

Water/Sewage Important Issues

1.1 THE WATER RESOURCE QUALITY AND AVAILABILITY (DK-FR)

WHAT'S THE PROBLEM, DESCRIBE THE TYPE OF PROJECT CONCERNED?

The first key-problem concerns the aquatic bodies. We will study here especially **urban groundwater management**. It will integrate projects about:

- Protection and management of the groundwater including the limitation of pollutants discharge and the limitation of water consumption.
- Management of groundwater and surface water
- The best management practices (BMP's) of storm water
- Interaction between surface activities (social and economical considerations) and groundwater management

The way of management and protection of groundwater can be different toward the country context. For instance, in Denmark the groundwater resources are reduced due to pollution and its over-extraction; there are many strategies possible as response to this challenge as pollution restriction, collaboration on groundwater protection, water consumption reduction, water purification, water import... and the problem seems to concern the implementation and production of tools/methods to evaluate, assess and compare different strategies. In France, the problems are defined in other way because the groundwater resources are relatively large and so challenges in this sector concern mostly the pollution reduction and control.

There is no country which is not concerned by this kind of problems. The water resource quality and availability are important issues because it can bring problems of health or costly pre-treatment.

The importance of such problem is highlighting by the establishment of an European Framework Directive in the field of water policy which recognises the need for action to avoid long-term deterioration of freshwater quality and quantity and called for a programme of actions aiming at sustainable management and protection of freshwater resources. In fact, waters in the Community are under increasing pressure from the continuous growth in demand for sufficient quantities of good quality water for all purposes. This Directive shows that this key-problem is a real preoccupation in many European countries.

The issue of new ways of collaboration for sustainable groundwater management is also an important need of end users. This new methods of collaboration should make it clearer where the best chance are for sustainable changes. Furthermore concerning urbanisation impacts, storm water source control is perceived as an efficient solution to resolve flooding, groundwater feeding and pollution problems. It is a key issue for sustainable development in the urban context. However, implementing the best solution remains difficult because the range of possible measures is vast.

In relation to the case studies, the end-users (primary employers from different departments in the water supplier and municipal officers) have raised very specific questions in relation to this key-problem, including:

- How do we motivate people to save water?
- What is the realistic level to reduce water consumption to? – are there potentials for further reductions?
- Does water saving information campaigns still make a difference?
- How do we motivate people to install individual water-meters?

- What type of incentives can they be given not to pollute the groundwater?
- How do we co-operate with stakeholders around groundwater protection?
- Which water facilities can be implemented on an urban project to protect groundwater?
- How to combine protection of ground water with the evolution of land use?

CASES STUDIES LINK TO THIS KEY-PROBLEM

7 case studies produced by PETUS can be linked to this key-problem: “new methods of co-operation on groundwater protection” (Dk), “water savings in Copenhagen” (Dk), “Folehaven-green laundry” (Dk), “harbour bathing” (Dk), “Lyon Confluence” (Fr) and “Porte des alpes” (Fr).

TIME AND SPACE SCALES' CHARACTERISTICS OF THE PROJECT ?

The reference space scale is the catchment area of the groundwater considered. It mainly deals with the management of natural resources. In the urban water management, the most relevant scale for defining problems and developing the most appropriate solutions is the catchment area.

A catchment area is a system constituted by a network and its surfaces which potentially contribute to the network supply with run-off water. This notion of catchment area presents 2 stakes. First, it is the spatial unit from which is defined the whole organisation of the drainage system of an urban area and then, it is the scale from which is defined the ratio between effluent production and its discharge in the drainage network.

The division of an urban area into catchment area could depend on different elements. Its size could range from hundreds of square meter to hundreds of hectares. So we can link it to the city scale or to the neighbourhood scale. In practice, it is often in-between.

Time scales are mostly design, design assessment and operation.

CONFLICTING AREAS

- Water savings contra electricity consumption: In many projects on local water management (e.g. stormwater-collection in green buildings), the electricity consumption increases. This raises a question of “exchanging”-rates between water and energy – how many kWh electricity should we accept to pay per saved m³ of water? **Example** : Folehaven

- Water consumption and building regulations: Initiatives for reducing water consumption in buildings are often stopped by building regulations. **Example** : Water savings in Copenhagen

- Groundwater protection is related to purchase of organic food; promoting organic farming and purchase of organic food will reduce groundwater pollution. Organic foods and organic farming is not included in PETUS, but it is a part of initiatives described in other case studies (Water co-operations and Dogme 2000)

WHAT SHOULD BE ENHANCED IN THIS CASE, WHAT IS GOING TO IMPROVE SUSTAINABILITY?

The management/ protection of aquatic environment could be enhanced by the implementation of BMP's, the recommendation of a short cycle of water, by implementing recommendations on agricultural and industrial activities, by the improvement of co-operation between different actors involved in the cycle of water, by the implementation of water savings, ...

