

IWRM and Water Governance¹

- Striving for 'Incentive Compatibility' in the Water Sector -

Walter Huppert

Abstract

Integrated Water Resources Management (IWRM) and Water Governance: there are hardly any other topics that have drawn so much attention of water professionals in recent years. The reasons are obvious. Water is becoming a scarce resource in many countries and awareness is rising that this has serious consequences in many respects. The challenge of Water Governance is to reconcile the often conflicting water related demands made by different sectors and provide "the means by which order is accomplished in the relations between the various stakeholders in order to avoid potential conflicts and realize mutual gains" (Williamson). This calls for the ability to quickly analyse a multi-sectoral water system with respect to its "incentive compatibility". In other words, water managers need to gain a quick overview whether or not the governance of a water system applies rewards or sanctions ("the incentives") in a way that is compatible with the intended overall goals and objectives. An approach that allows a rapid appraisal of this "incentive compatibility" is presented in this paper. Its application is demonstrated with a practical IWRM case example.

1. Introduction

IWRM. Practically everyone working in the field of water management is familiar with this acronym. Indeed, since the end of the nineties, IWRM - Integrated Water Resources Management - has become synonymous with the progressive, future-oriented, environmentally sound management of water resources. IWRM, and the goal of managing existing water resources in an "integrated" way, are today an accepted creed among international water experts.

How could the call to practise integrated management of water resources become such a unanimous and all-embracing leitmotif for the water management of the future? The reasons are obvious: the dramatically worsening water shortages in many parts of the world pose new problems for various aspects of water management. The need to ensure optimum "production", allocation and utilisation of the scarce water resources is confronted with a large number of divergent demands and interests. Supplies of drinking and service water at rural and urban level, agriculture, fisheries, power generation, waste management, shipping, forestry, tourism and the conservation of water-related ecosystems - all are stakeholders who can rapidly become competitors for the scarce water resources that are of existential importance to all. This situation is further aggravated by the problem of water quality. In many places, rivers and streams are being transformed into receiving watercourses for waste water, creating major health problems, causing ecological problems and further restricting the availability of usable water.

The options of overcoming water shortages by increasing water availability, for instance by expanding existing storage capacities and transmission systems, by tapping new water resources and in particular by making greater use of groundwater reserves, are already exhausted in many places, and soon will be in others. Climate change seems set to worsen the problem. In situations like this, which affect developing countries in particular, the challenge is to find ways of making "optimum" use of the scarce, life-giving water resource, and of ensuring optimum distribution. Hence, the actual and future demand on water

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engineers is to widen their perspective and take into account these underlying conflicts of interest. This leads to the goal of "holistic" management of water resources, i.e. to integration and to balancing various claims and interests. The propagation of IWRM is the expression of this objective at the international level.

2. Understanding IWRM

The most frequently cited definition of IWRM is the one put forward by the "Global Water Partnership" (GWP). It reads as follows:

"Integrated Water Resources Management is a process which promotes the co-ordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems."

A list of aspects that ought to be considered in an integrated or coordinated manner within the framework of IWRM is presented, for instance, by SVENDSEN². This list calls for the integration / coordination of the following topics, fields and sectors:

- *Various sectors of water use (drinking water and waste water/sewage, agriculture, industry, transport, others)*
- *Administrative responsibilities*
- *Ground and surface water*
- *Human and ecological water use*
- *Demand and supply management*
- *Water quantity and water quality*
- *Land and water use*
- *Transboundary claims on water use.*

A closer look at this list allows to identify three distinct fields of integration / coordination:

(i) *Inter-sectoral integration*: the coordinated consideration and handling of different resource sectors and water uses with a view to achieving a common, supra-sectoral management (e.g. coordination between water uses for agriculture, domestic uses and ecology).

(ii) *Intra-sectoral integration*: the coordination of different aspects of management within a particular water sector (e.g. conjunctive use of groundwater and surface water in irrigation).

(iii) The coordination of roles and responsibilities of multiple actors at different levels of decision-making and administration (e.g. water managers at local, district and national levels).

Taken together, these integration needs result in the requirement to coordinate the interactions, i.e. the services and supporting services³ performed by multiple actors with

² Svendsen, 2001.

