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Glossary/ Definitions / Acronyms: See Deliverables D3.1, D3.2, D3.3 and D3.4

1 Introduction

One of the tiles on the front page of Hydropolis is reserved for Urban Dynamics. Behind this tile there are three tools that can help the user how to deal with the urban context of urban stormwater management. The tools are:

- Aspects of Water
- Ambition Reflecting
- Coping with Urban Dynamics

European water managers need to know how to cope with urban dynamics in order to improve the water management in our cities. In the previous deliverables of WP3, the concept of Urban Dynamics is introduced. D3.3 contains a definition of Urban Dynamics and marks the position of this concept in the field of USWM. Furthermore this deliverable introduces the aspect theory as a means to gain insight into the urban dynamics. Also a planning approach is developed in order to enable water managers to cope with urban dynamics during the evolvement and implementation of BMPs. The deliverable rounds off with four strategies to solve four typical Urban Dynamics problems. The next deliverable, D3.4, identifies three archetypes of water managers regarding the attitude towards Urban Dynamics. This report concludes with recommendations for contextual water management.

The next chapters contain a description of these tools that are incorporated in Hydropolis. The tools can be used without reading this document. The chapter about the Aspects also contains also the content of the example database, for this content is not part of D3.3 in which the rational of the aspects of water is described.

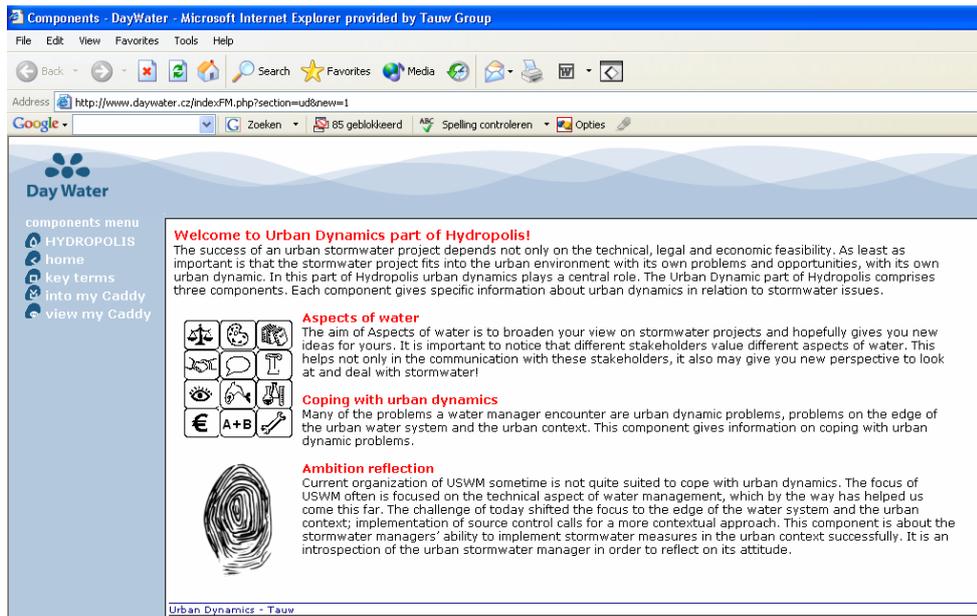


Figure 1.1 The introduction page of Urban Dynamics

2 Aspects of Water

2.1 The added value

The aspects as presented in Figure 2.2 throw light on the different facets of urban stormwater management. The aim of the aspects is threefold: The aspects of water component distinguishes twelve different aspects of (storm) water. The aspects offer a framework for dealing stormwater within the urban environment. The aspects helps us to drawn a complete picture of stormwater related issues. Furthermore the aspects of water help you look at stormwater projects from different perspectives. This helps to build a shared problem perception among stakeholders; a precondition for cooperation. Finally, the aspects help you to 'unlock values' of stormwater that are related to the 'higher' aspects that are often neglected.

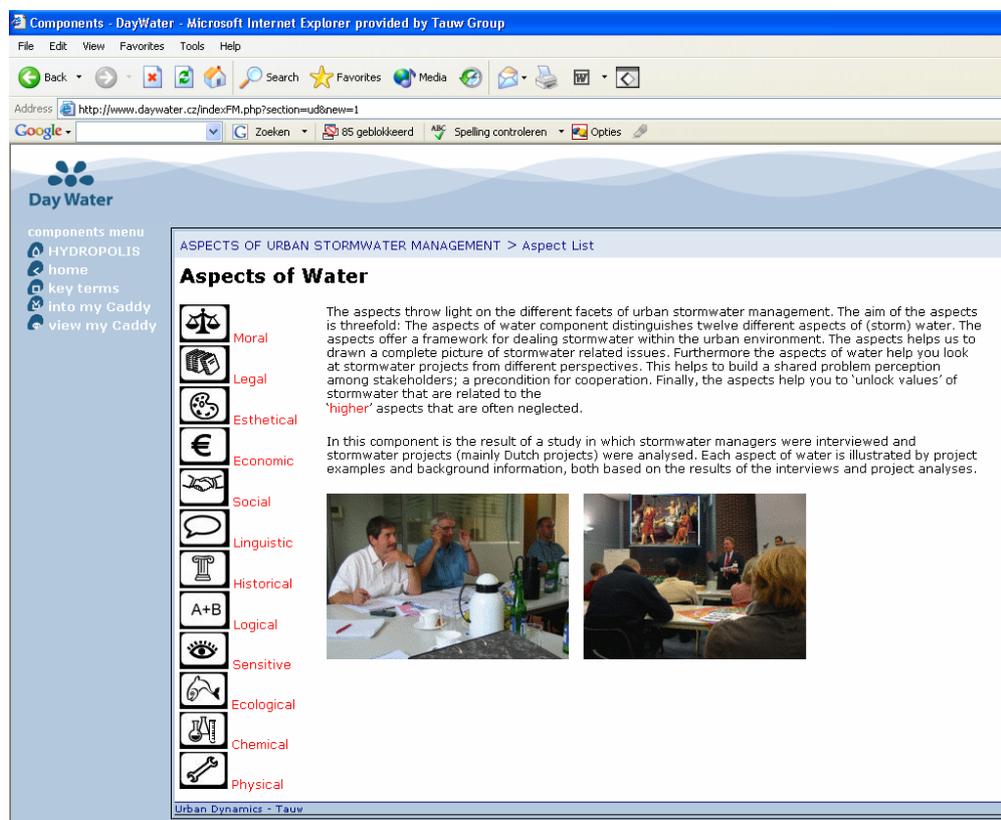


Figure 2.1 Home page of Aspects of Water

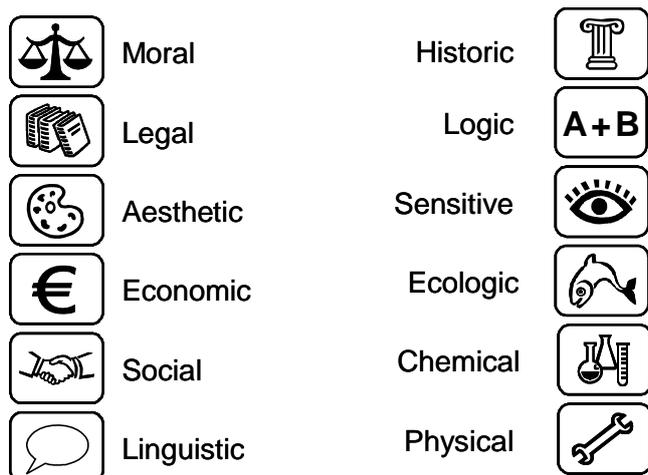


Figure 2.2 The aspects of water.

2.2 The research methodology

This component is the result of a study in which stormwater managers were interviewed and stormwater projects (mainly Dutch projects) were analysed. Each aspect of water is illustrated by project examples and background information, both based on the results of the interviews and project analyses.

2.3 Technical aspect

2.3.1 Nijmegen

A rotting sewer was the reason to start a project in the Voorstadslaan in de municipality of Nijmegen. The idea was to disconnect the street and the houses next to it. The street is separated in three peaces by speed bumps.

Each peace functions as a basin to collect the storm water. Next to the carriageway there are parking places. These parking places are paved with Aquaflo. Aquaflo is a porous pavement. The water flows through this pavement and infiltrate in the soil.

But then a problem showed up. The storm water didn't infiltrate and the street was flooded! One of he causes was that autumn started during the work on the street and the fallen leaves lay rotting in the joints and the pores of the pavement. Because of the contract with the building contractor, the municipality wasn't ably to sweep the parking places. Another cause was that the greenbelts next to the parking places were sowed on the wrong moment. From the disconnected roofs lots of storm water was lead to the greenbelts. The soil wasn't porous, because the grass hadn't came up yet. The water from the roofs prevents the grass to come up, and so on. So, the design didn't function.

