INTEGRATED WATER PLANNING IN DUTCH URBAN AREAS: THE EFFECTIVENESS AND EFFICIENCY OF PLANS AND OTHER INTEGRATION INSTRUMENTS[1]

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SUMMARY

This paper addresses the issue of coordination in water management in western cities by analytical and empirical methods. The theoretically perfection of Integral Water Resource Management (IWM) in practice does not sufficiently solve urban water issues such as securing drinking water resources, securing quality of surface and groundwater, preventing too low or high groundwater levels, preventing floods, providing space for water in the city, emphasizing its aesthetic value. The paradigm based approach is too complicated and too many barriers are not taken into account. A second paradigm entered the world of water managers and planners while they experimented with new coordinating instruments to overcome complexity and barriers: Adaptive Urban Water Management AUWM). This does not imply that comprehensiveness and rationality are abjured principles/values however it means that these have to be supplemented with principles/values such flexibility, open-mindedness and adaptiveness. Finding the connection between the paradigms, balancing the efforts and keeping the balance provides the urban water managers with a challenge for the coming years. This paper contains empirical data from a commissioned research for the Dutch ministry of Transport, Public Works and Water management that elaborated the existing system of urban water planning, the coordination instruments used, their effectiveness and efficiency and potential improvements. An extensive literature review and an online survey among 70 key respondents from ministries, provinces, municipalities and drinking water companies. The focus was on a number of existing and new integrating instruments and their effectiveness and efficiency.

1 INTRODUCTION

Water in cities is not a problem in itself. Water in the city can be simultaneously regarded as beautiful, threatening, useful and necessary. This view on water can change over time and differ between places and cultures. Sometimes water is seen as a friend and sometimes it is seen as an enemy. If water in the city presents a problem depends on the function it performs, like:

- Water as a resource; if there is a shortage of water this raises issues of allocation and access to water;
- Water as a means to dispose of waste; this raises the question of water quality;
- Water as threat; if there is to much water it raises the question of protection against water;
- Water in its symbolic and cultural dimensions; this raises questions about the visibility of urban water and its aesthetic values.

From the perspective of urban services water management is vital for services such as the supply of potable water, the drainage of wastewater and rain water, the treatment of wastewater, protection from river flooding, and the environmental consequences of water pollution. Some developments change the demands with regard to the urban water system.

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- In the first place new political goals emerged. The demand of European citizens for clean water was one of the main reasons why the Commission has made water protection one of its priorities. The new European Water Policy aims to get polluted waters clean again
- Secondly climate change presents us with new challenges in urban water management; for instance to cope with extreme temperatures and droughts as well as with extensive precipitation. So the extent and speed of drainage should be controlled in order to be able to retain water resources in the urban area in periods of droughts as well as to prevent flooding in periods of extensive precipitation. Also the ground water level is relevant and should be closely controlled, extreme high levels might cause damage as well as extreme low levels. In urban areas with limited supporting power, traditional wooden underpinning-pools of buildings older than 40 years might start to rot if the ground water level is too low and varies considerable (mold-corrosion).
- Thirdly, because of the rise of sustainable approaches in urban water management. Traditionally the aim of urban water management was to remove all water flows (rainwater as well as wastewater of various qualities) out of the urban areas as quick as possible, using an underground sewage system. New insights on sustainable urban water management aim at keeping water in the city, keeping the water clean and also more visible in the city. If we follow these principles (e.g. by disconnecting rainwater from the sewage system and increasing the number of ponds and ditches) it is not only an environmental improvement, but can also enhance the aesthetic value of the urban environment. Nowadays also the attention grows for the cooling function of water in urban areas. Both surface water areas as the 'air-conditioning function' of vegetation by evaporating water is more focused upon than before.
- And finally not only the functions of urban water are changing but there are also independent technical and societal changes:
    - techniques to make an area suitable for building have changed, for instance we think about building houses in the water;
    - new types of water infrastructure have been developed,
    - the role of water in urban design and spatial development has changed, water surfacing in the city etc.

Because of these change in the role and functions of urban water the number of parties involved increases also. Because large investments have to be made for urban water systems, this draws the attention of the citizens in its role as tax payer. Raised ambitions in combination with limited resources usually leads to a quest for smarter approaches.

