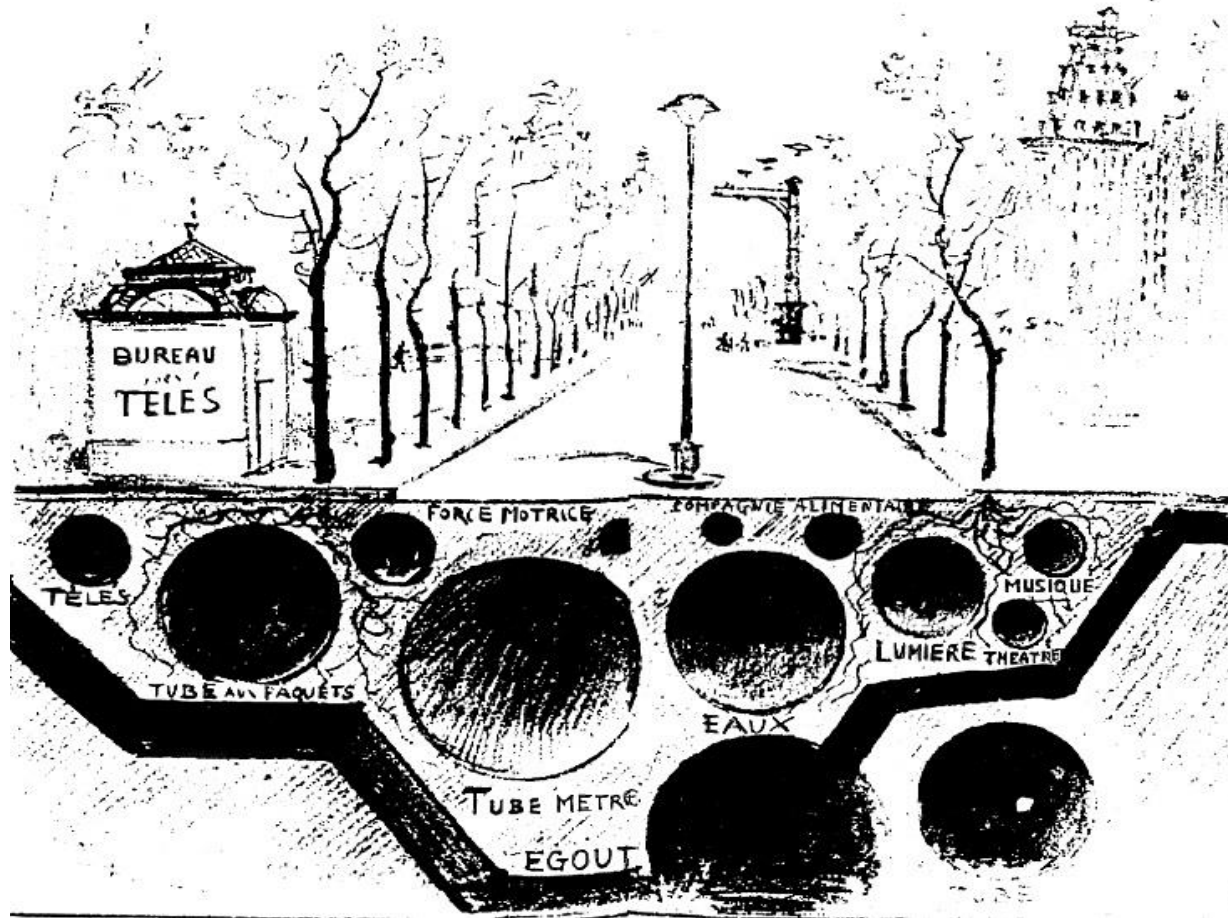
**Ward, 1852. (Circulation and stagnation)**