The inhabitants of the Voorstadslaan are not glad with the situation. They don't know if the municipality has the intention to solve this problem. They don't hear anything of the municipality.

2.3.2 Den Bosch

Several beautiful technical innovations are deployed in the district 'de Vliert' in the municipality of 's Hertogenbosch. Because of a needed renovation of the sewer, the municipality decided to disconnect paved areas and make something 'beautiful'. The storm water infiltrate in the soil through special drains. This infiltration is a success because of the thick pack of sand (approximately 4 meters) on top of the soil. The remnant of storm water flows off to a lake: 'The IJzeren Vrouw' (The Iron Lady).

Disconnection of a roof gives more than once problems. At the end of the drainpipe flourish alga and the drainpipe get blocked up by leafs in the autumn. An inhabitant of de Vliert came with a solution; he designed a beautiful and simple stone. This stone prevent blocking of the drainpipe and lead the storm water in the good direction.

This innovation is caused by the intensive cooperation between inhabitants and the municipality. Some inhabitants also collect the storm water in an underground device and use it for their toilet. This action was subsidized by the municipality.

2.3.3 Enschede

The streets in the district of Ruwenbos in the municipality of Enschede drain into the so-called Wadi (in Dutch an abbreviation for Water drainage by withdraw and infiltration. The Wadi is also a dry river in the desert.)

The Wadi is a system for the slowly discharge and infiltration of storm water. The system exists of a channel filled with a porous substance like sand or gravel. On the bottom of the channel lies a porous tube. This tube transport the water to the surface water or infiltrate the water into the soil.

This infiltration is needed to maintain the natural ground water level. If the ground water level is to low, the soil dries out and dying vegetation is the effect. Another effect is descent of the soil. These two effects are real problems in The Netherlands. The cause of these problems is the traditional principle of collect water and transports it to the waste water purification plant. Because of these problems infiltration is needed. An analogy can be made by the example of the drunken man. (Commentaar hiervoor in caption plaatje)

Another problem was the peak load after a rain shower. The sewer couldn't deal with this load of storm water and discharge the storm water, mixed with the waste water, on the surface water. So, the effect was polluted surface water. The water that reached the waste water purification plant was also mixed. So, the efficiency of the plant was reduced. The water manager of the district water board says: "I don't speak about waste water purification plants anymore; I call them rainwater pollution plants. After all, the output of the plant is more polluted than the rainwater input." All these problems are effect of nowadays rainwater treatment. These problems can be solved by the new principle of 'hold water, slow it and than release it'

2.3.4 Almelo

As part of several pilot-studies the project 'Sandenburg and Ter Kleef' is executed in the municipality of Almelo. These pilot-studies aim to gain the necessary experience with disconnection of pavement and roofs in urbanized areas in Almelo. Sandenburg and Ter Kleef are two streets who are a representative part of the municipality. There are rented houses and owner occupied properties. There is quite a space for greenery in this typical seventies streets. A problem in these streets was the incidental high groundwater levels. With the facts disconnection and high groundwater levels, the project started.

The technical matters were solved by a DIT (Drainage, Infiltration and Transport) system. This system transports the so-called 'first flush' of storm water to the wastewater treatment plant. This 'first-flush' contains the pollution which lays on thee roofs and streets before a rain shower. The rest of the storm water is infiltrated into the Wadi. The groundwater withdrew flows to the surface water. If the groundwater level is too high, the storm water directly flows to the surface water. This separation of different water-flows was made possible by the 'Smart Drain'.

2.3.5 Almelo

Wadi's have the aim to infiltrate the storm water. Sometimes the rainfall it so intensive or the groundwater level is so high, that the water level in the Wadi rise to edge of the Wadi. To

prevent the Wadi for a flow over, the Wadi have a so-called 'slokop' (Dutch for 'swallow up'). This slokop is connected to the DIT system that transports the storm water to the surface water.

The problem in Sandenburg and Ter Kleef was the soil around the slokop. Because the vegetation hadn't come up yet, the soil could wash away in the stream around the slokop. Special synthetic grass-let-trough tiles, holds the soil and give the vegetation a chance to come up.

2.3.6 Almelo

The municipality of Almelo motivated inhabitants of the streets Sandenburg and Ter Kleef to collaborate in sustainable water management. They motivated them by offering them a cheap rain barrel. The aim of using a rain barrel was to disconnect the back of the roofs. Experience shows that it is difficult to disconnect the back of the roofs, because, in the case of terraced houses, the connection to the street, where the drains are situated, is far or even unreachable. Rain barrels solve this problem. However, inhabitants have to be convinced first, because the rain barrel is set up on their parcel.

To convince the inhabitants in Sandenburg and Ter Kleef, there was a folder spread with all the favourable of a rain barrel. For example: there is water for the garden and water to scrub the terrace. Rain water also contains not much lime, so it is ideal to do the windows. In Sandenburg and Ter Kleef the rain barrel action was also a test to gain information about people's interest in a rain barrel. Experience shows that a rain barrel is a suitable mean to disconnect the back of the roofs.

2.3.7 Utrecht

It seems hard to disconnect the back of the roofs. In the enormous new housing estate 'Leidsche Rijn' in municipality of Utrecht this is a problem. Not all inhabitants want a gutter in their back gardens, and underground transport of storm water is not always an option. Possibly the 'Enschede-solution' ([LINK TO BMP](#)) is an option, but only for detached houses. In the residential area of Ruwenbos in the municipality of Enschede the detached houses have disconnected their back roofs by drainpipe against the side wall (see photo). To disconnect the back of the roofs may be not a technical issue, but a social one...

2.3.8 Groningen

Stinking ponds were the effect of a flow trough problem in the residential area of Lewenborg in the municipality of Groningen. The ponds are excavated during the construction of the residential area in the early seventies. These ponds combined with rough growth formed a 'green' living environment in a densely populated district. The ponds are not mutually connected. The other function of the ponds was to serve as a buffer location for the sewer. After heavy rainfalls the sewer gets overloaded and need to get rid of the surplus of storm water. However, the sewer is a mixed sewer. This means that wastewater and storm water are collected in one sewage pipe, so the storm water gets polluted. When the sewer discharges its surplus of water into the ponds, the ponds get more and more polluted. This combined with the fact that the ponds can't flow trough, gives the terribly smell.

This problem is largely solved by the heightening of the discharge location, so that the frequency of the flow over will reduce. However, this solution means that the sewer itself needs to get relieved from the surplus of storm water. For this, source control measures are needed. So, disconnection is planned for the near future.

Another measure to reduce the bad ponds is to connect them. If the ponds are mutually connected, flow trough will appear. Good flow trough cause a better oxygen content in the ponds, which will help to decrease the pollution. This connection will be made in the near future by an underground tube. And the ponds become dredged by the water board

2.3.9 Doetinchem

The Infiltration and Transport sewer (IT-sewer) wrestled with silt up problems during the realisation period of the residential area of Kleurrijke buurt in the municipality of Doetinchem. Usually, the sewer is installed before the construction of the road. This road is during the realisation period in use for heavy building traffic. So, during a heavy rainfall, the dirt road transports his wastewater to the IT-sewer. The IT-sewer get silted up with the mud and dirt from the road. To prevent this, they came up with a simple but smart answer. They construct the road like a gutter: both sides of the road slopes to the heart. The water flows to the nearest cesspit, which was connected with the waste water sewer. After the realisation period, the permanent road was constructed and now both sides of the road slope to the flank of the road where the IT cesspit is installed.

The municipality experienced that the connection of rainwater pipes an infiltration system was not very effective. It seems to be very hard to control the inhabitants. The fact is, sometimes inhabitants connect the rainwater pipe wrong, for example to the washing machine... So, henceforth the rainwater gets transported visible and later, on the street, infiltrated. Visible transportation of rainwater creates a easy controllable situation and more 'water-consciousness' for the inhabitants.

2.4 Biotic aspect

2.4.1 Nijmegen

The problems concerning the sewer in the Voorstadsiaan in the municipality of Nijmegen were of that kind that health problems showed up. So, the replacement of the sewer was highly prioritised. By disconnecting the paved areas the health problem disappears, but other problems showed up.

