

Institutional arrangements for integrated river basin management

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Abstract

This paper considers the institutional arrangements that are needed and that being developed to enable communities to depart from sectoral and isolated water management in order to reach a higher level of integration. Key aspects are described that should be properly handled to manage river basins as a whole and in an integrated way.

The justification for various countries to opt for systems of integrated river basin management is explored. Triggers for change are identified: the need for integrated water management on hydrological boundaries; the added value of functional decentralisation enabling decision making at the lowest appropriate level; stakeholder participation in decision making and water resources planning; and cost recovery and water pricing.

Ongoing developments in processes of change are identified and described. A comparative assessment is carried out between the situation in Zimbabwe, South Africa, Tanzania, Turkey, Indonesia, France and The Netherlands. A common denominator of institutional arrangements is determined, from which developing countries in particular could benefit with regard to the introduction and establishment of systems of integrated river basin management. Sample competencies for effective functioning of river basin and sub-basin organisations are identified and described. Platforms of stakeholders with clear rules for representation and for participation in decision making in water resources planning are identified as crucial tools and described. In order to apply effective water pricing and to charge for pollution, a comprehensive system of water rights and discharge permits is considered necessary. The capacity to implement these necessary institutional arrangements is very variable, especially in developing countries, and hence the stage of implementation may differ substantially. Further, it is very important to have initial access to funds to kick-start the process of implementation. It has been found that systems of cost recovery can only be successfully introduced when acceptable service levels are established and when an enabling institutional environment is in place. Investments are needed and not all countries can afford that.

Above all, a major requirement for implementation of any institutional development is the presence of sufficient human and institutional capacity at the right time and at the right place.

Keywords: Capacity building; cost recovery; Functional decentralisation; Integrated river basin management; Stakeholder participation; Subsidiarity; Water management on hydrological boundaries

1. Introduction

From the earliest civilisations up till now river basins have played an important role in sustaining communities of people and other forms of life. A quick glance at history demonstrates the intimate connection between the stability of a group of people, its economic and social development, and the availability and reliability of water. This has rightly led many authors to define the first developed social groupings as hydraulic civilisations (Caponera, 1992). All major human migrations and the birth of towns and communities have been closely correlated with the search for, and the settlement around, naturally irrigated areas and valleys adequately supplied with water. River basins are the natural entities in which freshwater appears, the ultimate source of nearly all water used and nowadays also the receptors of most wastewater. River basins play a pivotal role not only in the water cycle, but also in nearly all other life cycles as a crucial source of bio-diversity. Multiple sector interests are predominantly served and covered by the resource base of river basins: drinking water supply, agriculture, hydropower generation, recreation, transport, etc. River basins are used ever more intensively and many of them are under pressure. In some cases human pressure is reaching the maximum sustainable level or has already surpassed this level. Severe water competition is resulting between users, sectors and countries. Conflicts between upstream and downstream are on the increase. The slightly exaggerated term “water wars” is appearing now and then in newspapers (Jaspers, 2000). The incidence of floods in quantity and in severity is also considered to be increasing. Causal links with unbalanced human occupation and watershed destruction are likely.

Throughout the world there is a broad consideration of water as a finite and vulnerable resource (ICWE, 1992). Water policies and new legal frameworks are prepared in order to embody new principles and strategies for integrated water resources management (Global Water Partnership, 2000). Whenever implementation of water policies and strategies is at stake, it is unavoidable to consider river basins as logical units for water and environmental resources management (Savenije, 2000). To prevent or remedy problems and conflicts and to meet social and natural demands, integrated approaches are indispensable. Basic elements of these integrated approaches are a basin-wide planning scope, attention to management of surface and subsurface water and to water quantity, water quality and environmental integrity as an inseparable entity. Further, there should be an emphasis on the relations between land use and water resources and to the integration of natural limitations, social and economic demands and legal, political and administrative processes (cf. Teclaff, 1985; Mostert, 1999a, 1999b; Savenije, 2000).

A fundamental question, of course, is: “how should all this be implemented?” Which arrangements can be made to bring theory into practice? This paper will emphasise the institutional arrangements that are being developed and that are needed to enable developing countries to depart from considering water management per sector and in isolation. Key elements are described that should be handled to manage river basins as a whole and in an integrated way.

Institutional arrangements for the integrated management of internationally shared river basins obviously constitute a complex and challenging field of analysis. However, this would warrant a paper by itself and falls outside the scope of this paper.

