Embedding economic drivers

in participative water management

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Abstract

Country location influences the institutional surroundings of the infrastructures related to water systems. In the Netherlands, water management has its own particularities. Temporarily inflow of affluent water from the rivers or the sea resulted in a highly developed institutional setting based on flood risk prevention. From an economic perspective, managing water is about allocating and using water in an effective and efficient way. This article deals with the coordination problem related to multi functionality of water systems. 'Allocation efficiency' is the issue. The diversity of water systems such as rivers, lakes, ditches or groundwater is multifunctional and within the systems, demand is competing. Decision makers should be aware of the different aspects of infrastructures that interfere with water systems. Further on in the decision-making, these aspects need to be valued. This may be done explicitly (for example in a formal cost-benefit analysis) or implicitly. Implicit valuation takes place when the outcome of a choice is expressed without an explicit weight and value of the effects a project has. The focus of this article is on economic drivers that express values to decision makers and thereby may stimulate the implementation of planned water projects. The problem addressed here is how these economic drivers may be institutionalized and what

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institutional (re-)designs are necessary to organize the coordination problem related to the multi functionality of water systems. It is part of participative water management that, under the name of Joint Planning Approach (JPA), is developed during the 'Freude am Fluss' international project that aims at formulating and realizing adaptation strategies in water management, specifically the realization of more space for rivers.

Key-words: water management, public participation, multi-functionality, economic drivers, institutional design, Cost-Benefit Analysis, Joint Planning Approach (JPA).

1. Introduction

The Netherlands are known for their water management practices. Obviously, this is resulting from an economy located in the delta of the rivers Rhine, Meuse and Scheldt. Country location influences its institutional surroundings, which means that also water management in a different setting has other particularities. High water levels of rivers or the sea resulted in a robust institutional setting concerning flood risk prevention.

From an economic perspective, managing water is about allocating and using water in an effective and efficient way. In this respect three main levels of decision making can be identified:

- the international level (with countries and supranational organizations);
- the national level (with governments and stakeholders);
- the level of the individual (with users like consumers and producers).

This article deals with the efficient allocation of the many functions water systems provide. In other words, the coordination problem related to multi functionality of water systems is at stake. For example, a river, or one of the many other types of water system, may absorb waste streams (cooling water, polluted waste water) in competition with ecological and other economic activities, such as production of drinking water.

From an economic point of view, clean, fresh water can be interpreted as a scarce commodity. Scarcity of water and water systems is sometimes reflected in the prices users need to pay, or in collective resources (collected taxes), governments provide

money out of. Increasingly, water managers allocate natural resources of a water system on the basis of the value of water systems. This means that decision-makers should be fully aware of all these values connected to a water system. These values may be explicitly reflected in a market price or implicitly acknowledged by means of meeting qualitative or quantitative standards. For decision-makers, this issue of getting a complete and accurate understanding of the value of water systems is crucial, but generally, information asymmetry is at hand. The policy makers are often not fully aware of the costs and benefits of each separate function a water system possibly may fulfill. Besides, stakeholders want to take their role in the decision-making process that precedes the acknowledgement or rejection of the functions a water system may fulfill in the future or against which costs this will take place.

These values can be explicated by the involvement of the public or representing stakeholders within decision-making processes (Van Ast and Boot, 2003). Nevertheless, decision-makers can never be sure that the outcome of public participation in terms of value is realistic for the full range of values of the water system. How can policy makers be assisted in this complex and dynamic challenge of getting ecological values incorporated in a balanced way? Not only economic and ecological functions are at stake, but also social and cultural values have to be considered. What are the rules of this allocation game?

2. Contents

The importance of economic drivers that can stimulate implementation of planned water projects is high (WMO, 2006). Creating more room for rivers is necessary to reduce climate change induced water levels. Realization of projects that aim at giving back territories to natural systems however is extremely difficult in terms of costs and culture. The ‘Freude am Fluss’ (FaF) international project aims at improving and smoothening the realization of ‘Room for Rivers’ projects. A basis stream of research within the project deals with participative water management that is developed under the name of ‘Joint Planning Approach’. One of the research objectives of FaF (2008) is the identification of economic drivers that can foster realization of these projects, including the institutional

arrangements that can embed these drivers. Figure 1 shows the different steps in the FaF-project, that were taken to develop a JPA that includes public and private values. Explication of these values can function as necessary economic drivers for the realization of water projects. The JPA should assure that economic, ecological and social values that policy makers aim for, are integrated into regional planning. This integration is approached from the perspective of the process of institutional design that policy makers are key actors in.