2.4.2 Groningen

The problems concerning the ponds in the residential area of Lewenborg in the municipality of Groningen have significant effects on the flora and fauna in the ponds. The dirty ponds don't only stink; the pollution also causes a poor flora and fauna: the ecological system is affected. Because of the bad water quality, fish die. The ecological imbalance becomes evident in the duck population. With grandpa and grandma walk to park and feed the ducks is a funny activity for children. On condition that the ducks don't get overfeed. And that's just what happens. Overfeed of wild ducks has many adversely consequences. The duck population explodes and, moreover, it attracts rats. The droppings of the animals lead to a surplus of ammonia in the ponds, which cause a decreasing water quality. And that harms the other flora and fauna in the ponds, like fish and water plants.

The strict 'law on flora and fauna' makes it impossible to interfere and reduce the duck population. Other signaled problems are street litter and blue alga. Inhabitants complain often about these problems.

2.5 Sensitive aspect

2.5.1 Den Bosch

The municipality of 's Hertogenbosch decided that the remnant of storm water, witch could infiltrated in the soil, has to flow of to a lake: The IJzeren Vrouw (Iron Lady). The bank of this lake is a park. This park has the function of infiltrate buffer. The remnant of storm water flows in the lake. Lake and park are together a beautiful fuse of ecological functions. It makes people happy to walk along the water. However, the lay out of this park didn't come without striking a blow. The soil of the park seems to be waterproof. After a shower of rain great pools of water appeared in the park; the park became one muddy mass.

The inhabitants of the district were, of course, not happy with this situation. "It seems like an Iron Baby", they say in jest about the park. A communication employee of the municipality service wrote a column in a local newspaper. She wrote about the Iron Baby who "wasn't toilet trained yet". With this sense of humour and the promise that the municipality was working on it, she created trust under the inhabitants. After all the infiltration succeeded. The result is a beautiful park, a place to meet and a place to enjoy.

2.5.2 Nijmegen

One of the plans for the Voorstadslaan in the municipality of Nijmegen was to create a lane again. Once had stood stately trees beside the street. Nowadays trees in the Voorstadslaan are scarce. The plan was to plant some trees and to lay out wide greenbelts with the function of infiltrate area. These trees and greenbelts give the street a stately view and make it attractive. People love greenery in urbanized areas. Water on the street is a negative experience for the most civilians. This experience is based on perceptions which can cause a sense of suspicion against the municipality and new, unknown, water management systems.

2.5.3 Enschede

Greenery is one of the spearheads in the design of the residential area. This gives the district a rural character and makes it attractive. Also the space and ponds makes the district a comfortable environment. The perception of the inhabitants of the district appears from an investigation. These inquiries shows that almost half of the inhabitants want to live in a Wadi-district again when they ever move. Eighty percent of the inhabitants agree with the idea that the Wadi contribute to the beauty of the district. The inquiry also shows that more far-reaching methods of sustainable water management will be appreciated. By example the uses of rainwater for flush the toilet. The inhabitants draw point of particular interest to the maintenance of the Wadi. So, in Ruwenbos, the Wadi and whole the water system, contributes to a high quality of the living environment.

2.5.4 Groningen

The ponds in the residential area of Lewenborg in the municipality of Groningen are not the only problem. The street furniture and the greenery need a redecoration too. Further the blocks of flats in the centre of Lewenborg are in a bad state. The bad condition of these objects gives a bad perception value to the residential area. These problems are tackled by an urban upgrade programme. The solution for the water problems can join in this programme.

The first thing to do is the restructuring of the centre. The blocks of flats get demolished to make place for the 'Lewenborgsingel' (Lewenborg canal). "This canal forms the spinal cord of the residential area in the near future" says the municipalities' ecologist. The 'Lewenborg canal' aims to connect the vital public facilities of the residential area and to increase the water quality and the water consciousness. The inhabitants, anyway, were sceptical about the canal: wouldn't this canal cause anymore stink and inconvenience? The answer is: no. The canal gets refreshed by clean storm water from the disconnected paved areas and roofs.

A postman, who lives in the residential area, seems to like the canal, which excavation is just started. "But next to the canal are some schools and a day-care centre located. The canal can be dangerous for the children. Maybe the municipality should place fence to prevent the children from drowning" he says.

2.6 Logical aspect

2.6.1 Almelo

A local newspaper covers some critics on the Wadi. This critic was given by some of the inhabitants of Sandenburg and Ter Kleef after the completion of the water project. The story tells: 'Inhabitants of the street Ter Kleef, in the municipality of Almelo, are complaining about

flooding. The drainage system (Wadi), installed by the municipality, doesn't work. "The water doesn't infiltrate and causes a lot of trouble. It stinks enormous and when the skies are clear is this place swarming of mosquitos", tells an inhabitant. "Furthermore", he says, "in springtime the Wadi was a real flowerbed, now the bed is ruined." After a rain shower, the water often rises up till half a meter. This deep water is dangerous for the schoolchildren. "Water attracts the children. Many children get soaked" the inhabitant says. Directly after the delivery of the Wadi, people gave notice about their difficulties. The municipality didn't respond. An informant of the municipality reacts: "the Wadi works as it should be". The safety of the schoolchildren is secured by placing a fence around the school.'

This story shows different views on the Wadi and how it should function. Inhabitants are especially concerned about the safety and esthetical value of the Wadi and the municipality are concerned about its technical functions. So, there are several different ways of thinking about the Wadi.

2.6.2 Groningen

The water board which is involved in the cooperation for the revitalization of Lewenborg in the municipality of Groningen has little affection with the urban environment. The control domain of the water board consists for the most of pasture land and because of this the water boards' government consists for the most of farmers. These farmers aim for the farmers interests. So, the water board pays much attention to the countryside and less to the urban waters. The effects of this imbalance are noticeable. The partly failure of the project in Lewenborg is partly caused by the water board. The ponds in Lewenborg are after all the responsibility of the water board, so, the involvement of this water board was necessary. The ecologist of the municipality thinks it is important to know the priorities of the involved water partners. If a partner seems to have other interests than the project, clear engagements have to be made, especially for the division of the tasks and costs.

How works the water board? See link: www.waterschappen.nl , also available in English.

2.7 Historical aspect

2.7.1 Den Bosch

The district De Vliert in the municipality of 's Hertogenbosch is separated by an busy traffic route. Many traffic lights are placed on the route. Effect of these traffic lights is that a lot of car drivers take a short cut through the build up area. In the past measures were taken to solve this problem by lobby of a little group of inhabitants.

During one of the participation evenings for inhabitants this solution became the subject of the discussion again. Several inhabitants did not agree with this solution anymore. The municipality constructed a solution advised by a traffic expert and presented that solution to the inhabitants with an attitude of arrogance. The inhabitants didn't like that attitude and either the solution. Finally the solution became a synthesis of different ideas. It wasn't the best solution in traffic terms, but by making a concession, the municipality created a basis of trust under the inhabitants.

This anecdote shows how non- water related problems can show up by the (necessary) involvement of inhabitants. Compromises have to be made to maintain the trust or even create it. The knowledge that measures are taken to improve the quality of the living environment is a solid basis for this trust. The lake 'the Iron Lady' has great historical value. A real pressure group tries to protect this value (see link: <http://www.ijzervrouw.nl/>). This value and its natural beauty combined with sustainable water management make it a unique piece of inheritance.

2.7.2 Enschede

The project Ruwenbos in the municipality of Enschede lifted the trend of the sustainable building projects in the early eighties. Sustainable water management and sustainable district development are the 'successors' of durable building. The project was an enormous success. From everywhere came people to visit the residential area in the making to hear how sustainable water management was developed over there. And still, Ruwenbos serves as an example for engineers who want to develop a sustainable residential area and increase the quality of the living environment by the water system.

Not everyone is enthusiast about this development. Traditions can be a barrier to create a sustainable water system. This problem is signalled at the fire brigade, but also at other authorities. For example the maintenance service, who are responsible for the maintenance of the Wadi. The maintenance worker has a very traditional mentality, so for him it's difficult to adapt to the new circumstances. "The maintenance worker, for example, is used to mow the grass twice a year, and everything on the same height; quantity, that's what it's all about. The Wadi demands another strategy. Perhaps it is enough to mow the Wadi once a year, but the next year it has to be mowed three times. And the environment of the Wadi must be saved. So, they have to adapt to the circumstances of the Wadi at a certain moment. This necessary change of attitude gives resistance among certain authorities. Synergy is needed. We have to cooperate with these authorities, and they with us. But they have to think for themselves either, that demands change of attitude, and that is difficult." The water manager of the municipality of Enschede says.

