

## PART 5

---

# **AFRICAN EXPERIENCES IN WATERSHED MANAGEMENT**

---

# CHAPTER 12

## PROCESSES THAT WILL INFLUENCE RESOURCE ALLOCATION IN THE REPUBLIC OF SOUTH AFRICA

**S. Rademeyer**

National Water Resource Planning, National Department of Water Affairs and Forestry, Pretoria, South Africa

### ACRONYMS

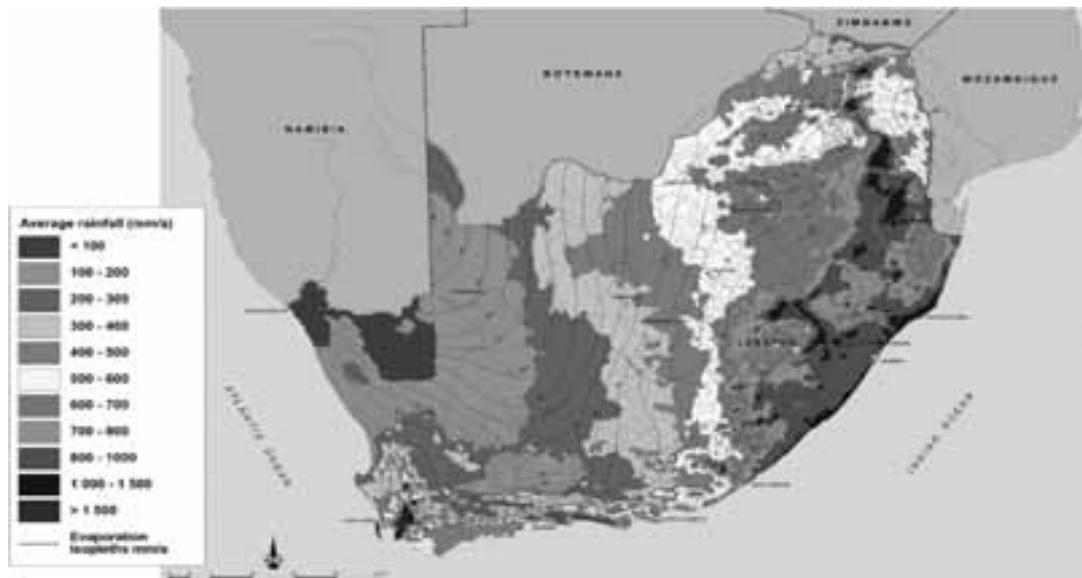
<b>CMA</b>	Catchment Management Agency
<b>CMS</b>	Catchment Management Strategy
<b>DWAF</b>	Department of Water Affairs and Forestry
<b>EWR</b>	Ecological Water Requirements
<b>ISP</b>	Internal Strategic Perspectives
<b>NWA</b>	National Water Act
<b>NWP</b>	National Water Policy for South Africa
<b>NWRS</b>	National Water Resource Strategy
<b>WMA</b>	Water Management Area

South Africa is located in a predominantly semi-arid part of the world. The climate varies from desert and semi-desert in the west to sub-humid along the eastern coastal area. The average rainfall for the country is about 450 mm per annum, which is well below the world average of about 860 mm/annum; however, evaporation is comparatively high. As a result, South Africa's water resources are, in global terms, scarce and extremely limited. The country has no truly large or navigable rivers, and the combined flow of all the rivers in the country amounts to approximately 49 000 million m<sup>3</sup> per annum, less than half of that of the Zambezi River, the closest large river to South Africa. Groundwater plays a pivotal role, especially in rural water supplies. Because of the predominantly hard rock nature of South African geology, only 20 percent of groundwater occurs in major aquifer systems that could be utilized on a large scale.

Owing to the poor spatial distribution of rainfall, as shown in Figure 1, the natural availability of water across the country is also highly imbalanced. This situation is compounded by the strong seasonality of rainfall, as well as high within-season variability over virtually the entire country. Consequently, surface runoff is also highly variable. As a result, stream flow in South African rivers is at relatively low levels for most of the time. The sporadic high flows that do occur limit the proportion of stream flow that can be relied on to be available for use. To aggravate the situation, most urban and industrial development, as well as some dense rural settlements, have been established in locations remote from large watercourses, dictated either by the occurrence of mineral riches or by political dispensations of the past. As a result, in

several river basins, the requirement for water already far exceeds its natural availability, and widespread and often large-scale transfers of water across catchments have already been implemented in past decades.