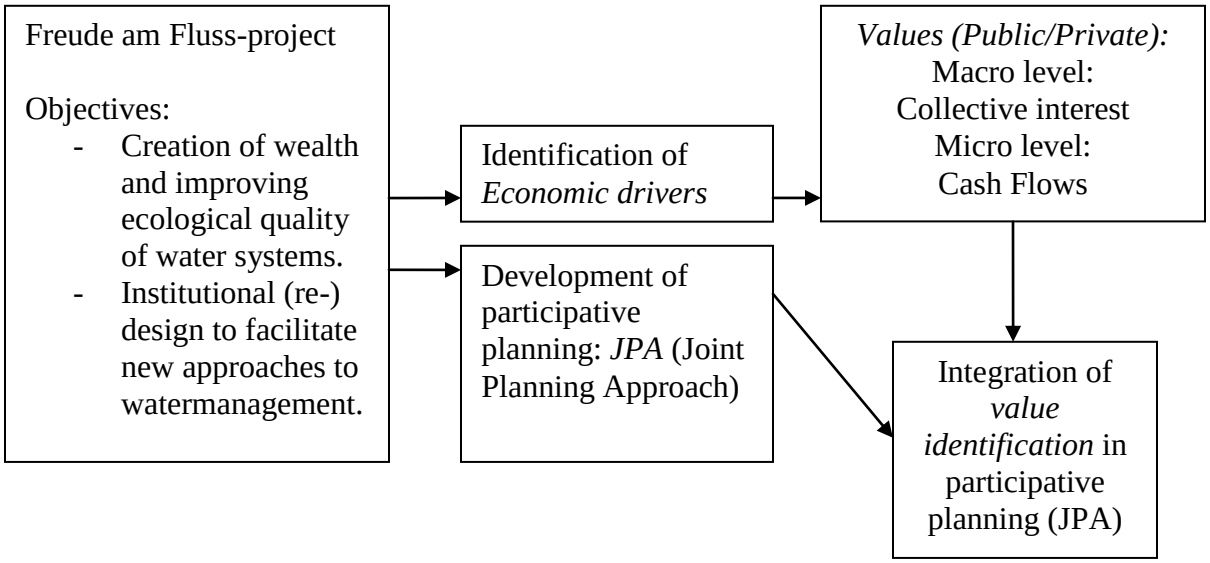

Figure 1, economic drivers and the Joint Planning Approach

After the introduction of the subject and the contents of this article, section 3 describes the framework of interactive policy-making JPA. Further the economic drivers of managing multifunctional water systems and the infrastructures that contribute to or even co-create the multi-functionality are elaborated. In many cases the water system is accompanied by infrastructures that play a key role to provide the services to the people. This is the case for infrastructures related to functions such as providing drinking water, sanitation and transportation. The difficulty of reflecting the total economic value of water systems in decision making is discussed in section 4. To illustrate the concepts,

firstly, in section 5 a framework is presented, in which economic drivers can be captured. This is illustrated in a case study, presented in section 6. Finally, in section 7 conclusions are drawn and practical recommendations are presented.

3. Joint Planning Approach

The Joint Planning Approach (JPA) is developed within the Freude am Fluss-project (FaF, 2008). It incorporates the idea that the performance of water systems has an ecological, a social and an economical dimension. It assists the capturing of the total economic value of innovative regional planning by measuring the economic value realized by managing the multi-functional dimensions of water systems. If innovative regional planning implies a sound combination of, for example the housing function of riverbeds (like the use of floating houses) and the transportation function (transportation by boats and transportation by trucks over roads), a net economic benefit should be gained.

In general, the Joint Planning Approach (JPA) provides an action oriented framework on how authorities, local communities and private actors can organize the planning process from the earliest stage of problem identification up to the agreement on what measures to implement (De Groot, 2008). Additionally, the JPA facilitates the design of institutional arrangements that embeds the values (framed as economic drivers) related to concrete measures that shape regional in combination with its river systems. In the FaF-project, this framework is applied to regional planning along rivers. The term ‘joint’ implies that all morally considerable actors that are involved in causes, effects or solutions of the problem are also involved, directly or by representation, in the planning process. These actors are referred as stakeholders and are regarded as the ‘morally considerable entities’. This includes individual people but also future generations, and the elements of nature that are recognized, e.g. in policy documents, as carrying intrinsic value. The representation can be directly, e.g. as a farmers group representing involved floodplain farmers or indirectly, as an NGO representing the interests of nature. However, representation may imply that also governmental organizations take part of the planning

process because they are democratically vested to represent all kinds of values the protection of which individual people cannot easily organize (the 'common good' or 'system-level rationality') or tend to forget in the midst of the affairs of daily life.

