

INSTITUTIONS

FOR

INTEGRATED
WATER RESOURCES
MANAGEMENT

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1. INTRODUCTION

1.1. GENERAL

The objective of these lecture notes is to describe mechanisms of institutional reform towards integrated water resources management as well as the institutional and management arrangements needed in the process. Recent developments will be highlighted as well as phenomena and evolutions that sustained the ages. The focus will be on river basin management following a systematic approach that considers the river basin as a whole. The management of raw water is taken as start, but for a better understanding, some side steps will be done to the field of managing drinking water and wastewater. Here and there, comparisons to (other) forms of natural resources management will be presented.

First, a few preliminary basic definitions will be given. To kick-start a process of reflection some relevant examples of institutions that sustained the ages will be described and the characteristics that may have induced their sustainability are discussed (chapter 1). Concepts of integrated water resources management are introduced and the respective requirements for institutional development (chapter 2). The process of institutional development is discussed and some (analytical) tools to achieve targeted changes (chapter 3). Thereafter, an integrated approach towards river basin management will be highlighted (chapter 4). The process of water sector reform is introduced through a description of leading reform processes that took place recently in South Africa and Zimbabwe and further in the past in France. Further, the crucial issue of water allocation will be described especially in the light of the growing water scarcity in developing countries and elsewhere.

For completeness sake these lecture notes will be completed with a selection of annexes containing relevant papers discussing and supporting some of the introduced topics.

1.2 TERMS AND DEFINITIONS

Everywhere in the world, even in societies with a complete absence of organisational culture, institutions have developed as soon as the need originated for patterns of behaviour that are susceptible for repeated application.

The concept of “institutions” means different things for different people and is often used in a different way, depending on the context.

Ostrom (1990, p.51) is defining institutions as sets of working rules that are used to determine who is eligible to make decisions in some arena, what actions are allowed or constrained, what procedures must be followed, what information must or must not be provided, and what payoffs will be assigned to individuals dependent on their actions.

This definition is probably not complete - it certainly covers the term ‘institutional arrangements’- but it is very practical one for our use.

Often institutions are referred to as organisations or as established customs, laws or relationships in a society or community. Important to note is that institutions, unlike organisations, may not be directly visible or may not be officially regulated. Often though, when we talk about institutions, we actually talk about organisations or about establishments that take care of the functions that an organisation would take care of.

For the purpose of arranging water resources management we propose the following definition for institutions: *organisations, working rules or establishments founded for a specific purpose of public interest based on an accepted custom, law or relationship in a society or community.* This should be sufficiently wide in order not to exclude useful arrangements between people to handle certain basic societal functions.

For the sake of clearness it is proposed to speak about organisations, whenever we want to indicate organisations and to speak about institutions in case we mean arrangements not being organisations or when all arrangements, including organisations, are meant. So under institutions we comprise:

- Policies
- Strategies
- Legal frameworks
- Guidelines and principles
- Procedures
- Standards, norms and traditions
- (Organisations)
- Etc.

Organisations can be public bodies, semi-public corporations, community or private organisations or mixed agencies, depending on the character of the rules that they are supposed to follow.

We are mainly interested in institutions that deal with water resources management or to be more precise, have a direct function in it. Function in this context should be understood as a *comprehensive set of tasks and competencies needed to cover a field of management*. Under water resources we can comprise all water elements wherever they may be in the hydrologic circle. For the time being it suffices to address to water resources as surface and subsurface water. A simple definition of management: *the attainment of organisational goals and objectives in an effective and efficient manner through planning, organising, leading and controlling* (van Hofwegen and Jaspers, 1999).

1.3 EVOLUTION CONTRA REVOLUTION

The descriptions in the following boxes are an illustration of institutional arrangements for natural resources allocation in Zimbabwe that evolved over the years and that till now have preserved their influence despite strong efforts of colonial and post-colonial governments to impose and institutionalise other arrangements.

Apparently, this customary institution stills offers social stability and is geared to the management of a vast, but increasingly scarce resource with a low excludability, but a high subtractability (cf. Savenije, 2001).

Box: Traditional land use in Zimbabwe

(Rainfed agriculture in a communal area in Zimbabwe)
Access to land in Zimbabwe used to be a right for all households. The limited labour force in each household in effect meant a natural limit to the size of land any household could cultivate. Access to land was thus quite evenly distributed, through 'natural' means. Although you cannot physically 'see' it, access to land in a communal area in Zimbabwe is highly regulated, mainly through kraal heads and chiefs. This system works because of social pressure: infringements are monitored by neighbours. This is a logical institutional solution to the 'vastness' or expanse of this specific resource (v.d. Zaag, 1998, p. 3).

Box: Traditional grazing

Grazing/range management in a communal area in Zimbabwe

The drier the area, the more important livestock becomes for the local economy. Traditionally, grazing areas were abundant; there was thus no need for fencing. And this was important for the particular physical imperative for the range: in these areas of erratic rain, very unevenly distributed even at minor scales, cattle could be moved to those areas where enough rain had fallen. This is an example of a social solution to a physical imperative.

Access to grazing was in principle open to all households, but in practice only those households with cattle could beneficially use it. The more cattle you had accumulated, the more you would benefit from the grazing (v.d. Zaag, 1998, p. 3).

Box: Traditional land allocation in Zimbabwe

Land tenure

The land tenure system in Communal Areas in Zimbabwe today is a result of an evolution of the traditional customary tenure system existing in the pre-colonial days. Under traditional tenure, land rights are defined for groups, households and individuals based on traditions and customs evolving over time. Generally, individual families enjoyed more clearly defined spatial and temporal rights over the use of several parcels of land and the natural resources on it.

Such family rights were transmitted to succeeding generations in accordance with customs.

Such inheritance has always allowed subdivision. Under varying circumstances, families could also enjoy residual rights of certain land in fallow (Rukuni et al., 1994, p. 20).

Box: Present situation of land tenure in Zimbabwe

Local level institutions administering tenure have been characterised by conflicts particularly between the traditional authority and “elected” leadership. The intractable nature of these land administration disputes have, however, been further complicated by the subsequent superimposition of local ruling party structures and later, of government village and ward development committees. This profusion of overlapping and incongruent local organisational structures, each with its own boundaries and drawing on different sources of legitimacy, has thus created weak and disparate local institutions (Rukuni et al., 1994, p. 26).

A few lessons can be drawn from these examples when later on we will start to ‘design’ new institutional arrangements:

- Always and everywhere institutions to manage natural resources already exist
- Institutions not necessarily need complex organisational structures to be effective
- They evolve over time and grow stronger the more they are accepted
- The level of organisation has to be kept as simple as possible
- Institutional arrangements dealing with resources management are a reaction on scarcity
- In the (relative) absence of scarcity the arrangement will be weaker
- It is often not effective to superimpose institutions.

1.4 EVOLUTION TOWARDS FUNCTIONAL WATER MANAGEMENT: THE DUTCH WATER BOARDS

Origin

When reflecting about the origin and the transition of the Dutch Water Boards, one should realise that they originated in the west of what we call at present the Netherlands, an area predominantly near or under mean sea level.

From the ninth century onwards, large peat areas had been drained for agriculture. As drainage in peat areas causes land subsidence, flooding and the discharge of excess water became

important issues. The local governments, the so called ambachten, singly or together, had to build dykes and construct drainage canals. Sometimes they dammed rivers, which minimised the total length of dykes to be constructed and freed the downstream area from water from upstream, thus facilitating drainage of their areas. In the upstream areas, however, this construction of dams caused very serious flooding problems (Mostert, 1998).

Gradually, the scale of the water management problems became so large that the local communities could no longer solve their management problems on their own or with some neighbouring communities. Thus, from around the twelfth century regional water boards were established, being regional government bodies with specific water management tasks. These tasks were related to relatively minor infrastructure works with regional benefits.

In addition to regional water boards and the ambachten, also local water boards were established, in the west of the Netherlands called 'polders'. Their task was to improve local drainage, first by constructing local drainage canals discharging as far downstream as possible, and as from the early 15th century onwards by building and operating windmills. Their size could differ greatly, and many transgressed the borders of the ambachten. As their activities could influence the regional drainage systems, the regional water boards gradually began to supervise the local water boards.

General versus functional (specific) Government

In the Middle Ages the relation between the functional water boards and general government was close. Local water management was the responsibility of the local landowners, supervised by the local government. The construction and maintenance of the regional infrastructure was the joint responsibility of the benefiting local communities, supervised by the regional water board.

In the 16th century changes took place. The regional water boards started to do more work themselves, the costs of which they recovered from the beneficiaries.

After 1798 the functional water management and the general government separated more. Due to old charters the independence of the water boards remained secure. Provincial supervision over the water boards functioning, however, became more intense with the increase of the influence of the provinces as general government institutions for land and water issues.

Concentration of water boards

In 1953 in the Netherlands 2544 water boards existed (Mostert, 1998). Then, on 1 February of that year, a combination of spring tide and a strong storm raised the water level in the south-west of the Netherlands to a level 0.57 meter higher than the highest level previously recorded. An area of 200,000 hectares was flooded and 1835 people drowned. The maintenance of the dykes in the affected area had been the responsibility of mostly very small water boards without much technical expertise and financial possibilities. Consequently, the dykes had been in a bad state of repair. To solve the problem, many water boards in the south-west of the Netherlands merged after 1953.

Concentration was also necessary because the scale and complexity of water management increased. Water quality became a new object for water management. Water quality management required expertise that could not be efficiently developed by small water boards. The solution chosen was to give the responsibility for water quality management to the provinces, which could delegate the task to existing (bigger) water boards or to newly formed water quality water boards (Mostert, 1998).

The last stimulus for concentration came from 1985 onwards from the introduction of the concept of 'Integrated Water Resources Management (IWRM)'. In this approach water systems (surface and groundwater quality and quantity, banks, river bed and technical infrastructure) have to be managed as a whole, and nature gets more attention. This increased the demands on the water boards in terms of required expertise even further. Moreover, the idea became popular that water quantity management and water quality management should be in one hand

(Ministry of Transport and Water Management, 1985, 1989, 1990). This promoted further mergers between small water quantity water boards and between water quantity and water quality water boards, resulting in about 27 water boards in 2003. (The number is still decreasing). Within the framework of the implementation of the new EU Framework Directive it is likely that even more water boards will merge as a reaction on the need for water management on tangible hydrological boundaries (river basin districts EU Framework Directive, article 3)

Appraisal

You may say that the water boards in the Netherlands are unique phenomena that survived the ages. Which factors prompted the evolution of these organisations so crucial for the integrated management of water resources in the Netherlands?

They originated where needed and transformed to changing conditions and concepts. The boards were spearheaded by influential people with authority based on the general approval of the public. No consensus meant/means flooding and starvation. The boards have always been financed by the stakeholders and the level of contribution is in relation with the level of interest. The right of say is also in line with the level of contribution. The 'existential slogan' of the Dutch water boards is 'interest, payment, right of say'. Their functions have developed in line with changes in society and changes in physical circumstances and requirements for efficiency and effectiveness.

QUESTIONS

1. Could you describe in your own words the term 'institutions for water resources management'?
2. Can organisations always be qualified as institutions? Is a chain of supermarkets an institution?
3. Can you explain the sentence: "Institutions do not listen to revolutions"
4. The existential slogan of the Dutch water boards is 'interest, payment, right of say'. Please, explain.
5. Could you describe the term 'functional water management'?

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2 INTEGRATED WATER RESOURCES MANAGEMENT

2.1 GENERAL CONCEPT AND DEFINITION

Within this context we concentrate on the understanding of institutional arrangements needed to come to integrated water resources management. A renowned expert once typified IWRM as “a raincoat on which you can pour out any liquid, but the liquid will gradually slide down and disappear”. Nevertheless, the concepts of IWRM are widely recognised as the best effort to foster problem oriented and solution driven management of water and related resources. It should be considered as an ideal situation, that may be very difficult to reach, but which is very worthwhile to be aiming for.

The Global Water Partnership describes integrated water resources management (IWRM) as a process that favours the co-ordinated management and development of water resources and of related land and other resources for the purpose of maximising in an equitable way the economic and the resulting social welfare without compromising the sustainability of vital ecosystems (GWP, 2000). It is an accepted, but to my opinion slightly incomplete description. Probably any definition will lack the necessary distinctive power because of the complexity of the conception.

Nevertheless, with appreciation of the risk to create another raincoat, to my opinion IWRM can be understood as *the management of surface and subsurface water in qualitative, quantitative and environmental sense from a multi-disciplinary and participatory perspective and focussed on the needs and requirements of the society at large with regard to water for now and in the future* (Jaspers, 2002). Water resources management is approached in a *holistic* way.

IWRM deals with:

ALL WATER (spatial)
ALL INTERESTS (social)
ALL STAKEHOLDERS (participatory)
ALL LEVELS (administrative)
ALL RELEVANT DISCIPLINES (organisational)
SUSTAINABILITY (in all senses: environmental, political, social, cultural, economic, financial, legal) (Savenije, 2001)

So it means that all water wherever it occurs in the hydrologic cycle is subject to management: surface water, subsurface water, seawater, rain, vapour, wastewater etc. All interests are covered through the organisational modalities of the respective water. For instance the consumptive uses for drinking and domestic water, agriculture, industry, aquaculture, nature and wildlife and the non-consumptive uses of power generation, cooling, transport, recreation, environment, fishery etc. Ideally all stakeholders are consulted or participate in decision making and other management functions: direct users, potential users, government as water management custodians, (quasi) non-governmental organisations, experts, politicians, society at large etc. Further, all levels of (semi)-public administration are comprised: the functional levels of the river (sub)basin, but also the general levels of district, province, state, national and international level. Water management is interacting with all relevant scientific (α, β, γ) disciplines so not only civil engineering, hydrology, agricultural and environmental engineering, life cycle sciences etc. but also law, economics, (rural) sociology, public, private and business administration etc. It goes without saying that such an orientation per se is ambitious, if not unrealistic. Fortunately, the development of some specific institutional arrangements with the river basin as logical unit may help in the process of prioritisation, integration, co-ordination of the necessary activities to support and fulfil the ambitions to a reasonable extent.

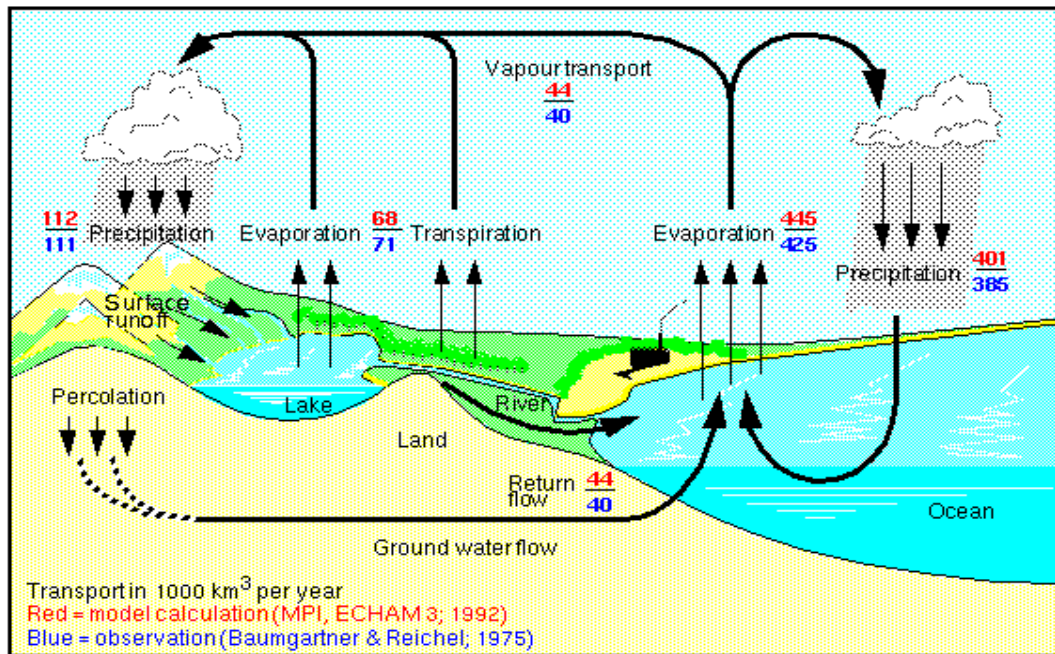


Figure 1: Water in the water cycle

2.2 POLICY PRINCIPLES FOR DEVELOPMENT TOWARDS IWRM

2.2.1 DUBLIN PRINCIPLES

It has become a generally accepted approach that prior to any formalisation of legal and institutional frameworks extensive consultation takes place at the relevant platform about the policy principles that will guide the legal and institutional reform process (in this case towards IWRM).

At the international platform this approach was strongly advocated on the International Conference on Water and the Environment in Dublin 1992. During this conference after a thorough process of consultation the influential **Dublin Principles** were produced and adopted by the member countries. These Dublin Principles ultimately resulted in the Fresh Water Chapter (18) of Agenda 21 of the United Nations Conference on Environment and Development and in the influential World Bank Policy Paper on Water Resources Management.

DUBLIN PRINCIPLES

WATER IS A FINITE AND VULNERABLE RESOURCE, ESSENTIAL TO SUSTAIN LIFE, DEVELOPMENT AND THE ENVIRONMENT

WATER DEVELOPMENT AND MANAGEMENT SHOULD BE BASED ON A PARTICIPATORY APPROACH, INVOLVING USERS, PLANNERS AND POLICY MAKERS AT ALL LEVELS

WOMEN PLAY A CENTRAL PART IN THE PROVISION, MANAGEMENT, AND SAFEGUARDING OF WATER

WATER HAS AN ECONOMIC VALUE IN ALL ITS COMPETING USES, AND SHOULD BE RECOGNISED AS AN ECONOMIC GOOD

ASSOCIATED KEY-CONCEPTS

ASSOCIATED KEY-CONCEPTS INTEGRATED WATER RESOURCES MANAGEMENT:

- **AN INTERSECTORAL APPROACH**
- **REPRESENTATION OF ALL STAKEHOLDERS**
- **ALL PHYSICAL ASPECTS OF THE WATER RESOURCES**
- **SUSTAINABILITY AND ENVIRONMENTAL CONSIDERATIONS**

SUSTAINABLE DEVELOPMENT IN ALL SENSES

DEMAND DRIVEN AND DEMAND ORIENTED APPROACHES

**DECISION MAKING AT THE LOWEST APPROPRIATE LEVEL
(SUBSIDIARITY)**

Hereafter, international consensus progressed towards full acceptance of water resources management in an integrated way emphasising integrated planning, stakeholder participation, subsidiarity, economic pricing, cost recovery, decentralisation, public-private partnerships etc.

2.2.2 SYNTHESISED POLICY PRINCIPLES FOR IWRM

A summary of the present policy principles derived from the most recent international deliberations and their practical implications is hereunder displayed. The principles are subdivided in principles of the first and second order. Principles of the first order are not negotiable, principles of the second order and their respective implications could differ from time to time and from place to place.

A. FIRST ORDER:

- **PROTECTION OF ALL LIFE: WATER IS A BASIC NEED FOR EVERY FORM OF LIFE WITH NO SUBSTITUTE**
- **SUSTAINABILITY OF THE RESOURCE BASE: PRESERVATION OF THE RESOURCE BASE: CONTROL OF FLOODS, EROSION CONTROL, POLLUTION CONTROL**
- **(INTER)NATIONAL STABILITY: EQUITABLE WATER DISTRIBUTION: TAKING CARE OF ALL RELEVANT INTERESTS**
- **PRECAUTIONARY PRINCIPLE: INTERGENERATIONAL EQUITABLE USE**

B. SECOND ORDER OR DERIVED PRINCIPLES:

- **WATER IS INSEPARABLE: (INTEGRATED APPROACH): WATER MANAGEMENT ON HYDROLOGICAL BOUNDARIES AND MANAGEMENT OF WATER QUANTITY, WATER QUALITY AND ENVIRONMENTAL INTEGRITY**
- **ECONOMIC USE: WATER IS AN ECONOMIC GOOD: COST RECOVERY THROUGH WATER PRICING 'POLLUTER PAYS' PRINCIPLE TRADABLE WATER RIGHTS**
- **EFFICIENT USE: DEMAND MANAGEMENT**
- **DECISION MAKING AT LOWEST APPROPRIATE LEVEL: (SUBSIDIARITY) FUNCTIONAL DECENTRALISATION**
- **STAKEHOLDERS PARTICIPATION: PLATFORM CREATION**

2.3 KEY-CONCEPTS

Water management on hydrological boundaries

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 also the necessity for communal flood control always 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. 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. 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 either 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 per 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, which together form an inseparable entity of the hydrologic circle.