# A period of time different from ours

- Sanitarianism,
- Centralization,
- Scientism,

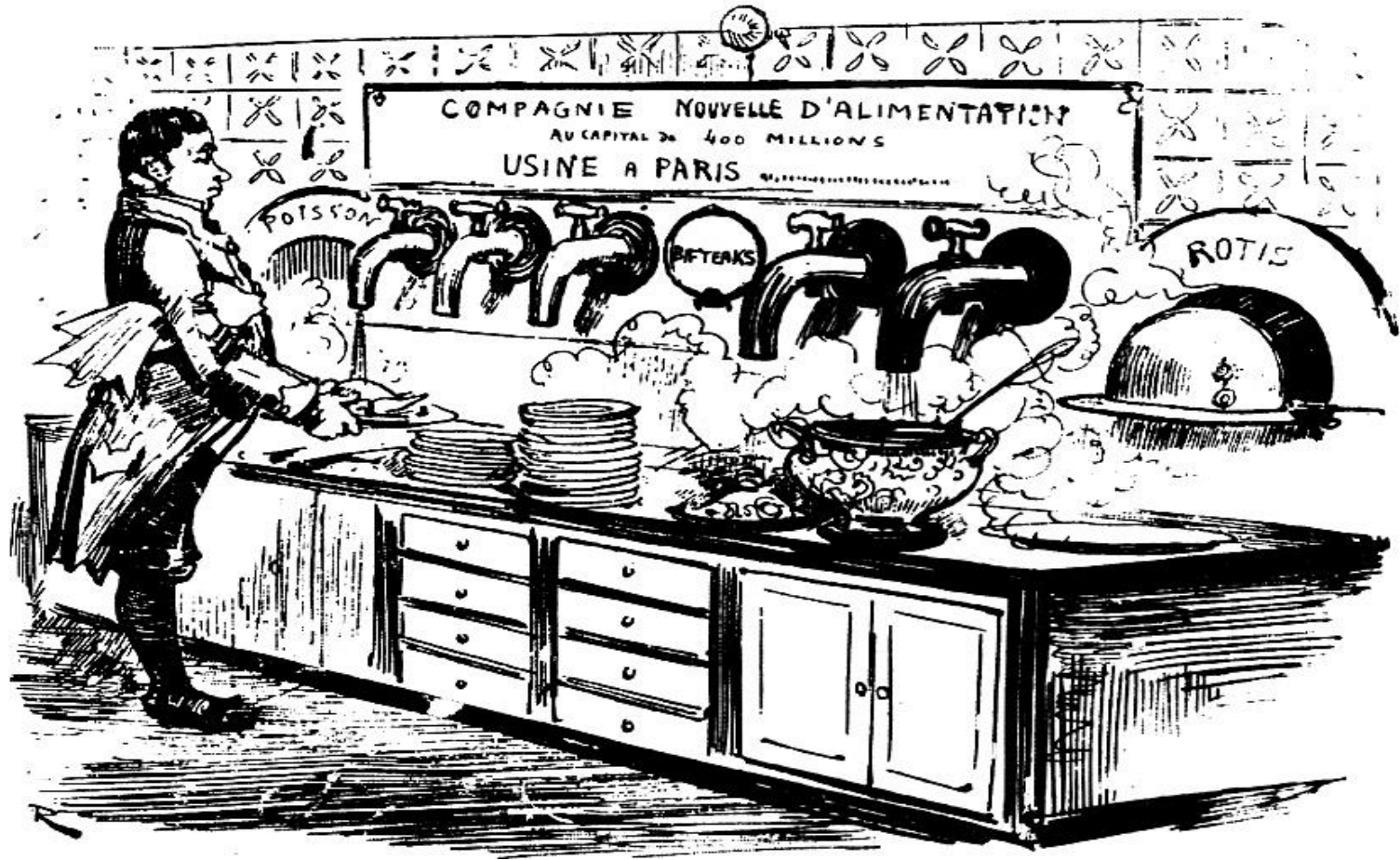


# The city in 2000 (as seen in 1900!)





# The city in 2000 (as seen in 1900!)



# A period of time different from ours

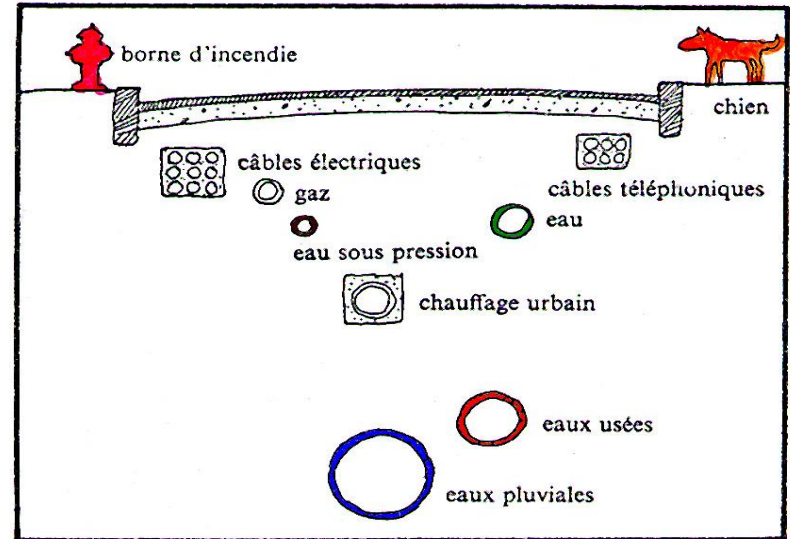
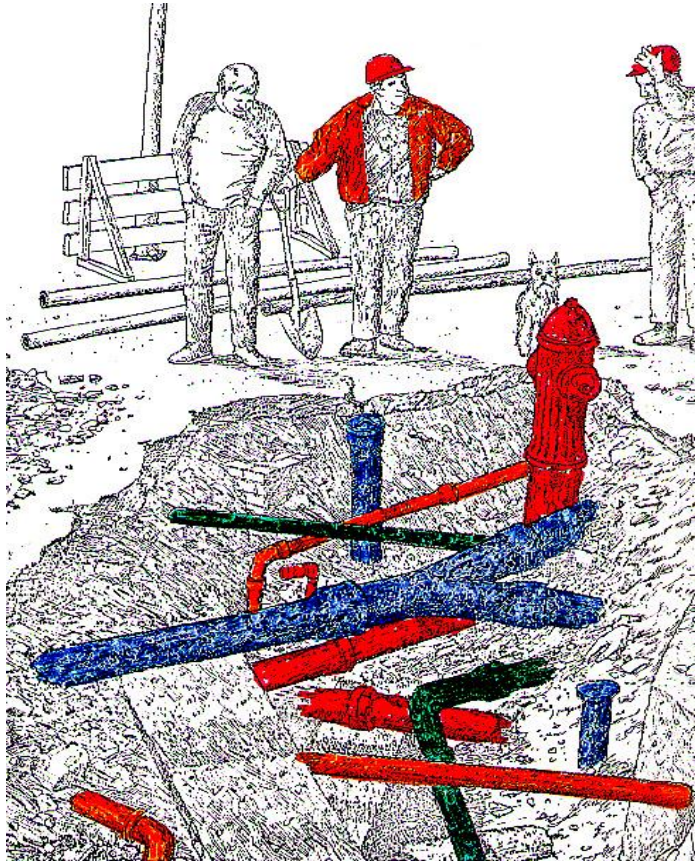


- **Sanitarianism,**
- **Centralization**
- **Scientism,**
- **Colonialism,**
- **Capitalizm,**
- **School,**
- **Industrial revolution.**

# 150 years later

- A set of **fragmented systems** : water supply, wastewater management, management of urban runoff, management of «natural» receiving waters, ...
- **Do these systems function as well as we wished?**

# A very complicated technical system



DISPOSITION THÉORIQUE

# A too complicated system



# An exclusive option : the technician



***« Water comes from the tap  
as electricity from the  
socket and money from the  
bank. »***

Alfred Sauvy

# A water which quality is discussed



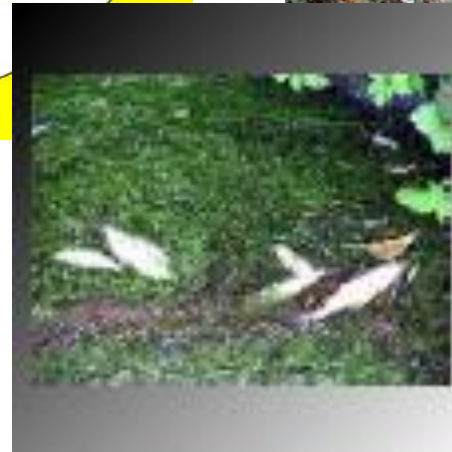
« I would like to talk about the quality of water... »