JPA should help in realizing inclusive planning that involves a broad set of stakeholders that depends on the perception of the problem, its causes, effects and solutions. No standard lists of participants in FaF can be provided. Because perceptions what the problems and possible solutions are to manage a river and its direct surrounding may shift over time. The possible technological solutions with its challenges and threats may evolve. Also, the political context may change and consequently the policy approaches towards managing water systems. The Joint Planning Approach is based on a number of principles emerging from various scientific disciplines (De Groot and Lenders, 2006). Crucial is the contribution from ecological science with insights and new concepts of non-equilibrium ecosystem behavior (Smits et al., 2000). This has triggered notions of 'adaptive management', that do not aim to fix ecosystems in states of presumed climax, but aim to maintain ecosystem quality, for the benefit of people and nature alike, by way of intensive monitoring and flexible responses to change (e.g. Holling and Gunderson, 2002). Adaptive management should be guided by a long-term vision in order to prevent that the sum of many small adaptive steps could end up in an undesired overall result. In this respect policy approaches such as 'room-for rivers' is incorporated into the plans that result from the FaF-project. JPA may be coined as a practical guideline but the relationships it builds upon are derived from theoretical insights into the combinations of variables that affect the incentives and actions of stakeholders in water systems (Ostrom, 2007). The JPA builds upon strong relationships between the Resource systems (the geographical area with its water and landscape), resource units, governance system and users of the resource systems. It are these relationships that frame economic drivers into variables (institutional arrangements) that build the governance of rivers.

De Groot and Lenders (2006) brought forward in the FaF-project that in the social sciences, resistance against the seemingly irrevocable logic of the Tragedy of the Commons (the idea that communality of property can only lead to destruction of that

property; see for instance Hardin (1968)) has led to increased insight that local communities can be quite successful in the management of their common resources, and the conditions under which this is possible (e.g. Ostrom 1990). At the same time, however, local communities cannot easily be entrusted with monitoring and management of systems far beyond their spatial scale, such as sea-wide fisheries or whole river basins. The combination of new drive for community-based work and the limitation of community capacities has led to the rise of 'co-management' (or 'collaborative management', or 'joint management') as a central concept for empirical study, management ideas and theory-making. In co-management, local actors and supra-local agencies share visions and divide roles in the management of a given resource, in styles and balances depending on the resource itself, its local and supra-local functions, and the local and supra-local management capacities. See for instance Borrini-Feyerabend et al. (2004) for a general exploration and Wilson et al. (2003) reviewing the co-management traditions existing already in the fishery sector.

Concurrently in policy and political science, approaches have emerged that rather than viewing policies as mechanistic models of inputs and outputs and viewing politics as a mere competition between opposing programs. In a broad system perspective, with the world as a complex system, learning, feedback and adaptations take place through highly linked, self-organizing networks. This makes it easier to understand how collaborative dialogues function and produce innovative actions. See for instance Hajer and Wagenaar (2003) for an overview. A sufficient level of social capital (organizational density and mutual trust within communities and between communities and government) is an important prerequisite for such dialogues to be successful, but at the same time, research has shown that social capital can also be produced during the dialogues themselves (e.g. Ostrom 1990). The latter may be of special relevance for societies in transition, where social capital tends to be low; see for instance Chloupkova et al. (2003), comparing social capital in Denmark and Poland. In these terms, the JPA can be characterized as an approach for the adaptive, vision-guided collaborative planning of river sections, in a framework of room-for-river policies.

The JPA is composed of a number of public planning steps. They vary much in weight and content in each actual planning situation, but the steps give the JPA its basic structure. The process starts with a 'step zero', in which the initiators internally design the envisaged JPA application of their local situation. Then follows the real (public) planning process, ordered in six steps. The whole of the process is formulated as:

0. Preparing the JPA application
1. Mutual learning
2. Shared visioning
3. Rules and institutions
4. Joint options exploration
5. Joint design and decision-making
6. Towards implementation.

Especially from the step from visioning towards a realistic project is depending from the existence of economic drivers. This means that the identification of economic drivers that can fire up the JPA-process is of utmost importance. Typically for the approach is that the JPA generates technical plans but also helps in creating the institutional context in which these technical options can be implemented. For example, sometimes the permitting processes should allow for a regional plan along with some interventions in a river like the location of a windmill park or new infrastructures that facilitate transportation of goods and electricity. Political will may force current permitting procedures to change. Conflicting values needs to be settled in a JPA and the outcome embedded by means of a institutional (re-)design.