2.7.3 Utrecht

A water management advisor of the municipality of Utrecht is sceptical about the involvement of inhabitants in water projects. His experiences learn that inhabitants of the new housing estate 'Leidsche Rijn' are not very interested in the water system, as long as it functions. He says "if the water system troubles the inhabitants, then they begin to complain. Because of this lack of interest in the water system it is a waste of time to tell the inhabitants that they can't take out their dogs next to the watercourse, or wash their cars on the street"

This thought was starting point for his definition of 'sustainable'. He thinks that a sustainable water system has to be independent of external actors, who can influence the system. The system has to be sustainable in itself. So, it has to be the capacity to clean itself, and that's what he defines as 'robust'. "People must have the possibility to take out their dogs next to the watercourse, just because that's more fun than take the dogs out to a special 'dog's toilet'! It's hard make a good combination between the water system and other space demanding functions."

2.8 Linguistic aspect

2.8.1 Den Bosch

The information centre is manned by two communication employees of the municipality. This man and woman have strong ties of trust with the inhabitants of the district. Because of these strong ties, the inhabitants tell their worries and their enthusiasm about the project to them. They are the essential factor in this project. They connected the inhabitants to the municipality and created commitment. Because of them the children in the district know what has happened in the district: "Children from here know exactly what is under the surface level; yellow, green and brown tubes. They also know what happen to the storm water after a rain shower". One of the employees is pessimistic about the future of the project: the bottom of the source of money is in sight. The effect of this fact is that the information centre in the near future is disbanded. She predicts that the inhabitant's involvement slowly fades with the consequence, by example

that inhabitants go to wash their cars on the street. She says: "give me an old coach and make the information centre mobile. That would be a wonderful solution because, if I have a coach, I can support other projects too". The municipality don't listen to her. Even her suggestion to form a group of inhabitants who report signals from the other inhabitants to the municipality is rejected; there is no money. But this kind of aftercare and maintenance is necessary and essential for the prosperity of the project.

2.8.2 Nijmegen

The inhabitants of the street experience the circumstances, caused by the wrong design, as very unpleasant. Via the greenbelts they use to reach their cars and houses. These greenbelts are changed in an enormous mud mess. A hairdressing salon is situated in this street. The hairdressing salon is difficult to reach during and after a rain shower, so the decrease of customers leads to less turnover. According to a water management advisor of the municipality is this situation unacceptable. He says: "fortunately the inhabitants still have some trust in us, because we fixed the health problem. In the future we can use this trust as a basis for the solution of the flood problems". However, the inhabitants seems to have other opinions about this case. "I can swim to the other site of the street during heavy rain showers", says a lady who lives in the Voorstadslaan. "They even haven't installed cesspits!" she says while meaning pointing to her forehead. It is evident that this lady is not well informed about the disconnected paved areas.

After re- informing her, she seems to remember some things, but the situation is still not very clear to her. She makes a subtle that her disconnected roof is not well connected to the guidance tiles on the footpath. Other people in the Voorstadslaan know very little about the project too.

2.8.3 Enschede

Communication was a keyword during the project Ruwenbos in the municipality of Enschede. There was a unique cooperation between the spatial planner and the hydraulic engineer, between the municipality and the inhabitants and between the municipality and the district water board. This project was the first of his kind. That's why communication and mutual understanding was very important. By way of the real estate agent were information materials distributed among the potential house buyers to make them enthusiast about the houses and the living environment. The inhabitants say, by way of an inquiry, that communication about the design and layout of the residential area and the plan process is an important thing. They should appreciate if the municipality communicate more intensively to the inhabitants. The same inquire shows that inhabitants feel much affection with the residential area Ruwenbos. A part of the inhabitants wish to contribute to the building process and the maintenance of Ruwenbos. For this a residence association could be an option. This residence association could solve the problems about the social involvement that the water manager of the municipality foresees.

During the communication en cooperation a lot of obstacles have to be taken. The designer of the Wadi remembers: "engineers were very sceptical about the use of a system that holds up storm water in the residential area. It was difficult to convince them about the advantages of the Wadi. Old traditions have to be broken". Either the contacts with the fire brigade were laborious: "The streets were too small according to the fire brigade, so for this time it was allowed, but never again. After calculating the statistic chance that it ever will happen, we found that the chance is practically zero. So, we argued, if the possibility will occur, than they have to drive through the gardens!" However, the fire brigade found this argument unacceptable, so the streets in the other parts of the district have to be five meters wide. He continues: "every time it turns out that the involved professionals are very attached to old traditions. It is difficult for them to adapt to new, sustainable, circumstances."

2.8.4 Imelo

A primary school was involved in the water project in the streets Sandenburg and Ter Kleef in the municipality of Almelo. A handle pump was installed in the schoolyard. Groundwater can be pumped up and the water flows through a gutter to the Wadi. As a game element, slides are installed in the gutter. The schoolchildren can operate the pump and the gutter, and play with the water level. The system is used as an educational mean. The project's supervisor has led the children around the construction site. The school organized a 'water week'. A week long groundwater and storm water was theme at the school. The official date of commencement was a real feast. Some schoolchildren performed a little stage.

2.9 Social aspect

2.9.1 Den Bosch

In the district De Vliert in the municipality of 's Hertogenbosch are paved areas disconnected. A part of the storm water infiltrate in the soil, but another part gets visualized. This visualization of water creates unique possibilities to do some extraordinary things with the water. One of those possibilities was designing a play area for the children in the district.

On a free day the children met in the information centre for integral water management in the neighbourhood. Under guidance of a real artist they designed their ideas about a storm-water-play-area in clay models. The adults in the district came together in the information centre to discuss about the best solutions for storm water treatment. After a Saturday noon walk through the district they designed their wishes while enjoying a nice cup of soup. This meetings were an impulse for the social cohesion in the district.

2.9.2 Enschede

The disconnected roofs show often nice scenes. Neighbours, for example, have connected their drains. The result is a beautiful symbol of what can happen if inhabitants enthused about water management and the quality of their living environment in their neighbourhood.

2.9.3 Almelo

A primary school was involved in the water project in the streets Sandenburg and Ter Kleef in the municipality of Almelo. This involvement had the intention to investigate the educational possibilities of a sustainable water system. The principle was sceptical about the idea. In the past an annex to the school was confronted with a water project too. Next to the annex the building contractor dug a deep gully, which was a potential danger for the schoolchildren. However, the principle gets convinced by the idea that they would have input in the project. After this agreement the atmosphere became very positive. De school wishes to think along with the water partners. De principle decides to organize a 'water week'. Water becomes an educational mean.

The school puts a classroom at the water partners' disposal to organize an afternoon to inform the inhabitants of the street about the water project. During the afternoon are the reactions of the inhabitants for the most positive. 20 Percent of the invited inhabitants showed up that afternoon.

2.9.4 Almelo

During the elaboration of the project in the municipality of Almelo, continuous interaction with several departments of the municipality was the practice. This interaction was specially oriented towards the department of maintenance. This department have the responsibility to maintain the Wadi's after the deliverance. Furthermore, there was continuous interaction with the building contractor, the district water board and a housing cooperation. They all think along with the initiators of the water project. The building contractor approached personally all the inhabitants

who were qualified for the surface transport of storm water. It turned out to be hard to convince inhabitants of the benefits of disconnection, especially when their parcel is qualified.

Sharing experiences with other, not directly involved, water partners, was one of the intentions of this project. In that way integral cooperation gets of the ground, with all the fertile effects. A good example of an ambitious collaboration is the 'Waterpact Twente' (Water pact of the region of Twente). This water pact contains cooperation between different authorities: municipalities, a district water board, the waterworks and the Province. The aim of this pact is "to create a sustainable water chain and a sustainable urban water system". A concrete target is the reduction of the pollution of the water systems with 95% in 50 years. To reach this target the following engagements has been made:

- Structural cooperation on basis of a declaration of intent;
- An integral view on the water chain;
- A collective view on the project area;
- Source control measures concerning water problems;
- Involvement of target groups, including civilians.

2.9.5 Groningen

By the firm of consulting engineers, a group of participants is gathered. This group aims to reflect on the condition of the residential area of Lewenberg in the municipality of Groningen and its water system and revitalization it. The group exists of participants from the water board, the municipality, the province and inhabitants of the residential area. The cooperation was fruitful and together they came up with some ideas. Tree of these ideas are already described. These are the radical changes in the residential area. It will take a while before this relative big project can start. For that the inhabitants, who know the district very well, invent some little 'meantime' projects. They propose to give a name to the ponds and to organize annual 'pond of the year' elections. Another idea is to place a bird observation hut at one of the ponds. These easy executable ideas are highly appreciated by the inhabitants, because it is their own contribution and the inhabitants take action where they experience the problems.