HOW CAN THESE "SOLUTIONS"/IMPROVEMENT BE DEVELOPED?

In improving the co-operation between different actors (industries, agriculture, farming, municipalities, associations...). The water management conception of these several stakeholders is expressed in different ways due to the geographical space scale in which they are involved. Programs, policies, and also enhancement of information communication should bring new opportunities to manage the water cycle in urban area in a more integrated view.

To provide tools, guidelines, experiences, frameworks, to help stakeholders to integrate the different part of the water management, to consider all the water management aspects as a whole in a more sustainable way.

1.2 MANAGEMENT AND CONCEPTION OF URBAN WATER INFRASTRUCTURES (DK-FR)

WHAT'S THE PROBLEM, DESCRIBE THE TYPE OF PROJECT CONCERNED?

This key-problem is divided into 2 parts. The first one deals with patrimonial management of urban infrastructures. The second one concerns construction of new project of urban infrastructures.

On one hand, the management in the duration of pre existent water infrastructures (waste water treatment plants, water network, infiltration and retention systems...) raises difficulties stakeholders need to tackle. This kind of problem exists essentially in the west part of Europe where investments have already been done to reduce the conflicts between urban sprawl and water management. Nevertheless it appears crucial to manage these infrastructures in the most appropriate way to keep the asset in the best state for minimal cost.

In this category of projects, actors express the lack of indicator set which describes the project evolution in the duration and allows the follow of it through time.

On the other, the creation of new water urban infrastructures raises problems of evaluation and comparison between different solutions (decision making). The construction of such infrastructures, which required important investments, have of course to be as much adapted to the need of inhabitants as possible.

This key-problem should also approach the modelling of the different flows (water and pollutants) of urban water system (network, waste water treatment plants, aquatic bodies).

These 2 main sections present the same entry point which is the urban infrastructures. It corresponds to the same kind of end users categories and consequently to the same space scale.

The database of PETUS case studies concerning water sector shows that issues on urban infrastructures can be divided into 2 main sections.

In relation to the case studies, the end-users have raised very specific questions in relation to this key-problem, including:

- Are there methods for separate collection of storm water from roads?
- How can I spend a given annual budget for rehabilitation on the most efficient projects?
- Which water facilities can be implemented to avoid increasing runoff concentration into pipes?
- How to build a sustainable water infrastructure?
- How to evaluate the sustainability of an infrastructure project? Is a project proposition sustainable or not?
- What kind of material should I use for water network?

CASES STUDIES LINK TO THIS KEY-PROBLEM

At least 4 case studies are considering this kind of problem ("ARP", "retention basin of Clichy", "collector N°5 of Samokov, "Porte des Alpes" and "Harbour bathing in Copenhagen").

TIME AND SPACE SCALES' CHARACTERISTICS?

The project space scale is the water infrastructure (from building to neighbourhood).

For the management issue the time scale considered is the project operation and for the creation of new project the time scale is the negotiation, design assessment.

CONFLICTING AREAS

- Storm water BMP (Best Management Practices) versus green space management: BMP offers the possibility to manage storm water and enhance landscape (leisure function). Administrative conflicts

appear when the following questions are raising: Who is in charge of the management of such facilities? Is it the water department or the green space department of the city who is in charge of the management? Such kind of questions exists also with the management of the permeable pavements between the road system department and water department (the use of salt or sand affects the efficiency of the permeable pavement and so increases the flows of run off water). **Example:** Porte des Alpes- storm water management.

- Transport versus Water sector: Conflicts appear between transport sector and maintenance of the water network. Too much weight on a road can deteriorate highly the state of water network. This is particularly true for the development of tramway lines. **Example:** CARE-W-ARP

WHAT SHOULD BE ENHANCED IN THIS CASE, WHAT IS GOING TO IMPROVE SUSTAINABILITY?

To take into consideration the whole water cycle from the different actors, and also the opportunity of developing urban water infrastructures which could enhance environmental issue of course but also social and economic issues. Organisational structures often act as barriers for implementing solutions/innovations. Therefore, new ways of management, organising collaborations, can be enhanced to solve problems and implement innovations and new practices that can lead to a sustainable water management.

HOW CAN THESE "SOLUTIONS"/IMPROVEMENT BE DEVELOPED?

To provide tools, guidelines, experiences.

To promote the implementation of logbooks or indicator set to follow the project through time, the modelling the whole water cycle (network, WWTP, aquatic bodies), the monitoring to calibrate, improve simulation models.

1.3 SUSTAINABLE MANAGEMENT OF WATER IN CITIES (DK-FR)

WHAT'S THE PROBLEM, DESCRIBE THE TYPE OF PROJECT CONCERNED?

The problem deals with projects concerned by the necessity of combining water cycle and urban system. It can be a project linked with wastewater, storm water, run off water management in urban areas and urban development and planning documents.