Integrated planning

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 a 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, 2001; 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 (power supply, fishery, recreation, nature conservation) is indispensable in more complex systems. A system of integrated planning is needed in which water quality, water quantity and environmental integrity are managed in an integrated way.

Stakeholder participation

The term stakeholder participation is found in a lot of publications on water resources management. But, what do we comprise 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: 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 to be fulfilled to make water resources management effective. Measures taken without the involvement of the beneficiaries or the affected have a reduced change 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.

Platform creation

The aim of IWRM is to discard from sector approaches and to create environmental, institutional, social, technical and financial sustainability through the creation of a platform for Government and stakeholders for planning of water resources and implementation of water development and to deal with conflicting interests (van Hofwegen and Jaspers, 1999).

The platform has the following characteristics:

- It is a platform for weighing all interests and for decision making on use of water and water systems in the river basin.
- The platform should represent all interests and be under governance of 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 relevant administrative levels dealing with the relevant function: constitutional, organisational and operational function (related task groups).

Functional decentralisation

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 mention the public administration. So under the term decentralisation we comprise the process of transferring tasks and competencies durably 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 appeal 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, 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 case of integrated river basin management the figure of functional decentralisation is often applied. The decentralisation is not general, but is aiming at specific functions of administration, in this case tasks and competencies that are comprised by the function of water resources management.

Cost recovery

An increasing need for any government, but especially for governments of developing countries, is to recover the costs of the 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 upon (financial) government allocations only 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 in to 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 having a say, in fact, the characteristic mechanism under integrated river basin management (cf. Mostert, 1998). The water price is further an effective tool in reducing over-consumption and pollution of water.

Public private partnerships

Public private partnerships (or private sector participation) are widely perceived to offer effective solutions to complement or even replace public functions of water management and water supply. There are many different modalities in which public private partnerships can be shaped. The justification for public private partnerships can also be manifold.

In river basin management the process of gaining operational independency of stakeholders based river basin organisations is often based on considerations of participation as a better form of governance as well as on reasons of efficiency, improved monitoring through social control and acceptance.

Private sector participation in (drinking water supply) utility management is widely perceived to be the solution to the failure of many publicly owned and managed water utilities to operate efficiently and make the investments required to meet community needs. However, there are no guarantees that privatisation per se will actually yield the desired performance improvements (Rees, 1998).

Simply converting a public sector monopoly into a private one provides no guarantee for effective operation or for appropriate investments to respond to consumer demands without proper arrangements for regulation. An enabling institutional environment is needed, which is often lacking in developing countries. There are many different modalities to shape public private partnerships ranging from simple short term management contracts to fargoing complex concessionary relations in which the complete function of drinking water is delegated to the private sector in a very extensive way and for a long period (up to 30 years). For each situation a separate assessment has to be made on which modality is suitable for the specific circumstances. For each modality counts that a specific suitable regulatory framework has to be in lace.

Annex 1 describes in detail the different modalities for private sector participation in drinking water supply function and their strengths and limitations.

2.4 FUNCTIONS FOR IWRM

A function can be considered as a comprehensive set of tasks and the appurtenant competencies needed to cover a field of management. Water management could be divided in to three major fields of management: the constitutional, organisational and operational function (World Bank, 1993). The boundaries between those functions are not sharply defined.

The following descriptions are proposed:

CONSTITUTIONAL FUNCTION:

The total of tasks and competencies needed to set rules, to establish institutions and to formulate policies.

ORGANISATIONAL FUNCTION:

The total of tasks and competencies needed to develop strategies as logical combination of individual measures and to organise the implementation thereof.

OPERATIONAL FUNCTION:

The total of tasks and competencies to carry out strategies

This may result in the following subdivision of tasks and competencies:

Functional tasks

Constitutional function	Organisational function	Operational function
Vision establishment	Strategies	Implementation
Policy development	Criteria, guidelines, standards	Water use management
Formal legislation	Secondary legislation, regulation	Water utility management
Creation of institutions	Organisation of implementation	Monitoring
Co-ordination of strategies	Organisational planning	Policing
Strategic planning	General management	Sanctioning

As a subroutine of management, planning is represented in all functions (and at all administrative levels). Planning can take place intrinsically within all actions that are undertaken, the planning process can also result in plans as formal outputs, being official and publicly accessible, comprehensive sets of guidelines for decision making in the future.

From country to country, institutional arrangements to cover the above mentioned functions may differ substantially. This depends on many factors. Just to mention a few: size of the country, characteristics and scale of watersheds, climatic and hydrological properties, legal tradition, economic capacities, culture, religion etc. The following picture may act as a guideline:

Organisational actors

Constitutional function	Organisational function	Operational function
(General)	(General)	(General)
Federal Government	Minister	District
National (state) Government	Province	Municipality
(Specific)	(Specific)	(Specific)
River Basin Commission	River Basin Authority	Sub-basin organisation
National Water Authority		Water Users Association
		Service provider

It goes without saying that the organisations, authorised with specific functions of water resources management will apply their competencies and obligations to establish relevant legal instruments. To give an idea of how this could look like:

Legal instruments

Constitutional function	Organisational function	Operational function
International convention	Regulation, decrees	By-laws
Treaties	Development plan	Service contracts
Formal law	Management (control) plan	Sanctions
State law	Instructions	Participation, appeal
Formal regulation	Guidelines	Charges, levies
Policy plan	Impact assessments	
Taxes	Permit systems	

QUESTIONS

1. Can you give a definition of IWRM?
2. Explain in your own words the term 'integration'. Please, describe the elements of integration in IWRM.
3. What is functional decentralisation?
4. Is functional decentralisation different from integrated river basin management? Discuss the differences and similarities?
5. Explain the statement: 'The Dutch Water Boards are founded on the principle of interest, payment and having a say in decision making'.

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3 INSTITUTIONAL DEVELOPMENT

3.1 THE PROCESS OF INSTITUTIONAL DEVELOPMENT

From the previous chapters can be understood that in each and every society with any concept or level of civilisation under whatever political system, institutional arrangements will already exist and more often than not the existing institutional set-up will have logic roots. There are nearly always good reasons why the system became as it is.

However, gradual adaptation to slow changes in the time or to limited developments is not a dominant feature anymore. In an era of multi-national industrial development, mass-communication, explosive population increases and all kinds of cross-boundary interests and developments, communities, governments and other institutions have to react promptly on the rapid societal changes to which they are confronted. Many modern developments require accelerated institutional reaction. Various conditions are to be met before successful institutional reform can take place. And time is never on the side of reform processes.

A process of institutional development will normally be triggered by the need for reform as reaction on an existing or emanating problem.

Or in other words: THERE IS NO NEED FOR TRANSFORMATION TOWARDS IWRM WHEN THERE ARE INSUFFICIENT PROBLEMS WITH WATER QUANTITY OR WATER QUALITY OR WITH THE RESPECTIVE ENVIRONMENT.

Or a more complex variation: A WATER SECTOR REFORM IS DEEMED TO FAIL WHEN THE PROBLEMS ARE RELATIVELY MINOR IN RELATION WITH THE INPUT NEEDED TO CARRY OUT THE REFORM.

A reform process will only be useful when institutions or organisations are performing under standard. It may appear that a variety of weaknesses in the institutions or the institutional arrangements are nowadays the major causes of under-performance of the water sector. Sometimes, it may be one organisation or only individuals in that organisation, who clearly perform below standard. In many other cases, however, it is the lack of fit between the various institutions (the institutional architecture) and the basic objectives (Alaerts e.a., 1996).

Management science has shown that a poor fit between an organisation and its institutional environment is a common cause of weak performance (Mintzberg, 1993).

Very few absolute benchmarks exist that allow determining an institutions quality or performance. In general, benchmarks are set through comparison amongst peers of the sub-sector in the same region or worldwide (Alaerts, 1996).

In a number of situations it may suffice to strengthen the existing institutions, which is not very controversial. In many other cases, however it proves necessary to reform the existing arrangements, which can entail far-going interventions in the fundamentals of the administrative, organisational, legal and regulatory frameworks. Reform may cover e.g.:

- Re-design the purpose, goal, administration and personnel composition of a sector organisation
- Introducing new concepts through legal reform (IWRM, decentralisation, stakeholder participation, cost recovery)
- Re-designing tasks, financial responsibilities, procedures for decision making
- Etc.

Obviously reform encounters much more resistance than strengthening only.

It is, maybe, a bit cynical to observe that water sector reform processes in various countries in Southern Africa really took off after a series of extreme dry years with a substantial part of the population at the brink of perishing.

Also in Western Europe real solutions were found for international water pollution problems ONLY after some serious environmental disasters occurred.

Important in our case is the answer on the question: WHEN ARE TRANSFORMATION PROCESSES TOWARDS THE DEVELOPMENT OF IWRM TO BE CONSIDERED SUCCESSFUL?

The most important factor is that the process is originating from and carried by the stakeholders. So the key word is stakeholder involvement or participation. Involvement in decision making is a minimum requirement, but participation in other managerial functions as planning, control and monitoring is better. Consultation of stakeholders is often not enough, especially when afterwards nothing is done with the outcome of the consultation. It goes without saying that the incentive for stakeholders to participate will be higher when their interest is higher: the higher the stake, the higher the motivation to participate. Consequently, the resistance of stakeholders will be higher, when they are not involved in the process of making vital decisions.

Other important factors (benchmarks) are to reach acceptable levels of:

- Functional capacity and effectiveness
- Decentralisation
- Cost recovery
- Integrated river basin planning
- Equitable water allocation
- Effective flood control
- Benefit generation and benefit sharing.

The following composing elements were developed for the comparative assessment of institutional reforms of South Africa, Mexico and China.

Table 1: Framework for comparative assessment (South Africa, Mexico, China)

BACKGROUND
Physical properties
Water availability
Water quantity problems
Water quality problems
Others
THE REFORM PROCESS
Introduction of water policy
Water allocation principles (Flood control strategy)
Other strategies
Decentralisation
Stakeholder participation
Water pricing
Cost recovery
INSTITUTIONAL ARRANGEMENTS
Integration
Co-ordinated planning of natural resources
Management of quality, quantity, environment
River Basin Management (hydrological boundaries)
Management of ground- and surface water
River Basin Organisations
Functions
Water User Associations
Functions
STAKEHOLDER PARTICIPATION
Representation of interests
Participation in decision making (Role of women)
FINANCIAL MANAGEMENT AND COST RECOVERY
Water pricing (user/polluter pays)
Fee structure
Systems of charging for services
Funds development
Autonomous financial management

3.2 STAKEHOLDERS AND SUBSIDIARITY

The world of water managers is nowadays frequently buzzing over the importance of involving stakeholders. But, what is a stakeholder?

Does it matter to differentiate between direct stakeholders like water users or people with no access to safe water, between indirect stakeholders like government officials in a WRM function and between other interested parties without a direct stake like scientists or politicians?

It is virtually impossible to identify all possible and potential stakeholders, but a sub-division in the following categories might be instrumental:

Water users	Stakeholders	Interested parties
Individuals	Water users	Stakeholders
Groups of individuals	Potential water users	Experts
Water Users Associations	Government in WRM functions	Universities
Government as water user	Public private partnerships	Scientists
Companies	Etc.	Politicians
Etc.		NGOs
		Etc.

It goes without saying that in a successful process of water sector reform the relevant stakeholders for the various functions of WRM (Constitutional, Organisational and Operational) should be represented.

A modern institutional development approach will depart from the strategy that decision-making should be done at the lowest appropriate level. This does not mean that all decision-making should be done by water users. Certain decisions or decision-making processes are beyond the scope of the water user. It means that whichever decision-making can be left to a lower relevant level, should be left to that level.

However, a direct or indirect representation of stakeholders at all relevant levels of planning or decision-making is indispensable. In the next chapter an attempt will be done to discuss the advantages and disadvantages of selected systems of decentralisation for water resources management.

3.3 DECENTRALISATION

A crucial approach in any institutional development process is to come to a balanced distribution of tasks and competencies between the relevant levels of administration.

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 mention the public administration. So under the term decentralisation we comprise the process of transferring tasks and competencies durably 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 appeal 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, 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 case of integrated river basin management the figure of functional decentralisation is often applied. The decentralisation is not general, but is aiming 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 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 remains 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 case of a sensitive public function as managing a basic need like water. De-concentration is happening often. However, since there is no shift in responsibilities for decision making, this figure is not offering 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. Contrarily, in France the 'Agences de l'eau' gained in importance after 1964 through the absolute need in France to detain central government control (Alaerts, 1995). In Turkey the process of delegation is still experimental.

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. One could say that the success of a water sector reform hinges on a considerable number of completed effective delegation efforts.

In accordance with the situation in e.g. Tanzania it is envisaged that, following principles of progressive delegation, Basin Water Organisations will continue to be established in the river basins (lake systems) that are in need of stakeholder based water resources management. This is the case where considerable and growing water competition is found or where river systems are increasingly influenced by human occupation. In the river basin stretches where water competition or human interference is highest, the subsequent need for Catchment Water Organisations (and Water Users Associations) will be highest. A stage should be reached where river basins in need of stakeholder based water management can easily built upon achievements reached in pilot river basins with an effective Basin Water Organisation and a number of functioning Catchment Water Organisations.

Without meaningful water competition or without serious human intervention in the environment of a river basin, there is no need for heavy institutional arrangements. (Jaspers, 2003)

3.4 COST RECOVERY

One of the Dublin principles is that water should be considered as an economic good in all its competing uses. Consequently water should be priced (ICWE, 1992). The latter addition “in all its competing uses” is a very important one, because it implies that when there is no competition water per se should not necessarily be priced. Especially in developing countries and emerging economies there might be various reasons why water should not be priced up to its real value, reflecting the opportunity costs of the water commodity (Rogers, 1998). There might be social or even political reasons for not being too eager to price water, aspects of willingness or capacity to pay. The absence of water might have a paralysing effect on the kick-off of certain economic activities. Water availability is often a precondition for social and economic reform, for poverty alleviation in the widest sense. Water pricing sometimes also encounters cultural or religious constraints. In an Islamic culture water pricing has a different sound than in a commercialised segment of the US civilisation.

Notwithstanding the various different concepts of water pricing, the recovery of costs for providing water services is widely accepted. The justification for cost recovery can be manifold and is not necessarily restricted to economic aspects. The following reasons prevail:

- Coverage of costs per se to be able to provide water services and or to increase coverage
- Proliferation of water saving behaviour and water conservation
- Allocation of water as per best economic advantage.

More often than not a water pricing approach hinges on a combination of each of the above factors.

In the table below some instruments of cost recovery are presented. It is important to differentiate between those instruments in their purpose and in their desired application. Water taxes for instance are widely applied, but cannot be considered as direct cost recovery mechanism, because in general they flow back to treasury. They are not used to cover the specific cost of the services (if they do, they should not be considered taxes). Taxes can be used to proliferate water saving, but the mechanism is weak. Paying taxes is an obligation, there is no real choice for avoiding taxes. There is also no real choice to avoid levies, but there is a choice to avoid charges and priced services. However, in an administrative sense, taxes and levies are much easier to apply than charges and priced services. The latter applications require continuous metering and monitoring. One has to strike a balance between administrative simplicity on the one side and relation to the service and to capacity to foster water conservation on the other side.

Instruments of cost recovery

Character/ Instrument	Service relation	Cost recovery mechanism	Ratio of willingness
Service pricing	Strong	Direct	High
Tax	Weak	Indirect	Low
Charge	Strong	Direct	Intermediate
Levy	Intermediate	Direct	Low

Figure 2: Instruments of cost recovery

3.5 COMMERCIALISATION, CORPORATISATION, PUBLIC-PRIVATE PARTNERSHIPS

The decision to embark on a commercialisation or privatisation route (whether or not via the application of public-private partnerships first) is first and foremost a requirement for a need for more effectiveness and efficiency of public management and for a higher financial capacity to increase the service coverage. Important to realise is that public management of water resources ultimately is deemed to fail without a substantial cost recovery and without the attainment of a high level of service delivery with an acceptable price/quality relation. There are numerous modalities and approaches for reaching an increased level of effectiveness and efficiency through advanced or complete cost-recovery (commercialisation) and within those modalities several routes can be followed. Let us concentrate on a few mainstreams.

Basically, it is possible to embark on four different routes of commercialisation:

- (1) The first route is to engage in a process of individualisation of public management functions into often various separate quasi non-governmental organisations or quango's. This simply means that public functions are delegated to and carried out by specific individual agencies under full government authority and fully financed by government. Government sets the tasks and the goals, but the agency is fully free in the choice of approaches, instruments and means to reach the goals. The only (but strong) correction mechanism of the government is the budget. Examples of these may be public hospitals, universities, certain police services, surveyor general etc.
- (2) The second route or a further step is to engage in the formation of a para-statal, corporation or another corporatised agency. It is very applicable to the water sector. It implies that a set of government functions and service deliveries are formally brought under commercial law or are arranged under special law, but with a commercial orientation. Government remains the main or often full shareholder. Decision-making is regulated by the government, but done by the corporation. Ideally, the corporation has a mission of public interest, but may apply the flexibility of a private company.

- (3) Another modality is to invite the private sector to participate in to public management. This may vary from simple management or service contracts to take care of a single function for a very short period of time to nearly complete delegation of complex government functions for periods of say 30 years (e.g. concessions or BOT-contracts). Nearly everything is delegated except the final ownership with right of sale of the service assets (and often the tariff setting or pricing). (For an elaborate discussion of modalities of public-private partnerships see annex 1)
- (4) The last step is full privatisation with a full divestiture of assets, a complete shift of financial risks and a transfer of the right of price and tariff setting.

The role of the government as caretaker of the public interest may change drastically from modality to modality, but one aspect does not change. Government will always remain custodian of the public interest. Further, in any commercialisation effort the creation of an appropriate regulatory function is an absolute condition for success! The following matrix gives an overview of private sector participation modalities and their characteristics.

**Contract forms delegated management
(French model)**

Modality Feature	Service Contract	Management Contract	Lease	BOT etc.	Concession
Ownership	Public	Public	Public	Public & Private	Public
Investment	Public	Public	Public	Private	Private
O&M	Public	Private (little risk)	Private	Private	Private
Tariff Collection	Public	Public / Private	Private	Private	Private
Payment	Fee	Lump sum +	Tariff (restricted)	Tariff (restricted)	Tariff (restricted)
Duration (years)	1-2	3-5	8-15	20-30	25-30

Figure 3: Modalities of private sector participation and their characteristics

3.6 ANALYTICAL FRAMEWORK FOR ASSESSMENT AND DEVELOPMENT OF INSTITUTIONAL ARRANGEMENTS

Van Hofwegen and Jaspers developed an Analytical Framework for Assessment and Development of Institutional Arrangements for IWRM (Van Hofwegen and Jaspers, 1999). The model is meant as a starter approach of institutional development processes in developing countries, especially when the knowledge base of the water sector is limited. The analytical framework is based on a cyclic development process to come from an identified present water resources management situation to some desired integrated water resources management situation. The analytical framework is developed taking in to consideration focal elements within the respective (constitutional, organisational and operational) functions.

Together with relevant stakeholders main issues and topics are formulated that may establish an advanced stage of IWRM applicable to the situation and the country.

IDEAL SITUATION

In the analytical framework an 'ideal' IWRM situation is formulated that should give direction to the process of integration of the management of water resources. In an ideal IWRM situation water is managed on (sub-) basin level in a sustainable way. The water related interests of all stakeholders are considered in decision making on water use. All stakeholders are aware of the potential of the water resources and the impact of their use on other stakeholders. Decisions on water use and associated cost of service provision are made in a participatory manner according criteria agreed and accepted by all stakeholders. Implementation of IWRM is done at the least cost in a transparent way with effective accountability mechanisms in place.