2. Terms and definitions

In this paper a number of terms will be used that frequently arise with a variety of meanings in discussions, proceedings, publications and other communications. The most important and frequently used terms will be described not as statements but for the sake of streamlining the discussion.

A *river basin* is to be defined as the geographical area determined by the watershed limits of the system of waters, including surface and underground waters, flowing into a common terminus (cf. Helsinki Rules, International Law Association, 1966, article II). If the common terminus is a lake, a coastal zone, a delta, an estuary, etc, this may be regarded as an integrated part of the river basin.

Management can (for our purpose) be described as the attainment of organisational goals and objectives in an effective and efficient manner through planning, organising, leading and controlling the organisational resources (Malano & van Hofwegen, 1999).

Integrated water resources management is the management of surface and subsurface water in a qualitative, quantitative and environmental sense from a multi-disciplinary and participatory perspective. There is a focus on the needs and requirements of society at large with regard to water at the present and in the future, thus aiming at maximum sustainability in all senses (cf. van Hofwegen & Jaspers, 1999).

Consequently, *integrated river basin management* can be understood as the management of all surface and subsurface water resources of the river basin in its entirety with due attention to water quality, water quantity and environmental integrity. A participatory approach is followed, focusing on the integration of natural limitations with all social, economic and environmental interests.

Water resources planning is a continuous process which involves making decisions or choices about alternative ways of using available water resources with the aim of achieving particular goals at some time in the future (Jaspers, 2001). Often this process will be expressed in the form of a plan as the publicly accessible output with general internal or external binding and aiming at repeatable use for the time horizon given.

Institutions are organisations or establishments founded for a specific purpose based on a set of working rules originating from an established custom, law or relationship in a society or community.

Institutional arrangements are sets of working rules that are used to determine who is eligible to make decisions in some arena, and what actions are allowed or constrained. Further, the rules describe what procedures must be followed, what information must or must not be provided and what payoffs will be assigned to affected individuals (Ostrom, 1990).

(Administrative) decentralisation is the process of transferring executive tasks and/or competencies from the centre of authority to organise or implement a (government) function (cf. Ostrom, 1990).

3. Justification for integrated river basin management

Why is there a need for a relatively complex institutional mechanism such as integrated river basin management? Should river basin management be initiated by the government or by the relevant stakeholders themselves? Can it be introduced or is it self-originating? Why not restrict oneself to the regular management by sector ministries and their decentralised institutions operating on politically accepted administrative boundaries (regions, provinces, districts)? Why opt for water management on hydrological boundaries? These are relevant questions to assess the justification of integrated river basin management.

In summary: what are the triggers for change? Let us take a bird's-eye view of the reasons why certain countries decided on integrating their institutions for water resources management:

- The ten Nile riparian countries adopted integrated water resources management as a lead theme for the Nile Basin Initiative to develop a mutual platform for the development of a Shared Vision on the common use of water resources and the benefits of the Nile (cf. Nile Basin Initiative, 2000).
- The Rhine Commission was established to provide an international platform for the Rhine riparian countries to deal with upstream–downstream conflicts, notably on water quality (Mostert, 1999b). The Commission appeared to be a useful tool for the development of co-operation potential between the riparian countries.
- Sri Lanka established a separate ministry (Ministry of Mahaweli Development) to conduct integrated river basin management in its most densely developed area. It was also an attempt to streamline and co-ordinate the often conflicting policies and activities of 7 (!) ministries and 19 related institutions directly involved in water management (Meegastenna, 2002).
- In Zimbabwe stakeholder-based River Boards originated basically by themselves to deal with questions of the complexity of water allocation, setting priorities for use and enforcement of water rights (Water Resources Management Secretariat, 1999).
- The governments of Zimbabwe, South Africa and Tanzania are stimulating and enforcing the establishment of River Basin and Catchment Water Organisations and Authorities and Water Users' Associations for reasons of effective management, equitable water allocation, stakeholder participation and cost recovery (Jaspers, 2001).
- The Dutch Water Boards, who have been in existence from the twelfth century onwards as the first Dutch political institutions, are combining the traditional management principles of “interest, payment, control” with the modern requirements of integration of sectors and multi-disciplinarity (cf. Mostert, 1998).
- Indonesia's water policy has been characterised by a continuous striving for water management on hydrological boundaries (River Basin Authorities, Water Users' Associations, among others) for reasons of effective water allocation, stakeholder harmonisation and fee collection.
- The government of Turkey is presently involved in a process of identifying river basin districts and empowering them with the authority in order to produce integrated river basin plans. This is in line with requirements for admission to the EU posed in the new EU Water Framework Directive. The link between water quantity and water quality is a crucial issue in Turkey (cf. European Union, 2000; Senter, 2001).