In international scientific and policy documents the urban water cycle and similar concepts emerged (Gilmour a.o. 1999, Mitchell a.o. 2001, Hardy a.o. 2005). The basic thought of these concepts is that urban water, from source to final disposition, flows through a series of inter-related stages in a continuous cycle.

Waste and contamination at any stage impacts negatively on the sustainability of the cycle as a whole and on the health and safety of the community making use of that water. Urban planning, without consideration of the water cycle, results in water supply shortages, deteriorating aquifer water quality, groundwater infiltration into the distribution system, endemic health problems and other symptoms of an unsustainable situation.

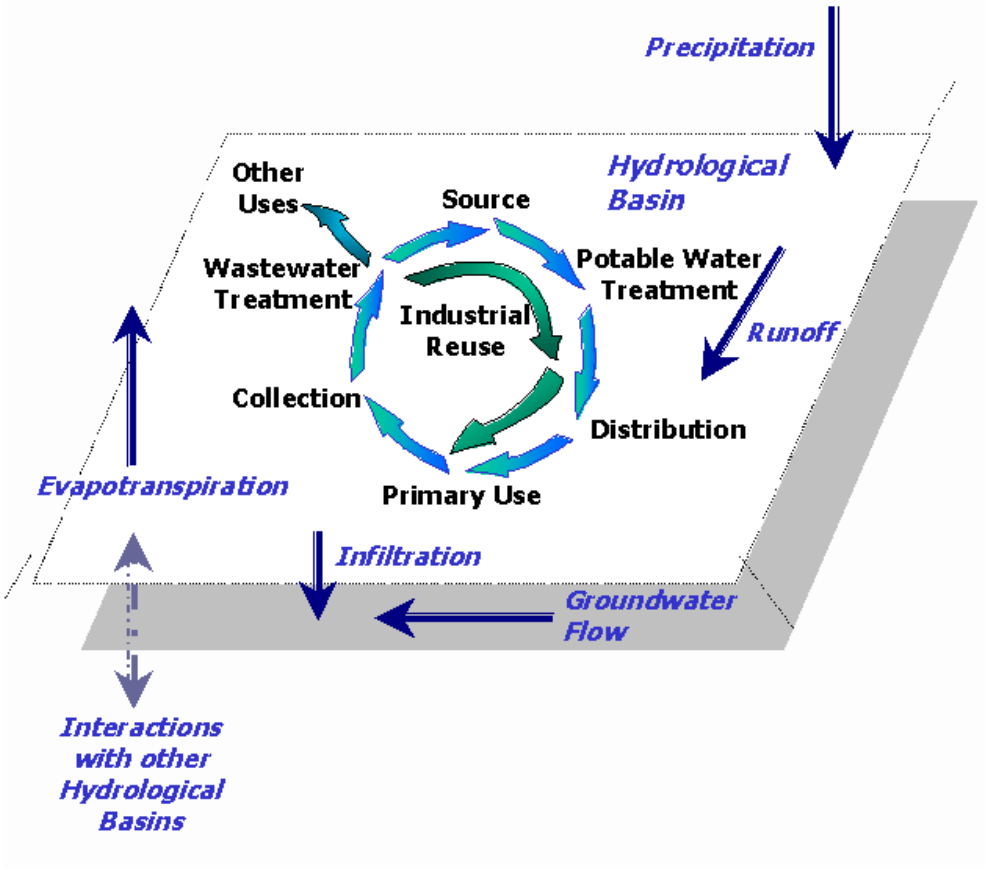

Fig. 1 The "Four Pillars" Approach to Water Sustainability
Source: United Nations University, International Network on Water, Environment and Health.

The urban water cycle consists of (1) source, (2) water treatment and distribution, (3) use and reuse, and (4) wastewater treatment and disposition, as well as the connection of the cycle to the surrounding and adjacent hydrological basins.

Since the Report 'Living with Water' in 1985 the leading principle in Dutch water policy is integrated water management based on a water-chain approach [Ministry of Transport and Water Management, 1985]. It should contribute to an overall vision, in which the interrelationships of user functions and the ecological functioning of the water systems are central. These should safeguard the internal aspects as well as the relations between water management and other policy areas such as physical planning, urban development planning etc. [Van Leussen, Kuks and Lulofs, 2007].

This paper is about lessons that can be learned from experiences with integrated water management in the urban context in the Netherlands and the experiences with new coordinating and tuning instruments.