# Flooding risks still exist

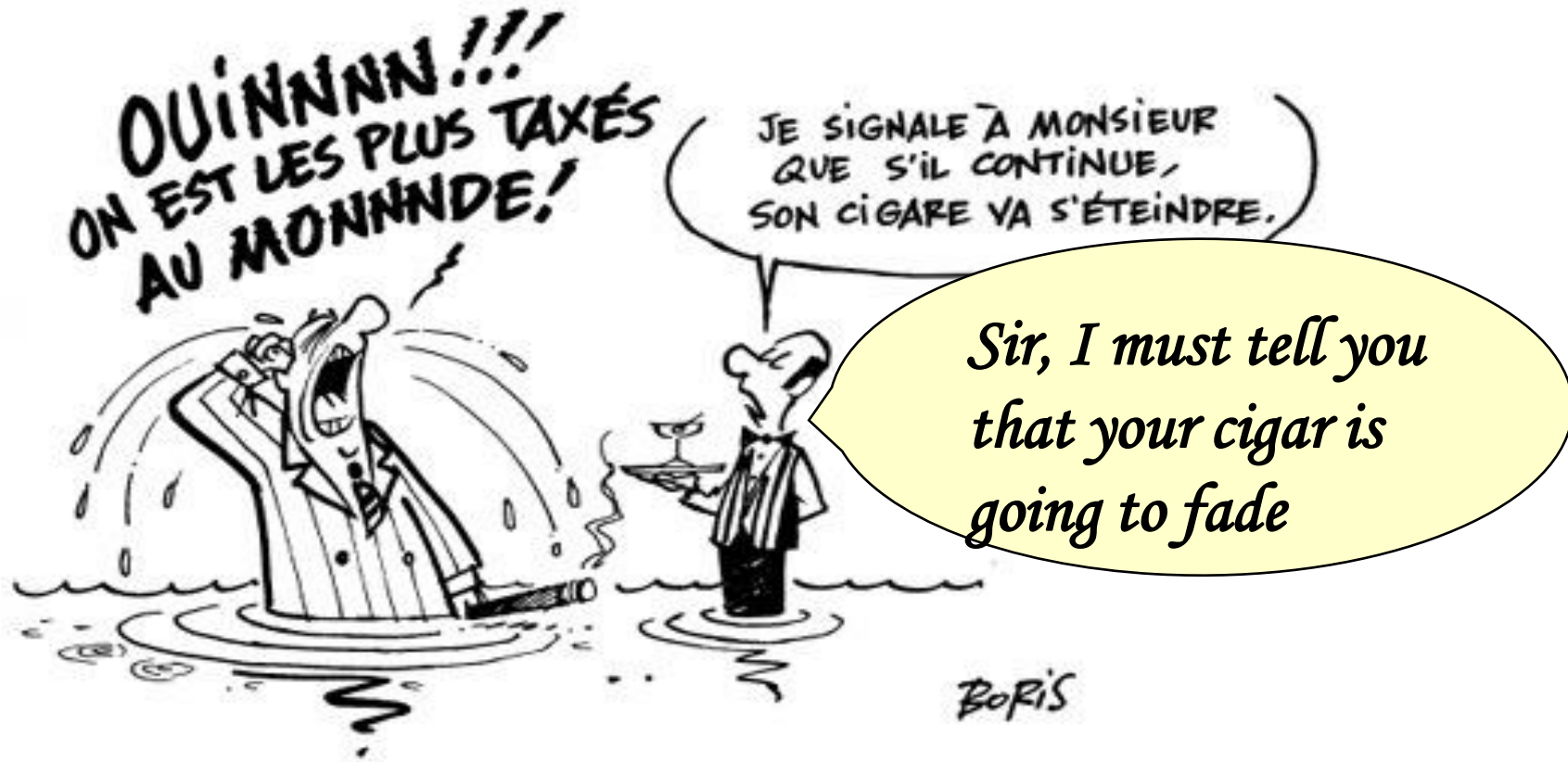




# Receiving water's quality is still deteriorating



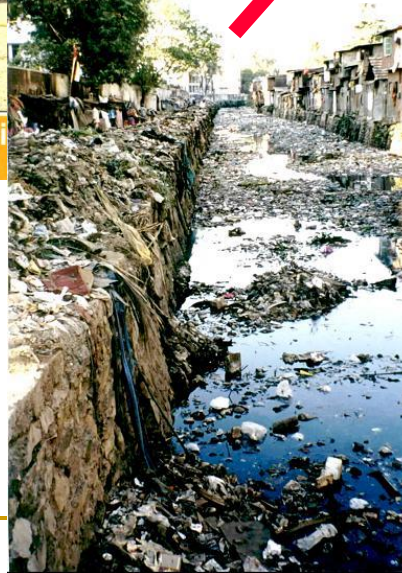
# A very expensive system, but affordable for developed countries



# But a system which is too expensive for many countries



Le développement participatif est une source inestimable de mobilisation des bénéficiaires de projets



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# A system that transform a resource to a waste and a threat