DESIRED SITUATION

The desired IWRM situation is a compromise between the present and an ideal IWRM situation because an instantaneous complete introduction of IWRM is an unrealistic and maybe undesirable expectation. This compromise will be the result of a negotiation process in which policy makers, water resources and water utility managers and stakeholders are involved. The outcome will be determined by technical, financial and political attainability under prevailing socio-economic conditions. With changing conditions the desired IWRM situation will change. This process contains the following steps (see figure):

- Assessment of the present situation and trends
- Formulation of a desired IWRM situation based on an 'ideal' or eventual IWRM situation
- Formulation of interventions to arrive at the desired IWRM situation
- Establishment of a monitoring system to see whether the interventions are being carried out properly and whether they really contribute to the achievement of the IWRM goals.

The Analytical Framework is displayed on the next page.

QUESTIONS

1. Can you explain the following statement: "Management science has shown that a poor fit between an organisation and its institutional environment is a common cause of weak performance"?
2. The Board of the Sub-catchment Council (Zimbabwe) is composed of water users. The Board of the Catchment Council is composed of stakeholders including local governments. The Board of the Zimbabwe National Water Authority is composed of representatives of the society at large. What is the difference? Why is this differentiation created?
3. What is the difference between de-concentration, delegation and devolution?
4. What is progressive delegation?
5. What is the difference between a tax and a charge? Please, give examples.
6. Can you explain the following statement: "In full privatisation the government should have a stronger regulatory capacity". Is the statement to your opinion true? Can you give arguments pro and contra?
7. What is a quango? What are the characteristics?

FIG.4: ANALYTICAL FRAMEWORK FOR TRANSITION TO INTEGRATED WRM AND FOR INSTITUTIONAL REFORM

- PRESENT SITUATION AND TRENDS**
- STAKEHOLDERS
 - PHYSICAL CONDITIONS
 - POLICIES AND TRENDS
 - LEGAL FRAMEWORK
 - INSTITUTIONAL FRAME
 - FINANCE&ECONOMY
 - SOCIO-CULTURAL ASPECTS
 - TECHNOLOGY AND DATA

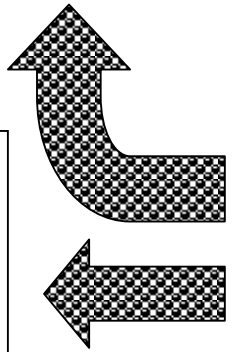
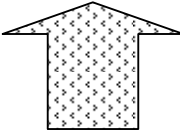
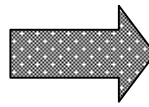
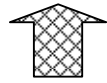
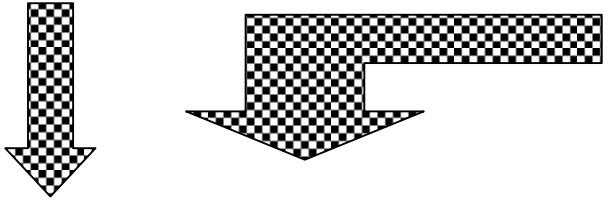
- MONITORING & EVALUATION**
- PERFORMANCE INDICATORS
 - EVALUATION CRITERIA

- DESIRED IWRM SITUATION**
- STAKEHOLDERS
 - PHYSICAL CONDITIONS
 - POLICIES
 - LEGAL FRAMEWORK
 - INSTITUTIONAL FRAME
 - FINANCE & ECONOMY
 - SOCIO-CULTURAL ASPECTS
 - TECHNOLOGY AND DATA

<u>INTERVENTIONS</u>	<u>FUNCTIONS</u>		
	CONSTIT.	ORGAN.	OPER.
- AWARENESS CREATION	+	+	+
- POLICY DEVELOPMENT	+	+	
- LEGISLATION	+	+	
- INSTITUTION BUILDING	+	+	+
- FINANCE & ECONOMY MEASURES	+	+	+
- TECHNOLOGY/DATA DEVELOPMENT	+	+	+
- HUMAN RESOURCES DEVELOPMENT	+	+	+
- INFORMATION SYSTEMS	+	+	+
- DECISION SUPPORT SYSTEMS	+	+	+
-			

- IDEAL IWRM SITUATION**
- POLICIES
 - LEGAL FRAMEWORK
 - INSTITUTIONAL FRAME
 - FINANCE & ECONOMY
 - ETC.

- POLITICAL REQUIREMENTS**
SOCIETY AT LARGE
STAKEHOLDERS



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4 INTEGRATED RIVER BASIN MANAGEMENT

4.1 INTRODUCTION

From early civilisations on 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. Multiply 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 finite and vulnerable resource (Agenda 21: UNCED, 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 inseparable entity. Further, there should be 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, 1999; Savenije, 2000). Fundamental question, of course, is: “how should all this be implemented?” Which arrangements can be made to bring theory in to practice? This article will emphasise the institutional arrangements that are being developed and that are needed to enable developing countries to depart from 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.

4.2 TERMS AND DEFINITIONS

In this chapter a number of terms will be used that are frequently coming up in 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, art II). If the common terminus is a lake, a coastal zone, a delta, an estuary etc. this may be comprised 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 and 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 the society at large with regard to water for now and in the future, thus aiming at maximum sustainability in all senses (cf. van Hofwegen and Jaspers, 1998).

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 focussing 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, 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).

4.3 JUSTIFICATION FOR INTEGRATED RIVER BASIN MANAGEMENT

Why is there a need for a relatively complex institutional mechanism 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 originating by itself? Why not restricting oneself to the regular management by sector ministries and their decentralised institutions operating on politically accepted administrative boundaries (regions, provinces, districts). Why opting 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-eye overview on 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 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 benefits of the Nile (cf. NBI, 2000).
- The Rhine Commission was established to have an international platform for the Rhine riparian countries to deal with upstream-downstream conflicts notably on water quality (Mostert, 1999). 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 stakeholders based River Boards originated basically by themselves to deal with questions of complexity of water allocation, setting priorities for use and enforcement of water rights (WRMS Technical 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 first Dutch political institutions, are combining the traditional management principles of “interest, payment, control” with modern requirements of integration of sectors and multi-disciplinarity (cf. Mostert, 1998).
- Indonesia’s water policy has been characterised by a continuous strive 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 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. 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 also the necessity for communal flood control always 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 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, especially the call for cost recovery of governments of developing countries provides a new trigger. Institutions for integrated river basin management provide substantial comparative advantages to practically implement these systems of cost recovery.

4.4 TRIGGERS FOR CHANGE

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. 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 either 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 per 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.

THE NEED FOR 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; Dublin Principles: ACS/ISGWR, 1992; Agenda 21: UNCED, 1992).

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 (power supply, fishery, recreation, nature conservation) is indispensable in more complex. A system of integrated planning is needed in which water quality, water quantity and environmental integrity are managed in an integrated way.

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.

STAKEHOLDER PARTICIPATION

The term stakeholder participation is found in a lot of publications on water resources management. But, what do we comprise 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: 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 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.

COST RECOVERY/WATER PRICING

An increasing need for any government, but especially for governments of developing countries, is to recover the costs of the 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 upon government allocations only 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 in to 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 further an effective tool in reducing over-consumption and pollution of water.

4.5 INSTITUTIONAL ARRANGEMENTS

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

GENERAL

In order to bring integrated river basin management in to 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.

STAKEHOLDER PARTICIPATION

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. Crucial is to set up a platform in which all relevant stakeholders are represented. This platform is meant to discard 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 or their representatives, government officials, NGOs, experts, representatives of society at large. At operational level the requirement for water users to be represented is clear. In strategic planning apart from water users also government officials in relevant water related fields of work, interest groups and experts are normally represented.

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 mention the public administration. So under the term decentralisation we comprise the process of transferring tasks and competencies durably 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 appeal 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, 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 case of integrated river basin management the figure of functional decentralisation is often applied. The decentralisation is not general, but is aiming 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 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 remains 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 case of a sensitive public function as managing a basic need like water. De-concentration is happening often. However, since there is no shift in responsibilities for decision making, this figure is not offering 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. Contrarily, in France the 'Agences de l'eau' gained in importance after 1964 through the absolute need in France to detain central government control (Alaerts, 1995). In Turkey the process of delegation is still experimental.

MANAGEMENT ON HYDROLOGICAL BOUNDARIES

It is advisable to identify river basins in 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 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 as the Nile or the Amazon are substantially more complex than of small local river basins, although in essence not 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 highly 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 in to 7 river basins (in fact river sub-basins) of approximately 80,000 km². Each of these basins was subdivided in to 5 to 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 in to 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 in to 5 River Basin Authorities ('Agences de l'eau': Alaerts, 1995). Water management in the Netherlands is comprised under about 60 Water Boards, administrating small sub-basins. There is an intention to consolidate those small and independent organisations into approximately 15 units. In Turkey the idea is to subdivide the country in to 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.

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). 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 to 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 in 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 an ongoing process. In The Netherlands members of the Water Boards are elected by the organised real estate owners (Mostert, 1997).

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 highly depends 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.

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 and Jaspers, 1999).
- Planning delivers an opportunity to streamline the participation process and it 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, 1999).

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 to be 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-going 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. Not necessarily, however all these aspects should/could 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 on 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 at all crucial stages of the plan development in contact with partner governmental institutions and interest groups and NGOs. The open planning approach is extensively studied at present (even by unexpected actors e.g. by the American business world).

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. Traditional example is that paying for water per se in a muslim culture is not really accepted. The acceptance of cost recovery, however, is widely spread. This acceptance is very 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, 1998). The final stage is that water rights are traded or even that water is auctioned (Holden and Thobani, 1995; Lee and Jouravlev, 1998; Jaspers, 2002). Water is used as an instrument to maximise the economic output per unit of volume. For the latter modalities a high level of organisation and specific institutional arrangements are needed.

There are many supporters, but in the mean time also some adversaries of the statement that "water is an economic good". For sure 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 (EU, 2000)'.

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 of 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 prerequisite. (To describe effective water rights, pollution discharge licensing and water quality management systems would go beyond the scope of this article.) 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 logical unit for management (Jaspers, 2002).

4.6 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) aiming at the implementation of integrated river basin management. Interpretations on how to implement may differ here and there on details, but there seems to be consensus on the main stream of key-aspects.

The provision of legal frameworks is generally lagging behind as the law is always a conservative and slow reaction on changes in society. Crucial is the social consensus on institutional arrangements for implementation and the development thereof 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 stage of implementation in developing countries may differ substantially. For developing countries it is further 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 done 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 at the right place. The development of human capacity is a long-term effort, complex of 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 of 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 at the right place and synchronised at (inter) national, regional and river basin level is a task that can only be covered by the aggregated international community (cf. van Hofwegen and Jaspers, 1998).

QUESTIONS

1. Can you give a definition of Integrated River Basin Management?
2. 'The Dutch Water Boards are combining the traditional management principles of "interest, payment, control" with modern requirements of integration of sectors and multi-disciplinarity.' Could you explain?
3. Can you mention three different categories of stakeholders? Could you give 3 specific examples of each of the three groups?
4. Can you mention 4 key-characteristics for the application of integrated river basin management?
5. What is the difference between cost recovery of water services based on a system of charges and on a system of taxes. Which system do you consider more appropriate for the implementation of Integrated River Basin Management?
6. How can horizontal and vertical co-ordination be arranged in a system of IRBM?
7. What is functional decentralisation? What is the difference between delegation and de-concentration? And between devolution and delegation?
8. Can you give at least four good reasons to decide to subdivide River Basin Organisations into Sub-basin Organisations?
9. 'The representation in a River Basin Committee can be sectoral or through Water Users Associations!' What is the difference?
10. How can an integrated planning process support a system of integrated river basin management?
11. What can generally be understood by the term 'open planning process'?
12. Capacity building can be interpreted in many senses and can be aiming at various fields of development. Can you indicate the most important fields of development for IRBM?

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5 WATER SECTOR REFORM

5.1 SOUTH AFRICA

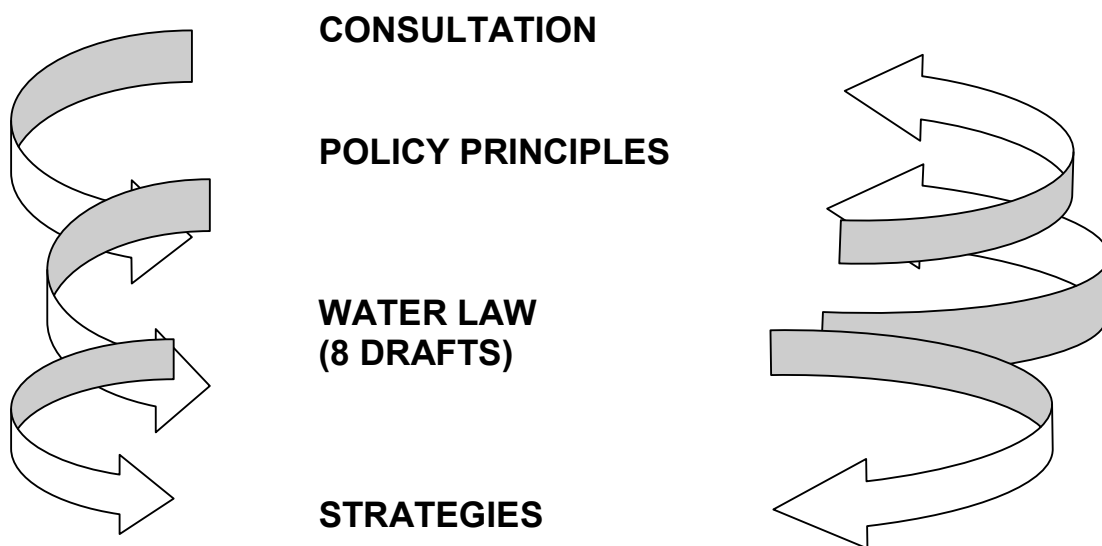
Water policy for South Africa

A very interesting approach was followed by the South African Government in its endeavours towards a drastic reform of the water sector. A nation wide consultation was set up throughout all layers of the South African society in order to come to new water legislation in line with the changes in concept of equitable water distribution and environmental sustainability. The first outcome of the consultation process was the production of the “Fundamental Principles and Objectives for a New Water Law in South Africa”, which was approved by the South African Cabinet in November 1996. These principles have in turn guided an intensive programme of work involving the Minister and other political leaders, officials from the Department of Water Affairs and Forestry and other Government Departments, organised users groups and South Africans from all walks of life and from all provinces in a process of consultation, research and synthesis.

The policy development process has been assisted by the support and involvement of officials and experts from other countries and from international organisations.

The Whitepaper on a National Water Policy for South Africa (DWAF, 1997) is a very summarised product of this process. It does however outline the direction that was given to the development of water law and water management, systems which will take South Africa into 21st century.

The approach that was followed in the case of the South African Water Sector Reform can be illustrated with the following simplified graph:



South Africa's legal reform

The initiative to produce new water legislation by the South African Government was part of a still ongoing extensive process of reversing the injustices of the past. In fact "the new South African Constitution is underpinning the need for the review of South African Water Law and for a fundamental change in the approach to water management". It is not difficult to ascertain that a prime interest of the new constitution is to redress a very unbalanced, racially askew distribution of resources.

The South African legal understanding of water use was based on two important ideas: Firstly a link between the right to use water and the ownership of land adjacent to that water (the riparian principle), and secondly a separation between private and public water (Department of Water Affairs and Forestry 1997).

The system of riparian rights (as found in the Water Act 54 of 1956) was largely developed by the courts through a combination of Roman-Dutch, English and American Law. This resulted in the idea of a river from which all adjacent landowners could take their share.

For many years water users (urban and industrial), who did not have access to water as a result of land ownership, could only get access to water through a Water Court application. A limitation was that they should meet their needs without affecting the allocations of established riparian owners. The other option was to buy land with access to water. Consequently, the position of the rural black and coloured people with regard to water distribution is not difficult to imagine. They simply did not have sufficient support and capacity to address the courts at all, let alone the financial means to buy land or to get access to the administration for establishing rights. The fact that black and coloured people were concentrated in homelands with marginal water resources and with informal or customary land use rights contributed largely to the inequity (Ramazotti, 1996).

Besides, government dams were (are still) located in areas of urbanisation and commercial estate farming, meaning that the rural population de facto was forced to turn to groundwater abstraction. Furthermore, groundwater resources in the former homelands are scarce and not easy to reach. The new South African Water Act empowers the National Government in section 3 as the public trustee of the nation's water resources, acting through the Minister. "The Government must ensure that water is protected, used, developed, conserved, managed and controlled in a sustainable and equitable manner, for the benefit of all persons and in accordance with its constitutional mandate."

The Minister is obliged to produce a national water resources strategy in line with the principles that are underpinning the Act. In general terms this means: equity, efficiency, sustainability, along the lines of an integrated approach with optimal stakeholder participation. The Minister has to make sure that specific catchment management strategies are produced by the relevant authorities in line with the national strategy. A catchment management strategy necessarily covers a water allocation schedule (among other requirements).

The system of allocation of water rights based upon the riparian doctrine is being abandoned. It is being replaced by a system of (i) lawful or permissible uses, (ii) general authorisations and (iii) licences. The permissible use system is formulated in such a way that basic (mainly domestic) water uses, indicated in a special Schedule attached to the Act are not subjected to the licence and authorisation system. Water uses permitted under other or prior legislation will continue to remain lawful unless and until they are or will be covered under the restrictions of the Act. The system of general authorisations gives the relevant authority the possibility to exonerate types of water uses, groups of persons, certain parts of a catchment at certain periods of time from legal restrictions or licence application (section 39). Any other water use, not comprised under any of these categories, needs a licence, with a maximum duration of 40 years. After this period the licence has to be repealed (section 40). In the system of general authorisations and licences the option is offered to the relevant authority to attach conditions or obligations to fulfil formal requirements (section 39-40).

River basin organisations

The choice of the former apartheid regimes to concentrate black and coloured people in areas with a precarious water situation, but also the inability to create institutional capacity in those rural areas, were two factors triggering the production of a special Water Services Act. This act deals with the provision of safe drinking water to all levels of society and is enhancing extensive processes of decentralisation of the water supply function to the local governments of the Republic of South Africa.

Further, the Department of Water Affairs and Forestry was organised on administrative boundaries, causing a main bottleneck in effective watershed management. Similar to the establishment of river boards in Zimbabwe, useful (non-governmental) experiments were undertaken in the field of watershed management. The positive outcome of these experiments supported the concept that water management unavoidably has to be carried out on hydrological boundaries. It goes without saying that full stakeholder participation was gravely undervalued under the apartheid regime. A comprehensive description of this problem goes beyond the reach of this article.

In future, water management in South Africa will be carried out on hydrological boundaries. For all 12 catchments in the country catchment agencies will be progressively established in an attempt to decentralise decision making to the lowest appropriate level. This progressive delegation will take place at the request of groups of stakeholders as and when sufficient management capacity has been established and can be demonstrated. Where catchment management agencies are not yet viable the Director-General will take care of their function, whether or not assisted by an Advisory Committee, as a first step towards establishing an agency.

Catchment management agencies may be established for specific geographical areas, after public consultation, on the initiative of the community and stakeholders concerned. In the absence of such a proposal the Minister may establish a catchment management agency on his own initiative.

Part 3 of chapter 8 of the new South African Water Act deals with the functions and operation of catchment management agencies. Original functions are concerned with the investigation of and advice on water resources, as well as the co-ordination of the related activities of other water management institutions within their water management area and the development of a catchment management strategy. Additional powers and duties as described in Schedule 3 may be assigned or delegated to agencies such as: to establish water use rules and management systems; to direct users to terminate illegal uses of water; and to temporarily limit the use of water during periods of shortage. A catchment management agency may be financed by the state from water charges made in its water management area or from any other source.

Part 2 of chapter 8 describes the appointment of members of the governing board of a catchment management agency. The board of a catchment management agency will be constituted in such a way that interests of the various stakeholders are represented or reflected in a balanced manner, and that the necessary expertise to operate effectively is provided. Members of the governing board can be elected or nominated by the different water user groups for appointment by the Minister, and the Minister may of his or her own accord appoint further members. (The Minister may also remove board members for good reason.)

The Act goes even further in its endeavours to guarantee stakeholder participation by the introduction of the principle of water users associations. Although water users associations are water management institutions, their primary purpose, unlike catchment management agencies, is not water management. They operate at a restricted localised level, and are in effect co-operative associations of individual water users who wish to undertake water-related activities for their mutual benefit. A water users association may carry out management powers and duties only if, and to the extent that, these have been assigned or delegated to it. The Minister establishes and disestablishes water user associations according to a standardised procedure based upon an approved model Constitution.