**FIGURE 1**  
**Rainfall and evaporation map of Southern Africa.**



## **EVOLUTION OF WATER USE AND WATER LAW IN SOUTH AFRICA**

### **Background**

South Africa was under Netherlands rule from the time of Van Riebeeck to the United Kingdom occupation early in the nineteenth century. All land was held in leasehold, therefore the State had ownership of all water and had absolute control over its applied use. Irrigation was from direct diversion of rivers. The responsibility for water resource development was in the hands of private enterprise.

During United Kingdom occupation in the early nineteenth century, freehold land tenure was introduced. Under English law, the natural rights appertaining to the land belonged to the owner. The riparian principle, namely that all owners of land along rivers had common rights to the water in such rivers, became established. Special water courts were created to apportion water and to determine individual rights. The Irrigation and Conservation of Water Act (No. 8 of 1912) was eminently suited to promoting irrigation development in accordance with these principles. With this, the State concentrated on the construction of works to benefit irrigation.

But the country developed, and it was realized after the Second World War that the 1912 act was obsolete in that it did not make provision for the growing needs of industry and other users in what had turned out to be a water-deficient country. As the result of a Commission of Enquiry,

which reported in 1952, a new Water Act (No. 54 of 1956) was promulgated, which was the first attempt in South Africa to regulate the use of public water for all demand sectors of the economy to the best national advantage. Unfortunately, the concept of State control was reintroduced (portion in excess of existing users' rights). The principle of private ownership was still enforced, and access to water for production purposes was still tied to landownership (the riparian system).

### **The National Water Policy**

Since the advent of a democratic South Africa in 1994, government policy has focused strongly on equitable and sustainable social and economic development for the benefit of all people in South Africa. However, many existing laws – including the law relating to water – were not at all appropriate in achieving these objectives. The National Water Policy (NWP), adopted by Cabinet in 1997, was introduced in response to the new direction set by government and as part of a thorough review of existing water law.

The NWP was preceded in 1996 by the development of 28 Fundamental Principles and Objectives for New South African Water Law. Principle 7 is particularly relevant and states that:

The objective of managing the quantity, quality and reliability of the nation's water resources is to achieve optimum, long-term, environmentally sustainable social and economic benefit for society from their use.

This became the cornerstone for the priorities for water resource management in South Africa.

Three fundamental objectives for managing South Africa's water resources, which are firmly grounded in the provisions of the Bill of Rights of the Constitution of South Africa (No. 108 of 1996), arise from these principles. These objectives are to achieve:

- equitable access to water;
- sustainable use of water;
- efficient and effective water.

Important proposals to facilitate achievement of the NWP objectives include the following:

- Water will be regarded as an indivisible national asset. National government will act as the custodian of the nation's water resources, and its powers in this regard will be exercised as a public trust.
- Water required to meet basic human needs and to maintain environmental sustainability (the reserve) will be guaranteed as a right, while water use for all other purposes will be subject to a system of administrative authorizations.
- The responsibility and authority for water resource management will be progressively decentralized through the establishment of suitable regional and local institutions. These will have appropriate community, racial and gender representation to enable all interested persons to participate.

Implementation of the NWP proposals will fundamentally change the ways in which South Africa's water resources are managed.

## **The National Water Act**

The National Water Act (NWA) (No. 36 of 1998) derives directly from the Fundamental Principles and Objectives for a New South African Water Law and the NWP proposals for managing water resources. The NWA is the principal legal instrument relating to water resource management in South Africa and contains comprehensive provisions for the protection, use, development, conservation, management and control of South Africa's water resources. These legal provisions enable the proposals in the NWP to be implemented. The NWA was therefore enacted in recognition of the following:

- the water cycle, and water's scarcity and uneven distribution;
- although water belongs to all the people of South Africa, some were excluded from its use in the past;
- water is a national asset, and the national government should therefore be its custodian;
- the ultimate aim of water resource management is to achieve sustainable use;
- the quality of water should be protected to ensure sustainability;
- the need for integrated management of all aspects of water resources and the delegation of management functions to the regional or catchment level.

However, the NWA is not the only instrument through which the objectives of the NWP will be achieved. It is supported by other legislation such as the Water Services Act (No. 108 of 1997) and the National Environmental Management Act (No. 107 of 1998).