In summary: water resources management on hydrological boundaries is not a new phenomenon. It has been in existence since ancient times whenever serious water competition arose. Under other physical circumstances the necessity for communal flood control also delivered a sound breeding ground for institutional “upstream–downstream” arrangements. In recent times the inability to manage water quality or to preserve environmental integrity and to sustain environmental flows offered a new dimension. It is at present virtually impossible *not* to organise water resources management in an integrated manner and on hydrological boundaries. A crucial issue is the process of stakeholder participation. It has become very clear that water resources planning without the participation of stakeholders in decision making is highly ineffective. Application of serious measures without the involvement of stakeholders nearly always seems to be lacking “fine tuning”. Subsequently, an even bigger problem of enforcement arises. The issue of stakeholder participation is strongly related to the

need for decentralisation or water management at the lowest appropriate level. Of late, the call for cost recovery from governments of developing countries especially provides a new trigger. Institutions for integrated river basin management provide substantial comparative advantages to implement these systems of cost recovery in practice.

4. Triggers for change

4.1. *Water management on hydrological boundaries*

The need for water management on hydrological boundaries is mainly triggered by the growing competition for water or by the need to co-operate in an upstream–downstream relation for flood control or both. Moreover, the practice of sharing benefits from water resources, like power generation, in stream needs and inland water transport, simply warrant hydrologic concepts. For an institution operating on administrative boundaries, not coinciding with the boundaries of the river basin or catchment, it is very cumbersome to conduct water allocation and priority setting or to carry out flood control. Any management action will always be constrained by what happens upstream or downstream. A system of water management on administrative boundaries will induce the respective authorities to monopolise the water supply sources within its area and to transfer the problem of flooding to downstream. The setting of priorities for water allocation in an equitable and efficient way other than on hydrological boundaries is, by definition, physically impossible. It is, of course, very wise to harmonise administrative and hydrological boundaries for the sake of administrative simplicity. However, water necessarily has to be managed on hydrological boundaries, because water simply tends to flow down and it does not stop at the boundary of the district or region. This is both valid for surface water and for subsurface water.

4.2. *The added value of integration*

The complexity of the physical river system, the exchange of groundwater and surface water and vice versa and the continuous interaction between environmental elements is another physical imperative. To be effective, water resources planning should consider all these interactions. The fact that different elements of the water resources management function are implemented by different sectors and through different disciplines is a complicating factor, which can only be tackled by a holistic approach (cf. Savenije, 2000; ICWE, 1992, Dublin Principles).

Besides, water resources planning should consider and prioritise all relevant societal water uses in their spatial distribution. A fine-tuning between consumptive uses (domestic, industrial, agricultural water supply) and non-consumptive uses (hydropower generation, fishery, recreation, nature conservation) is indispensable in more complex situations. A system of integrated planning is needed in which water quality, water quantity and environmental integrity are managed in an integrated way.

The notion that different uses can be combined and work together on a basin-wide scale is probably the most salient benefit and incentive for co-operation. Added value can be created in terms of benefit sharing which would not be possible without an integrated approach.

4.3. Subsidiarity or decision making at the lowest appropriate level

Aspects of subsidiarity or decision making at the lowest appropriate level are modern interpretations of the traditional administrative decentralisation mechanism. Decentralisation is aiming at effective management through a fine-tuning of information: more relevant details can be observed at a lower level, closer to the end-user. Further, direct stakeholder participation can be facilitated better in a system of decentralised decision making. Decentralisation is also meant to bring decision making closer to where the decision is applied. It is considered a more democratic process and it normally fosters a considerable increase in transparency. This stimulates the understanding and acceptance of conflicting interests.

4.4. Stakeholder participation

The term “stakeholder participation” is found in a lot of publications on water resources management. But what do we include under stakeholders: only direct water users, or also indirect water users or potential water users? Can government institutions be qualified as stakeholders? Do they qualify as water users only, or also as water resources managers? How does society at large come in: experts, NGOs, scientific institutions, etc? Another relevant question is: in which processes should stakeholders participate? In decision making, of course. But can they also play a role in other functions of management: planning, monitoring, enforcement?