2 PROBLEM DEFINITION AND RESEARCH QUESTIONS

2.1 The dead horse of integrated planning

The realization of 'integrated water management' is strongly linked to planning and planning instruments. The 'common' assumption is that planning raises the effectiveness and efficiency of government action and adds value compared with 'ordinary policy' [Coenen, 1996]. Under 'ordinary' policy, day-to-day decisions are taken relatively independently, or even on an ad hoc basis. Planning, it is argued, is more systematic, consistent, coordinated, forward-looking and rational than 'ordinary' policy. This view assumes that planning is necessary if the aim is more coherent decision-making and greater focus on the future effects of policy. So, water management that uses planning is supposed to be more effective and efficient and more coherent than water management without plans and polices.

Rational-comprehensive decision-making (also known as synoptic orthodox planning or total planning) aimed to include every possible detail in both the process of knowledge gathering and of knowledge management. Great planning thinkers such as Hayek and Popper have called such a view into dispute. The all-knowing planner with a total vision of the general interest would attempt to know and control as much as possible, from a position of hierarchical decision-making power at central level. Planning in all areas would be co-ordinated and all the consequences would be considered. In this way, planning was seen as a scientific tool based on scientific knowledge, which is able to work more or less independently of political and social relationships.

Because no practitioner, academic or politician would really agree to these rational comprehensive planning ideas anymore, criticizing this rational perspective sounds like beating a death horse. Unfortunately, among practitioners and politicians the death horse is still alive and kicking. When new planning systems have to be designed some of the ideas underlying rational planning appear still to be there. When these assumptions behind this model are put into practice they lead to a number of problems:

1. Information gap. The rational planning model is based on the idea of rational actors who are able to identify and review all possible actions, take stock of their consequences and order them according to stable preferences [Meyerson and Banfield, 1995]. This is precisely the sort of technical rationality that is criticized by authors like Simon (1957) and Lindblom [1959] in dealing with uncertainty. In real life, not all consequences can be foreseen.
2. Implementation gap This problem is strongest with 'blueprint' type plans that assume that implementation is just a question of finding the right means and the exercise of power. Uncertainties are ignored. Certain goals and measures are declared desirable, without making clear whether adequate measures, resources and power are available to carry out the plan.
3. Neglecting multiple actors. A specific problem in orthodox planning is the 'rational-central-rule approach' (Van Gunsteren, 1976). In this approach the emphasis is on one level of planning and not with lower tier authorities and other actors.
4. Neglecting multiple goals The final lesson for planning concerns its apolitical character. Orthodox planning assumes that planners know the wishes of politicians and the public. In its extreme form, planning used to be presented as a politically neutral instrument. In practice, though, planners were often ignorant of political and public preferences.

2.2 Research questions

Given these objections against and experiences with comprehensive planning approaches we were intrigued by how the planning system in urban water management developed under growing societal and problem pressure and growing urgency to act. Theoretically analytical, knowledge-based coherent and comprehensive approaches are welcomed however in reality information and knowledge 'black holes', vested interests, conflicting goals and even contra-productive planning and legal procedures favor more incremental approaches. So on the scale reaching from rationality up to ordinary decision-making, what happened to 'integral water management in a water system approach' in the urban area?

Our research questions are:

1. How does the Dutch planning system concerning urban water management look like and in how far embraces it elements of rational comprehensive planning?
2. How does the planning system function in practice and how does this relate to the problems with rational comprehensive planning?
3. How do professionals in water management asses the planning system and the new integrating and tuning instruments?

In section 3 we will be explicit about some of the features and functioning of the Dutch planning and water management system that has been in use since 1985. Section 4 presents our empirical analysis regarding the planning system, coordination instruments and issues in urban water management. In section 5 we will reflect on our observations.

3 THE CONTEXT OF THE COORDINATING INSTRUMENTS

In this paper we focus on experiences with integrated water management and recently introduced coordinating and tuning instruments urban water management, this in order to draw some 'lessons'. Although the Dutch system of water management has it's unique features, especially the position of the so-called water boards and the different planning tracks in physical planning, we think we that a lot can be learned from the Dutch experiences as a country that has more than 1000 years of experience in water management. Therefore such an elaboration is only worthwhile if interpreted in the context of analysis. In section 3.1 we will explore how water issues enter into the planning system and it will become more clear why we describe it as the 'planning roller-coaster'. In section 3.1 we will briefly report about the experiences with the integrated water management concept.