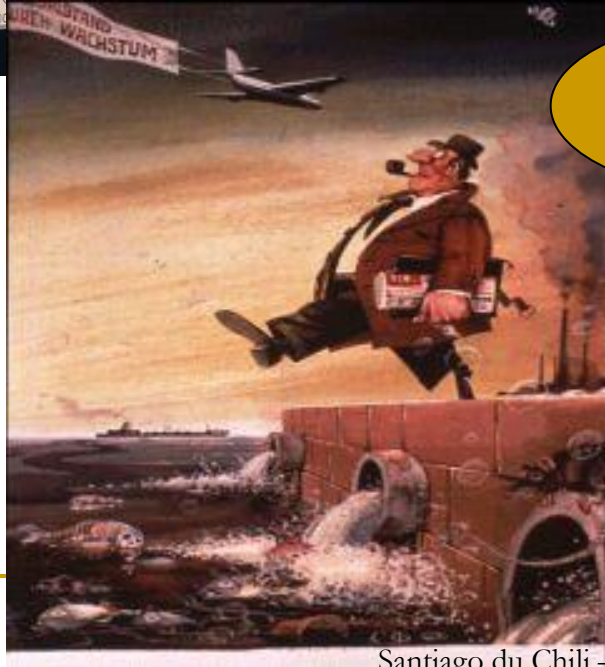
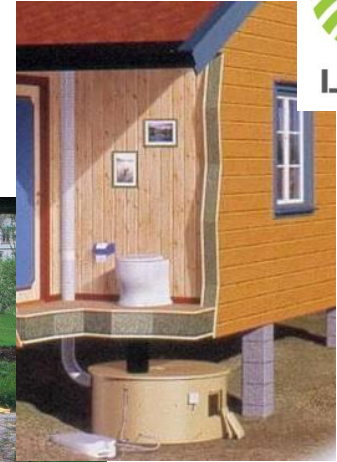
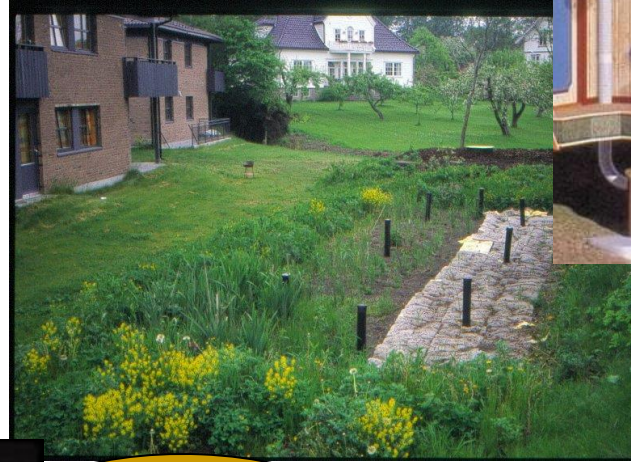
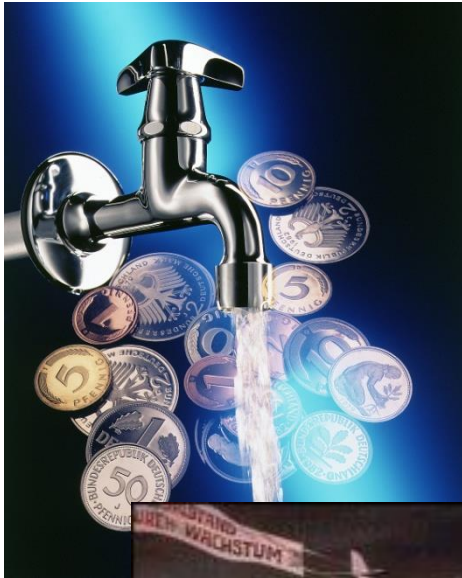