JPA has been practiced in areas in France, Germany and The Netherlands. The standardized interactive methodology shows remarkably positive results in terms of understanding under stakeholders (FaF, 2008). Policy makers in different countries may have different opinions about the relevance of some economic drivers, the values behind these drivers and how these values become drivers behind concrete projects in regional planning. Some policy makers may want to perform a Cost-Benefit Analysis (CBA) by means of using a single decision-making supportive technique and present a net benefit to

societal welfare. Other policy makers want to aim for some specific economic benefits for a sector (for example, transportation or housing) and represent this stake in the decision-making process. JPA acknowledges this diversity up to some degree by stimulating participation of (often local) stakeholders. Also, JPA makes explicit that the rules of the game that guide the stakeholders in their policy making are not static but may change as result of the planning procedures. It acknowledges the dynamics in relevant values and the governance of a water system (Kuks, 2002; Hoevenaars, 2004; Oosthoek, 2006). JPA may increase these dynamics itself and shapes the institutional context of managing river systems.

4. Economic drivers

As has been mentioned, one of the objectives of FaF is the identification of economic drivers for 'room for the river' solutions. To explore economic drivers in relation to integrated water management a variety of approaches are of interest, each of which contains different elements. A distinction can be made in different types of benefits for society, different functions of the river system and several values of natural systems.

The focus on a more holistic approach to water management as a water system results in the balancing of economic, environmental and social benefits for a wide set of stakeholders.

a) Economic Benefits

Economic benefits reflect the creation of welfare in a society and can be divided into goods and services of freshwater ecosystems. Economic goods include water (for drinking, agriculture, cooling, production etc.), bio-products (fish, shellfish, plants) and resources (clay, sand). Economic services include flood control and water quality control of river plains, wetlands and watersheds (including forest landscapes) and tourism. The classification of an impact on welfare is strongly related to the economic valuation process.

b) Ecological Benefits

Ecological benefits focus specifically on increased biodiversity and protection of rare species in river basins. These environmental benefits include river basins as living space for species like fish and birds, diversity of river landscapes (forests, wetlands, floodplains) and dynamic ecosystems (nutrient rich, versatile). The classification of ecological effects as benefits is strongly related to the definition and interpretation of ecological quality.

c) Social (and cultural) Benefits

Social benefits include elements of enjoyment related to nature (recreation and tourism, living space) and sustainability aspects (future generations), but also social justice and equity. The positively perceived changes in the allocation of economic benefits and costs to specific stakeholders are strongly related to the adoption of certain policy principles, such as the Polluter Pays Principle.

It this respect, it is important that in most cases the realisation of regional plans have benefits for the society that are neither pure economic, social or ecological. The impacts cannot be captured within one dimension for all stakeholders. The key of integrated water management is to approach the water system as a whole, from upstream to downstream, and balancing upstream-downstream stakeholder interests and needs. Table 1 illustrates the different combinations of the potential variety in impact on the benefits.

Plan alternatives (example)	Economic benefits	Social benefits	Ecological benefits
1	X		
2	X	X	
3	X	X	X
4		X	X
5			X
6		X	

Table 1: Example of water system performance: three dimensions of the potential impact of regional plans.

In the Netherlands several institutions are involved in realising new approaches in water management. The key drivers are governments, non-governmental organisations (NGO's) and academic institutions, often in close collaboration with each other and with the private sector. A good example is the Freude am Fluss (FaF) project, of which a key component, JPA, has been mentioned extensively. Involving many institutions in these kind of projects results in spreading of the new introduced approaches. JPA aims at identifying the economic drivers for a management approach to rivers and the design of institutions that transform economic drivers into the identification of current and future cash flows related to these drivers. By using this approach economic drivers may become financial drivers for individual stakeholders.

A practical example of the identification of economic drivers is the 'One Europe More Nature Program' of the World Wide Fund for Nature (WWF). WWF is collaborating with local knowledge institutes, governments and the private sector in river basins in 6 EU member states to identify, create and communicate practical examples of alternatives for rural development in Europe, that are good for people and for nature. At the foundation of the project is the Living Rivers concept aiming at conserving nature from source to sea. For example in the Netherlands, WWF is working with Stichting Arc in the Rhine river basin in the Gelderse Poort, where a new economy is being built that is not only also creating new jobs, but also helps to restore ecological processes and landscape quality.

From the perspective of the physical system, in this case the river system, different functions can be identified. Economic drivers are based on the value people attribute to the different functions. From the perspective of society, economic drivers refer to the perceived benefit of a value that actors attribute to the consequences for them of a decision affecting the river system. These benefits can be assessed from two perspectives: those benefits that accrue to society as a whole (macro-economic drivers) and benefits that accrue to individual stakeholders (micro-economic drivers). Table 2 summarizes the main drivers in relation to the functions of a river system.