3.1 Water issues in the planning 'roller-coaster'

Before we sketch the Dutch urban water management system we have to make some remarks about the Dutch administrative system. The Netherlands have a decentralized unitary state constitutional system. The administrative system compromises three levels of government: 467 municipalities (gemeenten), twelve provinces (provincies) and the central government. The unitary nature of this type of state is based on agreement between the three layers of government and not on central government. The communities are responsible for their own affairs and can to a limited extent take their own initiatives. This constitutional freedom of initiative is restricted by the constitutional obligation to take account of legislation passed by higher authorities.

The Dutch water system can be divided in two parts: the main water system and the regional water system. The main water system contains the coastal zone, the main rivers (like Rhine and Maas) and the IJsselmeer. This area is controlled by the Ministry of Transport, Public Works and Water Management (Rijkswaterstaat). The regional water system includes polder water and the surrounding outlet and drainage waters, which are controlled by water boards. District water boards are unique Dutch decentralized public authorities with defined legal responsibilities and a self-supporting financial system for local and regional water management. These Water Boards are a strictly functional type of administration. Water boards are set up and terminated by provinces, however central governments has to approve of these decisions.

In our paper we focus mainly on the urban water problems within regional water systems. The Water boards play an essential role here. In general, there are three tasks devoted to water boards: regional flood defense, water quantity management and water quality management. Flood defense means protecting the land against flooding by ensuring dikes, dams and dunes are in good condition. Water quantity management implies making sure that the right amount of water is at the right place at the right time (appropriate water level). Water quality management involves the care for the treatment of urban wastewater and ensuring that water quality in ditches and canals is good enough for functions like recreation and agriculture. Although water boards have a principal position in regional and local water tasks, also other actors have specific responsibilities. Ground water issues lay with provinces and municipalities, sewage solutions and local surface water tasks lay with municipalities, drinking water involvement rests with drinking water supply companies, several ministries and provinces have strategic tasks related to norms, designation of water protection, transportation and safety, etc.

Clearly, many actors are involved in Dutch water. What makes the Dutch planning regime for urban water governance so complex is that it planning for the physical environment in the Netherlands stretches over four policy compartments that involve the physical environment:, (1) land-use planning, (2) environmental protection (3) nature conservation and (4) water management planning.

Table 1 provides a general overview of the planning system concerned.

Level of government		Water management	Environmental protection	Spatial planning
National		National water document Management plan for national waters	National Environmental Plan	National Spatial Plan
Provincial	Strategic	Provincial policy document on water	Environmental Policy Plan	`Streekplan' (provincial land-use plan)
	Operational		Environmental programme	
Water boards	Strategic			
	Operational	Management plan for local and regional waters		
Municipal level	Strategic	Water plan	Environmental policy plan	Structural plan
	Operational	Sewage plan	Environmental programme	Bestemmingsplan' (local land-use plan)

Table 1 The Dutch physical planning system

This table summarizes the most important elements for this paper of the Dutch physical planning framework. The table leaves out for this paper less relevant plans in all tracks, and we also left out the for the urban environment less relevant nature conservation and rural planning

For spatial planning, the state sets the broad strategic lines (via so-called Key Planning Decisions). Provinces then translate these lines into specific features for their province in regional plans. Municipalities prepare detailed plans for land-use in accordance with the provincial plans. The local land-use plans allocate functions for certain areas like housing, industry, public services, and they lay down infrastructure like roads, canals, railway lines and parks. In addition, the municipality can also opt for making a more strategic municipal structure plan.

For water management the national water notes set the strategic lines. The provincial water document operationalises national policy for the region. The water boards produce management plans for their area. The water management plans of water district boards have to be 'approved' by provinces. The only formal municipal instrument in local water management is the sewage plan. Not obligatory is the more strategic and informal water plan that will be discussed later as a recent coordination instrument.

For environmental protection national and provincial government have to make environmental policy plans. On the municipal level the environmental policy plan is not obligatory but the environmental programmes are. In the environmental track there is no formal hierarchical co-ordination mechanism between the plans at the different administrative levels.