Precious resource



Dangerous waste

# What will be tomorrow?



*I am the Boss*



# We need a new paradigm



**Guess : What sign must be added to make the equality exact?**

$$\text{IX} = \text{VI}$$

# We need a new paradigm

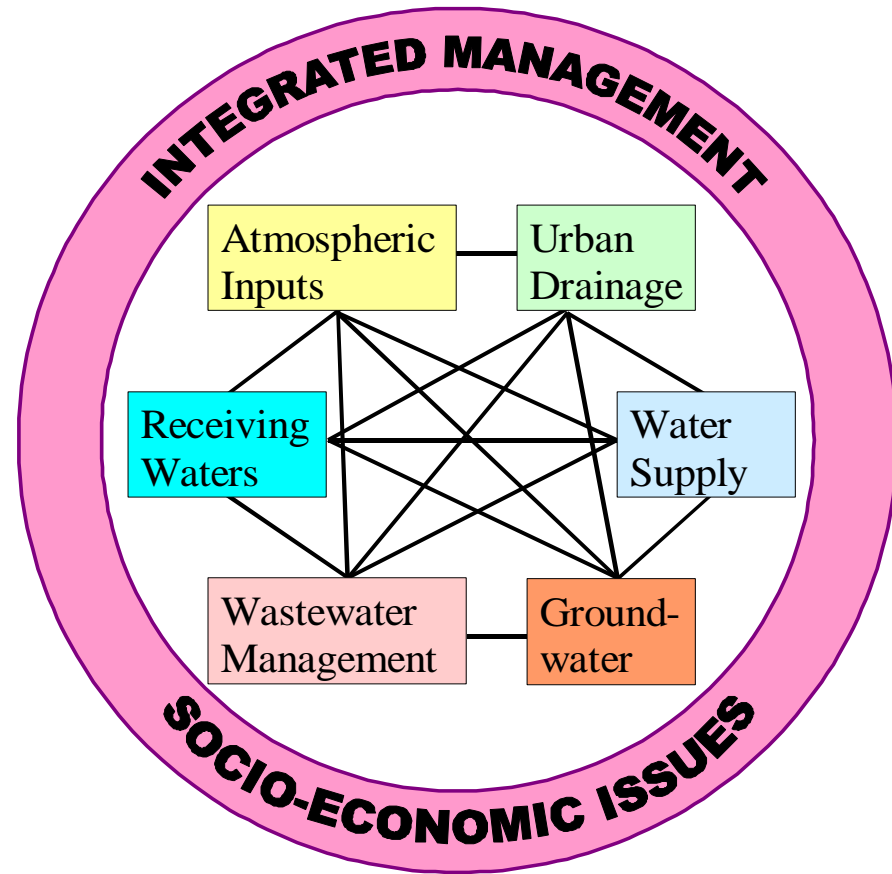


**Solution : think differently.**

**SIX = VI**

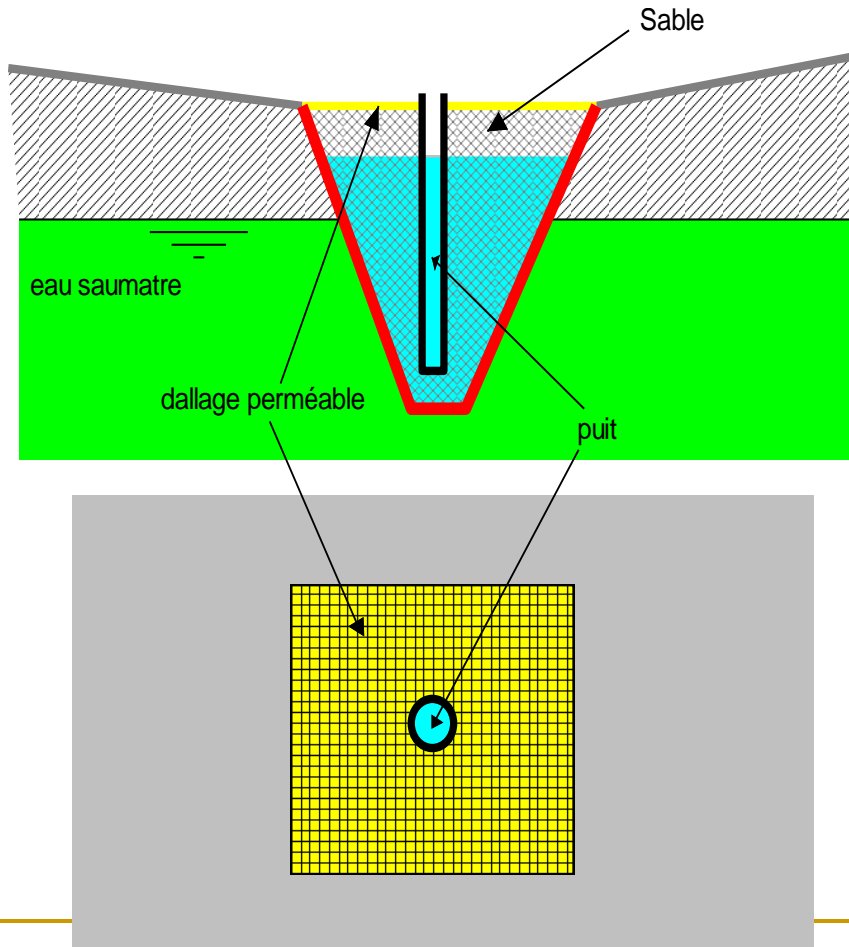
# A hope of solution : Integrated Storm Water management

SWM is Designed to **mitigate the impacts of urbanisation**, and is a **integrated approach** to all urban water management issues (flooding, water supply, groundwater, wastewater management, urban drainage and receiving waters)