In essence, stakeholder participation is a condition which has to be fulfilled to make water resources management effective. Measures taken without the involvement of the beneficiaries or the affected have a reduced chance of fulfilment. The bare minimum is participation in decision making. The decisions will be made after all interests have been looked at or at least after stakeholders were offered the opportunity to bring their interests forward. Depending on the level of decision making and the specific management function envisaged, stakeholder participation can also be instrumental in planning, monitoring and enforcement. In Zimbabwe the monitoring of water meters was taken care of by neighbouring water users in the same part of the river basin (Jaspers, 2001). Because of the interdependency of the users it appeared to be a very effective instrument of monitoring. Through the mechanism of social control enforcement was self-arranging.

4.5. Cost recovery/water pricing

An increasing need for any government, but especially for governments of developing countries, is to recover the costs of service of water resources management. The various social and physical interdependencies, the need for transparency in the link of cost recovery and service level have provided new strong triggers for the establishment of integrated river basin management. Cost recovery is not a very popular measure, but it is very conducive to reach acceptable service levels and very necessary for fostering economic sustainability. Effective river basin management based only upon government allocations is nowadays barely imaginable both for financial reasons and for reasons of effectiveness. The dependence on the national budget does not stimulate any development of functional responsibility at the level of the river basin. Moreover, counterproductive political interference remains a likely scenario in this case. Payment for the service of managing and providing raw water and the subsequent *ploughing back into the same service* is a necessary tool. This link has to be made very transparent in

order to establish the mechanism of combining interest, payment and authority; in fact, the mechanism which is underpinning integrated river basin management (cf. Mostert, 1998). The water price is furthermore an effective tool in reducing over-consumption and pollution of water.

5. Institutional arrangements

Just to answer the question of why integrated river basin management is unavoidable does not advance problem solving much further. More important (and more difficult) is to indicate how integrated river basin management can be successfully applied.

5.1. General

In order to bring integrated river basin management into effect institutional arrangements are needed to enable:

- the functioning of a platform for stakeholders involved in decision making,
- water resources management on hydrological boundaries,
- an organisational set-up in river basin and sub-basin authorities with their respective by-laws to incorporate decision making at the lowest appropriate level,
- a planning system oriented at the production of integrated river basin plans,
- the introduction of a system of water pricing and cost recovery.

5.2. Stakeholder participation

The key concept of integrated river basin management is the participation of stakeholders in decision making or other functions of management, notably in water resources planning. It is crucial to set up a platform in which all relevant stakeholders are represented. This platform is meant to move away from sector approaches and to create environmental, institutional, social, technical and financial sustainability. The function of the platform is to serve as a tool for dealing with conflicting interests in the process of water resources planning and implementation of water development. It can also play a pivotal role in effective conflict prevention and resolution.

The platform has the following characteristics:

- It is a platform for weighing all interests and for decision making on the use of water and water systems in the river basin.
- The platform should represent all interests and be under governance of the government to protect the interests of society at large.
- The platform should enable decision making and have controlling and sanctioning powers (through itself or by delegation).
- The platform should represent the administrative levels dealing with the applicable tasks and competencies.

Depending on the type of decision making or planning the platform will be composed of direct, indirect and potential water users and their representatives, government officials, NGOs, experts and

representatives of society at large. At the operational level the requirement for water users to be represented is clear. In strategic planning, apart from water users, government officials in relevant water-related fields of work, interest groups and experts are also normally represented.

5.3. Decentralisation and subsidiarity

Within the context of integrated water resources management we are dealing with government functions of which the tasks and competencies (at least initially) are covered by what we could refer to as the public administration. So under the term “decentralisation” we understand the process of transferring tasks and competencies permanently or for an indicated period of time (but not incidentally) from the centre of authority to other departments, agencies or administrative levels in order to organise or implement a government function. The purpose of the decentralisation effort can be manifold. A driving force for decentralisation is to guarantee the effectiveness of its measures and also aspects of efficiency are of interest. However, another driving force for decentralisation is to create transparency and to stimulate public accountability through participation and appeals procedures. A modern idea behind decentralisation of government functions is to put decision making in the hands of people who are well informed, accessible for interested people and capable of making fundamental decisions in a timely manner. Further, for reasons of accessibility, decision making is supposed to take place at a level as close as possible to the end-users.

There are various ways to arrange decentralisation within the public administration and from public administration to semi-public or private organisations. In the case of integrated river basin management the mode of *functional* decentralisation is often applied. The decentralisation is not general but is aimed at specific functions of administration, in this case tasks and competencies that are comprised by the function of water resources management.

If we concentrate on the public sector first, we can identify three main methods of implementing decentralisation efforts: de-concentration, delegation or devolution.