There is also no formal horizontal mechanism in Dutch law to co-ordinate environmental and physical planning on the local level. For the national and provincial level a system were plans 'leap frog' over each other which means that when changes in one plan is introduced this will lead to changes in the other related plans. A same kind of system could be used on the local level, although not formally required. The problem on the local level is the difference in planning horizon (four against ten years) and the differences in juridical status and the weight of the plan changing procedures. There is at the local level a co-ordination mechanism on the operational or permit level between building and environmental permits (see below).

The role that spatial plans can play in environmental, water and nature protection is well defined in law and jurisprudence. The prime objective of the physical plan is `good physical planning' which

restricts the possibilities for conducting water policy through physical planning. Land use plans can be used to reserve space for water infrastructure, resist urban functions that could threaten security against water and forbid activities that endanger water quality.

3.2 Co-ordination and integration dilemmas in urban water management

On paper the system for physical and water planning looks very comprehensive and integrated, but in (urban) practice we observe most of the in section 2.1 elaborated problems that are interconnected to rational comprehensive planning. The integrated water management approach has been used for more than two decades in the Netherlands. Conceptually it was developed in national policy documents, best described as memorandum or notes on water management These were written by the involved 'water' Ministries with responsibilities for Public Works, Agriculture/Nature and Environment/Spatial development. These policy documents were discussed and accepted in Parliament. Particular since the Third National Policy Document on Water Management in the Netherlands in 1989, the concept of 'integrated water management' has become very popular. The reason for the introduction of the concept was that the existing policy concepts were no longer powerful enough to solve the problems of modern water management and achieve a sustainable development. The integrated water management concept is spread to at all levels of government: national, provincial, by the water boards and municipalities. Also in the EU-Water Framework Directive elements of the IWM concept are being used, for instance:

- process approach (participation)
- thinking in systems (basins, etc.)
- taking into account other functions / themes
- integration in spatial planning

In recent years the IWM approach lost much of it's shine. Although new 'integrated' water law is being prepared (2006) replacing separate laws on flood defense, quantity, quality, groundwater, etc. We see clear signs that the enthusiasm for IWM is on it's return. Were the 4th Policy Note (1998) still mentions IWM explicitly as guiding principle, at the national level in recent documents IWM is hardly mentioned any more. For instance in last policy note the word 'integrated' is only used once and the 'Commission on Integrated Water Management', a symbol of the area of IWM, is dissolved and replaced by a 'Advisory Commission on Water'.

Another clear sign of the decline of the IWM concept is that the attention mainly goes to specific policy themes and issues:

- flooding: space for water (rivers, drainage) and drought both in relation to possible change in climate and climate variability
- water quality / ecology (WFD)
- GGOR (preferred groundwater table)
- urban water management.

Of course this does not mean that the Netherlands completely left the IWM concept. Also in this themes IWM managed to emphasize certain important aspects and IWM concepts have in some respect been 'internalized' in water management in the Netherlands. But other themes captured the political agenda. Especially the WFD is taking up a lot of time. Were IWM approach is rather fuzzy and does not appeal to stakeholders, these thematic approaches (flood, drought, pollution) are easier to understand and accepted by the stakeholders. This is partly caused by the dominance of the theme 'risk of flooding'. Climate change reintroduced the issue of flooding on the political agenda, being situated in a low lying delta, the fight against water and flooding forms a narrative throughout Dutch history. In a large policy program called WB 21 the focus is on creating space for water by creating retention areas and other measures.

But the most important explanation for the retreat of the IWM concept lies in the ambition of the concept itself. Although at regional level the concept is still often used, especially at the regional and local levels the support for a pragmatic issue related approach is growing. This pragmatic approach is a reaction to and an effort to overcome problems with the IWM concept. In these reaction we recognize the classical problems with a comprehensive, integral approach.

First we see an **information gap.** A count of the Dutch union of water boards got to over 100 relevant plans for water. More than halves of these plans have a legal status, which means they are either obliged or facultative plans by law. Here we get at least to 10 plans made by water boards, 10 by municipalities, 13 by provinces and 29 by different national actors like ministries. As we have seen the public sector in the Dutch water management field consists of government ministries, provinces, municipalities, district water boards and the drinking water supply sector. Up to that we have actors from the private sector like the business sector, NGO's and citizens. It is nearly impossible that everybody is informed about everybody plans and involved in everybody's decision making. Due to a continuous struggle with stakeholders and decision-makers meanwhile at the implementation level a more practical approach is followed. Furthermore where it comes to the inevitable distinction between strategic planning and operational planning some critical remarks are at place. Whereas table 1 suggests that plans are easily categorized, this suggestion is only supported for legal arrangements. In practice the world proofs to be less perfect