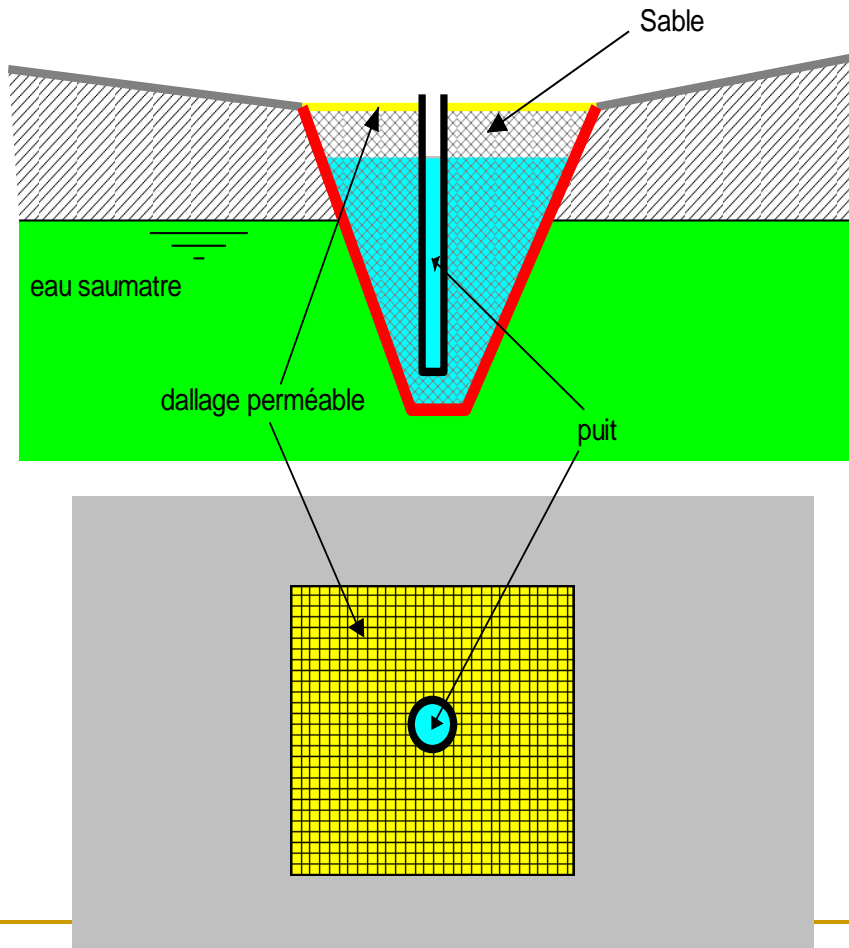
# An exemple : Venice in the XVIth century



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Storm Water Management is **not** a new idea.

But can benefit of **new technologies**

# Other Solutions do exist.



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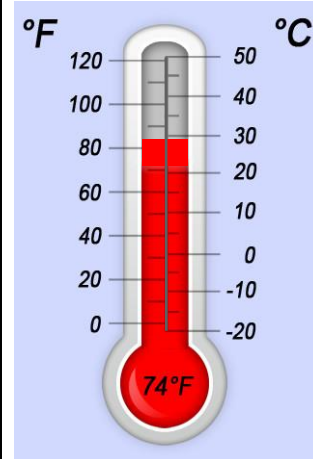


# Other Solutions do exist.



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# Other Solutions do exist.



# Some key points about SWM

- **Various terminology** used - BMPs, SUDS (sustainable urban drainage systems), AT (alternative techniques), water sensitive cities, ...
- Depending of the country main issues can be different : flood protection, environmental issues, water harvesting, ...





# Common Trends in SWM



## **1. Minimise inflow of stormwater into sewers**

- Practised in both separate and combined systems (using BMPs)

## **2. Harvesting Stormwater and reusing wastewater**

## 3. Changing modes of ownership and operation of stormwater systems

- ❑ Stormwater utilities should be set up (could be public or private agencies), possibly in larger water companies
- ❑ Fees should be charged for services (For example fee proportional to the impervious area) and credits given for BMPs.

## 4. Adaptive Management

- ❑ Future is unclear due to climatic changes.
- ❑ Systems which are built today are going to work during a long period of time under changing conditions.
- ❑ **Urban Water Systems must be adaptive.**

## 5. Existing systems must be maintained

# Main Conclusions

A **holistic approach to SWM**, is to be used.

Six points are to be emphasized :

- Drainage should be think in an environmentally sensitive and **sustainable** way, by preserving water balance and preventing pollutant entry into stormwater
- **source control is a key point**
- Network is not the only one solution, more environmentally friendly infrastructures do exist: ponds, wetlands, infiltration sites and swales, ...