³ With the term "services" we refer to all activities, provisions and functions that are the subject of interactions or exchange relations between two partners (principal and agent; provider and client; customer and supplier; superior and subordinate staff etc.)

respect to water in various sectors. Such services may consist in directly allocating, storing, distributing or providing water and/or protecting the water sources and maintaining water quality or they may be supporting services that enable such interventions (e.g. planning, book-keeping, management of personnel etc.).

3. From Water Management to Water Governance

Considering IWRM, it is important to be aware of the meaning of the term "management". This term has both process-related and institution-related connotations. The former points to management functions like planning, controlling, organizing and leading. The latter makes reference to a group of individuals or a particular organisational arrangement ("the management") that has decision making authority and can issue orders and directives to subordinate organisational members. Here, serious misunderstandings may arise with regard to the management term used in IWRM. The claim of IWRM for an "integrated management" is often exclusively interpreted in a way that calls for one overarching umbrella organisation – e.g. a river basin agency - that assumes overall decision making power over the various sector related organisations. However, this must be perceived as only one option in the context of IWRM. Often also, sector organisations will retain their original role, mandate and sector related responsibilities while being called upon by IWRM to interact and coordinate closely with relevant other sector organisations. What is important in either case is the need to set up mechanisms that help to organize the relations between the different actors within and between the sectors in a way that allows for easy mutual adjustment of activities and appropriate balancing of conflicting interests. A wide variety of social steering mechanisms are possible to be used here. Depending on the situation at hand, such mechanisms may involve laws, regulations, market mechanisms, formal and informal agreements or also – as in the case of centralised agencies – hierarchical administrative mechanisms. Approaches and mechanisms like these, that balance out the interests of a wide variety of actors and align them with a common goal, are best being described using the term "governance".⁴ "Water Governance", in adaptation of the governance definition put forward by Williamson⁵, may be defined as follows:

"Water Governance is the means by which order is accomplished in the relation between the different stakeholders in the water sector in order to avoid potential conflicts and realize mutual gains in the context of IWRM".

4. "Incentive Compatibility" - Getting the Incentives Right

Following such an understanding of Water Governance, where order must be accomplished in multiple relations between many stakeholders, it becomes evident that effective Water Governance hinges upon two preconditions:

1. The governance mechanisms intended to "accomplish order" in the relations of certain stakeholders with other stakeholders (e.g. in the relation between the Department of Water with the Department of Agriculture; between the regional water engineer with the local water

⁴ To avoid an additional discussion about the term "governance" it will be taken for the purposes of this article to mean the collection of rules, pertinent implementing mechanisms and interactive processes which gear the activities of a large number of (relatively) independent actors to a common goal, and which coordinate these activities.

⁵ Williamson states that "Governance is the means by which order is accomplished in a relation in which potential conflict threatens to upset opportunities to realize mutual gains" (Williamson, 1996).

engineers etc.) so as to optimize IWRM, must be designed such that they *provide incentives* to these stakeholders to engage positively in such a relationship;

2. The incentives created by the governance mechanisms applied in multiple stakeholder relationships must be compatible with the overall goals or objectives set by the IWRM concept in question ("Incentive Compatibility"). E.g. incentives provided by water fee arrangements in irrigation must be designed such that they contribute to actual water savings in agriculture as a partial goal of IWRM (in contrary, water fee arrangements linked to area irrigated often provide incentives to use excessive volumes of water).

An *incentive* for a certain actor is understood here as any reward or sanction, which has as its effect a modification of the actor's behaviour. *Incentive Compatibility* is achieved if the applied incentives induce a change in behaviour that is in line with previously set goals or objectives.

Incentive Compatibility is a basic but widely neglected concept in water management and IWRM. Its importance is self-evident: if relations between multiple stakeholders are governed in ways that provide no (or even negative) incentives to the actors to behave in ways appropriate to achieve IWRM objectives, water governance will have dysfunctional effects. Therefore a simple analysis of Incentive Compatibility will provide a meaningful check of the potential chances of success or failure of given IWRM and water governance arrangements. Such an Incentive Compatibility Analysis (ICA) should include five essential steps (see also *Fischer et al, 2004*):

1. Specifying the IWRM goals and objectives
2. Determining the essential services and service relations within the network of multiple stakeholders
3. Identifying the applied governance mechanisms
4. Assessing the effectiveness of the applied governance mechanisms for incentive creation as well as the compatibility of the incentive provision with the specified goals and objectives.