In the case of *de-concentration*, executive tasks and competencies are assigned to other (regional) offices of the central authority or to lower levels within the same administrative structure. Authority and responsibility remain within the central institution. This agency can retake the task and competency at any time. It can impose rules or regulations at any time or randomly.

In *delegation*, executive tasks and competencies are assigned to another public or private body with transfer of responsibility but without irreversible transfer of authority. Responsibility is shifted to the surrogate unit or private organisation and the central authority will create a regulatory framework in advance. The central agency is not allowed to take up the task or competency itself, at least not within the indicated period of delegation or only unless this reservation has been made.

In *devolution*, executive tasks and competencies are assigned to other administrative levels on a continuous basis with a complete shift of authority and responsibility. The lower administrative level is responsible for decision making and resource mobilisation. “Devoluted” tasks and competencies are further managed in autonomy by the lower level of administration.

Cases of devolution are rare. To shift authority completely is identical to giving away a caretaker function. No government wants to do that, especially not in the case of a sensitive public function such as managing a basic need like water. De-concentration is happening more often. However, since there is no shift in responsibilities for decision making, this method does not offer extra opportunities to empower stakeholders. Delegation is also very common. It is probably the most practised institutional

instrument to transfer tasks and competencies. Delegation can be prompt and definitive (Zimbabwe) or gradual and progressive (South Africa). *Progressive delegation* is applied over time *as the need for delegation arises and on request by the stakeholders*. Actual delegation takes place when stakeholders are, to a basic extent, capacitated and when effective institutional arrangements have been established. In South Africa and Tanzania the delegation of responsibilities to river basin organisations is progressive. In Zimbabwe delegation has been necessarily prompt (Jaspers, 2001). In The Netherlands the Water Boards developed autonomously. Their power was gradually restricted. In contrast, in France the “Agences de l’eau” gained in importance after 1964 through the absolute need in France to retain central government control (Chéret, 1993; Alaerts, 1995). In Turkey the process of delegation is still experimental.

5.4. Management on hydrological boundaries

It is advisable to identify river basins by their total sphere of influence and to consider all types of water resources that are feeding into the basin: surface water, underground water, waste water, intruding seawater, seepage, ice melt, etc. Some management functions can only be carried out with the total river basin as the object. A comprehensive hydrological measuring network for the monitoring of all types of water resources is needed. Ranges of data should be made available. The network should facilitate water resources planning as well as operational management.

More often than not a river basin is too large a unit to manage. Scale aspects are very important. Institutional arrangements for a river basin such as the Nile or the Amazon are substantially more complex than for small local river basins, although in essence no different. Various levels of subdivisions are sometimes needed to either subdivide or support the management functions of the entire river basin or to enable operational management *per se*. The scale of the subdivision will very much depend on the physical characteristics, on the density of occupation, the type of land use, etc. At this stage it is wise to consider administrative boundaries as well. With a few minor adaptations hydrologic subdivisions may effectively coincide with administrative boundaries or vice versa. This may add considerably to the co-ordination potential.

In Zimbabwe during the process of revising the water legislation the whole water sector was decentralised and commercialised (Jaspers, 2001). The country was subdivided into 7 river basins (in fact river sub-basins) of approximately 80,000 km². Each of these basins was subdivided into 5 or 6 logical sub-basins, in essence till now the lowest management unit. A similar process is going on in Tanzania. Nine river basins have been identified that will be subdivided into various sub-basins. (The scale is essentially the same.) There is a likelihood that these Catchment Water Organisations will be composed of (lower level), multi-sectoral Water User Associations. In South Africa 12 river basins have been identified. In France the country is hydrologically subdivided into 5 River Basin Authorities (“Agences de l’eau”: Alaerts, 1995). Water management in the Netherlands is carried out by about 60 Water Boards, administrating small sub-basins. There is an intention to consolidate those small independent organisations into approximately 15 units. In Turkey the idea is to subdivide the country into 7 large river basins, to which smaller sub-basins will be added. For the time being the Water Department DSI operates in 26 River Basin Districts, based on rational considerations more than on hydrological boundaries.