Existing irrigation boards, subterranean water control boards, and water boards established for stock watering purposes will continue in operation until they are restructured as water users associations.

Part 4 enables the Minister to disestablish a catchment management agency or make changes to its water management area, for reasons which include the need to reorganise water management institutions for more effective water resource management. An agency may also be disestablished if it does not operate effectively.

5.2 WATER SECTOR REFORM IN ZIMBABWE

Introduction

In Zimbabwe the main motive for a water sector reform was the general feeling that water even many years after liberation from colonial influence, was distributed inequitably and that a vast majority of (black) rural people in the Communal Lands in particular had insufficient access to raw water resources (Jaspers, 2001). Around 1995 the Government of Zimbabwe embarked on an initiative to put a new Water Resources Management Strategy together, in fact a process of policy development announcing massive changes for the water sector in Zimbabwe.

The respective guiding principles for a process of policy development were (are), Government of the Republic of Zimbabwe 1998):

- (i) The development and continuous updating of a water resources management strategy aiming at equity, efficiency and environmental integrity;
- (ii) The introduction and implementation of water management at hydrological boundaries and at the lowest appropriate level, involving all stakeholders and relevant interests;
- (iii) The introduction of integrated approaches also covering the management of groundwater resources and the conservation of environmental values;
- (iv) The pricing of water and the appreciation of water as an economic good in all its competing uses;
- (v) The commercialisation of the government agencies involved in water management (Zimbabwe only);
- (vi) Continuous capacity building among all the actors in water resources management and institutional strengthening of the relevant agencies;
- (vii) The need to disregard borders in order to solve problems of cross-boundary river basins effectively.

Annex 2 is handling and describing factors of prime importance in the process of legal and institutional reform in both Zimbabwe and South Africa. Major factors are earmarked and derived from the proceedings in Zimbabwe and are compared with the situation in South Africa. Thorough analysis of proceedings, preambles, memoranda, legislation and addenda has induced roughly 5 major reform issues:

- The call for equitable water distribution based on a widely consented water resources management strategy,
- The need for effective and efficient integrated water resources management conducive to stakeholder participation through decentralisation processes,
- The redressing of legal shortcomings in former water legislation with the emphasis on the introduction of integrated approaches,
- The introduction of instruments of cost recovery for water resources management,
- The need to develop human resources capacity and institutional strength within the implementing agencies (Jaspers, 2001).

Triggers for change

During the severe droughts that struck the country in the early nineties, the insufficient administrative capacity to supply and allocate water for even covering bare necessities became apparent. The following factors played a major role:

- The water rights system on date priority appeared to be very difficult to administer under circumstances of severe drought. Especially, the insistence of downstream users to have their flow (abstraction without storage) rights satisfied resulted in the loss of desperately needed water.
- Too many water rights had been issued in already oversubscribed catchments (river basins). The fine-tuning was failing between the Administrative Court, as the legal institution authorised to issue water rights, and the Department of Water Development, as advisor in hydrological matters. In practice the Department of Water Development always submitted positive advises on any application upon which the Administrative Court automatically granted the right. This resulted in rights with failure chances of over 80%.
- The legal tools of the government to declare Water Shortage Areas and Public Water Control Areas¹⁰, instruments intended to tackle droughts and structural shortages of water, proved to be too bureaucratic and impractical.
- The Government was organised on administrative boundaries, which resulted in all kinds of co-ordination problems between the national level and provinces and districts, especially in the planning of the use of water resources.

The river boards, till then consisting of private users only, and bestowed with some public authority since the (minor) changes of the Water Act in 1986, were in practice managing the catchments. Their (privately financed) monitoring ability, social control and management flexibility proved to be very valuable. There was just one major problem with river boards: only commercial farmers were represented.

The outdated Rhodesian Water Act gave the opportunity for the Permanent Secretary as head of the Water Department to constitute Advisory Councils and to produce outline plans. However, this opportunity was never utilised. The planning and decision making on water allocation was carried out in a haphazard way by the Department of Water Development and the Administrative Court, who jointly took a “sky is the limit” approach. There was no organised participation of stakeholders other than powerful individuals applying for an unrestricted amount of water rights, thus accumulating unrestricted volumes. Obviously, large groups of people and many interests remained outside the “deal” and this triggered large social unrest, especially when the public became aware of the fact that huge private dams were constructed without a valid water right and that the law was not enforced in practice.

Legal reform

In the new Water Act of the Republic of Zimbabwe (1998), Zimbabwe Water Act No 31, Chapter 20:24, the differences in managing surface and groundwater are from now on to be removed. All the legal instruments expressed in the new Water Act now also apply to the management of groundwater in line with international practices.

The ancient system of water rights established on a system of date priority is abolished and replaced by a system of water permits with a time restriction. The water permits are derived from a river basin management plan composed under auspices of the catchment council. The use of water is forthwith priced.

The legal reform entails a complete commercialisation and decentralisation of the water sector. Strategic management and national planning is delegated to a state owned corporation, the Zimbabwe National Water Authority operating according to commercial principles and under special law. Further, the country is subdivided in to 7 catchments, headed by catchment councils, composed of delegates of subcatchment councils.

Under Part VI of the Act there is a special arrangement concerned with the control of water pollution and the protection of the environment in general. In *clauses 67 to 71* of the Act, provision is made for ensuring that water resources management under the Act is consistent

with the broader national environmental approaches. The discharge of effluent or wastewater into any water body will be regulated by permits, to which conditions will be attached, subject to prescribed standards.

Economic penalties will be introduced with respect to contraventions of the Act and where an order prohibiting a person from doing something has been made the order will stand, despite the fact that an appeal may have been noted against the order. This is a considerable improvement because there are waiting lists of two years and more for minor cases to be handled by the Zimbabwean Courts.

The penalties now clearly exceed the profits that could be gained by persisting in the contraventions. The Act specifically mentions a maximum economic sanction of twice the amount of any profit or advantage unlawfully gained, or a period of imprisonment for maximum two years, or a combination of both (*clause 118*).

Commercialisation and cost recovery

Until the present changes of the Zimbabwe Water Act, 1998, no water was priced except water from government storage and this at a very low level. Due to lack of administrative capacity and rapid price inflation, the government water price was always lagging substantially behind the real value of water (Robinson, 1998) and the rate of billing was very low. This implies that cost recovery for raw water management and development is, even until now, very low. In a country stricken by one financial disaster after the other and subjected to Economic Structural Adjustment, this resulted in a fast decay of government infrastructure because of a shortage of funds to cover the necessary maintenance. In short, government infrastructure in Zimbabwe is falling apart and very little is being done about it. The simple necessity of a system of cost recovery was a major impulse for legal and institutional reform.

The whole water sector is commercialised by the introduction of the Zimbabwe National Water Authority through the Zimbabwe National Water Authority Act, specifically designed for this purpose. The National Water Authority is a statutory corporation charged with the operational aspects of what has hitherto constituted part of the work of the Department of Water Development. With the establishment of the Zimbabwe National Water Authority (ZINWA), the development and management of the national water resources will be the responsibility of the Authority, whilst the policy making and regulatory functions will remain the responsibility of the Government in the Department of Water Development. The Authority will operate on a commercial basis except in respect of certain non-commercial functions.

Fees for applications for permits to use water and for the commercial use of water are being introduced. This revenue will be used for the development of water resources through a special Water Development Fund. There will also be charges for permission to discharge any effluent into streams or water bodies, and the revenue will be channelled into matters relating to water quality control, in this case through the introduction of a Water Levy Fund. The Water Levy Fund will be used to finance water quality and water quantity management. Thus, the principle of the "user or polluter pays" is embodied and the idea is that water development and water management will generate sufficient revenue to pay for itself.

The National Water Authority consists of a Board and a Chief Executive. The Board, operational from 1 January 2001 onwards, consists of 10 members. Of these, six members are appointed by the Minister directly and four members are appointed by the Minister from a list of persons nominated by the respective catchment councils. Of the six Minister's direct appointments, five will be persons recognised for their ability and experience in the development and management of water resources, business and administration and one member will be a water engineer from the Ministry responsible for water resources development.

Clause 5 of the (ZINWA) Act sets out a detailed list of functions of the Authority. Essentially, the Authority will advise the Minister on the formulation of national policies and standards on water resources planning, management and development; on water quality and pollution control and the protection of the environment; on hydrological and hydro-geological matters; on dam safety and bore hole drilling; and on water pricing! The functions emphasise the Authority's role in ensuring the equitable accessibility to water by citizens and its efficient allocation, distribution, use and development on a cost-effective basis. The Authority will superintend catchment

councils established under the Water Act in discharging their functions under that Act and will assist local authorities in the development and management of, in particular, potable water resources in areas under their jurisdiction.

By choosing for the institutional modality of a corporation ruled by special law, it is expected that government will not lose the traditional caretaker function, typical for the management of “common pool” resources.

River Basin Organisations

In the new Water Act the principle of managing water on hydrological boundaries is being introduced. According to the Water Act the Minister (of Rural Resources and Water Development) has the authority (and obligation!) to establish catchment councils in consultation with a newly established National Water Authority (*clause 20*). Authority is bestowed on seven catchment councils to set up the management of the use of water in the catchment areas under their jurisdiction. This includes the power to issue water use permits. In principle the council has full autonomy in the allocation of water. This implies that the original function of granting water rights is changed to one to issue water permits and this function is removed from the Administrative Court and instead decentralised to catchment councils. The Administrative Court will further operate as a court of appeal.

The tasks of catchment councils are roughly: assisting in the preparation of outline plans; determining applications and granting permits for use of water; regulating and supervising the use of water by permit holders; and ensuring compliance with the Act. The Water Act stipulates that in the composition of the catchment councils equal representation of all water users in the area concerned has to be reached. A specific intention of the new legislation is that people in the Communal and resettlement areas are involved in water management.

Before the promulgation of the new legislation there was an extensive trial period to experiment with various systems of representation (in pilot projects). The system that was selected encompasses a subdivision of the catchment in workable sub-catchments (in principle selected on hydrological boundaries but with an open eye for administrative realities). The councils have an equitable distribution of all water uses and potential (!) uses. Existing water users organisations, private and public, have been merged into the sub-catchment council. The catchment council consists of the chairpersons of the various sub-catchment councils in its area. In addition, some representatives of major urban areas have a fixed seat in the catchment councils. The concept of representation is displayed on the next page.

Subcatchment councils are corporate bodies with the power to levy rates upon permit holders in the areas for which they are responsible for the purpose of meeting their expenses. The subcatchment councils are in charge of the monitoring and the day-to-day management of the water use. In some instances the boundaries of the subcatchment councils coincide to a certain extent with the former boundaries of the river boards, thus giving a sort of administrative continuity.

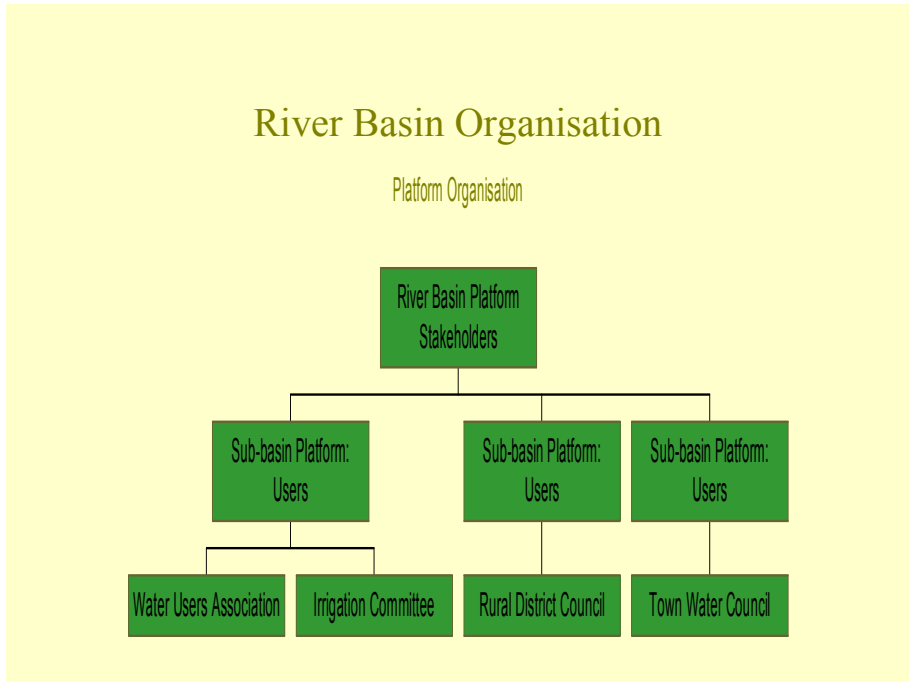


Figure 5: Representation of stakeholders in river basin organisations in Zimbabwe

5.3 THE FRENCH WATER SECTOR REFORM

Background

Historically, France is a centralised country, characterised by the large authority vested in the central government, also at regional level (through the system of prefects). It is a country rich of natural resources, and it hardly depends on neighbouring countries for its water supply. As for water management, the most characteristic feature is the existence of river basin management agencies (the Agences de l'Eau), and river basin management plans, the river basin master plan (SDAGE) and the (sub-basin) management plan (SAGE).



Figure 6: France

France is a centralised democracy, with two sovereign entities: the central state and the municipality (De Bruin a.o., 2003). In between there are two administrative layers, namely that of the Departments (*96 Départements*) and of the Regions (*22 Régions*). Furthermore, there are six specialised, functionally decentralised water agencies, the River Basin Agencies (*Agences de l'Eau*).

National level

The Ministry of Environment co-ordinates water policy at the national level. This task is delegated to the Water Directorate (*Direction de l'Eau*). The Direction has three sub-directorates:

- Planning, programming and regional action (including the administrative control of the River Basin Agencies)
- Aquatic environment and fishery
- International and inter-ministerial co-ordination and legal affairs.

Next to these main units there is a water management department dealing with water resources management, pollution and flood control.

Furthermore, the Water Directorate houses the secretariat for two platforms in which national water policy is discussed:

- Interministerial Water Commission (*Commission Interministérielle de l'Eau*): for concerned ministries
- National Water Committee (*Comité National de l'Eau*): for all water users.

Other ministries with tasks on water management are:

- Public Health (*Santé*): control of drinking water, public beaches, catchment areas and shellfish breeding
- Public Works (*Équipement*): navigation, flow regulation, pollution control in large rivers, sewerage and underground water in urban areas and close to the waterways
- Agriculture: drainage, irrigation, sewerage in rural areas, management of non-navigable rivers and (the rest of the) groundwater
- Industry: industrial pollution.

Many of these ministries have consulting platforms that play a role in water policy. Usually, they also have territorial offices at department (or sometimes regional) level.

France is further subdivided in to 22 Regions and 96 Departments with specific but limited water management tasks (De Bruin, 2003).

Decentralised institutions

Municipalities

In total, there are almost 37,000 municipalities (*communes*), lead by mayors. Municipalities are responsible for drinking water supply, sewage collection, waste water treatment and river maintenance. Apart from these general tasks, mayors have the power to stop pollution in case of serious danger. Since French municipalities are quite small entities (80% of them have less than 1000 inhabitants), and therefore lack the funds and knowledge to take care of these tasks, such services are usually either contracted out to the water industry, or taken care of by a number of municipalities jointly (a *communauté de communes*). The French water industry is a major player, providing approximately 80% of drinking water in France, managing the largest wastewater treatment plants and a large part of the sewerage network. The market is dominated by three large companies, who also are active in other services than water (e.g. public works and housing, solid waste disposal, energy and telecommunications).

Water agencies

Six Water Agencies (*Agences de l'Eau*) levy pollution and water intake charges and grant subsidies for pollution reduction, sewage treatment and river maintenance. Next to these operational tasks, the Agencies have an important planning task. They also provide technical assistance. The Agencies are under the control of the Ministry of Environment, but have significant autonomy in practice. The Agencies are managed by a Board of Directors, composed of 8 representatives from local communities, 8 representatives from the various categories of users, 8 representatives from the State, and 1 representative of the Agency staff. The Chairman of the Board of Directors and the Director of the Agency are appointed by the Government. The Board is partially elected by the River Basin Committee. While based primarily on hydrological boundaries, the division into six basins is also influenced by administrative realities such as a manageable size of each Agency.



Figure 7: The six water agencies (*Agences de l'Eau*) in France

The six Regions in France where the Agencies are seated have a special status in the field of water management. The Prefect of the department in which the Agency is located approves, in the name of the state, the final version of the Master plan (*SDAGE*).

Also, he is in charge of co-ordinating water planning at the departments level, in particular concerning sensitive zones to eutrophication, sustainable sand and gravel extraction and migration of fish, in fact main issues in France.

River Basin Committees

The River Basin Committee (*Comité de Bassin*) is an advisory body, a sort of 'water parliament', existing in every river basin. In the Committee, representatives of different government layers, stakeholders and some specialists discuss the general work of the Agency. Forty percent of representatives are elected directly, another 40% are appointed by the water users, while 20% consists of representatives from state administrations. The River Basin Committees have the following tasks:

- To prepare and adopt the Master Plan for Water Development and Management (*SDAGE*, see below).
- To approve the rates and bases of water charges, and priorities for the Agencies' 5-year action programmes.

Next to this, the Committee chooses 16 of the 25 members of the Board of Directors of the Agencies, namely 8 representatives of local communities and 8 representatives of water users.

The figure below shows the average composition of the River Basin Committees in the Agencies. The secretariat of the Committee is taken care of by the Prefect of the Region where the Committee (and also the Agency) has its seat.

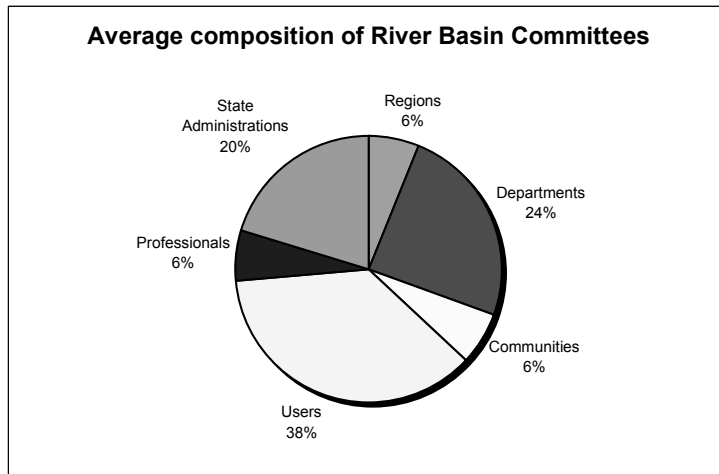


Figure 8: Average composition of River Basin Committees in France

Legislation on water management

The legislature framework in France is characterised by a relatively small number of acts, and a large amount of decrees specifying the general points made in the laws. In this overview it would go too far to mention all relevant decrees. Only the main laws and decrees related to water management are discussed below.

- 1964 Water Act (Law n° 64-1245): established a water regime and distribution plan and started pollution control. This outline law and its application decrees instituted the principle of water management in its natural environment. France's territory was divided into 6 major hydrographic basins, each with a River Basin Authority (Later called "Agence de l'Eau").
- 1992 Water Act (Law No. 92-3): on water regulation and management, role of territorial authorities in water management, water sanitation and distribution. Integrated Water Management ('balanced management') is a central issue. This law among others institutionalises the SDAGE and SAGE plans.
- 1993 Decrees No. 93-752 and 93-743: concerned with general authorisation procedures, gives the list of operations subject to simple declaration and to authorisation.
- 1995 Law on the enforcement of environmental protection (n° 95-101, *relative au renforcement de la protection de l'environnement*).

Main functions and instruments

In the following paragraph, the main functions and instruments in use for those functions will be presented. The functions which can be distinguished are:

- Planning
- Operational Management
- Analytical Support.

Planning instruments

Master plan (SDAGE)

The master plan (*Schéma Directeur d'Aménagement et de Gestion de l'Eau*) is prepared by River Basin Committees. It contains the fundamental principles of integrated water management in the basin. It balances the principal plans and programmes of the administration with the users' interests and defines the principal objectives concerning quantitative and qualitative aspects of water and the managerial instruments to reach these objectives. The master plan

must be complied with in the administrative decision making process concerning water and must be taken into account in other administrative decision making processes.