Such an analysis can be established independent of the overall organisational context of the applied IWRM concept, whether it may be based on a centralised governance mode (such as a river basin organisation) or on a mode of decentralised but well coordinated sector organisations.

5. Case Example – the "Neste System" in Southern France

5.1 The General Set-up

Considering the following case example, attention should *not* be given to the organisational set-up as such – which in this case centres around a regional semi-public water management company – but to the mechanisms that govern the service relationships, the incentives created by these governance mechanisms and the compatibility of the incentive provision with the established IWRM goals and objectives.

The "Neste System" is a system of storage reservoirs, canals, small rivers and irrigation schemes that is located in the region of Midi-Pyrénées, in southern France. The hilly landscape in that region stretches from the south to the north and is interspersed with a total of 17 small rivers and streams, which, owing to the morphological structure, only have extremely small water-catchment areas. As a result, water flow would, under normal conditions, not be possible all year round. To improve the availability of water, both for

agricultural purposes and for drinking water supplies to the cities and local communities in this area, a link canal ("canal de la Neste") was built some time ago. This canal is fed by storage dams in the Pyrenees and carries water both to the river Neste and to the head of the other 17 small rivers and thus makes it possible to provide minimum flows of water even during the time of the year when these rivers would normally run dry.

The "Compagnie d'Aménagement des Coteaux de Gascogne" (CACG) is a semi-public company ("société d'économie mixte") that is mandated by the state to promote the development of the region of Midi-Pyrénées primarily through measures in the field of IWRM. CACG regards itself explicitly as a service provider to irrigation farmers, water supply companies and to the State (with respect to environmental services and the maintenance of state owned infrastructure). It claims to be one of the few large-scale, regional water management organisations that achieve full cost recovery in operating and maintaining its various sub-systems.

The overall goal consists in an effective and efficient IWRM in the region Midi-Pyrénées. Major objectives contributing to that goal are the following:

- a. Supplying water all year round to streams and rivers for different water uses (irrigation, water supply, industry)
- b. *Maintaining minimum flow rates in the water courses for reasons of environmental protection*
- c. *Ensuring effective and efficient management of parts of the region-wide irrigation systems on the basis of a concession by the state*
- d. Maintaining the entire (state owned) infrastructure of the Neste canal system in full working order ("sauvegarde du patrimoine national").

Looking at the water governance practices in the Neste Systems reveals particularly high incentive compatibilities. Given the limitations of space, we will highlight such achievements with only two examples that relate to objectives (b) and (c):

5.2 Maintaining minimum flows in the water courses

Objective

IWRM-objective (b) in the Neste System consists in maintaining minimum flows in the water courses during dry seasons for reasons of environmental protection.

Service Contents

The service "to maintain minimum flows in the water courses" can be regarded as a service provided for the state water agency (Agence de l'eau). This service includes appropriate management of the storage reservoirs in the Pyrénées and a well balanced water allocation to the various water courses. In addition to an absolute minimum flow of 4 m³/s, the cumulative total of a further 5m³/s (in autumn and winter, this figure is set at 6.5m³/s) has to be maintained in the 14 re-supplied streams and rivers at the point of entry into the receiving Garonne in order to sufficiently dilute the sewage waste that has been released. Minimum flows of this kind are enforced by the state for reasons of hygiene. Furthermore, account is thus taken of ecological aspects, such as the conservation of natural flora, as well as the concerns of the fishing industry.

Governance Mechanisms and Incentive Provision

In return for maintaining minimum flow rates, the water agency grants the CACG a subsidy known as "aide à la gestion des étiages" (subsidy for managing minimum water levels). This subsidy is financed from a water duty, i.e. a sort of tax paid to the water agency. This economic governance mechanism has positive incentive implications for CACG, for the state and for the general public and water users: CACG, not wanting to lose this subsidy will strive to live up to the given objective; the general public and the water users who all are interested to have environmentally healthy water courses, are ready to pay that tax contribution; and the state has the incentive to get the service provided to the public without a substantial burden for the treasury.