5.5. Institutional framework

The institutional set-up in the assessed examples varies from country to country, especially because the package of required tasks and competencies is highly variable. In Zimbabwe the Catchment (River Basin) Authority is composed of a Catchment Council consisting of direct water users and an Executive appointed and employed by the National Water Authority (the water sector in Zimbabwe is decentralised and commercialised). A variation could be that the Executive is appointed and employed by the Catchment Council. The Catchment Council is composed of two representatives of each Sub-catchment (Sub-basin) Council. Further, depending on the working rules expressed in the by-laws of the specific council, some positions may be reserved for specific sector representatives (Town Water Supply Authority, Governor, etc) with a crucial stake. The members of a Sub-catchment Council are elected by the stakeholders organised in the sub-catchment. In Tanzania the situation is comparable. The Basin Water Organisation is subdivided into an Executive and a Basin Water Board, composed of stakeholders (mainly government officials in this case). The Catchment (Sub-basin) Water Organisation is still in an experimental stage. A representation per sector is likely until such time that Water Users' Associations have been established and capacitated. In South Africa the system of Catchment Authorities hinges on the development of Water Users' Associations. At present this is an ongoing process. In The Netherlands members of the Water Boards are elected by the organised real estate owners (Mostert, 1998).

Tasks and competencies of the river basin organisations may differ substantially from country to country. Especially in the African environment an intensive process of experimenting is still going on. A “common denominating” task distribution is difficult to give because it depends highly on scale, physical, social and other characteristics. One could say that the river basin authority concentrates on *collective choice* functions and the sub-basin authorities/water users' associations on *operational* functions (cf. Ostrom, 1990). Let us imagine a sample country with a two-layer river basin organisation (Zimbabwe, Tanzania, South Africa) and specify a common (non-exhaustive) denominating task distribution:

Sample functions for river basin level:

- Development of strategic river basin plan
- Development of operational river basin plan
- Contributing to river basin protection plan/measures
- Water right or water permit allocation
- Effluent discharge permit allocation
- Allocation of drainage permits or drainage responsibilities
- Co-ordination between sub-basins
- Collection of water charges
- Fund administration and development
- Appeal function (first layer)
- Awareness creation and capacity building

Sample functions for sub-basin level:

- Co-development strategic sub-basin plan
- Co-development operational sub-basin plan
- Contributing to sub-basin protection plan/measures

- Advising on water/discharge permits
- Monitoring and enforcement of drainage responsibilities
- Monitoring of water abstractions, water pollution
- Monitoring of drainage processes
- Enforcement of water rights, discharge permits
- Enforcement of drainage responsibilities
- Legal action against defaulters
- First layer of conflict resolution
- Collection of charges and levies

It is crucial to arrange aspects of representation and task distribution in a clear set of regulations or standard by-laws that can be modified by the users where local circumstances demand. Apart from rules for *representation* and functioning, by-laws should also cover aspects of *water resources planning; allocation and registration of water rights; tariff structures and fee collection; fund development and application; monitoring arrangements; penalties and sanctioning; conflict resolution and appeal procedures*.

5.6. Integrated planning system

An integrated planning process can support a system of integrated river basin management in various ways:

- Planning helps to assess the present and the desired situation in the basin and to develop a comprehensive set of measures to reach the desired situation (van Hofwegen & Jaspers, 1999).
- Planning delivers an opportunity to streamline the participation process and should increase the transparency of the decision making.
- The production of plans forces the makers of decisions into a process of horizontal and vertical co-ordination (cf. Mostert, 1999b).

One of the targeted key outputs of a system of integrated river basin management is the production of river basin plans in which the aspects of water quantity, water quality and environmental integrity are maximally integrated (horizontal co-ordination). Besides, this planning should contain a full consideration of the interests involved. It should be established according to procedures that enable full stakeholder participation in terms of decision making. The river basin plan is to be composed of lower level sub-basin, catchment or watershed plans if the scale of the river basin makes them necessary (vertical co-ordination).

This is easier said than done! First of all, planning is not a uniform single-level process. Plans can have a strategic or operational character. Sometimes the only objective is communication; sometimes far-reaching decision making is involved. Plans may address government institutions or citizens or both. Plans may focus on very different time horizons. And then, of course, they may differ substantially in subject.

Crucial is that the management of water quantity, water quality and environmental integrity is linked up as far as strategic (policy) planning is concerned. For the sake of uniformity and administrative simplicity it is advisable to reduce the number of plans. However, all these aspects should/could not necessarily be covered by one plan. The system of (national) environmental planning in The Netherlands

is linked up with the system of water resources planning. The separate plans allocate guidelines or tasks to one another and every plan indicates how the issues earmarked by the other plan are dealt with. Every four years one plan is revised in alternating sequence.

It will not always be possible to link up operational plans in time and in subject, but a legal instruction to the planners to harmonise the implementation could be very viable. In the so-called “open planning approach” (The Netherlands) the responsible authority is in contact with partner governmental institutions, interest groups and NGOs at all crucial stages of the development of the plan. The open planning approach is extensively studied at present (even by unexpected parties, e.g. by the American business world).