The Agencies direct the planning process for the master plan from the start to finish, with the help of regional government bodies. All six master plans have been approved in 1997. The plans have to be revised in a 10 to 15 years interval.

The master plan addresses a wide scope of water-related issues, such as water quality and quantity, water supply, ecosystems, flooding etc. The plans list among others water resources, main users, and pollution discharges. Some master plans also define the boundaries of the management plans (see below), in which the general framework outlined in the master plan has to be translated into specific measures.

Management plan (SAGE)

The (optional) management plan (*Schéma d'Aménagement et de Gestion de l'Eau*) cover a local (sub)basin in the Agencies territory, and are more specific than the master plan. They are prepared by a Local Water Commission (*Commission Locale de l'Eau*), which is set up especially for this task. It is composed by one half of representatives of local communities, by one quarter of representatives of users and by one quarter of state representatives. This is analogue to the River Basin Committees which are part of the Agencies.

Management plans present concrete measures related to water use. Among others, they can set quality and quantity standards. When adopted, the management plan must be complied with in administrative decision-making concerning water management and must be taken into account in other administrative decision-making.

River Contracts

Initiated during the 1980s, river contracts are exponents of a bottom-up approach towards integrated river management. River contracts provide a framework for collaboration between local and higher level governments, water administrations and users. It is less formal and therefore more flexible than the procedures for master and management plans.

Operational Management

In this section some specific instruments will be discussed, namely permitting, charges, levies and subsidies.

Licensing

Permits for the use of groundwater and surface water are handled by the departmental or regional state administrations: Within their respective responsibilities these authorities judge the applications for:

- Concessions for the use of watercourses and falls, in particular for hydropower stations.
- Development of rivers, lakes and water bodies.
- Extraction of materials and gravel.
- Water withdrawal for various uses.
- Wastewater discharges, spreading of sludge and liquid manure.
- Opening of dumping sites.
- Operation of establishments classified as dangerous or insalubrious.

It depends on the nature of the activity whether installations or activities are subject to administrative authorisation or to simple declaration. If the activity it is considered harmful to health and safety, has serious impacts on water resources and aquatic ecosystems, is harmful to the free flow of water, or increases the risk of flooding, a public inquiry is required.

After this inquiry a permit may be given. Upon receiving the permit, the owners or operators of the facility are required to install and run monitoring systems.

Charges, levies and subsidies

The French system of water management is based on the 'polluter pays' principle. Charges may be levied on public or private groups or individuals if they:

- Contribute to the deterioration of water quality;
- Extract water for use from natural sources; or
- Alter a river basin's aquatic environment.

The water charges system is managed by the six Agencies. They establish the water charges to be collected based on a compulsory declaration made to them by all persons or bodies liable for the charge. The water charges can be divided into pollution and withdrawal charges.

- Pollution charges are levied each year on the basis of the average daily quantity of pollution generated during the month of maximum discharge. Five to nine pollutants are taken into account in assessing domestic and industrial water pollution levels, including suspended solids, oxidisable substances and nitrogen. For industrial establishments the pollution generated is either measured or estimated at a flat rate. The pollution charge is collected directly by the Agencies from organisations generating more pollution than would normally be generated by 400 average inhabitants. Pollution charges for domestic and assimilated waste are added to the price of domestic water calculated in each urban or rural district.
- Withdrawal charges are also levied by the Agencies for the purpose of quantitative management of water resources. Public and private bodies or individuals are liable to pay this charge for extracting water or altering the aquatic environment.

Approximately 90% of the charges levied by the Agencies are used for subsidising water users in environmentally friendly measures. The remaining 10% goes into operational costs, research activities, and the monitoring networks. The rates of the levies are determined by each Agency with the agreement of the River Basin Committee. Priorities are set according to Five-Year Action Programmes.

The Agencies have been set up initially as Financial Agencies (*Agences Financières de Bassin*), because of the merely financial task they had in the beginning. Still, one of their main tasks is to distribute the main part of the money from charges and levies as subsidies and loans. These are mainly used by municipalities to finance the building of waste water treatment plants, but also other organisations (including private companies) can apply for a grant.

Analytical Support

In France, aside from the research divisions of water companies and the Agencies, there are a number of research institutes that have a function in providing information to water management organisations. When it comes to information provision, the French Data Network (*Réseau National des Données sur l'Eau - RNDE*) should be mentioned. The RNDE was created in order to group together the main producers and users of water data. Its participants are among others the Ministries of Environment and Health, the Water Agencies, the High Council for the supervision of Fishing, the French Environmental Institute, and Météo France.

Standardisation of data is ensured through the French Data Reference Center for Water (*SANDRE*). It provides a data dictionary, exchange formats and reference lists. The databases in the RNDE can be subdivided into:

- River basin databases: the backbone of the system, these are operational in each of the six river basins.
- National data base: centralises and processes information coming from the river basin data bases to meet national and international demands.
- Specialised data bases: separate data banks on rainfall, hydrology, coastal water quality etc., which are included in the network.

For further information on the French water sector reform, please, be referred to annex 2.

QUESTIONS

1. The water resources management function in Zimbabwe is both commercialised and decentralised. Explain!
2. The water resources planning function in both Zimbabwe and South Africa is integrated as well as decentralised. Explain!
3. What is functional decentralisation? Is this the same as subsidiarity?
4. What is progressive delegation of authority? How is this applied in South Africa with regard to the establishment of Catchment Management Agencies?
5. Can you explain why the River Basin Committee in France can be considered as a sort of 'water parliament'?
6. Explain why and in how far the French system of water charges is based upon the principle of the 'polluter pays'?
7. How is the water resources planning system in France organised? Discuss the following characteristics of planning in the French system: integration, co-ordination, public participation

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6 WATER ALLOCATION

6.1 INTRODUCTION

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 the reliability of water supply. This has rightly led many authors to define the first developed social groupings as hydraulic civilisations. 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. As soon as human groups settled around a water point or in a river valley, the need arose for minimum water control in order to satisfy water demands and to ensure an equitable water distribution between different uses and users. It is from this need that the earliest water right systems developed. Their growth, persistence and character varied and were dependent upon many factors, such as local geo-physical and climatic conditions, socio-economic and managerial situations, and the religious-philosophical beliefs of the population concerned (Caponera, 1992).

In regions where water was abundant, water control was largely directed towards defence against harmful effects of water, such as flood warning and control and fight against water invasion, embankment and dyke construction and maintenance. In areas where water was scarce, this control developed towards the conservation of water supplies and adequate distribution of the little water available. Here, water law systems were more detailed and restrictive. It goes without saying that in regions where periods of water shortage were alternated with periods of flooding, water law systems showed elements of both patterns. In contemporary times with the increasing complexity of societies, dense occupation of land and growing economic development, extra dimensions were added to the original functions of water allocation and flood control. There is an increasing interest in both looking upon water as an economic good (ICWE, 1992) and in considering the water cycle as inseparable and hence managing water on hydrological boundaries with the watershed as logical unit. Nowadays, the aim is to reach sustainability in social, economic and environmental perspectives (Savenije, 2000).

To go back in history and to put water allocation principles in perspective is certainly not a cosmetic approach only carried out for completeness' sake. Traditional principles ruling water allocation still exist in both developing and developed countries among certain layers of society or under certain circumstances or for a certain type of users. Many principles may be applied simultaneously. Recently developed water legislation is often based on multiple water allocation principles. Moreover, principles that were considered redundant before may become of present interest again, when circumstances change. For example, the modern approaches in water resources management to apply stakeholder participation in decision making and integrated methodologies are in fact a return to the old days when water was considered as belonging to the community as a whole (*res communis omnium*).

This publication concentrates on the description of principles that ruled and still rule water rights in the sense of water allocation to individuals or groups of individuals for certain uses. The aim is to identify the value of these principles for contemporary civilisations in developing countries and to determine the institutional arrangements under which their performance may be optimal. Examples from literature are matched with the authors' own experiences in establishing and managing water right systems in various (mainly developing) countries around the world.

6.2 WATER USE AND WATER RIGHTS

Which type of water can be subject to a system of rights? Seawater, surface water in stocks, surface water in streams, soil water (both percolating water and capillary rising water), groundwater, fossil water, water in organisms, waste water, rain, vapour etc.? In which appearance in the hydrological cycle can it be subject to righting?

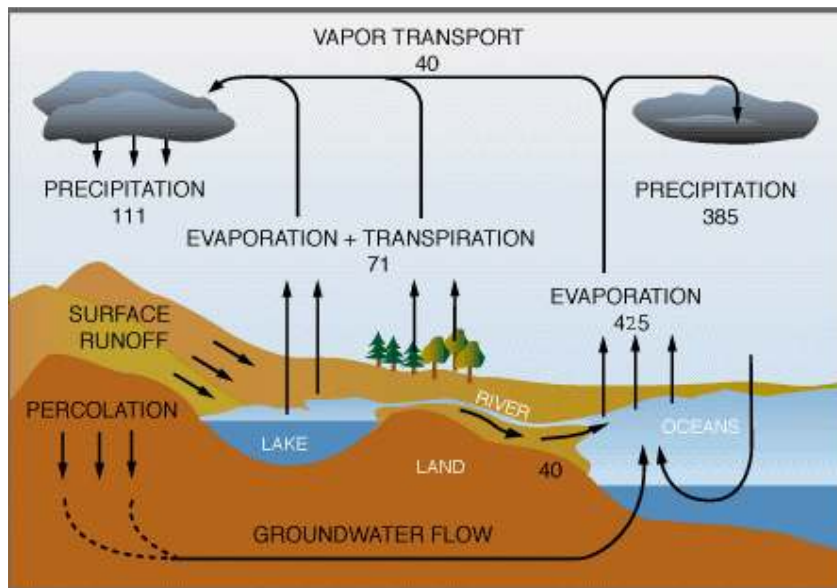


Figure 10: Example of hydrological cycle

What kind of use may be authorised by the water right? The use of water for consumption, water disposal, power generation, fishing, recreation, transport, nature and wildlife conservation etc.?

In this publication we narrow our research down to investigating rights for consumptive uses for drinking water, industrial water, water for agriculture and livestock and further for the non-consumptive uses of power generation and preservation of environmental flows. In physical terms this implies that we concentrate on water rights for the use of surface and subsurface water. Further, we focus on Roman Dutch and Common Civil Law water right systems.

On the one hand water law creates legally enforceable expectations ('water rights'), duties to respect those, and means to redress violations of these rights (Goldfarb, 1988). On the other hand, water law creates (among many other items) also control mechanisms against flooding and for the protection of the quality of water and the watershed as a whole. In this publication we concentrate on the first category of water rights in the strict sense of the word.

The following types of rights can be identified in an analytical sense (the summary is not exhaustive):

- Absolute water ownership right. Water belongs to the property on which it is found. It is part of a real estate. The owner of the property also owns the water. He may use it for any purpose or whatsoever (*ius utendi et abutendi*).
- Absolute right of use. The water is owned by somebody else or another institution often by the state as tutor of the public domain. The right to use, however, in its purest sense is absolute. It is not attached to land or depending on a specific abstraction point, it can be leased, sold, inherited, mortgaged and is not restricted to any type of effective and beneficial use. The owner can sit on it as a speculation object. Only very few legal systems i.e. in the Western United States and in Chile have a water right concept close to these absolute user rights.
- A relative right of use may have some of the restrictions mentioned above. Often, it is attached to land and specific abstraction points; it cannot be sold or transferred, mortgaged or inherited. It is restricted to a certain type of beneficial and effective use: agriculture, cattle watering, drinking water supply and when 'you do not use it, you loose

it' either temporary or indefinite. This is a very common type of right and found all over the world.

- A water permit (concession, licence) is acquired through administrative allocation or authorisation. It may have the restrictions of above, time limitations and it may be subjected to charges or fees either for the use of it or as a contribution to the water management services.

The legal status of a right may have far going consequences in terms of capability to trade, transfer or inherit the right or to use it for collateral or as a security investment. It is more difficult to attach conditions (time, charges, suspension) to ownership and absolute user rights than to relative user rights and permits and concessions. More often than not the Constitution of a nation protects ownership rights and absolute rights to the extent that compensation is required in case of expropriation. A summary of important characteristics of the respective types of water rights is displayed in the following table.

CHARACTER	OWNERSHIP	ABSOLUTE USE	RELATIVE USE	PERMIT
Trade	XX	X	-	--
Transfer	XX	X	-	--
Investment security	XX	X	-	--
Option for collateral	XX	X	-	--
Conditions	--	-	X	XX
Time restrictions	--	-	X	X
Inheritance	XX	X	-	--
Compensation object	XX	X	-	--
Charges	--	-	X	XX

Table 2: Comparison of types of water rights

A water right may be acquired through the law, through custom or practice, by a court resolution, through continuous effective and beneficial use, and in case of a permit or licence through administrative allocation or from a river basin plan.

Further, a water right may be expressed in volumetric terms (m^3/s or l/s), as a share of the stream or canal flow or as a share of the water available in a reservoir, a lake or an aquifer. A water right may also be expressed in terms of shifts or hours of water availability at a certain intake (Holden and Thobani, 1995). It is also possible to express a water right as a percentage of capacity of storage works (either or not subdivided in stages of probability of filling, examples in Zimbabwe). A water right may be applied by simple diversion or by abstracting through mobile or fixed pumping installations.

6.3 CASE STUDY: WATER ALLOCATION PRINCIPLES IN HISTORIC PERSPECTIVE

To oversee the whole spectrum of potential water allocation principles it can be useful to imagine a huge continent with all possible physical circumstances and a variety of human occupation patterns and cultures alongside one another. The continent is 'discovered' by an external power as was usually the case in the present developing countries, our target group of countries.

In the North the continent is humid and has a relative abundance of water and in the South it is arid and has a relative water shortage. Initially the North is 'developed' first and the South remains inhabited by the traditional societies in their own cultural and physical context. As times go by, the North becomes very occupied, and the need arises to develop the South, which is extended in space, but rather short in water resources. Migration takes place and the pressure on the water resources in the South as well as in the North intensifies. In the South this is mainly due, because of population pressure and overexploitation. In the North this is due to far-going industrialisation and failing water quality control. The following is a summary and a

description of water allocation principles that (may) emanate over time and under different circumstances during the process of transition of a traditional civilisation towards a highly industrialised continent with dense human occupation patterns. Our imaginary continent is gradually emanating as a nation of federal states that have sovereignty in developing their own water laws. The management of river basins, however, is predominantly an issue that goes beyond the state boundaries. The watersheds of the larger river basins cover areas in multiple states. Any similarity with existing nations is fully coincidental.

Res nullius

Initially before the continent was discovered, the traditional inhabitants were nomads who travelled around with their (relatively) small herds of cattle and sheep. 'Water belonged to nobody' and was taken by everybody as, when, and where the need was arising. When water shortages emanated people simply moved with their herds. Mainly surface water was abstracted and some water from shallow wells. Water was not abstracted outside its natural domain. The water balance of the watershed as a whole remained basically unchanged. The principle remained in vigour until present. Although the nomads reduced drastically in numbers and at present only per-exist in sharply delimited reservations, the principle of water allocation has remained unchanged, but only for the territory of the reservations. The principle is also used outside the reservations for any limited water abstraction not being done through any artificial fixed abstraction means (incidental water use). Mobile abstraction devices are allowed, but the abstraction must be incidental and limited in extent. Water supply for herds of cattle of more than 100 head cannot be qualified as incidental use. The condition is that the abstraction must not be contravening any other regulation like e.g. trespassing on other people's property without their consent. The exemption of formal righting of the incidental water use is not only inspired by the need to give living creatures access to the limited amount of water they need for direct use, but also by the wish to avoid heavy administrative procedures for relatively small water abstractions.

Res communis omnium

After the continent was 'discovered' and 'invaded' by immigrants, the land use pattern drastically changed at first in the North, but later also in the South.

The original nomadic character was exchanged for a sedentary pattern with either only agriculture or a mix of agriculture and livestock. After a while most of the land was occupied by farms. With the emergence of fences around land and when the concept became rooted that 'land could actually be owned by individuals', the concept of water allocation also changed. The conception that water belonged to nobody gradually changed in to one that water was 'owned by the whole community' (*res communis omnium*). An example of this principle of water allocation is the well known *riparian doctrine*, the corner-stone of the water allocation under the earlier common law systems (U.K. until 1963, some states in the U.S. and South Africa until 1998). The key tenet of the riparian doctrine is that only persons owning land on natural watercourses possess riparian rights (Goldfarb, 1988). A riparian owner or occupier may abstract water for his own domestic purposes, i.e., for drinking and cooking, cleansing and washing and to satisfy the ordinary needs of livestock. If abstraction for domestic purposes exhausts the water, downstream riparian owners cannot complain. Nevertheless, the right of a riparian owner to take water is not limited to domestic purposes. He may exercise his right for extraordinary purposes, provided that he does not interfere with the rights of other riparian owners. The use should be reasonable and connected with the riparian tenement, and the water should be returned to the river undiminished in quality and quantity (!) (Caponera, 1992). This misconception could only per-exist as long as there was no real competition for water. Of course, this was before the major take-off of irrigation practices.

After the big boom of water diversion for irrigation, the riparian doctrine was combined with the *natural flow doctrine*. Diversion rights were restricted by the obligation of preserving a 'natural' flow in the river. Any other riparian owner was entitled to have a stream flow through his land in its natural condition not materially retarded, diminished, or polluted by others (Ausness, 1977). In principle in areas where groundwater abstraction is dominant the riparian diversion from a stream should be understood as the contiguous abstraction from an aquifer.

So, in summary a water right according to the riparian doctrine is a user right allocated by law (ministerio legis) without any administrative intervention to the owner or the occupier of land adjacent to a stream or contiguous to an aquifer (Caponera, 1992). Restrictions to this right are the attachment to land and the beneficial and effective use and the obligation of preserving the natural flow as far as non-domestic uses are concerned. The system has the advantage of administrative simplicity and transparency. The system does not provide any solution for non-riparian owners or occupiers, or landless people or even for nature in the sense of being the custodian of environmental values. (Only landowners and land occupiers can claim legal action for the interruption of flow).

The system also denies the existence of water needs of nomadic people or for the incidental needs of any people, as passers-by. A combination of the first and the second principle could cover the needs of both sedentary and nomadic people and people depending on incidental needs.

With the development of irrigation practices, however, conflicts unavoidably had to arise at times of low stream flow and/or depletion of aquifers. The natural flow principle could not tackle drought prone water distribution. The definition of *natural flow* already appeared cumbersome, if not impossible (Jaspers, 2001).

Prior appropriation

As time went by another principle of water allocation emanated in the dry South: *the prior appropriation doctrine*. To stimulate frontier development and to safeguard investment, water rights of the prior users in time were protected. These user rights were initially attached to land and could not be transferred from one property to another. There was no obligation to use them. Not utilised water flowed naturally downstream. At first, these user rights were simply applied through direct abstraction from flow as and when flow was available. Later, private storage works were built to overcome the dry season or periods of drought.

This 'first come, first served' or *date priority* principle helped out especially in drought prone areas and elsewhere during periods of low water availability. Initially, this principle appeared to be very useful, until such time that rivers and aquifers were fully righted or even over righted in terms of availability of *normal or natural* flow. In some situations the mean annual runoff was nearly completely absorbed by existing water rights. In such cases no other development than the initially enhanced agriculture could take place at least not at a secured manner. The water supplies of towns and cities were jeopardised and nature and wildlife were often deprived of the water resources necessary to sustain aquatic and other life. Consequently, in the South laws were enacted in which drinking water supply and water for preserving natural flows was prioritised above the water use of other sectors (*sector or use priority*). Water was reserved for these prioritised uses and it was used whenever it was needed. When in the wetter periods, water was not needed, water was added to the pool of other uses and distributed under the system of date priority.