## **The National Water Resource Strategy**

The implementation of the NWA is a progressive process that will subject the country to gradual water reform for a long period. An important initial step was the development of the first edition of the National Water Resource Strategy (NWRS). The NWRS describes how the water resources of South Africa will be protected, used, developed, conserved, managed and controlled in accordance with the requirements of the policy and law. The central objective of managing water resources is to ensure that water is used to support equitable and sustainable social and economic transformation and development.

The NWA is a national framework for managing water resources, developing catchment management strategies and giving information on the Minister's intentions for water resources management. The NWA is also utilized to identify development opportunities, as well as constraints.

## **Catchment Management Strategies**

A vital element of the NWRS is the progressive decentralization of the responsibility and authority for water resource management to Catchment Management Agencies (CMAs) and, at the local level, water user associations. The initial functions of the agencies include the important responsibility of developing a Catchment Management Strategy (CMS) for each Water Management Area (WMA). This strategy may not be in conflict with the NWRS, and must give effect to the NWRS's provisions and requirements, providing the

framework for managing the water resources of the area. In particular, it must determine the principles according to which the available water will be allocated among competing user groups.

### **Internal Strategic Perspectives**

The first step towards the CMS, which is the writing up of the so-called Internal Strategic Perspectives (ISPs), has already been done, and ISPs for a number of WMAs are already available in the public domain.

The Department of Water Affairs and Forestry's (DWAF) regional offices have to manage the water resources in their areas of jurisdiction until they can hand over some of these management functions to established and fully operational CMAs. In accordance with the NWA, the Minister of DWAF will retain ultimate responsibility for the management of the water resources.

In light of this responsibility, DWAF's corporate perspective on how the water resources should be managed needs to be formally put on paper. This is with a view to maintaining consistency when answering requests for new water licences, and informing existing water users (including authorities) on how DWAF will manage the water resources within the area of concern and which decision support information still needs to be collected.

## **SOUTH AFRICA'S WATER SITUATION AND STRATEGIES TO BALANCE SUPPLY AND DEMAND**

### **Background**

Although South Africa's water resources are limited and highly variable, they will be sufficient to support social and economic development for the foreseeable future, provided that they are judiciously managed and wisely allocated and utilized.

An important basic concept relating to water resources management that needs to be explained is the portion of the available water, in respect of both quantity and quality, in each WMA that is under the direct control of the DWAF Minister in terms of his or her national responsibilities. This includes the reserve water necessary to meet international obligations, provision to meet realistic future requirements, transfers between WMAs and water of strategic importance.

Once these obligations are met, the balance is allocated to the various other users in the catchments.

### **The reserve**

In the NWA (and therefore also the NWRS), the highest priority is afforded to the provision of water for the purposes of the reserve. The first objective is to ensure that sufficient quantities of water of appropriate quality are readily available to provide for basic human needs.

The second objective is the provision of water for safeguarding and sustaining healthy ecosystems, including fauna and flora. This can also be termed the Ecological Water Requirements (EWR). Owing to the complex interdependence among species in nature, and our extremely limited knowledge of the wide spectrum of habitat and water requirements, only provisional estimates of the EWR are presented in the NWRS.

In simple terms, it can be said that the EWR is the water that should be left in a river (or wetland or estuary) for the healthy ecological functioning of the system. This water is not available for abstraction and therefore limits the available yield from the system. Allowance for EWR has been made in all yield numbers quoted in the NWRS.

### **Water required for international rights and obligations**

Four of South Africa's rivers are shared with other countries. These are the Limpopo, Inkomati, Pongola (Maputo) and Orange (Senqu) rivers, which together drain about 60 percent of the country's land area and contribute about 40 percent of its total runoff (river flow). Approximately 70 percent of South Africa's gross domestic product (GDP) and a similar percentage of the population are supported by water supplied from these rivers, making their judicious joint management of paramount importance to South Africa.

### **Water use of strategic importance**

Electricity is fundamental to the functioning of modern society, and the abstraction and storing of water for use at power stations operated by Eskom, as the organization entrusted with generating the bulk of the country's electricity, is therefore regarded as being water use of strategic importance.

### **Reservation for transfer between WMAs**

The allocation of reserves for transfer between WMAs is also regarded as water use of strategic importance, and is established by the Minister in the NWRS.

### **Contingency to meet projected future growth**

As part of the reconciliation of supply and demand, projections were made of the future requirements for water, together with an indication of the resource potential that could still be developed. The best strategies for the future reconciliation of requirements and availability will be combinations of various possible interventions. Only under certain conditions will further developments and transfers of water prove to be desirable. It is therefore not generally practical for reservations to be made of specific quantities of water to allow for future growth. However, there are certain instances in which the limited resources still available must be reserved (e.g. where known quantities of water need to be reserved for specific uses or transfers; where general reserves that are not quantifiable at present need to be made for future priority uses; and where dam sites need to be reserved for specific purposes).