Secondly, on the urban and regional level we recognize an **implementation gap**. There is a lack of power and means to realize plans. Formally there are as we have described vertical coordination mechanism in place. In practice both water boards and provinces do not have enough influence on relevant municipal policy, or do not want to interfere. Striking is the squabbling between civil servants of provinces and water boards. Professionals of water boards perceive the water plan of the province is very abstract and not very relevant for their practice, although they participate in the planning processes in order to serve the interests of the water boards' policies. Municipalities in most cases do not participate. On the other hand, professionals from provinces told us that they find it very hard to perceive water management plans of water boards as operationalizing their strategic goals, the water management plans of water boards are perceived as too strategic and not operational [Lulofs, Coenen and Kuks 2004]. Of course our scholarly position is that we find it weird that these provincial professionals do not oppose these plans. We refer to the fact that although provinces in a formal manner have to approve of the water management plans of water boards, in practice it proofs a powerless vertical coordination procedure. In practice the province and the water boards are in a long term relationship in which all kind of consensual arrangements around all kind of issues are relevant, institutional interdependency is a fact of life for them, which does not make it attractive to play the role of the super-police. And besides, like a provincial official openheartedly confirmed: 'Do you think it would make any difference if I returned water management plans unapproved?' His answer was no, it just increases bureaucratic costs.

A third problem is that actors seem to be neglecting the fact that urban water management involves **multiple actor**s. Water boards perceives themselves as central actor. The water management plans of water boards normally emphasize non-urban areas. Waste water treatment is considered a 'technical' issue, while the urban sewage system is managed by municipalities. Municipalities for long times were rather passive in water management and do not coordinate their planning efforts with water plans. Still municipalities make the local land use plan ('bestemmingsplan') which determines what really happens (provides a legal power resource). Water goals are traditionally ignored in this.

And finally there is also the problem, that the persistence of **multiple goals** is neglected. Municipalities hardly participate in the planning process of the province, which leads to the Waterhuishoudingsplan. Cities often find it already difficult enough to realize satisfying spatial quality and manage transport processes, without incorporating water goals. The 'Bestemmingsplan' therefore normally reflects the sediment of urban development processes in which private project developers have large influence, to some extent this is because they speculate by simply buy properties and anticipate physical planning. City developing is a 'closed' game dominated by institutional interests. Water goals are not integrated unless they might bring additional profit, for instance building houses at the waterfront.

4 THE PLANNING 'ROLLERCOASTER' AND RECENTLY INTRODUCED COORDINATING INSTRUMENTS EVALUATED

In the absolute certainty that other planning systems not necessarily would deliver an improvement, all kind of add-ons and informal arrangements popped-up to improve commitment, coordination, sharpness and implementation. In this section we will deal with some of these improvements based on the views revealed in our survey among experts and our secondary data review [Lulofs, Coenen en Kuks 2004].

Mise en forme : Puces et numéros

4.1 The planning 'rollercoaster'

In the urban area the general view is that the planning system is operating reasonable well where vertical interaction (national government, provinces and municipalities and water boards) is at stake, with one exception: groundwater level and groundwater quality and related drinking water resource interests. Also more than half of the consulted experts think that planning on national and provincial level fails to sufficiently take into account implementation problems and scarcity of resources. The water boards and drinking water companies express this most strongly, municipalities agree to some extent. The coordination on the provincial level between sector planning falls short according to experts, meanwhile they consider the physical-planning sector to be dominant. With regard to the horizontal coordination and interaction in urban water management they observe that superficially the allocation of tasks is clear, however when digging into the issues this proofs not to be true. Mutual expectations differ. About half of the experts feel that the knowledge base in the urban area is too small, especially among municipalities. A large majority feel that there is a substantial political unwillingness to allocate resources to water issues, housing and transport is prioritized and provinces do not tend to correct municipalities in this. Table 2 summarizes the opinions of our experts with regard towards whether the planning system contributes to goal attainment (urban water issues) and whether this is done in an efficient way:

	Negative	Neutral	Positive
Effective	23	37	40
Efficiency	42	50	8

Table 2 Opinions on the effectiveness and efficiency of the planning system for water issues and water goals in urban areas (%)

The experts feel that there are too many formal and informal plans, in the excessive multitude of plans the real important coordinating and tuning issues are often lost touch with. For instance the timing and frequency of plans is not 'in line' and tuned and often new rounds are arbitrarily started. About 40% of the experts judge that the planning system carefully and effectively incorporates water issues and water goals into the planning system, 60% of the experts are skeptical.