When it was clear to the inhabitants that the stinking pond were caused by the flow trough problem, they proposed to install a home trainer, which is actually a pump driven by muscle power, to give an extra impulse to the flow trough. The residential area of Lewenberg has enormous potentials for sustainable water management: there is much space to store water and develop ecological functions. For the ecological zone in the residential area is already an enthusiast group of inhabitants (the Le Roy-group. Le Roy is the landscape architect who designed the particularly greenery and ponds in the district). This group is clearly manifested in the residential area. This group has already promised to maintain the home trainer pump and can take probably the responsibility for more tasks, like represent the rest of the inhabitants in future negotiations with the municipality as an interest group.

2.9.6 Doetinchem

The residential area of Kleurrijke buurt in the municipality of Doetinchem, has a water playground. Children can meet here and play together. Water to play with and water to learn from. Playing with water increases the water-consciousness of the children. So, education, meeting and fun go hand in hand. And not only for the children, while watching their children parents can meet on the bench around the playground. A fourth aspect of this playground is the capacity to store water. The storm water flows from the roofs of the surrounding houses directly to the square. Then it flows, visible, to the playground. In the Kleurrijke buurt the playground needs much space. But also without much space available, for example in revitalisation projects in urban areas, a similar playground is a decent possibility.

2.10 Economic aspect

2.10.1 Den Bosch

Disconnection of paved areas and revalue the quality of the living environment by water in cooperation with inhabitants asks for money. In this case more financial means are needed compared to traditional water management. The district De Vliert, in the municipality of 's Hertogenbosch have a lack of money. A lack of money could be fatal for the maintenance of the project. The municipality had not count on this kind of direct and future costs. Example: the municipality subsidized in the past whole installations for inhabitants who wanted to use the storm water for their toilets, now the subsidy is 50%. This costs much money.

Fact is that the concrete avail for this kind of water management is less compared with traditional water management. Avail could be: increase of social cohesion. Because of this social cohesion a growing sense of responsibility for both the district and the water system. The attractiveness of the district has increased, resulting in rising house prices. Another avail is that disconnected paved areas relieve the sewer system and the installation that purifies waste water. The surface waters become cleaner because of reduce of the flow over frequency. So, in long terms, disconnecting with the cooperation of inhabitants and the use the values of water is profitable and even lucrative.

2.10.2 Nijmegen

There is relative much money available for disconnection of paved areas in the municipality of Nijmegen. Even for the Voorstadslaan. Problems have to be solved and fortunately the money is available. The hairdressing salon misses turnover during rainfalls because of the muddy greenbelts. Disconnection of roofs is not obligated for the inhabitants of the Voorstadslaan. However, they get a subsidy for the disconnection of their roofs. Some of them have funny gutter in their garden.

2.10.3 Ruwenbos

Economically was the exploitation of the residential area Ruwenbos in the municipality of Enschede attractive. The residential area is a new estate of houses, so the area recovers the costs on. However, it was the same old storey about the financial means for communication and cooperation with inhabitants. The essence of communication and cooperation with inhabitants is often underestimated by governments. A water manager of the municipality is worried about the future. "Especially the second generation of inhabitants depends on what nowadays inhabitants will tell them. We do not have the guarantee that the extraordinary circumstances concerning the water system in the district will be communicated towards new inhabitants. It'll be helpful if the municipality send a information set send to everyone who move to Ruwenbos, but the municipal officialdom makes that practically impossible." The district water board wants to stimulate disconnection and refunds disconnection up to 50 % of the total costs.

2.10.4 Groningen

Dark clouds gathered over the water project in Lewenborg in the municipality of Groningen. The water board is not as co-operative as it first seems. Today, some ponds are dredged, under pressure of the municipality. The other ponds have to wait. Until when? That's unsure. The only other ideas executed are the excavation of the Lewenborg canal and the demolition of the blocks of flats. The rest of the ideas; those of the inhabitants, are temporary cancelled. Until when? That's unsure too. Because of economizations of the municipality there is not much money for this kind of projects. After a European Union subsidy request with a refusal, the bottom of the money source is in sight.

The intended and promised plans can't be executed temporary. Good prospects are, despite the thoroughgoing cooperation between different stakeholders, because scarcities of money out

of reach. A later project of the municipality aimed to let inhabitants disconnect their roofs. The municipality hoped to reach this by the provision of rain barrels. The response from Lewenborg was nil. The ecologist of the municipality thinks that this is the effect of the damaged trust of the inhabitants; the municipality, after all, didn't keep her promise, so the inhabitants don't want to cooperate with the municipality anymore. It'll be a huge job to start with the project again in all its old glory, with the cooperation of the inhabitants. But, does the water system depend on the cooperation of the inhabitants? "Yes", says the municipalities' ecologist, "we simply don't have the space to make the water system sustainable without them".

2.11 Aesthetic aspect

2.11.1 Den Bosch

In De Vliert (a district in municipality of 's Hertogenbosch) are beautiful objects to see and to experience. The inhabitants, especially the children, designed together two play areas. The result is both educational and esthetical: the children play with water on beautiful objects. Even the park near the lake 'De IJzeren Vrouw' ('The Iron Lady') is beautiful. People can meet there beside the nice lake. All over the district are ground-water-level-measuring-instruments placed. Here too are educational and esthetical functions combined.

Some technical innovations are developed by the inhabitants themselves! One of the results is a stone which guide the storm water to the infiltrate locations. So this stone have a technical and esthetical function.

2.11.2 Enschede

The project Ruwenbos in the municipality of Enschede is realized within the framework of the campaign of DuBo (sustainable build project). The municipality wanted a sustainable residential district in all aspects: water and greenery were fully involved in the property development. Sustainable property development on this scale was a new thing for the municipality administration of Enschede. Because of that there was total plan freedom for the water expert and the urban development expert of the municipality. This 'bottom up' approach resulted in the 'finger model': like join hands the blue-green fingers (ecological zone) are fold into the grey fingers (streets); symbol for harmony. This design of the residential area is the result of synergy in the cooperation between the urban planner and the water expert.

2.11.3 Doetinchem

The Kleurrijke buurt is a beautiful residential area. The houses are cheerful and colourful designed. But not only the houses have had much attention, also the public space has a lively effluvium. De pavement, for example, is multicoloured and executed in several beautiful patterns. There is much space for a great diversity of greenery. The residential area is designed with water as a central theme. The rows of houses are located on little islands and peninsulas. Trough bridges the islands are connected with the mainland. By way of this extraordinary urban development, the transition from water to land is sometimes full of contrast and then magnificent harmonious. Water gives this residential area, which nevertheless consists of middle range houses, a stylishness and elegant effluvium.

The other public facilities, like the playgrounds, are adapted to this urban development. Everything is connected to the principle 'storm water: slow it, hold it and than release it'.

2.12 Legal aspect

2.12.1 Nijmegen

A lot of trouble is caused by the fact that the contract with the building contractor prevented that leaves in the autumn could be swept. This contract said that any damage during the construction of the street caused by the municipality must be paid by the municipality. The risk

to cause damage was high, too high, so the municipality decided not the sweep. This decision and the unfortunate planning during the project caused the floods.

The municipality described disconnection of paved areas as a precondition in the so called 'water plan'. This plan gives a vision on water in the urban context. Because of the progressive water plan there was a lot of money available. In the so called 'structure plan' the municipality had decided that the Voorstadslaan have to be paved with asphalt. That meant that no permeable pavement could be used. Because of this legal order the infiltration possibilities decreased enormous.

2.12.2 Doetinchem

In the municipality of Doetinchem, the Oude IJssel, a river, is of great value of the water transport and shipping traffic. In several districts are ponds created for the storage of water. The municipality don't want to drain storm water to the water treatment plant anymore, but disconnect the paved areas and infiltrate the water into the soil. These intentions characterize the water policy of the municipality. This policy is called 'the water plan'. Every municipality have to set up a water plan. This policy translates the government policy and gives a framework for the water managers on local level. The themes which come up in the water plan are, among other things, safety, water quality and groundwater. The wish for a water plan stem from the fact that water has always been a key item: water shortage, flooding, problems with dikes and water quality. The water plan is set up by local water managers, the water board, the association of provincial municipalities and Rijkswaterstaat (Department of public works). Furthermore this water partners enter into debate with other interest groups like: social organizations, farmers, trade and industry and nature conservation.

An important part of the water plan is the so-called 'function map'. Spatial functions, developed in other plans, become translated to preconditions for the water management. This means that, for example, house-building become clear as a spatial function. Beside this, the function map can show where revision or specification is necessary. Disconnection is a coercive requirement, according to the water plan, in the municipality of Doetinchem, at least, for new estates of houses. "But", says a hydraulic engineer, "we take every chance we get to disconnect, even in existing urban areas".