1. Macro-economic drivers; **Economic gains related to:**	
Water quantity (inclusive ice)	- Prevention/mitigation of floods - Prevention of drought
Water quality	- Improved water quality for different functions like drinking water and agricultural water
Erosion control	- Control of land slides and sedimentation of rivers
Landscape beauty	- Beautification of the landscape/urban area with water bodies
Ecological value	- Improving nature development and increasing biodiversity
2. Micro-economic drivers: **Cash flows and value increase related to:**	
Industry: production water	- Water quantity: More availability of water to hydro-electric companies, industry, drinking water and bottling companies - Water quality: Improved quality of water as production input for industry,
Industry and electricity production: water for cooling	- Water quantity: Availability of water to hydroelectric companies and industry. - Water quality: Improved quality of water to ensure cooling water input for industry and electricity generation
Hydropower production	- Water quantity with a reasonable quality to use as intake for generators
Drinking water and bottling companies	- Better water quality with less efforts in purification
Erosion control	- Less siltation of rivers increases availability of water as a production input to bottling companies and hydro-electric companies, and less siltation of the beds of rivers as transportation systems for the

	shipping industry
Clay mining, gravel extraction and brick factories	- Improved clay mining leading to improved water retention and improved corporate image of clay mining industry
Sand extraction	- Sustainable sand extraction leading to restoration of ecological process and improved corporate image
Tourism and recreation	- Increase of nature-based tourism, recreation: sailing, rowing, hiking etc. and hospitality (hotels)
Fishing and hunting	- Increasing value of recreational fishing licences, water bird hunting rights
Products of nature	- Increasing use of wood, tree and reed stems, 'green' vegetables
Agriculture	- Increased availability of water for irrigation and watering in dry periods, water for drinking of cattle; sediments for soil improvement
Building	- Increasing availability of sediments for heightening of land for building
Housing industry	- Increase of housing prices in nature areas
Transport	- Increasing space for navigation, pipes and cables

Table 2: Examples of macro-economic and financial drivers of new water management approaches.

If the benefits that people attribute to the above mentioned functions are associated with real cash flows, the economic drivers are simultaneously financial drivers. However, many economic benefits and costs are not associated with direct cash flows. For example, the value of a house may increase as a result of regional planning, but as long as the house has not been sold, the gain is not associated with 'real' cash flows. On the other hand there is an increase in property tax, which shows clearly the increased value. Another example is the increase of recreation activities around an upgraded river system. This is generally not associated with any actual cash expenditure, since the river is freely accessible to all. However, indirect economic activities that could be the result should

also be taken into account. Revenues from transport to the area or increased mental wellness resulting in higher productivity can surely lead to an implicit increase of economic value and hence should be taken into consideration as an economic driver. It is often regarded as a pitfall that many cash flows are not clearly visible. In the determination of the economic feasibility, innovative ways of integrated water management may be regarded as economically unfeasible due to a lack of insight into the true economic value of regional plans that create more room for the river in an integrated way.

With respect to the value of water systems and water in specific, some reflection should be added about the special position, water has in economic sciences. Obviously, treating water as an economic good can have large advantages in optimizing water scarcity issues. For other goods and services that water systems can deliver, the efficiency improvement can be expected. Nevertheless, water delivers very special services and water is certainly not a 'normal' economic good. Table 3 compares the different attributes of water to other important commodities.

	water	**air**	**land**	**fuel**	**food**
essential, vital	+	+	+	+	+
scarce, finite	+		+	+	+
fugitive	+				
indivisible	+				
bulky	+	+	+		
non-substitutable	+	+	+		

Table 3**:** Comparison water and other commodities, based on Van der Zaag and Savenije (2006; pp. 14)

Amongst others, Van der Zaag and Savenije (2006) state that just letting the market decide upon the price, does not result in the most favourable allocation of the scarce good 'water'. They argue that water should have a set price. This fixed price sends out a message to all users that water is a scarce good and should be treated that way. Their view on the economics of water is pragmatic, implying informed choices of use. Applying this approach to all other values water systems can deliver, means that prices

should not depend on the market. Putting fixed prices can help people in understanding the need for a change in their approach to water management. Often, water is still seen as an enemy that can do a lot of harm, neglecting that water is essential for human survival and a special commodity that should be treated that way.

Besides, other types of values can play an important role too. Social, cultural, religious and historical values that can not be translated easily in financial terms can be distinguished, next to issues related to risk. Also the intrinsic value, that by definition does not have any relation with (economic) use, should also be considered. Regarding the socio-cultural value of water systems, The Netherlands as a country provide an outstanding illustration. The Dutch have been fighting against water for centuries. Water history has been dominated by a battle against the water of both rivers and sea. Many practices of water management reflect the incorporation of these kinds of socio-cultural values, like the habit to discharge water into the ocean as fast as possible. The proposed measures in the 'Room for the River' program entail a fundamental change in attitude towards water management in the Netherlands. Instead of fighting against the water, the paradigm is changed in living with water. This includes that the water is given more space and should be retained longer in certain areas, meaning a loss of land in this highly populated country. The history of fighting against water has much influence on how people feel about the proposed measures in the 'Room for the River' project. A fundamental change in attitude is not likely to happen overnight.