# Main Conclusions

- Such systems should be operated by dedicated agencies, within water authorities, financed by drainage fees.
- Further progress in SWM - need for R & D, and knowledge sharing.
- Urban drainage touches lives of all urban dwellers. It is important to keep the public in the forefront of these activities, recognising that **SWM success depends on public support and participation**



**Infiltration basin - France**  
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Detention basin - France



## Swales – France





## Podsdamer Platz (Berlin)



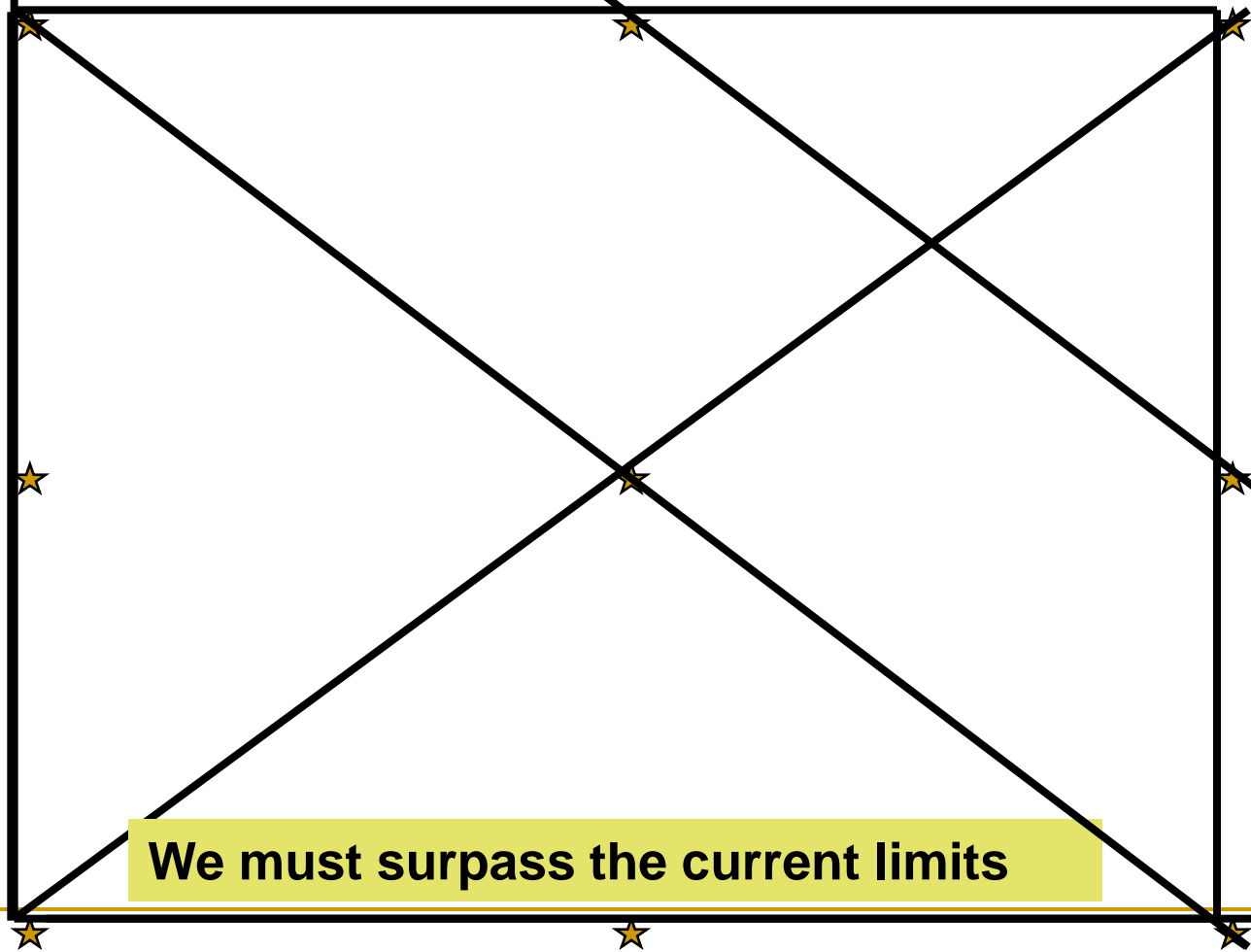


## Vegetated roofs



## Rain gardens (USA)

# Think Differently



**We must surpass the current limits**

# Thanks for attention