2.13 Moral aspect

2.13.1 Den Bosch

'Sustainable development!' Today, every modern company or government cries this yell. But without doing something, this yell is just a hollow phrase. Do something without the awareness of the citizen in this kind of development is still senseless. The morality has to come from both the citizen and the government.

A good example of this kind of 'cooperation' is the district of De Vliert in the municipality of 's Hertogenbosch. In this district the municipality has designed a qualitative high-minded living environment trough a sustainable storm water system with intensive cooperation of the inhabitants. During a participation evening for inhabitants an old lady make an appeal to the rest of the inhabitants. She pleads for disconnecting paved areas. Because: "I know that clean water become rare in the near future. I want my grandchild to have a clean world an unconcerned life too!" This speech impressed the rest of the inhabitants and today this old lady represents their conscience and their feeling of responsibility.

2.13.2 Enschede

A sustainable water system combined with ecological functions is sensitive to pollution. Such a system lies in the district Ruwenbos in the municipality of Enschede. This means that it is

undesirable that inhabitants wash their cars on the street or use herbicides. However, it is desirable that inhabitants plant hedges as parcel partitions to encourage the return of a rare kind of sparrow. These are three examples of non- obligated rules. That's why involvement of inhabitants is essential to maintain these habits.

This involvement was realized by organizing information meetings in small groups. Questions like: "are Wadi's a drown risk for my children?" and "Why can't we wash our cars on the street?" were answered. Another function of the information meetings was the personal meeting between inhabitants. This stimulation of social cohesion was one of the points of interest of the district designers. For example: there is a lot of space on the street for kids to play, but these streets are so narrow that just one car can pass. The increase of the social cohesion makes people stimulating each other to wash the cars not on the street and to use no herbicides. Still, one of the designers of the residential area is pessimistic about the future. The problem is the individual character of man. It seems to be hard to bring people together and make them the responsibility for the quality of their living environment. He thinks that it is a structural problem. Good information service and continuous interaction between the municipality and the inhabitants of the residential area could be helpful. But the municipality don't have the financial means to do this. It don't have priority.

2.13.3 Enschede

The disconnection project in the residential area of Ruwenbos in the municipality of Enschede is morally funded. One of the water managers of the municipality is personally motivated to encourage people to be careful with nature. Sustainability is funded in the hearts of people. Only if sustainability is a personal conviction it will succeed. To increase this consciousness, people have to bring up. People can only be well brought up by personal contacts with someone who can convince them of the necessity of sustainable water management.

"Bring people together" is one of the moral themes of the municipal water managers, water can play a role to reach that goal.

2.14 Lessons learned

The next table presents the lessons learned in the several case studies, to deal with the several aspects of the water system. This tool contains a number of valuable insights for planning BMPs in a project.

Table 2.1 Lessons learned

Aspect	Learning experiences
	<ul style="list-style-type: none"> • New BMPs, such as permeable surfaces, can give problems during realisation and use, because of inexperience with these technologies. Do not be surprised when problems occur, but try to learn from them and to share these learning experiences. • Account for the geomorphological situation while designing infiltration techniques. • Stormwater in the sewer system has a negative impact on the treatment of waste water, since pollutants dissolve and are harder to remove. The swale is a good alternative • The DIT-technology is suited to cope with haltering ground water levels. • By harvesting disconnected stormwater, as a resource for the 'sewer ponds' the water quality is even more improved. • Flowing waters have a positive effect on the concentration of oxygen. • Open transportation of stormwater decreases the chance of false connections. If these connections are made, they are easily to find. Open and clear waters nearby, increases the water consciousness of inhabitants. Water can become a part of their living environment.
	<p>Green and accessible ponds are very much appreciated by inhabitants</p>
	<ul style="list-style-type: none"> • Several perceptions on a pond can give tensions between stakeholders. Therefore it is important to know the perceptions and to be prepared to build compromises. The best technical measure, is not always the solution which fit society best. The gap between technical and societal aspects can be bridged by clear communication. By communication one gets to know the several problem perceptions and preferred solutions. • Use source control measures as a mean to improve the quality of the living environment. By choosing for permeable verges, the Voorstadlaan could arise in its former glory. Otherwise there was a lack of money.

	<ul style="list-style-type: none"> • Each stakeholder has valuable knowledge in a project. Technical knowledge of water experts isn't sufficient. So, intensively involve inhabitants during design, implementation and maintenance. • The swale meets the principle of 'hold the water, store it and then release it'. • During the design complex reality is easily underestimated. Therefore, build practical experience by defining pilot projects. A fruitful strategy is 'Interactive Implementation', see D3.3. • What in the perception of the municipality is a sewer pond, perceive inhabitants as an attractive recreation area. This demonstrates a tension between the technical and societal perspective on the water system. By communication, both problems are tackled. The sewer system is relieved and inhabitants get an even more clear pond. • The implementation of new BMPs is a learning process, in practice the handy knowhow need to be developed. This cannot be made up behind a computer.
	<ul style="list-style-type: none"> • Incidents in the past influence the realisation of projects. • When starting cooperation, be interested in what is in the minds of stakeholders and where their hearts are. If a water measure can be connected to what a stakeholder finds important, such as safety, they are willing to cooperate. • Failures in a design will always occur. The trick is to share these mistakes to learn from them.
	<ul style="list-style-type: none"> • Since inhabitants of the residential area Ruwenbos have something to lose, they want to participate in the maintenance. This reduces the maintenance costs. • Changes appeals resistance. This is a natural phenomenon. Choose beforehand to put effort in making the change, or not. • A centre for communication is an effective mean for meeting inhabitants, involving them and learning their perceptions. The implementation of BMPs together with inhabitants requires more then an information meeting. Continuity is very important. • By a little amount of extra money, water can serve as a playing object and for an education project. • Basic principle of environmental education: children raise their parents.

	<ul style="list-style-type: none"> • By demonstrating inhabitants the advantages of buying a rain barrel, like the use of the stored water for cleaning the windows, washing the car or sprinkling the garden, they started to cooperate on disconnection of their roofs. Disconnection makes stormwater a better part of the lives of inhabitants. In stead, forcing cooperation, will not be successful. Only if the effects of BMPs are related to the ordinary life, there is a will to contribute. • Improvement of the quality of the environment do not have to be expensive. Where parking problems can be solved by implementation of a transportation system of stormwater, small measures can have significant effects. • Cooperation of inhabitants proves to be essential in disconnection projects, surely when the backyard must function as infiltration area for the stormwater of the roofs. • Lack of trust undermines the public support for a project. • If stakeholders keep one's commitments, cooperation will grow. Therefore, pay attention to the realization of small scale solutions, brought up by inhabitants and relatively cheap. If water managers don't keep their promises, distrust will increase.
	<ul style="list-style-type: none"> • On the short term, source control measures are more expensive then traditional measures. The benefits of source control such as beauty cannot always be counted in money. • The attractiveness of a water system has economic benefits. For example, the prices of houses located at a water side are more expensive then the same house located elsewhere. • Cost reduction of source control can be achieved by combining functions, such as the uses of swales as public green or as inversed speed ramp. • Often, the amount of money is not the problem in realizing BMPs, but to locate the money.
	<ul style="list-style-type: none"> • Source control van be regarded as investments for the improvement of the living environment are appreciated by inhabitants. Therefore, do pay attention to an attractive design of these measures. • Cooperation should be harmonious, by finding a balance between the different stakes.
	<p>Regulations (norms, permits, procedures) enforce the the implementation of BMPs. Policy is flexible, thus suited for finding problems in interaction with stakeholders. A water plan on the municipality level is a good means for buiding cooperation with stakeholders by describing a vision and discussing the implementation of this vision.</p>
	<ul style="list-style-type: none"> • Since the costs of BMP sometimes rise above the costs of traditional measures, it is necessary to stress the moral importance of more sustainable solutions, connected to concrete actions: "What can I do, though little?". • Look for inhabitants who are the 'conscience' of the residential area, people feeling themselves responsible for the quality of their living environment.

3 Ambition Reflection

3.1 Why ambition reflection

The success of an urban stormwater project depends not only on the technical, legal and economic feasibility. As least as important is the water manager is able to make a connection between stormwater and urban dynamics. Ambition Reflection is about the manager's ability to successfully implement stormwater measures in the urban context. It is an introspection of urban stormwater management in order to reflect on its attitude (goals, philosophy, perception and position).