Socio-cultural value can also be illustrated by the essential role water plays in major religions around the world as a sacred gift of God. Religious interpretations and rules about ethically adequate use of water can strongly influence water management practices, but for that matter does not seem to have much influence in 'Room for the River-projects'' in Western Europe. In contrast, risk issues do have much influence on people's attitude towards water systems and hence the value they attribute to the functions the water system delivers. Research by Klaveren and Oostdijk (2002) found that especially the place of building the house, i.e. on a safe position, is important for the feeling of safety. Highly visible dikes can also increase this feeling of safety. On the other hand,

misleading or unclear information decreases the feeling of safety experiences by inhabitants.

In the empirical research of Broekhoven et al. (2006) peoples values with respect to how The Netherlands should protect itself in the scope of the policy concept of Space for Water were investigated. When Dutch people are asked how they think the Netherlands should protect itself against rising water levels, they respond that a combination of measures should be executed. The majority supports the heightening, enlarging and maintaining of dikes. Only a rather small minority of informed inhabitants supports the creation of retention areas, emergency runoff and reservoirs as risk decreasing. Only very few people name giving more room to the river or using nature as a protection option. It is clear that this 'dike-culture', in which dike protected land is valued high, is a large obstacle for 'room for the river'-projects.

On the other hand, many interviewed people consider conservation of historical landscape very important (Klaveren and Oostdijk 2002), even when dike heightening is necessary from a risk perspective. Here the intrinsic value of historical elements in the landscape, of nature and of beauty comes to the surface. In a strict sense, intrinsic value can be defined as the value that is in the object itself, not depending on human valuation. In a more practical meaning it refers to the value for people not depending on practical use (Bouma and Saeijs, 2000). Protecting a historical dike is a good example of an instiutionalised cultural value within water management.

The rules of the allocation, or economic processes, are referred to in the institutional-economic theory as institutions. Since the re-emergence of institutional economics in the seventies of the last century, the role of contracts within transactions has been the main unit of analysis. Amongst others, Williamson (1999) describes the importance of organizations within a market economy. Besides relative prices also organisational elements, as formalized in contracts, are taken into account. By introducing organizational and context dependent elements in economic theory, recent research is broadening the institutional perspective on economic development. Contracts can be seen

as the institutionalization of norms, values and beliefs that provide rules-of-the game for the economic processes in a society. In practice the design is very difficult because of its complexity. Many actors may be involved, all having their own values, norms and perceived risks related to the final outcomes of the contract. In the case study this will be further explored in section 6. But first, in section 5 a framework for the design of the institutional arrangements dealing with economic drivers is presented.

5. The institutionalization of economic drivers

In order to explicate the economic drivers behind Room for the River-projects, a guideline developed in the FaF-project (Van Ast et al, 2008), can be applied by decision-makers. Taking these steps, divided in three main steps, stimulates the implementation of 'Room for the River' in practical cases.

Step 1: Create a policy setting that links regional planning with river management (both water quantity and water quality control).

Formulate a formal statement in which the multi-functionality of rivers is acknowledged. The link between regional planning and river management should be organized. The following questions may be raised to the relevant stakeholders of the policy process:

1. What are the physical, social and ecological effects of regional planning? To what extent represent these effects a change in the total economic value of the river and for who are these economic drivers relevant?
2. How can the decision-makers account for the total economic value?

Step 2: Identify and/or (co-)design cost effective projects that enhance the concept of room for the river (a multi-functional approach to rivers).

The set of projects can for example consist of the construction of houses and dikes. The set of projects should have as a result that the river keeps performing its essential functions, together with its economic, social and ecological gains and losses.

Step 3: Design of an institutional arrangement that creates drivers for stakeholders based on the generation of economic gains.

Four types of institutional processes are of main importance:

1. The establishment of an organisation that enables decision making processes (participation of stakeholders and regulated use of formal costs-benefit approaches, Public Private Partnerships);
2. The development of clear policy and regulation, with rules in a project plan to create space for the river;
3. The release of resources like cash flows, labour and machines;
4. The use of a suitable mix of juridical, economical and social policy instruments. If financial instruments like subsidies and levies are possible, they can go together with the accounting practices at macro and micro level, which enables interaction with stakeholders. As a result stakeholders can be informed about the impact of the regional plans on their costs and benefits. This does not necessarily have to be in the form of a formal cost benefit analyses.