Mise en forme : Puces et numéros

4.2 Recently introduced coordinating instruments

All in all these outcomes are in line with the known critiques with regard to the orthodox rational planning approach. The horizontal coordination between sectors does not satisfy for several reasons, the planning is too strategic, does not take into account the lack of data and knowledge on operational level and in general, does not take into account implementation problems and the impact of politics is substantial and the resources for implementation are too limited in comparison to the level of ambition.

Strengthening the horizontal coordination

Strengthening the horizontal coordination is the reaction that one would expect from the 'planning professionals'. And especially with regard to the horizontal coordination and the dominance of land use planning, new elements were introduced in order to implement 'WB21' and the WFD.

Firstly, nowadays a water section is a mandatory in every new or renewed local land use plan. Secondly there is the 'watertest', a mandatory instrument for a series of plans, among which the local land use plan. The 'water test' is a mandatory water impact assessment of all spatial relevant planning activities. The 'watertest' might lead to a refusal to approve of accept a local land use plan as it is unless it is changed and does take into account the water goals more intense. The local land use plans have to be approved of by the province, a comparable procedure as applicable to the water management plan of the water boards. Thirdly mandatory deliberations between water boards and municipalities and a mandatory consult/advice from the water boards towards the municipality are introduced as part of the coordination instruments. The latter aim at a timely process of exchange between the water manager and municipality, adoption of water goals by the municipality and expanding the local knowledge base.. The aspect of the timely delivery of adequate information by the water managers still needs to be improved, within urban areas detail knowledge is often lacking. This issue does however also include the mutual understanding and expectances. The concepts used by the water manager and those of the city managers can and should be more closely connected. Experts feel that interaction between water managers and municipalities is improving.

Acknowledging the implementation gap

The acknowledgement that resources will only be allocated if politics prioritize water goals led to the development of new instruments in water management. To enhance political commitment a voluntary agreement between the national government, provinces, water boards and municipalities on planning and financing water management. This agreement deals with urgent water goals derived from 'WB21', that concerns issues of safety and flooding. Risk assessment and safety standard leads to 'water challenges' in order to meet the safety standards. The involved governments commit themselves to these hydrological challenges. How it will be financed is part of the agreement. About 250 projects are necessary, the spatial claim will be 100.000 hectares or more, it will cost 8 billion Euros or more for regional projects between 2003-2015. The national agreement is supplemented by regional agreements that deal with the implementation details [NBW, 2003].

Acknowledging the information gap

Related to the voluntary agreements another coordination instrument to improve the impact of water goals in informal city development plans is introduced: the water opportunities map. Water opportunities maps cover al1 or part of the area managed by a water management authority and expresses the views of that authority on the potential (or lack of potential) for specific land use functions, considered either in isolation or together, based on a target scenario for a sustainable future water management situation. This especially aims at preventing wrong choices of location (from the perspective of water goals) for urban development in informal city development plans, especially where the periphery is at stake. This map is also input in the implementation process of the voluntary agreements mentioned above.

Acknowledging multiple goals and multiple actors

Dissatisfaction with the far from perfect vertical and horizontal coordination between the provinces, the water boards and the urbanized municipalities led to the birth and experimenting of a new plan: the Urban water plan. By adopting an urban water plan the perspective on municipal water management is broadened, next to taking care of the sewage system other responsibilities for the (co-)implementation of water quality and water quantity goals are added in the varying informal plans. Our experts observe that this rather new plan is more effective where water quantity goals are at stake compared to water quality goals. Due to the character, often very concrete (and varying) themes are addresses, however drinking water resources and the quality of groundwater often fail. Most perceive this plan as an instrument to reinforce content and ambitions from other plans, raise political interest and commitment, find 'windows of opportunity' and develop implementation and measures. Implementation and finances are addressed, however this new planning instrument is still in an experimental phase. Most experts feel that incorporating this in legal framework would necessarily bring the 'bottom-up' process to a hold.