But government was in need of a lot of water for city water supply as well industrial development and energy supply. Huge storage works were built for satisfying those public interests. The surplus water (as and when available) or water not used for energy supply was sold by the government to private farmers on private contract or through long term concession. Although water was not tradable for private citizens, nevertheless, practices of selling or leasing water from private storage works also developed because of the sheer need of transferring water to where it was needed and using it as per best economic advantage. This practice could only take place by releasing the water along the river and hence private storage works were indispensable. Only the rich estate farmers could afford those kinds of investments. They were also the first who organised themselves in Water Users Organisations to take care of their private interests in water (Jaspers, 2001)

Correlation

With the appearance of fences the original inhabitants of our imaginary continent soon had to give up their nomadic lifestyle. There was simply not enough land to sustain this way of life. A process of settlement was enhanced and stimulated by the government. Large scale irrigation schemes were constructed by the government to support this process of settlement. Together

with the landless and poorer immigrants, the 'originals' could acquire irrigated land and housing in one of the irrigation schemes, initially as tenants only. These schemes were fed with irrigation water by huge river intakes combined with diversion weirs or in the dryer areas from dams. Through extensive systems of primary, secondary and tertiary canals the water was conveyed to the farm outlets of the smallholder farmers. The irrigation schemes were managed by the government and water permits could be acquired through administrative allocation. These water permits were issued and administered by government officials. Standards for water allocation were developed by the government. Water was allocated in correlation to these standards. As a yardstick, standards were based on farm and family size, cultivated area, cropping pattern and, if applicable, number of cattle. These 'correlative water permits' were strictly personal rights, non-transferable, attached to the piece of land for which they were allocated and were restricted in time. The only security a tenant of a piece of land or his successor could obtain, was that the permit was renewable. Informally, however, complex systems of exchange, lease, lease options and sales of water developed.

Later on, when the system of land tenancy appeared to be highly inefficient, ownership of parcels of land was introduced in those originally public schemes. With the ownership of land the transferability and mobility of water rights became more pressing.

Proportionality

In the beginning there were no water shortages in the public irrigation schemes. Farmers could simply take the water they needed, either as a continuous flow through their outlets or by rotational shifts. But when the schemes grew bigger or when canals were fully occupied, water shortages did occur. The only way for the Government of dealing with water shortage in a socially acceptable way was to distribute water scarcity proportionally. Thus, the birth of the principle of *proportional distribution* was born. In case of water shortage, farmers could only acquire water in proportion to their original allocation.

This principle was also used in the river basins for the private estate farmers when emergency legislation was applied. In times of extreme water shortage government from time to time had to apply its right to suspend all water rights and to allocate the available water proportionally over the users. This took place after the uses for drinking water supply and environment had been taken care of. When farmers in the irrigation schemes started to grow higher value crops on sizeable farms consolidated from former various small holder farms, this practice became inefficient and the need for tradable water rights increased.

6.4 CASE STUDY: CONTEMPORARY DEVELOPMENTS: TRADABLE WATER RIGHTS AND WATER MARKETS

Throughout the history of our case study continent water rights had not officially been priced. In fact, to charge for (raw) water per se was not allowed. (Water management fees to governmental institutions were common though). Only the water sold on private contract from huge government storage works was officially priced. Nevertheless, this type of water was still heavily subsidised and the price was certainly not reflecting the full costs of water. But it can be understood that practice nowadays overtakes outdated regulations. The following informal practices are developing especially among users with private storage works:

- Lease of otherwise not utilised water. Farmers who do not need or cannot use the water that they are authorised to use through their user right (from prior appropriation) are leasing the use of the right to another user. The title of the right remained with the lessor.
- Incidental water sales or water exchange (spot markets). Water is simply sold to other users on an incidental basis. A variation to this is that farmers are making agreements to exchange water resources for instance by rotation. The available water under two water rights is shared and used as per best mutual advantage.
- Lease options to overcome a very dry period or event. Farmers or users with high value crops (orchards) or products secure themselves against future droughts by leasing water from other farmers with lower value crops for as and when droughts will take place. In

that case the water right holder sacrifices the use of his water right (at high price). But the loss of a citrus orchard does not match the slight inconvenience of not being able to just not cultivate one crop of beans (cf. Lee and Jouravlev, 1998). Initially this takes place between neighbours or farmers in close proximity, later on also over bigger distances.

Private enterprises nowadays go even much further than that. In order to overcome prolonged drought periods, estate farmers associate themselves in organisations or private syndicates for the construction of huge storage or diversion works. These very successful enterprises are managed privately either by a committee or even by privately appointed managers. Farmers contribute to the construction and maintenance and management costs of the works and are allocated storage space in proportion to their financial input. The first stage of the storage with a higher probability of filling is more expensive. Those stages are bought by farmers who need a higher security of supply and are willing to pay a higher price (farmers with orchards, tobacco farmers etc.). The water (user) right for these private dams was initially on the name of the owner of the farm where the dam or diversion weir was located. Other users could legally take a share out of the water right of the owner of the land under a joint ownership clause. Later on, the law in the respective states was changed to the effect that syndicates can now own water rights for so called combined irrigation schemes (Jaspers, 2001). The syndicate actually owns the water right after public authorisation by the water minister. Joint ownership between government and syndicates as public private partnerships are on the increase. Hereunder an example of capacity sharing is displayed.

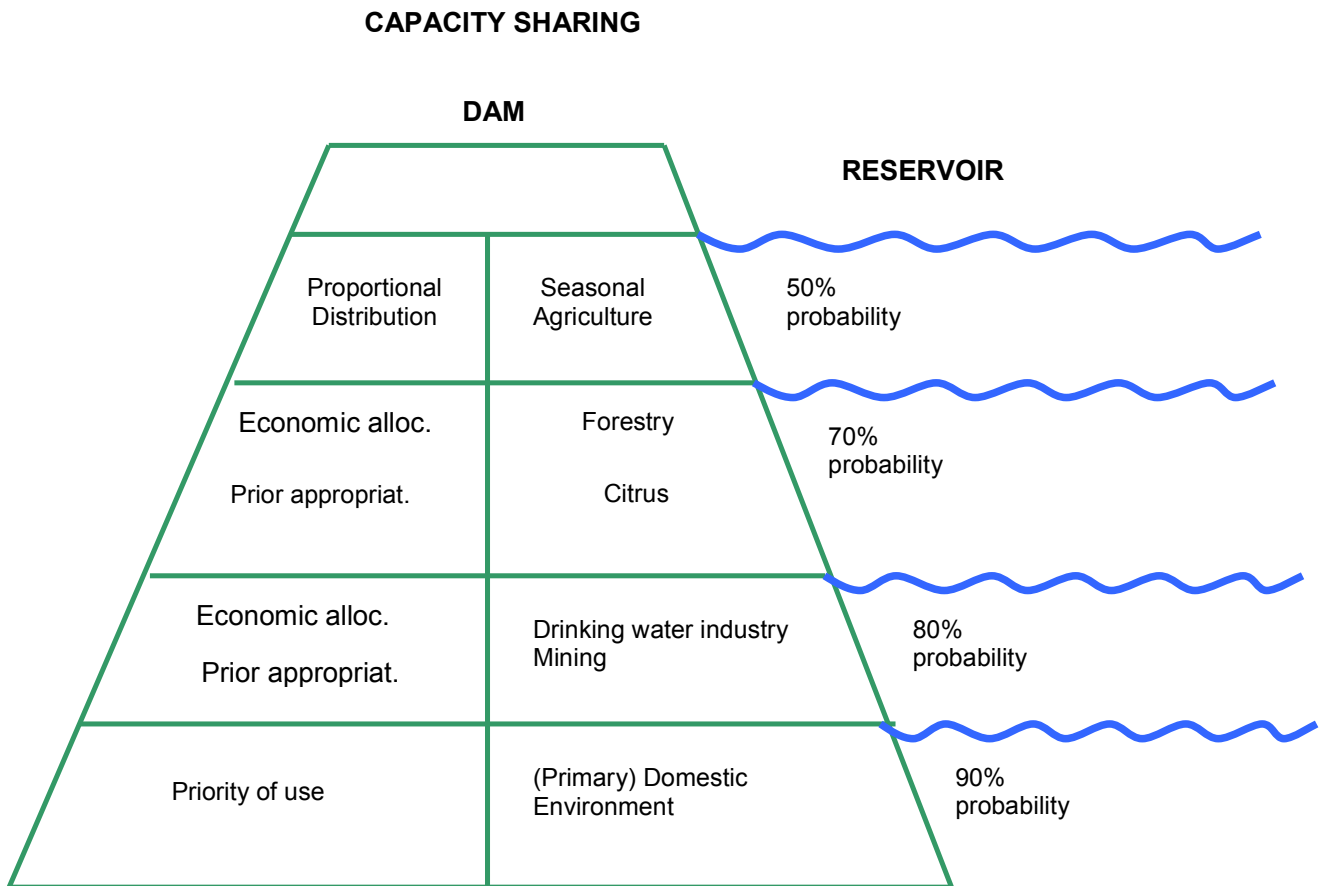


Figure 11: Example of capacity sharing (public private partnership)

Those private initiatives are forebodes of massive changes in the thinking about water allocation in various (drought) prone states of our continent. Somehow, the restriction of user rights and even of water permits to attachment of land and not being transferable does not do justice to the economic practice. Many properties have water rights attached under prior appropriation systems without being able to make optimal beneficial use of it. This counts for both estate farmers and for smallholders in the irrigation schemes. The call that water has to be considered as *economic good in all its competing uses* is gaining momentum (ICWE, 1992).

From a legal point of view, governments are challenged to formalise already existing practices. There is a lot of pressure to authorise and enable water sales, water lease contracts and option contracts. Strong lobbies are undertaken by the commercial world to enable water markets and maybe even water auctions in order to create optimal mobility of water rights. Of course, state governments are not opposed to the idea of allocating water as per best economic advantage. However, a few constraints are to be considered:

- The physical characteristics of water sometimes simply do not allow transfer of water rights. Because water flows from upstream to downstream and it is extremely expensive to transport water over large distances, it is not always possible to transfer water to another user. Moreover, in semi-arid to arid regions and at the higher positions in the river basin water is simply not available at all times and especially not during droughts, when the water is needed most. More often than not there is also substantial interaction of groundwater and surface water resources. Water abstracted as groundwater will not come to run-off.
- On the other hand markets can only develop under circumstances of substantial water shortage. In the absence of a strong economic trigger to transfer water, it can be understood that markets will remain thin. (Holden and Thobani, 1995)
- The market system per se does not foster any social equity. In fact, it is more likely that monopolies or other market imperfections will develop (Solanes, 1999). Especially, in the public irrigation schemes this could create substantial civil unrest.
- Water has no substitute. The demand for water is relatively inelastic. Speculation with water would be a sensitive issue even in our commercially oriented continent.
- There is no real market solution for tackling externalities. Government will have to come in anyhow to regulate (economic) externalities or third party effects.
- A free exchange of water rights may not only create environmental externalities, but it can also hamper environmental resources planning. Especially, moving water rights from downstream to upstream or inter-basin transfers can have serious environmental complications.
- In general there is the issue of transaction cost, especially when formal trade of water rights involves the construction of new conveyance structures or other infrastructure. These costs are generally high in relation to the value of the water.
- Inter-basin transfers are hard to manage and difficult to monitor.
- Government will have to develop adequate regulatory capacity to enable the functioning of the water markets. Monitoring, policing and sanctioning functions are still very needed. Appeal procedures and legal arrangements for compensation of 'victims' are needed. Accurate registration of the water transfers is needed as well as sophisticated decision support systems for water resources planning and operation. At the end, under certain circumstances, these 'transaction' costs might exceed the economic gains reached by the water transfer.

Nevertheless, water allocation as per best economic advantage through mobility and transfer of water rights is a major challenge that governments geared towards economic sustainability will have to address.

6.5 RIVER BASIN MANAGEMENT: PLAN DEVELOPMENT

In recent times it has become apparent that the traditional water management by the state governments on administrative boundaries organised in sectors is gravely ineffective and inefficient (Jaspers, 2002). A comparison can be drawn with the proceedings that took place to establish new water legislation in Zimbabwe and South Africa (Jaspers, 2001). The de-concentration to provincial and district offices has not really increased the efficiency. In fact, water management even becomes more scattered and the competencies between the many sector offices are not clear. Supply driven approaches to increase the number of storage works or the volume of stored water is not effective anymore. In over-subscribed river basins the viability of the new storage works under systems of prior appropriation is low. The viability of all storage works under systems of proportional distribution is seriously reduced. When consequently, groundwater is being tapped at a large scale for irrigation, water availability becomes even more erratic. Large scale and rapid industrial development, extensive urbanisation and the development of bio-industry enhances and accelerates the problem of water pollution and water quality deterioration beyond control. Hence, the relative availability of water of good quality is jeopardised. Dense human occupation patterns causing substantial erosion processes are contributing to further watershed degradation.

To overcome the problems, water sector reforms were enhanced in Zimbabwe and South Africa in which committees were installed to launch and undertake a nation wide consultation process involving all relevant stakeholders and interested parties from both the government and the private sector. The aim of the consultation processes was to come up with a nation wide water policy to prepare or harmonise water legislation. From these processes the following recommendations can be derived:

- All public water should be vested in the government and the management of it should make part of its public domain.
- Water has to be managed on hydrological boundaries with the river basin as the logical unit. It is cumbersome to apply effective and efficient water resources management and at the same time satisfy all kinds of political and administrative interests.
- The government has to create national institutional arrangements to enable river basin planning of the mainstreams and the tributaries.
- River basin authorities and watershed (sub-basin) authorities are to be established to carry out river basin planning and to authorise water distribution and water conservation. The river basin authorities are responsible for formulating river basin outline plans. The river basin plan is based on the plans adopted by the watershed authorities. However, in case of conflict the watershed plan should follow the overall river basin plan.
- Watershed authorities should play a pivotal role in monitoring, policing and enforcement of the use of water. In the boards of the authorities all relevant governmental administrations, all stakeholders' organisations and all interest groups should be represented. Existing water users organisations of any kinds could merge with or be represented in the boards of the watershed authorities.
- Water has to be managed through application of integrated approaches: water quantity, water quality and environmental values are managed in a co-ordinated and harmonised way (holistic approach).
- Water has to be reserved to keep up sufficient environmental flows for the protection of aquatic life and other natural values as well as to enable domestic and incidental uses. The government will have to be the custodian of these prioritised water uses.
- All existing water rights are to be suspended (after a grace period) and exchanged by water permits of a sufficient duration (to guarantee return of investments) with a maximum of 40 years. Permits can be renewed in accordance with the river basin plan.
- All water permits should be priced to finance water management (in every aspect) of the river basin. Water management should be based on principles of full cost recovery.
- Within a tributary administered by the watershed authority, water permits should be transferable as free as possible and one should be able to sell against market prices.

- Transfers of water permits are to be approved and registered by the watershed authority and should be in accordance with the river basin plan.
- The watershed authority should be authorised to auction new permits for competing water uses, not being domestic or environmental uses.

6.6 THE ULTIMATE CHALLENGE: SUSTAINABILITY

In fact, this is how the situation to a certain extent in many developing countries of the world is now. How would it be possible to reflect the considerations of above as tangible advises for developing countries to structure their water right systems?

On the one hand, there is great need to stimulate economic development and allocate water as per best economic advantage. For that purpose water transfers need to be facilitated. The necessary institutional arrangements should enable mobility of water rights. There is a need for mechanisms of registration, policing, enforcement, appeal procedures to handle externalities etc. On the other hand arrangements should be made to guarantee environmental flows and the reservation of water for (limited) domestic purposes. Integrated river basin planning to safeguard environmental values is a must. Further, there is the issue of subsidiarity: to take decisions at the lowest appropriate administrative level as close as possible to the end users, so as to create guarantees that all interests are considered. Further, it appears very difficult not to manage water on hydrological boundaries. Therefore, the river basin is the logical management unit as far as planning is concerned. For reasons of efficiency and subsidiarity the sub-basin or watershed appears to be very instrumental for the more operational management functions (Jaspers, 2001).

For water allocation this means that all water can be vested in the government. All water resources should be subject to valuation and priced for all its competing uses. The river basin authority should produce a river basin plan to give general directions for water allocation as well as for other purposes. Within the guidelines of the river basin plan, the watershed authorities should produce operational plans. The watershed authority is authorised to allocate water on permit through administrative allocation. First, water will be allocated on priority of use for environmental and for (limited) domestic purposes. As a transitory arrangement all existing water rights can be transformed in water permits on request of the owner or user for a period of maximum 10 years, but thereafter they should be phased out. Of course, the owner or user can be given an option to repossess his water permit at the prevailing market price to be determined by fixed arbitration.

All new competing uses including for drinking water requirements will have to compete for water. The watershed authority will issue water permits for a fixed duration of say 40 years. Conditions can be attached to the water permit, but only in accordance with clearly formulated written guidelines in the river basin plan. In case of drought, water permits can be suspended, but compensation is due.

Water permits are not attached to land and can be traded within the guidelines and upon registration by the watershed authority. (The board of the watershed authority has a strong representation of water users. Irrigation committees are per definition represented in the board). Also within the irrigation schemes water can be traded within the guidelines of the Irrigation Committee. Within the irrigation schemes the same rules apply as in the rest of the river basin (tradable water permits for a fixed duration). At present the mere possession of water permits is subject to taxation in relation to the volume (apart from the initial payment) in order to discourage speculation. To recover the costs of the water management a system of water management fees is to be applied.

6.7 INTERNATIONAL COMPARISON

Our imaginary continent of the case study has not been chosen haphazard and in a way its situation reflects a broad spectrum of potential water allocation and water right systems available in the world from the past, for now and with an outlook on the future. The riparian doctrine still per-exists in slightly adapted forms in the U.K., in many states in the Eastern U.S.

and de facto in South Africa. Systems of prior appropriation are still very common again in some states of the U.S. and de facto in Zimbabwe. There is no 'Utopia like' nation where systems of tradable water rights are combined with systems of decentralised and integrated planning for river basin management. Systems of tradable water rights are found on the American continent in the West of the United States, in Chile, Peru and Bolivia and in Spain. In Mexico rights can be traded after approval of the relevant water management authority. In (Northern) Europe the issue of water rights does not have much emphasis because of the favourable climatic conditions, perennial rivers etc. In Africa and Asia governments tend to play a dominant role in the allocation of water, especially in the irrigation schemes. Pricing, however, for at least the cost recovery of management services, is becoming of a more general application. Systems of (decentralised) integrated planning according to French (river basins) or Dutch (tributaries) example on hydrological boundaries are gaining interest in new legislation of African and Asian countries (Caponera, 1992). Spot markets of localised water transfers are originating throughout.

A special case is the new legislation of South Africa. The Minister of Water Affairs is legally tasked to make sure that specific river basin management strategies are produced by the relevant authorities in line with the national strategy. A river basin management strategy necessarily covers a water allocation schedule (among other requirements). A massive change is the introduction of a classification system of water and the obligatory (!) determination of the Reserve, as a volume of water in each river which is not to be used for any other purpose than domestic water supply or environmental flow. This system results in the determination of environmental flows for basically all rivers and streams in all periods of the (hydrological) year depending on the selected classification. Any other water is priced and economic allocation of water rights is foreseen for competing uses (Jaspers, 2001).

6.8 CONCLUSIONS

In conclusion we can say that water allocation principles from early civilisations on till now have played a substantial role in sustaining communities of people and other forms of life. Over time principles have developed to arrange water allocation from nomadic and early sedentary civilisations to complex industrialised contemporary societies. Water allocation can range from traditional systems where water is considered to belong to nobody and can be taken randomly to systems of tradable water rights and integrated river basin planning.

Traditional principles ruling water allocation still exist in both developing and developed countries among certain layers of society or under certain circumstances or for a certain type of users. Many principles may be applied simultaneously. Some principles that were considered redundant may become of very present interest again, when circumstances change.

The development of water allocation principles depends heavily on the physical characteristics of the river basins in question, the absolute and relative scarcities of resources, on the rate of (agricultural and industrial) development, on the customs, norms, values, culture and religion of the respective communities and on the legal and institutional history and traditions etc.

Contemporary water allocation systems are hinging on several principles that will have to be applied in balance with one another. Firstly, there is great need to stimulate economic development and allocate water as per best economic advantage. For that purpose water transfers should be facilitated as much as possible. Secondly, systems of integrated (river basin) plan development with full participation of stakeholders in decision making and at the lowest appropriate level are becoming indispensable. Finally, the need of looking at the river basin as a whole and at the sustainability of all its natural resources will continue to put pressure on the government as caretaker of general interests to guarantee that sufficient water is reserved for environmental purposes.