Through answering the questions in step 1, (policy setting) the gains and losses are identified and quantified in economic terms in the decision making process. Decision-makers should decide on how these economic costs and benefits are to be integrated into the decision making process. It is suggested that the following approaches/tools are to be applied:

- The use of Societal Cost Benefit Analyses (SCBA) with explicit valuation of social and ecological gains and losses: the economic value is calculated by using a valuation technique the participants of a decision making process accepts. Clearly there are differences among a decision-making process which values may be expressed in monetary terms and which not.
- The use of Societal Cost Benefit Analyses by presenting only those gains and losses represented by market prices. Those gains and losses that are not integrated into the SCBA should be identified and integrated into the rules of the allocation game. Hereby some weights can explicitly be given

to certain aspects of the value of water systems. For example, strict safety norms and quality standards of drinking water.

- Participation of stakeholders in the decision making process that integrates their economic gains and losses as stakes into the assessment of plans. . The stakeholders may present their own accounting formats for performing their cost-benefit analyses (so-called private cost-benefit analyses).

Step 2 (design of measurements) shows that river management and regional planning can enhance the integration of economic drivers by creating policy instruments that integrate the economic drivers into decision making processes based on regulatory push factors (such as levies paid by stakeholders who enjoy some functions of the river) and or creation of financial stimuli (creation of markets for attributes of the regional planning approach such as floating houses, increased market value of housing, revenues of concessions for fishery or drinking water concessions).

Step 3 considers the institutional embedding of the drivers. The following case study explores which economic drivers exist for new water management approaches related to spatial development. How these economic values are distributed among the different participants of the decision making process and integrated into the decision making process. This three-step guideline contributes to analysing if economic drivers are strong enough to push forward the concept ‘Room to River’ into the implementation of practical water management projects. Afterwards the development of institutional arrangements is mentioned that may increase the role of these economic drivers.

6. Case The Island of Brienenoord

Within the concept ‘Room for the River’ many different types of specific projects and measures are developed. In this case study a project is presented that combines different functions of an area within the riverbed. After describing the background situation of the

area and making a stakeholder analysis, we apply the earlier presented three step-model, developed for capturing the total value of a planned project to stimulate implementation.

History and physical, social and ecological effects of regional planning

Originally the island was a sandy dune that came to the surface of the river and was artificially heightened in the 19th century to become an island. The 21 hectare island was bought by the baron of Brienen in 1847, who started a salmon fishery on it because the main fish market, Kralingseveer, was just on the other side of the river. The year 1880 was the peak of the Rhine salmon fishery with around 100.000 salmon traded in Kralingseveer alone.The highest point of the island was built to keep the horses that were used for transporting the fishing nets. During the economical crisis of the 1930's, the island was hired by two institutions that helped the unhealthy people of the packed labour district in the south of Rotterdam. In the second world war, the Germans accepted small private gardens for food production and those stayed ever since. On the east point, the south pillar of the Van Brienenoord bridge has been built. This is also the place where natural processes resulted in a (small) marshy area with willows, reed and sandy beaches. Since 1989 most of the island is public space and earmarked as an area for further urban development.

Project plan and measures

In 1993 the World Wide Fund for nature published a new view on the wetlands in the Rotterdam (WNF, 1993). The island of Brienenoord is considered highly potential for nature development along the river and within the city. In 2000 the municipality signed an agreement (covenant) with WWF to develop an integrated plan for a combination of building and nature. At the east side, under and around the bridge pillar, a fresh water tidal system could be developed and be combined with recreation facilities. The area already has a function for nature education and educative hiking trips; since 2000 'wild' cattle is freely grazing the terrain. At the west side, near to the small connecting bridge, a hotel is planned.

Based on this covenant architect company Waardenburg draw a plan that was presented on 14 February 2002 in the community council. One day earlier, on February 13th, WWF retreated from the covenant because, as it states, the plan leaves not enough space for

nature and its further development. According to the plan a 180 rooms hotel complex with conference facilities and around 55 expensive apartments should be built on the west side of the island

Although the project (the *master plan*) was not realized in total, a number of separate measures were realized. In practice, discussions may arise which measures were generated in the scope of the master plan and which measures were initiated as a result of other initiatives. Still, as long as they support the mission and realization of the *master plan* they may be considered. In this respect typical examples are to be listed in the area of infrastructures (roads, bridges, etc.) and nature development.

Some specific measures of the master plan are:

- Construction of a hotel and its facilities;
- Reconstruction of bridge;
- Quay (transportation of visitors and temporary stay of boats for the commercial transportation in front of the isle);
- Nature friendly development of the river bank with reed and willows (planting of willows, reed, …).