Knowing that the instruments elaborated above are new, we asked the experts whether they deliver a potential for substantial improvement in urban water management, to be attributed to each of these instruments. We also asked the experts their opinion whether the implementation so far made them

hopeful that the potential will be harvested in the next future. Table 3 gives an overview of the findings:

Instrument	Positive about potential improvement management of water issues in urban areas	Quality of implementation		
		% negative	% neutral	% positive
Mandatory water section	71	37	48	15
Water test	75	46	34	20
Water-deliberations	59	34	54	12
Water consult/advice	49	24	61	15
Voluntary agreement (NBW)	53	17	62	21
Water opportunities map	61	32	49	19
Urban water plan	69	57	34	9

Table 3 Opinions on potential improvement and implementation practice so (%)
Source: Lulofs, Coenen en Kuks, 2004: 11

In table 4 we finally present the five themes in urban water management that are considered top-priorities (problems) at this moment and the views of the experts in our research project towards the contribution of the planning system in managing these issues, the improvement by the recent new coordinating instruments and whether this will do the job sufficiently or additional innovations are needed.

Issues	Positive opinion contribution planning system	Positive opinion contribution recent modifications	Additional innovations required
Disconnecting rainwater from sewage system	33	55	67
Preventing overflows of sewage water in sewage system	30	51	39
Space for water in the city and its aesthetic value	32	59	33
Groundwater level (too high or too low)	2	34	47
Securing drinking water sources, including groundwater quality	33	33	n.a.

Table 4 Five top-priorities in urban water management and judgements of experts (%)
Source: Lulofs, Coenen en Kuks, 2004: 29 -30

The dissatisfaction with regard to the disconnecting theme is understandable due to the fact that this concrete issue is sluggish (whole areas have to be renovated), extremely costly and the finances are not yet found (or local politicians choose other priorities to spend money on). The issue of the drinking water and ground water quality is largely ignored by cities and at the moment a re-evaluation of the responsible government actor is going on. Also in the processes surrounding the recent coordination instruments the drinking water issue is often neglected.

5 REFLECTIONS

In this paper we elaborated urban water management from the perspective of how well planning contributes to reaching water goals in the urban areas. We observed that the traditional critiques towards orthodox rational planning apply to their role in urban water management. Although the concept of integral water management was embraced with to some enthusiasm by both practitioners and scientists, who worked on the concept and made innovations in policymaking and implementation, also new problems have risen. As expected the policymaking process has become very complex.

The idea to create an optimal conditions for the resource water is watered down by imperfect vertical and horizontal coordination, the ignored however substantial impact of politics and lacking implementation resources. Some of the recently added elements stay within this planning paradigm, emphasizing the sought after coordination and integration by making it mandatory. While some other recent additions such as the voluntary agreements and the urban water plans, focus stronger upon creating an optimal management capacity and less towards a comprehensive and integral optimal situation. This might reflect a change of paradigm, water managers realizing that Integral Water Resource Management (IWM) in the end will not deliver a perfect adoption and integration of water goals in urban water management. It is too complicated and there are too many barriers. This does not

imply that comprehensiveness and rationality are abjured principles/values however it means that these have to be supplemented with principles/values such flexibility, open-mindedness and adaptiveness. In order to move the real world situation towards the ideal situation as strived for in IWM a second paradigm is considered based on adaptive management literature, Adaptive Urban Water Management.

Westley described the essence of adaptive management by stating that it is a question of creating the right links at the right time around the right issues to create a responsive system [2002: 357]. The result is that rather than managing for a single, optimal state, a range of acceptable outcomes is focused upon that all are considered substantial improvements. Managers should accordingly be flexible and focus upon institutions and opportunities to reach out for these acceptable outcomes whenever windows of opportunity emerge. Actively searching for these windows of opportunity is required and collaboration and participation are part of this approach as is a flexible attitude towards procedures, institutions. In this approach learning through experimentation is emphasized, while the comprehensive, scientific approach focuses on the knowledge base and certainty. Unexpected outcomes are not so much considered failures however a signal calling for new rounds of experimentation [Lee, 1993]. One might conclude that recent experimenting is about efforts to combine top down comprehensive and rational IWM with bottom-up, stronger action and result oriented and pragmatic AUWM. The issue oriented approach in urban water management as presented in table 4 illustrates this new pragmatic attitude. Finding the connection between two paradigms, balancing the efforts and keeping the balance will provide the urban water managers with a challenge for the coming years.

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