5.7. Water pricing and cost recovery

The issues of water pricing and cost recovery have not remained without debate in various countries and between various cultures. The traditional example is that paying for water *per se* in a Muslim culture is not really accepted. The acceptance of cost recovery, however, is widespread. This acceptance is really related to willingness and capacity to pay.

It is not always easy to recover the total costs directly from water users under all circumstances, especially when large investments in infrastructure are needed (cf. for flood control). The principle, however, is that the price for the service of having access to raw water or being protected against flooding or the price of treating the discharged pollution is *paid by the user/beneficiary/polluter*. One step further is to recover the full economic costs of the water *per se* (including externalities and opportunity costs: Rogers *et al.*, 1998). The final stage is that water rights are traded or even that water is auctioned (Holden & Thobani, 1995; Lee & Jouravlev, 1998; Jaspers, 2002). The value of water is used as an instrument to maximise the economic output. It is assumed that market forces will optimise a maximum return per unit volume of water. For the latter modalities a high level of organisation and specific institutional arrangements are needed.

There are many supporters, but at the same time also some opponents of the statement that “water is an economic good”. Certainly water is also a social good with an ethical dimension. The new EU Water Framework Directive states the following: “Water is not an ordinary economic good, but a (social) inheritance that has to be protected, defended and handled as such” (Senter, 2001).

However, there is consensus about the need for cost recovery and hence water pricing. On top of that, water pricing and charging for pollution is also a very important instrument for demand management.

In order to apply effective water pricing and to charge for pollution a comprehensive system of rights and licences is necessary. Clear water allocation criteria and pollution discharge standards, as well as quality standards for the recipient water, are prerequisites. (To describe effective water rights, pollution discharge licensing and water quality management systems would go beyond the scope of this paper.) The registration, administration, monitoring, enforcement and policing of water rights and pollution discharge permits, as well as the monitoring and enforcement of water quality protection measures, can only be carried out effectively *with the river basin as the logical unit for management* (Jaspers, 2002).

6. Evaluation and prospects: the need for capacity building

In many countries the need for integrated river basin management is widely accepted. Most countries have water policies and strategies in place (or underway) aimed at the implementation of integrated river

basin management. Interpretations on how to implement may differ here and there in the details, but there seems to be consensus on the mainstream of key aspects.

The provision of legal frameworks is generally lagging behind as the law is always conservative and slow to reaction to changes in society. Crucial is the social consensus on institutional arrangements for implementation and the development of these hinges heavily on institutional capacities. With regard to this, the picture in developing countries is not all that bright. The capacity to implement the necessary institutional arrangements is very variable and hence the implementation stage in developing countries may differ substantially. For developing countries it is furthermore very important to have access to initial funds to kick-start the process of implementation. Systems of cost recovery, crucial tools in integrated river basin management, can only be successfully implemented when acceptable service levels are established and effective administrative arrangements are in place. Investments have to be made and not all countries can afford that.

Above all, a major requirement for implementation is the presence of sufficient human and institutional capacity at the right time and in the right place. The development of human capacity is a long-term effort, complex in nature and very resources demanding. It is not enough to train experts in the relevant technical disciplines only. There is also a need to train and foster experts in integration.

The development of institutional capacity is even more complex. At a certain moment in time a sufficient (threshold) level of relevant technical, organisational, administrative, social and financial capacity has to be available to kick-start and sustain the process of integrated river basin management (cf. Abrams, 1996). The aggregated sectors should be able to perform sufficiently, at present and in the future (cf. Alaerts, 1996). In this field there is still a long way to go. To provide policies, strategies, legal and institutional arrangements, financial and economic instruments and relevant human and institutional capacities at the right time and in the right place and synchronised at the (inter) national, regional and river basin level is a task that can only be covered by the aggregated international community (cf. van Hofwegen & Jaspers, 1999).