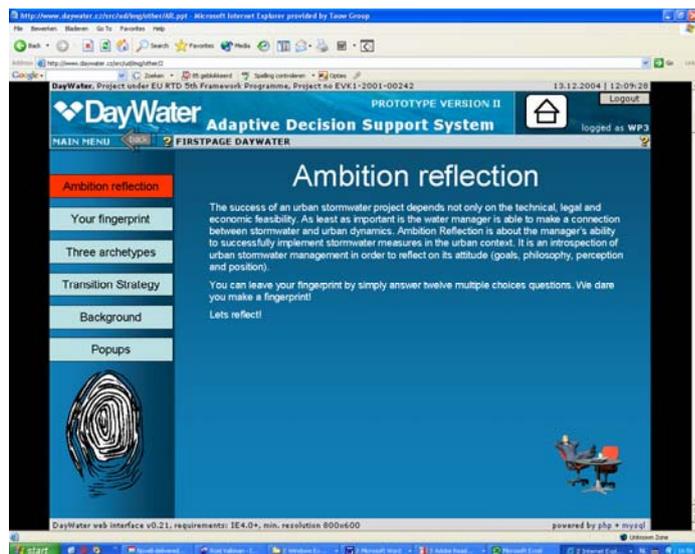


Figure 3.1 The homepage of Ambition Reflection

3.2 Features of the Ambition Reflection tool

3.2.1 Leaving a finger print

Implementation of source control measures demands a 'context sensitive' attitude, as source control find place in the very ends of the water system, interwoven in the urban environment. The fingerprint offers the user the opportunity to reflect on his or her attitude towards urban stormwater management by using the three archetypes of urban stormwater management.

The fingerprint is a tool that gives the opportunity to find out your attitude towards USWM related to urban dynamics. A questionnaire can be filled, in order to find out what kind of water manager the user is. In the prototype of Hydrpolis the questionnaire is built in an Excel-format which interacts with the Ambition Reflection tool (in ppt-format).

FINGERPRINT QUESTIONNAIRE

The list below consists of 8 groups of propositions about USWM. Please select out of three the proposition that fits your attitude in USWM the best. In this, there is no true or false.

1	<p>USWM aims at optimizing the water system on the basis of the functions defined by society (nature, recreation, etc.). It aims at preventing damage and making use of the possibilities and opportunities for water.</p> <p>USWM aims at optimizing the water system on the basis of physical, chemical and economic criteria. It primarily aims at preventing damage.</p> <p>USWM aims at optimizing the living environment by making use of the water system. It aims at preventing damage and makes use of possibilities and opportunities for both water and other fields of policy.</p>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
2	<p>It is impossible to reduce uncertainty and therefore has to be dealt with. Uncertainties do not thwart the implementation of alternative measures.</p> <p>Uncertainty can be minimized by modelling technical and physical aspects. Uncertainties related to other aspects are minimized by assigning well-defined functions to the water system. In order to implement measures the uncertainties have to be minimized. Uncertainties aggregate the implementation of alternative measures.</p> <p>In order to implement measures successfully the uncertainties have to be minimized by modelling technical and physical aspects of the water system. Uncertainties related to other aspects are less relevant and not taken into account. Uncertainties block the implementation of new measures.</p>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
3	<p>Good information service is an important aspect of USWM in order to create public support.</p> <p>USWM is about optimising the water system.</p> <p>Source control demands interaction with the living environment including citizens. Therefore public involvement is essential. However, public involvement is more than good information services only.</p>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
4	<p>The USWM negotiates with other fields of policies in order to come up with solutions that are supported by many.</p> <p>USWM has always been underexposed. There is minimal negotiation with other space demanding functions.</p> <p>There are negotiations on functions assigned to the water system.</p>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
5	<p>The water system is already complex without the involvement of other fields of policy. Therefore USWM should focus on stormwater.</p> <p>There is a strong relationship between the water system and other fields of policy. Continuous interaction between USWM and other policy fields creates new possibilities and opportunities for both USWM as for other policy fields.</p> <p>There is a strong relationship between the water system and other policy fields. By allocating functions to the water system this relationship is formalized. Involvement of other policy fields is restricted to the definition and allocation of these functions to the water system.</p>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
6	<p>The core concept of USWM is control over the water system. Optimization of the water system means that it meets as good as possible the different functions society has imposed on the water system.</p> <p>The core concept of USWM is control over the water system, damage can be prevented by good control of the physical and chemical processes in the water system.</p> <p>The core concept of USWM is control of the water system with respect to its urban context. USWM not so much aims at optimizing the water system, but at making a contribution to an optimum living environment.</p>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
7	<p>USWM should be based on clear and uniform standards to simplify uphold of regulations.</p> <p>USWM should be based on clear standards, derived from the allocated functions.</p> <p>USWM should be based on differentiated standards, which may cause complex uphold of regulations.</p>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
8	<p>Source control measures offer new opportunity to restore the relationship between the water system and society.</p> <p>Source control measures offer new ways to deal with stormwater. Besides important advantages, source control also introduces side effects such as complex interaction with private stakeholders.</p> <p>Source control is surrounded with uncertainties on legal, chemical and ecological aspects. These uncertainties have to be reduced in order to become a real alternative for traditional stormwater measures.</p>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

Check your fingerprint!!

Figure 3.2 The questionnaire to determine the fingerprint

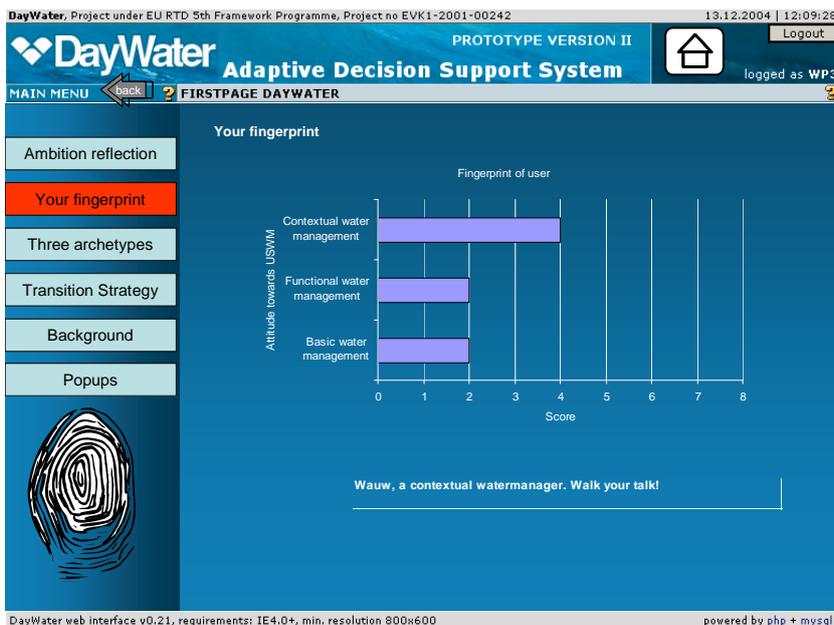


Figure 3.3 The result. It appears that the questionnaire is filled in by a contextual water manager!

3.2.2 Three archetypes and transition Strategy

The Ambition Reflection tool contains a lot of (background) information about the three archetypes of water management and the distinction between context and system that characterises the archetypes.

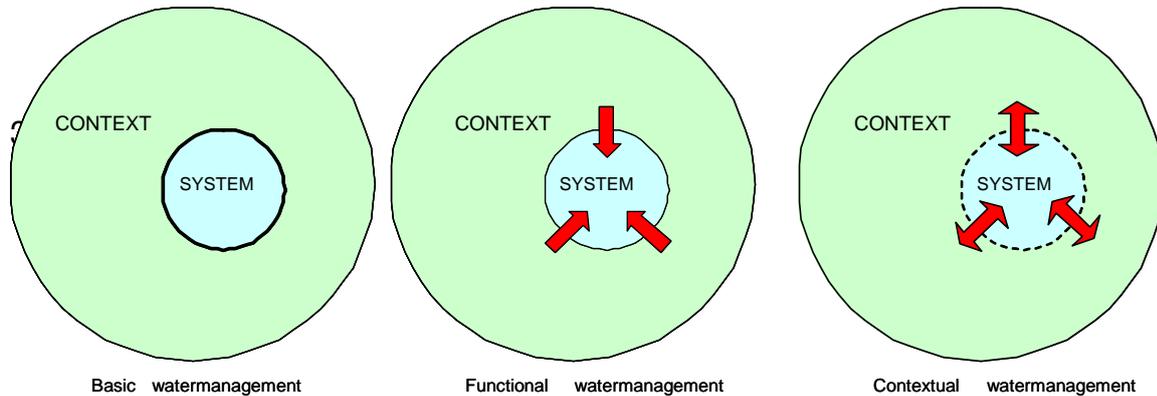


Figure 3.4 The three archetypes of water management are based on the distinction between system and context and how the watermanager deals with the interaction between them.