There is an additional governance mechanism in place to provide incentives for objective achievement: The CACG has a considerable incentive to maintain the agreed minimum flows in the water courses, since the level of subsidy provided to the CACG by the water agency is linked up with certain ideal hydrographic standards of water provision in the canal system, which are monitored directly by the state Department of Environment (DIREN). If the CACG fails to keep to the defined levels, it will face a cut in subsidy payments from the water agency. Consequently, the CACG has the incentive and makes every effort to adhere to the regulations governing water supplies.

The example shows that there is a high compatibility between the IWRM objective to maintain minimum flows in the water courses and the incentives provided by the chosen governance mechanisms to the various stakeholders.

5.3.1 Operating and Maintaining the Irrigation Perimeters

Objective

As mentioned above, CACG is commissioned by the state to achieve the objective of effective and efficient operation and maintenance of a certain part of the irrigation perimeters in the region. In fact, CACG has been granted a 10-year franchise for the water management of a total of about 70 000 ha of irrigated area. This franchise is extended automatically each year, unless the water users wish for some other arrangement.

Service Contents

The service of CACG consists in providing water at previously agreed flow and pressure rates to the field hydrants of individual water users. Thus, the CACG is responsible for operating all system components right through to the individual point of withdrawal and also for any maintenance and repair work. The special feature of this type of service provision is that the CACG has a direct service relationship with the *individual* water users and not with a user association. Nevertheless, the CACG still supports the respective associations in their administrative and bookkeeping activities, as an additional service provision.

Governance Mechanisms and Incentive Provision

The above services are funded by contractually agreed fees the irrigation farmers pay to the CACG. These fees cover the entire service package and are made up of a basic rate and a certain cubic-metre price. A key governance mechanism is to be seen in the actual concession that the state grants the CACG. A franchise agreement regulates the individual rights and duties of the CACG whilst a "Conseil Administratif", which includes representatives of important stakeholders, ensures its correct interpretation and implementation.

Water provision itself is agreed with each individual farmer separately within the framework of a contract governing the supply of irrigation water (contrat de fourniture d'eau d'irrigation). This contract covers the operation of all system components right through to individual field hydrants and corresponding maintenance and repair work by the CACG.

The incentive for the CACG to provide a good and reliable service centres on the possibility of the franchise being extended. In case the water users perceive CACG services to be unsatisfactory, the 10-year franchise may not be renewed and the commission may be awarded to another provider.

As for the water users themselves, they have high incentives to belong to such franchise perimeters as an attractive alternative to an irrigation system run by the farmers themselves. Here, they are not dependent on the operational capacity of a membership-based organisation and not at its mercy should it lack such capacity. They can rely on the agreed quantities of water being supplied to the edge of their respective fields. Although no specific organisational structure is in place to govern any supra-ordinate issues within the "périmètres en concession", they all, without exception, have a formal or informal association that discusses general issues concerning the perimeter with the CACG, and, on the other hand, is also represented on the Neste Commission. With this important discussion forum – an additional governance mechanism - they feel involved in the overall decision making process.

There is another important governance mechanism: The franchise perimeters differ decisively from other forms of operation in that the function of "police d'eau" has been transferred by the state to the CACG. CACG implements this service to the state via state certified experts ("agents assermentés"). This results in the fact that water users that do not pay their contractual fees can be shut off from the water supply. Without any doubt this acts as a particularly strong incentive to pay the fees.

Here again, a look at the stated objective, the actors involved, the services provided and the governance mechanisms that are in place reveals a high incentive compatibility. No wonder then, that CACG has gained high reputation for its effectiveness.

6. Conclusion

While IWRM and water governance have attracted high attention by water research and management in recent years, an important precondition for their functioning is widely neglected: appropriate *incentive creation* and *incentive compatibility* are essential requirements to be met. Approaches for a rapid "Incentive Compatibility Analysis", as the one presented here, can help to identify and remedy critical governance deficits both in IWRM and in mono-sectoral water management.

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