References

- Abrams, L. (1996). Capacity building for water supply and sanitation development at the local level: the threshold concept. In: *Proceedings of the Second UNDP Symposium on Water Sector Capacity Building in Delft 1996, Water Sector Capacity Building: Concepts and Instruments*, (eds. Alaerts G.J., Hartvelt, F.J.A. & Patorni F.M.), pp. 301–311, Balkema, Rotterdam.
- Alaerts, G.J.F.R. (1995). *Institutional Arrangements in the Water and Sanitation Sector, European Country Studies*, IHE Working Paper, Delft.
- Alaerts, G.J.F.R. (1996). Capacity building as knowledge management: purpose definition and instruments. In: *Proceedings of the Second UNDP Symposium on Water Sector Capacity Building in Delft 1996, Water Sector Capacity Building: Concepts and Instruments*, (eds. Alaerts G.J., Hartvelt, F.J.A. & Patorni, F.M.), pp. 49–84, Balkema, Rotterdam.
- Caponera Dante A. (1992), *Principles of Water Law and Administration: National and International*, Balkema, Rotterdam, p.11.
- Chéret I. (1993), *Managing Water: The French Model*. In: *Valuing the Environment* (eds. Serageldin, I. & Steer, A.), The World Bank, Washington DC.
- European Union (2000). *Water Framework Directive*, Directive 2000/60/EU, EU Publications, Brussels.
- Global Water Partnership (2000), *Integrated Water Resources Management*, Technical Advisory Committee Background Paper No 4, Stockholm.
- Hofwegen van Paul J.M. & Jaspers, F.G.W. (1999). *Analytical Framework for Integrated Water Resources Management*, IHE Monograph 2, Inter-American Development Bank, Balkema, Rotterdam.

- Holden, P. & Thobani, M. (1995). *Tradable Water Rights: A Property Rights Approach to Improving Water Use and Promoting Investment*, Cuadernos de Economia, December, No 97, Pontificia Universidad Catolica de Chile, Santiago, Chile.
- International Conference on Water and the Environment (ICWE). (1992). *The Dublin Statement and Report of the Conference, 26–31 January 1992, Dublin*.
- International Law Association. (1966). *Helsinki Rules on the Uses of the Waters of International Rivers, adopted by the International Law Association at the 52nd conference, Helsinki, 20 August 1966*, International Law Association, London.
- Jaspers, F.G.W. (2000). Institutions for river basin management, Paper presented at the conference *Alternatives to Water Wars in the Middle East, RUSI/MENARG Conference, London*.
- Jaspers, F.G.W. (2001). The new water legislation of Zimbabwe and South Africa. Comparison of legal and institutional reform, *International Environmental Agreements: Politics, Law and Economics* 1, 305–325.
- Jaspers, F.G.W. (2002). *Principles for Water Allocation, The Transition of Traditional Customary Water Allocation to Modern Systems of Sustainable and Economic Water Allocation*, IHE Lecture Note, IHE Delft.
- Lee, T. & Jouravlev, A. (1998). *Prices, Property and Markets in Water Allocation*, Serie Medio Ambiente y Desarrollo 6, Economic Commission for Latin America and the Caribbean, United Nations, Santiago, Chile.
- Meegastenna, J. (2002). *Towards Sustainable Water Allocation in Sri Lanka*, MSc Thesis, IHE Delft.
- Malano, H.M. & van Hofwegen, P.J.M. (1999). *Management of Irrigation and Drainage Systems*, Balkema, Rotterdam.
- Mostert, E. (1998). *The Allocation of Tasks and Competencies in Dutch Water Management: Discussions, Developments and Present State*, RBA Series on River Basin Administration, Research Report No 7, RBA Centre, Delft.
- Mostert, E. (ed.) (1999a). *River Basin Management, Proceedings of the International Workshop on River Basin Management, International Hydrological Programme, 27–29 October 1999, The Hague*.
- Mostert, E. (1999b). *River Basin Management and Planning; Institutional Approaches and Results in five European Countries and six International Basins*, RBA Series on River Basin Administration, Research Report No 10, RBA Centre, Delft.
- Nile Basin Initiative (1999). *Shared Vision Programme Overview*, Nile Secretariat, Programme Description, Entebbe, Uganda.
- Ostrom, E. (1990). *Governing the Commons; The Evolution of Institutions for Collective Action*, Cambridge University Press, Cambridge.
- Rogers, P., Bhatia, R. & Huber, A. (1998). *Water as a Social and Economic Good: How to Put the Principle into Practice*, TAC Background Paper No 2, Global Water Partnership, SIDA, Sweden.
- Teclaff, L.A. (1985). *Water Law in Historic Perspective*, William S. Hein: Buffalo, NY.
- Savenije, H.H.G. (2000). *Water Resources Management, Concepts and Tools*, Lecture Notes, IHE Delft.
- Senter International. (2001). *Implementation of EU Water Framework Directive in Turkey, Terms of Reference*, The Hague. For European Union.
- Water Resources Management Strategy Secretariat. (1999). *Towards Integrated Water Resources Management, Final Report*, Department of Rural Resources and Water Development of the Republic of Zimbabwe, Harare, Zimbabwe.