Large numbers of problems exist within the sector of Water/Sewage and solutions should take into consideration the context of the project which depends on several parameters. For example, if we have a look on Paris, Lyon and Marseille rivers, the main problem in relation with water management is totally different even if it is the 3 main cities in France and only 400 km far away from each others. For Paris River the main problem concerns oxygenation of water, for Lyon it is the high concentration of heavy metal in the sediments due to barrages and for Marseille it is the protection of beach areas from the rain water overflow. Thus it appears that practical answers to problems on water management are highly dependent on context and case studies can not develop enough information to respond to end user needs. **That's why even if PETUS has a practical objective, this key problem could bring to end users a conceptual approach and new considerations that should lead them to practical solutions of their problems.**

Sewage system must be considered as a part of urban system. In many situations, solutions to urban sewerage system or water management problems can not be achieve without thinking in a more global way at the whole urbanization. This is true for quantitative and qualitative points of view. For example, about quantitative aspects, the creation of new storm water outlets in response to urban sprawl is not enough to avoid flooding risks; it depends also on the site vulnerability that have been chosen for this expansion. Relevant technical solutions are often easier to find if on one hand water management and urban sewerage system is integrated from the beginning of the project and on the other if their implementation is following up at each stage of planned development (from urban planning to project realisation).

The classic conception of water management in which water system is considered as the interception of urban system and catchments area should be reconsidered.

The new conception of water management advocates thinking about solving problems not in terms of "sewerage" or "water supply" or "storm water management" but in terms of "management of the urban part of the water cycle".

This key-problem corresponds also to a need of end users. As the French legislation imposes to bring up to date water master plans (for drinking water and waste water), questions on how to insert sustainable elements and recommendations on water planning documents (water master plan) become more and more important to water direction of important cities. This problem is definitely a new one but appears as crucial for the following decades because of legislation requirement. This problem is in discussion in Denmark, and in particular, in Aarhus (second largest city in Denmark) where groundwater protection has already been integrated in the urban development plans, and has got a rather large influence on pointing out and prioritising possible zones for urban development. This relation between water planning documents and sustainable principles can also be a relevant input for new Eastern European countries where water management is a new objective. Indeed, the Water Framework Directive imposes to "achieve a good status" of all the waters considered (surface water, groundwater, transitional waters...) before 2015 and it imposes also to implement a "river basin management plan" before 2009.

Some questions linked with this key-problem and raised by end users are:

- How will the WFD (Water Framework Directive) influence our water management?
- How can we involve stakeholders, intermediaries and citizens in developing a sustainable water strategy?
- How do find out which strategy is the most effective?
- How to insert sustainable elements and recommendations on water master plan?
- How to combine urban development with the protection of ground water?

This key problem is the opportunity to make a link with the other sectors. To think on water management as a part of the whole urban management raises the connections with green spaces or building sector. For example, during the maintenance of green spaces, the rational use of fertilizers or pesticides is a mean relatively easy to reduce the run off water pollution.

CASES STUDIES LINK TO THIS KEY-PROBLEM

This key-problem is less practical than the 2 other ones. It can be more difficult to link it with one particular water case study done in the PETUS consortium but if we look at it in a broader sense, each water case study is directly link with it. On the other hand, we propose to add a case study on the relation between water management and planning document in the area of the Greater Lyon (urban community of Lyon).

TIME AND SPACE SCALES' CHARACTERISTICS?

Time and space scales are here very large. Space scale is at least the city and should be a group of communities. Time scale taken into account is the one of a planning document (2-3 years at least, up to 10 years).

CONFLICTING AREAS

- Water planning and urban planning: Water management highlights the fact that the impervious areas must be reduced and that some areas should not be built in order to allow the infiltration of water and so to avoid flooding. It is easier to avoid building in a site liable to flooding than to design a way to manage flows while flooding. Thus water management do not purchase the same goals than the limitation of urban sprawl and land-use. The challenge could be to combine both approaches. This last

conflict domain exists also between water planning and transport sector as urban development and transportation patterns have a similar evolution.

WHAT SHOULD BE ENHANCED IN THIS CASE, WHAT IS GOING TO IMPROVE SUSTAINABILITY?

Technical or political solutions for water management can easily be improved if the whole water cycle is taken into account.

To take into consideration the fact that water management can have other objectives than only environmental ones, but also social and economic ones: control of the water price for users, reduction of flooding costs and limitation of their psychological effects, exclusion reduction in the district liable to flooding...

HOW CAN THESE "SOLUTIONS"/IMPROVEMENT BE DEVELOPED?

- Propose a methodology to implement water planning document
- Propose different scenarios for water management future developments. They can show that a sustainable solution cannot be found without an equilibrium between technical, political and economical issues.
- Provide tools to evaluate different possibilities for water management planning document.
- Enhance the public participation in the planning document process.