Figure 3.5 Information about decision making processes of a functional watermanager.

3.2.4 Three archetypes and transition Strategy

Within Hydropolis the free mode stands for browsing through all components without defining a project and without the tracking function. Within Hydropolis the guided mode guides you through Hydropolis. In this mode the user can define a project and save some alternatives. In this mode, the actions of the user are recorded. By means of popups and smart links the user receives tips and tricks during your his or her visit to Hydropolis.

Three types of popups can be distinguished in Hydropolis:

1. popups with advice without a direct cause;
2. popups with noncommittal advice provoked by one or more actions;
3. popups with steering advice provoked by one or more actions;

NB. This tool is not implemented in the prototype of Hydropolis. However, there has been some experiments with the first type of popups (e.g. 'Enjoy your visit to Hydropolis')

4 Coping with urban dynamics

4.1 Back to reality

Urban Dynamics is one of the topics asking for attention of the urban water manager, but often neglected in USWM. The main reason is that in urban dynamics is encountered in the last two phases of the decision making process: the implementation and the maintenance phase. In this phases technical solutions have to be put back in reality. Dealing with urban dynamics only in this phase can be too late. Stormwater managers cry out: 'They don't understand!' That is true, but 'they' have did not have the chance to know the importance of USWM. By the way, stakeholders have a lot problems, water is just one of them. The Urban Dynamics form the 'environment' in which source control is implemented. This environment is dynamic: there are a number of different types of landuse and the people living there the people trying to influence the types of landuse have different stakes, often not water-friendly.

4.2 Mutual dependency

Source control is only one of the many topics asking for attention and (financial) support of stakeholders and in their eyes often not the most urgent one. The only exception is when they experience flooding due to a bad functioning water system, but this is quickly forgotten. The success of implementing source control is dependent of cooperation of these stakeholders. They cannot be forced, it is out of the legal influence of USWM. It is also not desirable to force stakeholders since the real source is the behaviour of stakeholders themselves. Source control needs to be part of a 'sustainable awareness' of stakeholders. So, all kind of stakeholders need to be invited to cooperate with implementation of source control. This requires interest of the urban water manager into the context. Urban Dynamics forces the urban water management to reckon with the stubborn reality.

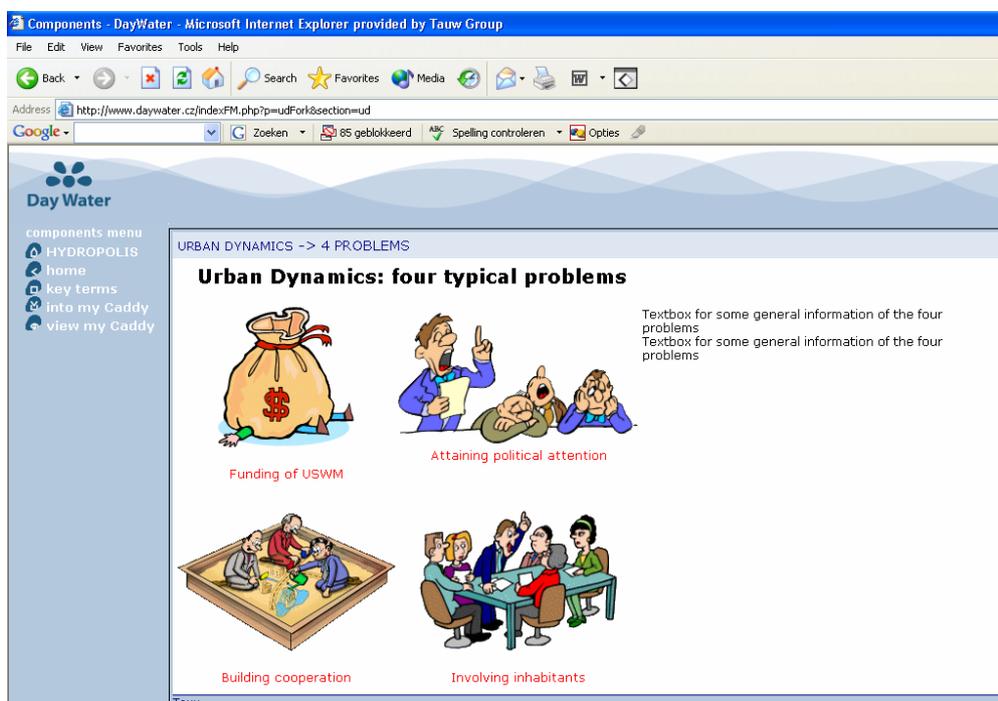


Figure 4.1 Four urban dynamic problems highlighted.

Many of the problems a water manager encounter are urban dynamic problems, problems on the edge of the urban water system and the urban context. This component gives information on coping with urban dynamic problems.

4.3 Four typical urban dynamic problems

The four problems this tool addresses are:

- Finding resources for USWM
- Attaining political attention
- Building cooperation
- Involving inhabitants

Eventually, the tool can be extended by adding new problems.

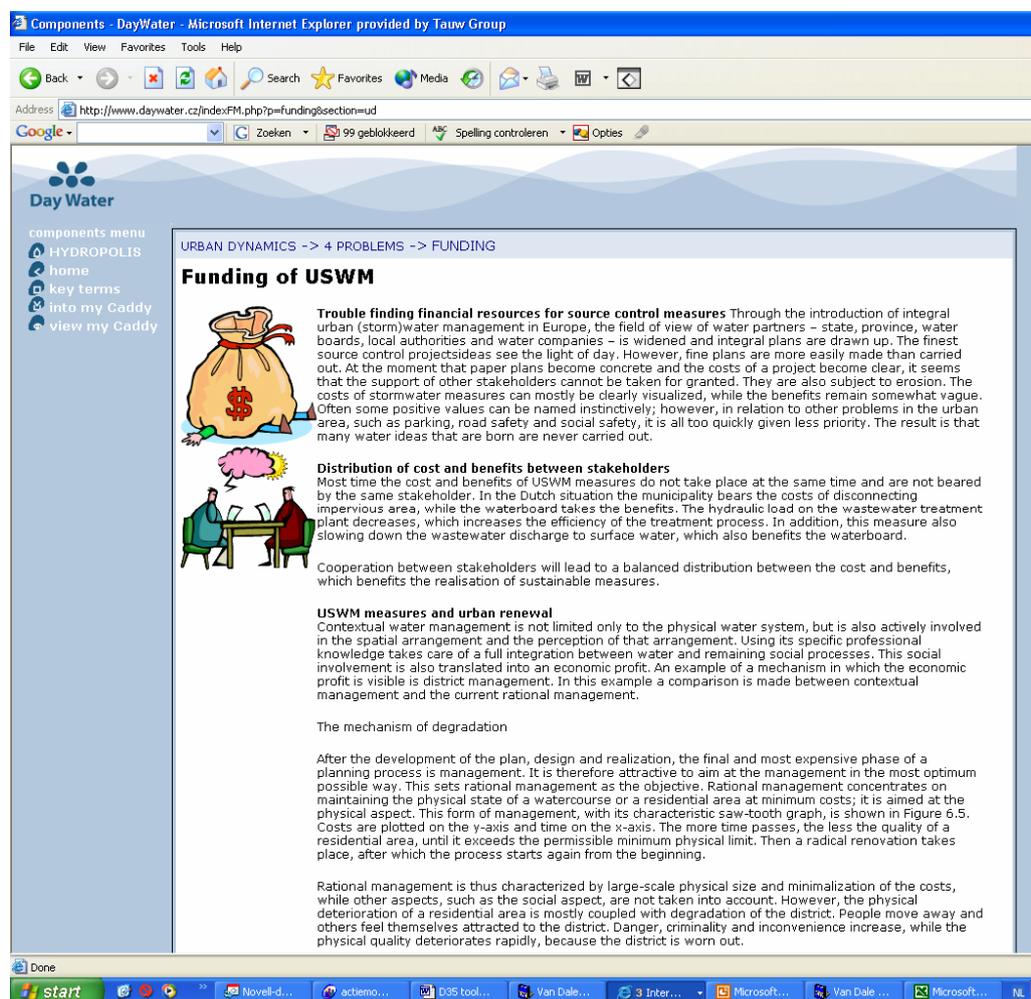


Figure 4.2 Information about finding resources for USWM.