Three step-model

In order to create the institutional arrangements that can contribute to capturing the total value of the project, the earlier presented three step-model has been applied. After formalizing the rules within the project (step 1), the gains and losses are identified and quantified in economic terms in the decision making process. Decision-makers should decide on how the economic costs and benefits are to be integrated into the decision making process. It is suggested that the total economic gains should be identified which may be accounted for in the decision-making process that proceeds to the implementation of the project or only some parts of the project. In practice the original plan may not be implemented but only parts of the project (eg. specific measures) may be realized. This is in fact the case with the *Island of Brienenoord*. It is assumed that project alternatives are assessed and that only cost-effective alternatives will be implemented (step 2). The next

step, design of institutional arrangements (step 3) has never been executed here. The case study should have been followed up with an analysis of the institutional arrangements that embed the economic drivers in the decision-making process.

Total economic value, economic and financial drivers

In order to obtain understanding of the economic drivers behind the project, a formal cost benefit statement according to the procedure designed by the Dutch research agency STOWA (see www.mkbainderegio.nl) has been arranged. Herewith the separate costs and benefit items could be identified in a cost-benefit framework with accounting rules and the integration of institutions in a public-private partnership. This explicit way of presenting the outcome of a societal cost benefit analyses indicates that the proposed project (Brienenoord plan) results in a welfare increase of 21 million Euros.

Despite this net gain at a macro level, the project was not implemented. Only some minor parts of the master plan are realised (building of a small bridge and a quay for recreational boating). Major parts of the plan were rejected because of the institutional arrangements related to the financing of the projects (potential hotel owner should cover the financial risks) and the processes of permits related to:

- spatial planning;
- exploitation of hotel and other recreational and nature development of the area;
- temporary storage of dangerous gasses (in boats) along the island.

The arguments for individual stakeholders to retreat from the plan were:

- WWF:
    - expected extra nature value is too low.
- Inhabitants of nearby houses (directed located at river):
    - the 70 meter high hotel will take away the river view.
- Real estate developer:
    - Potential financial risks in a period of economic recession.

Before the project is to be implemented, a number of conflicts among stakeholders need to be solved. This would imply far-reaching and probably unrealistic institutional redesigns. The case study shows that institutional design is needed at the level of individual stakeholders (the rules that define a project as financial acceptable or not). These rules are embedded in a context that imposes these financial thresholds. Also, the decision to express ecological values in monetary terms or not, can be perceived differently among stakeholders. These perceptions may even change in time for one stakeholder. Besides, conflicting interests among the stakeholders may hinder the implementation of the plan, reflecting a distributional issue of the costs and benefits. Institutional re-design can only overcome this hindrance with enough political power to overrule one or more stakeholders, with or without financial compensation for those who face the costs of the plan.

7. Conclusions and Recommendations

Economic drivers can be found in macro- (welfare) and micro- (cash flow) level and can be divided into implicit and explicit values. Economic drivers that manifest themselves as cash flows theoretically are also reflected at a macro level. However, by far not all macro economic drivers are presented as cash-flows at a micro level. This integration of macro economic drivers needs to be integrated into the decision-making process by policy makers who want to stimulate projects with a significant macro economic added value and that are expected to be realized or at least accepted by non-governmental actors (such as individual project planners, households or companies). This integration can take place by means of participation. Each participant can push forward its own perceived added value or loss of value the project implies to him or her. The presented case study shows that if parties can express their costs and benefits, this does not guarantee that a project with a net macro economic added value will succeed. The distribution and differences of the perceived uncertainties about the costs and benefits may hinder the implementation of a project. Again, this added value does not necessary mean a cash flow related to this benefit. Additional rules of the game may integrate these values and express their perceived significance to decision-makers. Most extremely, certain values can be

safeguarded by compliance to strict legal rules. However, the case study shows that conflicting values and distribution of values and costs may not always be overcome by institutional (re-)design.

Also, macro-economic values can be transformed into cash flow related drivers. Capturing the total economic value may stimulate the design of new institutional Arrangements. A Societal Cost Benefit can be of help to find the appropriate economic drivers. Each macro economic driver may ask its own institutional arrangements. Some may translate these drivers into cash streams. But economic drivers do not have to be as of definition cash related, before being regarded as economic drivers. The establishment of specific institutional arrangements that enhance to transfer implicit values at the macro-level to explicit cash flows on the micro level should be stimulated. For this the following recommendations can be given.

- *Increase the transparency in standardized costs and benefits (arrangements that for example create a website at the level of water board;*
  (see STOWA, www.mkbainderegio.nl);
- *Mobilize a project developer for realization of housing and recreational values (facilitate and speed-up the process of permitting);*
- *Scan relevancy of recreational value increase and mobilize potential benefits (hotels, restaurants, etc.) through arrangements that communicate to the often unknown (potential) stakeholders of rivers;*
- *Mobilize stakeholders with positive side effects with respect to health and ecological values: involve national government and down stream stakeholders in public-private partnerships (agriculture house owners, local communities and water boards, recreation sector). To identify these stakeholders a societal CBA can be performed with an orientation at the total river basin.*

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