QUESTIONS PERTAINING TO WATER ALLOCATION

1. Can you give 3 dominant differences between absolute water user rights systems and systems of water permits?
2. Explain the following statement: "It is also possible to express a water right as a percentage of capacity of storage works, either or not subdivided in stages of probability of filling."
3. Can you describe a practical example in which the same situation of water shortage results in 4 different outcomes when water is respectively distributed under the principles of date priority (1), prior appropriation of use (2), proportionality (3) and correlation (4)?
4. Imagine that you are a young investor. You borrowed money to buy a citrus farm. Under which water allocation principle would you prefer being considered? Use in your answer (at least) criteria as security of investment, potential for inheritance, potential for use as collateral, security of supply, legal protection.
5. Name 2 major advantages and 4 major disadvantages for the application of a system of tradable water rights.
6. What is the difference between a lease contract, an option contract and a contract for the sale of water?
7. Can you define the term 'externality'? What kind of externalities may emanate during the application of water markets? Give a practical example of an environmental externality originating because of the trade of a water right from a downstream use to an upstream use.
8. Explain respectively why a water allocation system based on the principle of water marketing cannot be combined with systems based on principles of correlation and proportionality.

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Regulation and Private Participation in the Water and Sanitation Sector

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ABSTRACT

PRIVATE SECTOR PARTICIPATION Is widely perceived to be the solution to the failure of many publicly owned and managed water utilities to operate efficiently and make the investments required to meet community needs. However, there are no guarantees that privatisation will actually yield the desired performance improvements. Simply converting a public sector monopoly into a private one provides no competitive incentives for the utility to operate efficiently, make appropriate investments or respond to consumer demands. Likewise, privatisation per se need do little to improve sector performance if governments are unwilling or unable to tackle such underlying problems as overmanning, uneconomic water pricing policies, financing the provision of public and merit goods, and restricting over-intrusive political intervention.

Given the characteristics of the water and sanitation sector it is inevitable that some form of continued public regulation of the private companies will be necessary. The regulatory burden can be reduced by adopting a competitive form of privatisation, choosing a more competitive sector structure and devising an appropriate regulatory regime. However, it has to be recognised that there will be a trade-off between making a venture attractive to private firms and introducing a notionally 'ideal' regulatory system. Regulation in practice is as much about creating the conditions under which private firms can operate effectively and efficiently as it is about protecting specific customer and public interests.

Privatisation and deregulation have become, since the 1980s, popular solutions to the widely perceived failure of state enterprises, planners and regulators. Government owned manufacturing industry has been characterised as lacking innovation capacity and being unable to compete in world markets; public utilities have been seen as hopelessly overmanned, inefficient and incapable of providing even basic services to growing populations, while regulatory bureaucracies have been regarded as costly burdens on private sector enterprise.

These failures have commonly been attributed to the fact of government ownership or management per se. Detailed explanations of why this should be the case vary, but most analyses cite three interrelated factors:

- State organisations are insulated from the competitive incentives found within free labour, capital or product markets;
- State enterprises are exposed to short-term political interventions, struggles for political advantage and the demands of special interest groups (such as trade unions) for privileges;
- State firm managers can pursue their own utility rather than the public interest because the ultimate owners - the tax payers - have few effective mechanisms to signal their requirements or dissatisfaction with the management.

There is now extensive evidence from many countries suggesting that lack of competition and "inconsistent and sometimes unpredictable political direction" have limited the efficiency with which state enterprises operate (Parker, 1997).

Will privatisation improve performance?

It is invalid, however, to assume that performance improvements will automatically occur if these state enterprises are subject to some form of privatisation. Private sector involvement cannot of itself and by itself remove many of the barriers to efficiency which impede public sector operations.

In the United Kingdom, where an extensive privatisation programme began in the early 1980s, a range of performance studies have all concluded that there is no automatic relationship between privatisation and productivity improvements (Yarrow, 1989; Bishop and Green, 1995; Martin and Parker, 1997). Although most (but not all) privatised firms have recorded gains in labour productivity, the results for total factor productivity have been described as "particularly disappointing and do not support the view that privatisation has led to a major improvement in terms of the use of all inputs" (Parker and Martin, 1997, p. 29). For some industries productivity gains were actually highest under public ownership in the years immediately preprivatisation, which raises the question of whether the mechanisms employed to achieve such gains can be effective without the privatisation threat. The assessments of UK experience not only serve as a warning against over euphoric expectations about the possible achievements of privatisation but also show quite clearly that private sector ownership or management is not necessarily the crucial determinant of future industry performance.

Factors influencing the outcomes of privatisation

It goes without saying that the scope for private participation to yield performance improvements will partly depend upon the way the current public sector enterprise is operating. Present productivity technical expertise, managerial capacity, pricing and revenue collection practices, investment strategies and regulatory constraints will all affect what it is possible for any new owner or manager to achieve. However, whether this scope will be translated into actual and sustainable performance improvements will be determined by the complex interplay between four interrelated factors:

- *The form of private involvement (e.g. divestment, BOT, concession, contract);*
- *The competitive structure of the sector and the way that this is likely to change over time;*
- *The type of private company involved – this includes its technical and managerial competence, the range of its operations (e.g..diversified conglomerate or single output firm),*

its operating scale (transnational, national or local) and the characteristics of its owners/major shareholders;

- *The post-privatisation regulatory regime* - this term is being used in the widest sense to include all the continuing roles of the public sector **and** the institutions (contracts, regulatory agencies, laws, market tools, etc.) employed to influence, provide incentives for or directly control private sector behaviour.

These factors do not operate independently of each other. The form of private involvement and the competitive market structure will both, for example, affect the roles the public sector will have to continue to fulfil. Likewise the nature and capacity of the post-privatisation regulatory regime will not only influence the type of private company (if any) attracted to the venture but may also place practical limits on the feasible forms of private involvement.

Privatisation Involves a Complex Set of Choices

IN THIS PAPER, it is argued that the privatisation process is not simply about changing the ownership or managerial characteristics of an industry. It involves making a complex set of choices about all the factors influencing sector performance and creating the conditions under which private involvement can yield the desired performance improvements. An attempt will be made to assess the way that different sets of choices (about the relative roles of the public and private sectors, form of privatisation, industry structure, and regulatory regime) are likely to affect the outcomes of private sector participation. It is clear that the impact of such choices will not be uniform; much will depend upon specific local socio-economic and political conditions. Moreover, it is evident that most governments will have a highly constrained range of choices; some options which would notionally be 'ideal' are ruled out as being politically or financially infeasible. Privatisation is always the art of the possible; some potential benefits will have to be sacrificed in order to get any benefits at all.

Regulation as a bargaining process

Before looking at the different privatisation and regulatory options, attention will first be paid to why the water and sanitation sector raises particularly difficult problems for private company involvement. The different forms of private participation and the implications that each has for the continued role of the public sector will then be discussed. Also considered will be the post-privatisation structure of the sector because this will affect the profitability of the private operators, the competitive incentives they have for efficient operations and the need for direct public regulation. The focus of the paper will then finally shift to regulation itself. Regulation is seen not just as a negative set of rules, monitoring and policing arrangements, but as a bargaining process which has to strike a balance between providing private companies with the incentives to invest and operate efficiently and protecting the interests of other social and economic actors. When discussing regulation, it is necessary to go beyond the measures specifically designed to affect the behaviour of the service providers. Also important is the broader regulatory environment which affects operator productivity, profitability and their willingness to accept different levels of commercial risk. A key element in this broader environment is the way that the water resources of a country are managed and allocated between competing users and uses.

The Difficult Characteristics of the Water Sector

THERE ARE FIVE important characteristics of the water and sanitation sector which make the involvement of private companies a particularly challenging venture:

- The level of natural monopoly and the lack of substitute products;
- The public and merit goods supplied by the sector;
- The crucial relationship between water infrastructure and urban/economic development;
- The highly capital-intensive nature of the sector and the overwhelming presence of sunk costs, which increase private-sector risks;
- The multi-purpose and hydrologically interconnected nature of the water resource itself.

Monopoly

If the water sector is divided into distinct functions along the supply delivery and waste disposal chain (figure 1) only two segments - the construction of capacity and plumbing services - are naturally competitive. The distribution of supplies to individual properties and the subsequent removal of sewage are classic network monopolies. Bulk supply provision, water treatment and sewage treatment all normally enjoy spatial monopoly because of the high costs involved

Competitive Characteristics of Water Industry Functions	
Resource Allocation and Use Regulation.....	Natural Monopoly per Hydrological Unit
Capacity Construction (including storage water treatment and sewage treatment)	Competitive
Bulk Supply Generation	Oligopolistic (in places monopolistic)
Bulk Supply Transmission	Areal Monopolies
Water Treatment	'n' Local Monopolies (at best oligopolistic)
Local Supply Distribution	'n' Local Monopolies
Local Sewerage Network and Interconnected Storm Water Network.....	'n' Local Monopolies
Sewerage Treatment	'n' Local Monopolies (at best duopoly)
Appliance Sales, Plumbing Services (e.g. quality testing)	Competitive

Figure 1. The water sector divided into distinct functions along the supply delivery and waste disposal chain. The distribution of water and removal of sewage are classic network monopolies; only the construction of production capacity and plumbing services are naturally competitive.

in transporting bulky water products. In other utilities, most obviously telecommunications and electricity, monopoly power is gradually being eroded by technological innovation and the development of competitive substitutes. Such an erosion is unlikely to occur to any significant extent in the water sector at least in the foreseeable future. Monopoly is, in other words, likely to remain a long-term feature of water and sanitation services.

It is frequently forgotten that market failure and the difficulties involved in protecting the consumer from private monopoly power abuses were important factors historically in the development of water utilities in many countries. The fact that these public utilities may have

failed to deliver the required services, does nothing change the basic monopoly problem. Evidence suggests that performance of privatised industries is critically affected by the level of competition they face (Bishop and Green, 1995). There is no reason why private monopolies should be any more efficient or responsive to customer demands than public ones. They need not employ least-cost production methods, may have few incentives to innovate and will not necessarily provide the quantity or quality of water products for which customers are willing and able to pay.

It is well known that in unregulated private monopolies, output volumes, standards of service and investment levels will all be lower than under competitive conditions, while prices are likely to be higher and set to discriminate against customers with inelastic demands for water (Herrington and Price, 1987). As Parker (1997) has recently pointed out a "privately-owned monopoly is not an attractive outcome, particularly in industries providing basic consumer services (e.g. water and sewerage services) and where the price elasticity of demand (the responsiveness of consumer demand to price) is low" (p. 1).

In reality unregulated private monopoly is simply not an acceptable proposition in the water sector. This raises two important questions:

- What measures can be taken to limit monopoly power and subject the companies involved to competitive pressures?
- How far is it possible to ensure that governments are any better at regulating private operators than they were as direct service providers?

Public goods and social functions

Water and sanitation services characteristically involve of so-called 'public' and 'merit' goods. The former are goods and services which provide benefits to communities in general rather than to specific individual consumers; the public health and environmental benefits from sewage transportation, treatment and safe disposal are an obvious example. Merit goods are those which a particular society considers should be provided irrespective of whether individual consumers are willing and able to pay for them. Public health and humanitarian considerations, not to mention political imperatives, may, for instance, require that low income households or those living in very high provision cost areas receive affordable, subsidized services.

In those countries where the public sector has been unwilling or unable to finance socially beneficial investments in sanitation and sewage treatment or to ensure that the poor have access to essential supplies of clean water, private sector participation by itself is not the answer. Private companies are not social services. They will only provide public goods or below cost water supplies if they can recover the costs involved, including their required return on any investments made. Excluding foreign grant aid, such costs can only be recouped directly from the public purse or from general increases in water charges. In other words, privatisation has to be accompanied by explicit changes in pricing policies and/or public expenditure priorities.

Water infrastructure and development

Industrial, commercial and housing developments are clearly crucially dependent on the provision of new water infrastructure and on the maintenance of existing systems in operating order. It is by no means always the case that the profit-maximizing behaviour of private companies will result in the scale, location and timing of expenditure on infrastructure which best meets public needs. An obvious example arises when private companies are operating under time limited contracts. Towards the end of the term, it could well be in the financial interests of companies to allow conditions to deteriorate and to neglect capital investments.

Given the developmental importance of water, governments will inevitably want to ensure that private expenditure decisions reflect changing public priorities and are responsive to alterations in economic and social conditions. This creates quite taxing problems for both the initial design of private participation arrangements and for the development of regulatory systems. A delicate balance has to be struck between protecting the public interest while also protecting the companies from shifting and unrealistic demands for additional expenditure.

Capital intensity, sunk costs and risk

Although not all forms of privatisation involve the private partners in accepting responsibility for major capital investments, one of the most common reasons for privatisation is to relieve the public exchequer from the burden of meeting the very large investment needs of the water and sanitation sector. This reason was certainly of critical importance when the water industry was privatised in England and Wales; major expenditures were required to renovate existing systems and meet European Union water quality and environmental requirements (Rees, 1989). It is an even more pertinent factor in countries experiencing rapid urban and economic growth and endeavouring to extend the coverage of water and sanitation provision to a greater proportion of the population.

For the private sector large scale investments always involve significant risks and particularly so when the assets are sunk, i.e. they cannot be removed for use elsewhere or redeployed on site for other purposes. If an airline operator fails to make an acceptable return on investment, the aircraft may be used in other markets or sold to another operator; likewise most factories can be adapted to produce different goods if the initial venture proves unprofitable. Such options are largely unavailable in the water sector; there are no obvious alternative uses for the sewerage system or sewage treatment plants.

Risk comes in a variety of forms:

- *Construction risk* (the costs of new developments or system renovation exceed expectations);
- *Commercial risks* (the demand for products change or new competitors enter the market);
- *Financial risks* (interest rates on borrowed capital rise or exchange rates shift);
- *Regulatory risks* (regulators alter standards of service requirements, refuse price rises or fail to prevent the pollution of water sources);
- *Political risks* (political instability, asset expropriation or expulsion from the country).

The more risk there is perceived to be, the higher will be the return on capital required by the private sector. This basic reality means that some countries (or individual municipalities) will simply be unable to find a willing investor because the market or political conditions are too unfavourable. In other cases, investors may be deterred by the lack of reliable information on existing asset conditions; this can be a particularly difficult problem for water distribution and sewerage services where assets are buried and not easily inspected.

Elsewhere success in attracting private investment at an acceptable cost to the economy (i.e. at a reasonable rate of return on the invested capital) will heavily depend upon what governments do to reduce private sector exposure to risk. This can often mean difficult trade-off situations. For example, commercial risks are cut if the companies are allowed a large spatial monopoly and exclusive rights to provide the whole range of services from bulk supply to sewage treatment. However, this means that governments have to forego the potential efficiency advantages of more competitive arrangements *and* accept the problems of protecting the public from potential monopoly abuse. Likewise, construction and regulatory risks can be reduced by guaranteeing full cost recovery if unanticipated construction or renovation problems are encountered or if new obligations are placed on the company. The problem is that such guarantees can remove incentives for least cost operations.

Regulatory risks can be further reduced by strictly limiting regulatory discretion or by giving a regulator the duty to ensure that the private companies can finance their activities (as in England and Wales). Risks can also be taken out of the business by removing, prior to privatisation, some of the barriers to profitability which exist in the public sector enterprise. For example, excess labour problems could be reduced by generous redundancy packages, but clearly such barrier removal may be expensive in both financial and political terms.

None of the decisions to protect the private companies from risk are free of cost. However, the bottom line is that companies will only invest in the water and sewage sector if risk and uncertainty are kept to acceptable levels.

Water as a resource

It is impossible to divorce consideration of water and sanitation services from questions about how water resources are managed. Water is a flow resource, occurring within hydrologically interconnected systems; change in one part of the system tends to set up chain reactions

affecting the availability, quality and cost of supplies elsewhere within the water region. Governments will want to ensure that private company operations do not impose unacceptable externality costs of other resource uses (by, for example, depleting underground aquifer or polluting the drinking water sources of downstream users). Moreover, governments will want to make sure that current practices do not compromise the ability of the water system to provide essential supply and ecological functions in the future

However, the private companies will also want assurances that the water resources law and any resource allocation or environmental agencies are capable of protecting them from the activities of upstream water and land users. Most obviously, they will want to ensure that their basic raw material remains available and of an acceptable (and predictable) quality. This can often mean that serious attempts to secure private involvement in water and sanitation have to be accompanied by reviews, and where appropriate reform, of a country's water resources law and resource allocation mechanisms. This is not a trivial nor uncomplicated exercise.

Private-Sector Involvement

FULL DIVESTITURE

Full transfer of assets to private sector through asset sales, share sales or management buyouts. Private sector responsible for all capital investment, maintenance, operations and revenue collection.

PARTIAL DIVESTITURE

Government sells a proportion of shares in a 'corporatised' enterprise or creates a new joint venture company with the private sector.

CONCESSION

Government lets a long-term contract, usually over 25 years, to a private company, which is responsible for all capital investment, operations and maintenance. The assets themselves remain public sector property.

LEASE

Long-term contract (usually 10-20 years but can be longer). Private sector responsible, for operations and maintenance and sometimes for asset renewals. Assets remain in public sector and major capital investment is a public responsibility.

BOT (Build-Operate-Transfer)/BOO (Build, Operate and Own)

Contracts are issued for the construction of specific items of infrastructure, such as a bulk supply reservoir or treatment plant. Normally, the private sector is responsible for all capital investment and owns the assets until transferred to the public sector, but in BOO schemes, private ownership is retained.

MANAGEMENT CONTRACT

Short-term contracts, typically five years. Private firm only responsible for operations and maintenance.

SERVICE CONTRACT- [BUYING IN]

Single function contracts to perform a specific service for a fee, e.g. install meters.

Figure 2. Forms of private-sector involvement.

Forms of Privatisation

THE TERM PRIVATISATION has been employed to cover a wide range of measures designed to improve the management of publicly owned enterprises (e.g. market testing or allowing access to private money markets). However, it is used here more narrowly to refer only to cases when governments physically transfer assets into private hands or contract the private sector to provide goods or services previously supplied by public bodies. Even within this more confined definition, the range of options is wide (figure 2, p. 10). The degree to which assets, responsibilities and functions are transferred to the private sector varies markedly, as does the nature of the accompanying regulatory regime.

Divestment

Divestment transfers the ownership of infrastructure assets into private hands as well as giving the private companies responsibility for all operations, maintenance, revenue raising and investment. This has not been a popular option in the water and sanitation sector despite the fact that there has been a long history of asset owning private operators in the United States and the United Kingdom.' Only two cases of divestment are known to have taken place - the flotation of the water utilities in England and Wales and the very recent sale of 51 % of the shares in Thailand's East Water bulk supply company (Hoare Govett Asia Ltd, 1997). The special characteristics of the water sector, discussed previously, mean that divestment would need to be accompanied by the creation of a system of continued public regulation. The more monopoly power and functional responsibilities the new companies have, the more comprehensive are the regulatory needs. As figure 3 shows, the water utilities in England and Wales have major constraints on their activities which would not apply to normal private companies.

Regulation and the Water Utility Companies in England and Wales		
Management Freedom	WUCs	Normal Plcs
To set prices	Constrained	Free
To decide and vary investment	Constrained	Free
To decide which raw material sources to develop	Constrained	Free
To decide which services/products to provide	Constrained	Free
To vary service quality	Constrained	Free
To refuse supply	Constrained	Free
To merge, divest and restructure	Constrained	Free
To dispose of assets	Constrained	Free
To go bankrupt	Most unlikely	Possible

Figure 3. Major constraints on the activities of water utilities in England and Wales that do not apply to normal private companies.

Concessions - a superior option?

Rejection of the divestment option frequently has more to do with ideology and politics than with its economic or regulatory disadvantages when compared to concessions. Under a concession the sector assets formally remain public property. But during the concession period (normally 25-30 years but can be over 50 years) a private company has exclusive usage rights over the assets and has complete responsibility for operations, system maintenance and new investments. In terms, then, of the functional responsibilities of the private sector there is little practical difference between divestment and concession. There are also, in reality, minimal differences between the two options in the regulatory tasks which need to be performed (see figure 4, p. 15).

It is conventional to claim that the concession system has two key features which make it a superior option. First, it introduces competitive incentives for efficiency since companies (normally but not universally) bid against each other to win the concession contracts. Second, it reduces the regulatory burden on government agencies by using the contract itself as the chief regulatory mechanism. Both of these claimed sources of superiority need to be viewed with some caution.

Bidding for concession contracts may result in short-term efficiency gains if genuine, free and fair competition actually occurs. Experience would suggest, however, that competition may be restricted by the dominance of a very small group of major companies in the international concessions market. These frequently form risk spreading consortia to win major contracts and may simply not take part in competitive bidding for smaller contracts. It is by no means unknown for a concession grantor to receive only one bid. In France, the home of the concession system, it has also been suggested that competition is restricted when contracts are rebid because the incumbent company has 'insider' knowledge and thus a higher chance of retaining the contract. Whatever the initial gains from competition for the contract, these could be short-lived unless some regulatory mechanisms exist to curb the tendency towards economic inefficiency inherent in monopolies. By its nature, the concession explicitly creates an absolute monopoly and protects the concessionaire from most forms of competition. Although contracts lay down explicit performance targets, mechanisms for price adjustments and standards of service requirements, it is a simplification to assume that the state's role can be confined to monitoring company performance against the contract conditions. It is impossible to predict changing economic, social and technical conditions over a 20-30 year period and incorporate these within contract terms. Contracts have to be renegotiated frequently and without the benefits of competition, which imposes a not insignificant regulatory burden. The Buenos Aires concession was, for instance, renegotiated barely a year after the initial award (Idelovitch and Ringskog, 1995). Moreover, mechanisms need to be in place to ensure that companies are responsive to customer demands, do not resort to discriminatory pricing practices and have incentives to provide a good value service. In France, the local 'regulators' (municipal mayors) and the fact that the companies need to protect their reputation if they wish to win contracts in other municipalities, help restrict potential monopoly power abuses. Where such conditions do not apply, more formal public scrutiny and consultation mechanisms will be needed.

Could divestment be an appropriate option?

There are situations where divestment may have advantages over the concession. First, share sales could allow employees, customers and other local interests to acquire a stake in their water company, which may help ensure it operates effectively to meet local needs. Second, share sales or management buyouts could help develop indigenous private sector companies rather than relying on the 'foreign' conglomerates, which typically dominate the concession market. Third, in rapidly changing socio-economic conditions the inflexibility of concession contracts can be a major barrier to responsive innovation behaviour.

It is also worth noting that asset owning private companies are not protected from all forms of competition. Under-performance or excess profits could attract take-over interest, so called capital market competition (Littlechild, 1986), and the companies may also be subject to competition from new entrants. The divestment option is likely to have the best chance of being effective in countries where the public water and sanitation services have technically competent staff, other private companies exist with experience of providing infrastructural services (e.g. power) and where local/national financial markets are reasonably well-developed.

BOT options

BOT (Build, Operate and Transfer) schemes and their variants are designed to attract private investment into the construction of new major items of infrastructure, such as bulk supply reservoirs, water or sewage treatment plants. Like concessions, BOT schemes introduce some competitive incentives for efficiency as companies normally compete to win the contracts. However, these gains can be eroded if specifications are changed after the contracts are let - the renegotiated terms are not competitively set. Moreover, efficiency incentives can decrease markedly if, in order to attract the desired investment, it is necessary to reduce private construction and commercial risks by providing cost overrun guarantees and onerous take or pay arrangements (the public sector is bound to pay for set quantities of water or sewage treatment irrespective of actual demands).

Leases and management contracts

None of the other forms of private sector involvement are designed to provide private capital for new water and sanitation infrastructure, although under leasing arrangement (the French affermage system), companies would be responsible for network maintenance, which could involve significant expenditure. Leases are normally competitively let and because of their more limited scope they are usually simpler to regulate than concessions or divestment. Where existing public suppliers have low productivities and poor revenue collection records, leases can be an effective option. However, much will depend on the contract terms and the system of economic regulation incorporated within the contract. Most lease contracts reduce commercial and regulatory risks by guaranteeing that allowable price rises will cover all cost of service increases. Such price guarantees do have the major advantage of curbing the political manipulation of water charges, which has so badly affected the financial viability of many publicly managed water enterprises. However, they do reduce the pressure on private companies to provide services at least cost. Moreover, where the leaseholder is part of a diversified conglomerate, problems of transfer pricing may well arise.¹

Management and service contracts are potentially the most competitive form of privatisation and impose the least regulatory burden. Since contracts are let at relatively short intervals, the private firms are under almost continuous pressure to cut costs. Moreover, as the functions transferred to the private sector are limited, barriers to entry into the business are likely to be fairly low; this is particularly so for service contracts where a potentially large group of firms would have, for example, the skills and resources to fit water meters or renovate a stretch of pipeline. One difficulty with contracting, however, is the tendency to accept the lowest bid for the work without taking sufficient account of the company's ability (or commitment) to provide an acceptable quality of service. Where the contract involves underground assets it is often difficult to monitor performance quality, and the effects of shoddy work may not become evident during the contract period.

Short-term management or service contracts clearly cannot help tackle the huge investment backlogs common in many rapidly developing and urbanising countries. Moreover, their effectiveness in improving operating performance can be limited if the public sector fails to provide the capital resources needed to renovate water treatment plants or distribution systems. In addition, where the problems of the sector have been caused, or exacerbated, by inconsistent political intervention, contracting may do little to distance the utility operator from such political interference. However, contracts can be a good way of achieving technology transfer and acquiring technical or managerial capacity.

1. "Transfer pricing" refers to situations whereby the costs of services provided by subsidiary or sister companies are not set by market forces but are established administratively within an integrated business to maximize total profits.

Industry Structure, Competitive Potential and Regulatory Burdens

AS ALREADY DISCUSSED, most segments of the water and sanitation business are monopolistic; it is therefore difficult to generate much 'in- the-market' competition. While it is possible to introduce some competition for the market by choosing a form of privatisation involving bidding for contracts, the use of other market (or market-like) incentives depends on the structure of the sector in which the private firms will operate (figure 5, p. 28). Economists have also long argued that sector structure has an important bearing on the regulatory burden which the public sector must carry to protect customer interests.

Regulation and Customer Protection					
Regulatory Tasks	O & M	Lease	Concession	BOT	Divestment
Price control	☐	✓	✓	✓	✓
Promotion of operating efficiency	☐	✓	✓	✓	✓
Service standard specification and monitoring	✓	✓	✓	✓	✓
Control of externalities	✓	✓	✓	✓	✓
Maintenance of public good functions	✓	✓	✓	✓	✓
Ensure asset serviceability over time	☐	✓	✓	✓	✓
Ensure development of essential infrastructure	☐	☐	✓	☐	✓
Controls over powers to manipulate land values/land speculation	☐	☐	✓	☐	✓
Controls over unfair trading practices	✓	✓	✓	✓	✓
Safety net regulations	✓	✓	✓	✓	✓
Promote water use efficiency	✓	✓	✓	(possibly)	✓
Ensure responsiveness to final customer needs	✓	✓	✓	☐	✓

Figure 4. List of major regulatory tasks needed to ensure various forms of customer protection under privatisation.

The competitive and regulatory advantages of disaggregated industry structures

From a competitive and regulatory point of view the water and sanitation industry should be vertically disaggregated (separate companies for each service function - bulk water supply, water distribution, sewerage, sewage treatment) and horizontally disaggregated (each firm serving a relatively small spatial area). With disaggregation, three advantages should, at least theoretically, arise. First, 'boundary' (entry) competition is facilitated. A neighbouring water supply company may, for example, be able to take customers away from an under-performing firm or one which is abusing its monopoly power by charging excessive prices. In practice, even where the legislative framework allows, and regulatory agencies are keen to promote this form of competition, it has proved remarkably difficult to achieve. It was, for example, only in May 1997 that the first case of a commercial user switching water supplier took place in England and Wales (OfWat, 28 May 1997). While the possibility of losing customers may act as a spur to better performance, there are problems involved in encouraging such competition. Private investors may simply not be attracted to situations where there is this source of commercial risk. In addition, 'cream skimming' could result in increased costs and prices for most customers. Cream skimming occurs when a competitor takes away customers (usually large industrial plants) which are cheap to supply, so leaving the incumbent company with high provision cost users and the burden of costly excess capacity

Clearly for bulky commodities, like water and sewage, which need specially constructed and costly transport systems, boundary competition is limited by geography unless common carriage arrangements are in place; these allow one company to use another firm's pipes, for a fee, to deliver water (or even receive sewage or trade effluent for treatment). With common carriage the scope for competition may be increased but so are the problems of cream skimming and reduced attractiveness to investors. Furthermore, it is exceptionally difficult, even with a uniform product such as electric power, to get common carriage arrangements to work effectively. For obvious reasons a company in danger of losing customers has every incentive to attempt to charge high prices for the use of its pipeline networks. Arrangements in the water and sanitation sector are further complicated by quality issues. It is simply not possible to ensure that individual users receive the water actually put into the network to meet their needs or for a treatment company to receive the actual sewage or trade effluent it is contracted to treat.

The second advantage of disaggregation is that it provides more complete and transparent information about the industry and thus increases the scope and effectiveness of 'yardstick' or comparative competition. Yardstick competition simply means that the performance of one company (public or private) can be assessed by comparing it with other suppliers of the same service using a variety of performance criteria (product price, pipeline leakage levels, maintenance cost per kilometre of main, investment expenditure on standard infrastructure items, etc.). Such comparisons can act as 'informal' pressure on companies to improve efficiency or refrain from monopoly power abuses. For example, where independent companies are operating as separate links along the water delivery and waste removal chain, each would have an incentive to scrutinize the relative performance of their 'supplier'. Likewise, both shareholders and customers would have better information about the way their company was performing. Such informal comparative assessments exert some pressure on managers worried about their share prices, keen to attract new business or simply anxious to protect their reputation. No managers are happy to see their companies at the bottom of a published performance league table.

Comparative competition has also proved to be an effective formal tool used by economic regulators to set companies efficiency targets and establish allowable price increases. Importantly, such competition can be employed to help sustain utility performance after privatisation has occurred; it acts as a countervailing force against the natural tendency for monopolists to diverge from least-cost operating practices. It was, for example, employed to good effect when new price limits were established for the private water utilities in England and Wales (OfWat, 1994) and has also been successfully used in Chile to improve the efficiency of publicly owned and managed water suppliers.

The final advantage of disaggregation is that it reduces the scope for some forms of monopoly power abuse. One example here is the restricted ability to use investment in water infrastructure to enhance the developmental potential (and thus land values) of land owned directly by the water service company, an affiliated firm or a major shareholder.

The costs of disaggregation

Whether these advantages of disaggregation actually produce enough benefits, in terms of performance improvements and reduced regulatory burden, to outweigh the costs involved, is in many circumstances highly debateable. If a disaggregated structure can only be achieved by breaking up the existing public sector utility, then the transaction costs could be considerable. These costs could include expenditure on realigning distribution pipes or sewerage systems, overcoming opposition from current managers and employees, and establishing enough information on which to create separate accounts.

In addition, disaggregated structures may result in lost economies of scale and scope. The former arise when the unit costs of provision fall as more customers are served, while the latter occur when it is cheaper to produce two goods (or services) together than it would be to provide each separately. Good data on the optimal operating scale for different segments of the water industry are typically not available in many countries. There is, however, enough international evidence to show that bulk supply generation and transmission services are subject to major scale economies. Moreover, spatially integrated bulk networks, capable of serving different demand centres from several supply sources (surface and ground) can reduce total supply capacity margins while increasing overall supply security. For this segment of the business it is then highly unlikely that the potential competitive advantages from having smaller scale operators would outweigh the technical efficiency advantages of large scale operations.

In the cases of local water distribution networks, sewerage systems, water and sewage treatment, the optimal operating scale appears to be much lower. UK evidence suggests that it could be below 1 million served customers, but the exact figure will be highly regionally specific (varying with population density, asset conditions and so forth). There may, therefore, be scope in large urban centres to have more than one company providing water and sanitation services. Disaggregation has, in fact, already occurred in Paris, with separate companies operating on either side of the Seine and two concessions have recently been let in Manila. It is worth pointing out that dividing provision in very large metropolitan areas not only allows some, albeit limited, comparative competition but it also makes it easier for local community and planning agencies to forge consultative links with the companies.

A further, and in some countries critical, disadvantage of disaggregation is that it could reduce the interest of private-sector companies in participating in the enterprise at all. Alternatively their interest may only be secured at a greatly increased cost. The real dilemma is that all measures designed to reduce monopoly power also reduce the potential profitability of the private-sector companies. Countries or municipalities which desperately need an injection of private-sector capital may, quite understandably, decide that the short-term gains from the investments will outweigh the future potential problems of regulating a monopoly company. Indeed, they may be right to do so, because once major investments are made, the company becomes much more vulnerable to political and regulatory risk. Some political risks are, of course, quite unrelated to company behaviour, but private-sector managers are well aware that excessive profit taking and widespread customer dissatisfaction with prices and service standards will increase the probability of an unpleasant political and regulatory backlash. There are then some self-regulatory mechanisms at work which limit the exercise of monopoly power.

REGULATION IS OFTEN thought of purely as sets of commands issued by governments, which are designed to control behaviour, with accompanying 'police forces' and penalties for failure to obey. Regulation is actually much more than this. While undoubtedly there are command 'sticks', incentive 'carrots' also have a key role to play. In addition, it is not valid to assume that all regulation is designed to force private companies to act against their own self-interest in ways which further general public interests (or the interests of dominant political parties). Most regulation, in fact, only works effectively with the consent of the regulated, being based on an acceptance that the 'commands' are reasonable. There is a massive literature which argues that regulation is often demanded by private firms to increase their market, curb risks or reduce competition by creating barriers to entry for new firms or substitute products (Stigler, 1971). Another, possibly even more voluminous, literature suggests that even when regulatory systems are not designed to serve private interests, they are 'captured' by them.

As early as 1955, for example, Bernstein (1955) was arguing that the regulatory commissions in the United States (regulating private electricity, gas and water utilities) were prone to act for the companies rather than for their customers.

The regulatory regime faced by potential private sector operators is, in a very real sense, the product of a bargaining process, the outcomes of which will very much depend on the resources (power) and needs of the various players. Government departments responsible for the water sector and private companies, including financial institutions, are not the only players. Other government agencies, political parties, current utility managers, labour unions and consumer organisations will all be among the stakeholders keen to ensure that private-sector involvement will serve, or at least not harm, their interests.

The elements of a regulatory regime

Four distinct elements are included in the regulatory regime:

- *The general framework of laws*, constitutional rules, policies and administrative structures within an economy, which while not developed with the water sector in mind, nevertheless impinge on its activities and affect the willingness of the private sector to participate in service provision. These include labour law, company taxation rules, currency controls, and the constitutional division of responsibilities between national, regional and local government.
- *Water resource and environmental laws*, water right allocation and protection mechanisms and the performance of any resource conservation or pollution control agencies;
- *Specific water and sanitation sector regulation*, including the legislation enabling private sector participation, the powers and capacity of any regulatory agencies, regulatory tools and mechanisms for public scrutiny and consultation;
- *The individual contracts or licences* under which the companies operate.

Competition in Alternative Industry Structures				
Form of Competition	Operating and Maintenance Contract	Concession	BOT	Divestment
In the market	No	No	No	No
Entry: boundary and inset competition	No	No	No	Yes (if common carriage, insets and entry allowed)
For the market	Yes	Yes (but limited by contract length)	Yes	No
Capital market	No	Yes (but limited for large conglomerates)	Yes	Yes
Comparative (yardstick) By regulator	Yes	Yes	Yes	Yes
	←(if several large companies are operating in the country)→			
By independent companies within industry water use chain	Yes	Yes	Yes	Yes
	←(if allowed by industry structure)→			

Figure 5. Sector structure has an important bearing on the regulatory burden to protect customer interests, competition can be an alternative to regulation.

From this list of elements it can be readily appreciated that privatisation (other than very basic service contracts) is not a simple process.

There will be situations where some elements of the general framework of laws will need changing before any meaningful level of private-sector participation is feasible at all. More usually, unattractive elements in this framework will have to be overcome by, for example, settling for a low-risk type of private involvement, such as a basic management contract. Alternatively, it may be possible to incorporate explicit (and enforceable) safeguards for the private companies in specific sector laws or individual contracts.

Inevitably, water and sanitation companies are going to be particularly sensitive to regulations (or the absence of them) which govern water resources allocation and water pollution control. If existing regulatory systems cannot guarantee usage rights, protect the companies from costly changes in resource availability or quality, and safeguard them from the introduction of new environmental quality controls, then once again the private participants will demand protection within the contract terms. For example, 'cost pass through' arrangements could be put in place, which allow companies to increase water prices to cover any cost changes. Alternatively, the private operator could be relieved of obligations to maintain supplies or supply qualities when exogenous changes to the water resource occur.

Regulatory tasks For reasons discussed earlier, unregulated water and sanitation companies are simply not an option. The list of regulatory tasks needed in an ideal world is potentially long (figure 4), particularly so for divestments and concessions. However, while some of these tasks may be desirable, the capacity of regulators to perform them, the costs involved and the willingness of the private companies to accept restrictions on their activities will all affect what it

is practical to implement. As with most aspects of the privatisation process, a large dose of realism has to be injected into the design of sector-specific regulations and individual contracts. By and large, private sector companies would prefer regulatory discretion (and thus regulatory risk) to be minimised and for the contract to be the major regulatory mechanism. Highly specific contract terms, setting out duties, performance targets, water price uprating rules, and dispute arbitration procedures, allow the companies to better predict the profitability of the venture and decide what it is worth paying to win the contract. Such contracts may also be advantageous for governments in that more bidders could be attracted and a better deal struck. In the case of long-term contracts, delicate judgments will have to be made about whether restricting the public sector's role of monitoring contract compliance is economically, politically and socially acceptable.

Conclusions

PRIVATE-SECTOR PARTICIPATION in the water and sanitation sector is not a general panacea.

The most commonly cited causes of the failure of state enterprises - insulation from competitive incentives and political interference - do not magically vanish when private sector involvement occurs. In some countries, the need for private sector expertise and financial resources is compelling, but these will only be made available if it is profitable to do so. Where governments and customers have been unwilling or unable to pay for the desired level of services, major politically and socially difficult choices will have to be made. The private sector will certainly not be interested in participating unless cost recovery questions are addressed. Likewise, private companies will not act as depositories for the disguised unemployed unless they are paid to do so; increased productivity will involve significant labour shedding with all the accompanying political and social problems. Privatisation may provide the catalyst for needed sector reforms, but the decisions to make the reforms and accept the consequences are public-sector responsibilities.

Any privatisation of a public utility is a complex exercise, but the water and sanitation sector has several key characteristics which make the process particularly difficult. The overwhelming presence of monopoly may mean that the efficiency savings, which private-sector involvement is supposed to achieve, will not arise, unless, that is, the form of privatisation, industry structure and regulatory arrangements provide competitive incentives.

In addition, the social, developmental and environmental importance of the water sector means that continued public regulation will be inevitable. Devising a regulatory regime which protects public interests while avoiding unpredictable political interference is a difficult task. The success of privatisation will, however, critically depend on how well this task is accomplished.

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Questions Private Sector Participation:

1. The post-privatisation regulatory regime will in complex interplay with other factors determine whether privatisation of water supply services will be translated into actual and sustainable performance improvements. Explain this sentence!
2. Can you mention some important elements of the post-privatisation regulatory regime?
3. The involvement of the private sector in the water and sanitation services is a particularly challenging venture because of the highly capital-intensive nature of the sector and the overwhelming presence of sunk costs, which increase private-sector risks. Explain!
4. Can you give a definition of 'public' and of 'merit' goods? Can you give examples of services that can be both public and merit goods?
5. Can you give a description of the following forms of private sector involvement (in water supply and sanitation services):
 - Service contract
 - Management contract
 - BOT
 - Lease
 - Concession
 - Partial divestiture
 - Full divestiture?
6. Can you explain the following sentence: 'Clearly for bulky commodities, like water and sewage, which need specially constructed and costly transport systems, boundary competition is limited by geography unless common carriage arrangements are in place?'
7. Can you describe the potential value of various forms of competition to replace a regulatory regime with regard to the following modalities of private sector involvement: maintenance contract, concession, BOT and divestiture. Discuss in your answer the following terms: competition in the market, competition for the market, capital market competition, yardstick competition, competition at entry.
8. The following statement is often encountered in well-respected literature: 'From a competitive and regulatory point of view the water and sanitation industry should be vertically disaggregated (separate companies for each service function - bulk water supply, water distribution, sewerage, sewage treatment) and horizontally disaggregated (each firm serving a relatively small spatial area).' Can you mention and describe the theoretical advantages and disadvantages of vertical and horizontal disaggregation?