This will ensure that optimal development choices are not foregone and developments are not allowed in one area that will unwittingly prejudice another.

## **STRATEGIES FOR WATER RESOURCES MANAGEMENT**

### **Background**

Strategies, objectives, plans, guidelines, procedures and institutional arrangements are necessary to implement the provisions of the NWA. This paper has alluded to some of these, such as the reserve and other water use under the direct control of the Minister and water management institutions. We need briefly to explain some of the other important provisions.

### **Protection of water resources**

It was indicated in the preceding section on the evolution of water use and water law that the fundamental objectives for managing South Africa's water resources are to achieve equitable access to water resources, and their sustainable and efficient use. In the section on the strategies needed to balance supply and demand, it was concluded that the country's water resources will be sufficient to support development for the foreseeable future.

Equitable access has both a short-term and a long-term dimension. It is important that the needs of current and future generations are considered in the management of water resources.

To give effect to the interrelated objectives of sustainability and equity, an approach to managing water resources has been adopted. This introduces measures to protect water resources by setting objectives for the desired condition of resources, and putting measures in place to control water use to limit impacts to acceptable levels.

The approach comprises the following two complementary strategies:

- *Resource-directed measures:* These measures focus on the quality of the water resource itself. Resource quality reflects the overall health or condition of the water resource, and is a measure of its ecological status. Resource quality includes water quantity and water quality, as well as the character and condition of in-stream and riparian habitats, and the characteristics, conditions and distribution of the aquatic biota. The class of a resource, the reserve and its resource quality objectives are intimately related to one another. The reserve includes the quantity and quality of water to meet basic human needs and protect aquatic ecosystems. Resource quality objectives provide numerical and/or descriptive statements about the biological, chemical and physical attributes that characterize a resource for the level of protection defined by its class. Resource quality objectives must take account of user requirements and the class of the resource. Accordingly, the determination of the management class of a resource, and the related reserve and resource quality objectives (jointly, a resource-directed measures determination) will usually be undertaken as an integrated exercise.

- *Source-directed measures:* These measures contribute to defining the limits and constraints that must be imposed on the use of water resources to achieve the desired level of protection. They are primarily designed to control water use at the source of impact.

### **Water use**

Concerning equity of access, the NWA replaces the previous system of water rights and entitlements (many of which were based on the ownership of riparian land) with a system of administrative, limited-period and conditional authorizations to use water.

“Schedule 1 use” (relatively small quantities of water) and “use under a general authorization” (limited, but conditional, water use without a licence) were introduced in the NWA. These were primarily intended to reduce the administrative effort of authorizing each individual water use in the country. However, a licence is required for any water use that exceeds a Schedule 1 use, or that exceeds the limits imposed under the general authorizations.

It is important to note (as previously stated) that the reserve has priority over all water uses and that the requirements of the reserve must be allowed for before any water use is licensed.

### **CONCLUSION**

Many challenges face South African water resource managers in ensuring that water supports the transformation of society and the economy, and neither the resources nor the time required to address them should be underestimated. However, building on the outstanding foundation provided by the NWA, the NWRS will guide the achievement of the common vision of an equitable and sustainable society.

### **REFERENCES**

- DWAF. Internal Strategic Perspective (24 reports covering all 19 Water Management Areas, some still to be published). Available at: [www.dwaf.gov.za/documents/](http://www.dwaf.gov.za/documents/).
- DWAF. 1986. *Management of the water resources of the Republic of South Africa*.
- DWAF. 1997. *White Paper on a National Water Policy for South Africa, April 1997*. Available at: [www.dwaf.gov.za/documents/](http://www.dwaf.gov.za/documents/).
- DWAF. 2004. *National Water Resource Strategy, First Edition*. Available at: [www.dwaf.gov.za/documents/](http://www.dwaf.gov.za/documents/).
- Government of South Africa. Constitution of the Republic of South Africa.
- Government of South Africa. 1998. National Water Act. No. 36.

# CHAPTER 13

## PUTTING INTEGRATED WATER RESOURCE MANAGEMENT INTO PRACTICE – GHANA'S EXPERIENCE

**Kwame Odame-Ababio**

Water Resources Commission, Accra, Ghana

### ACRONYMS

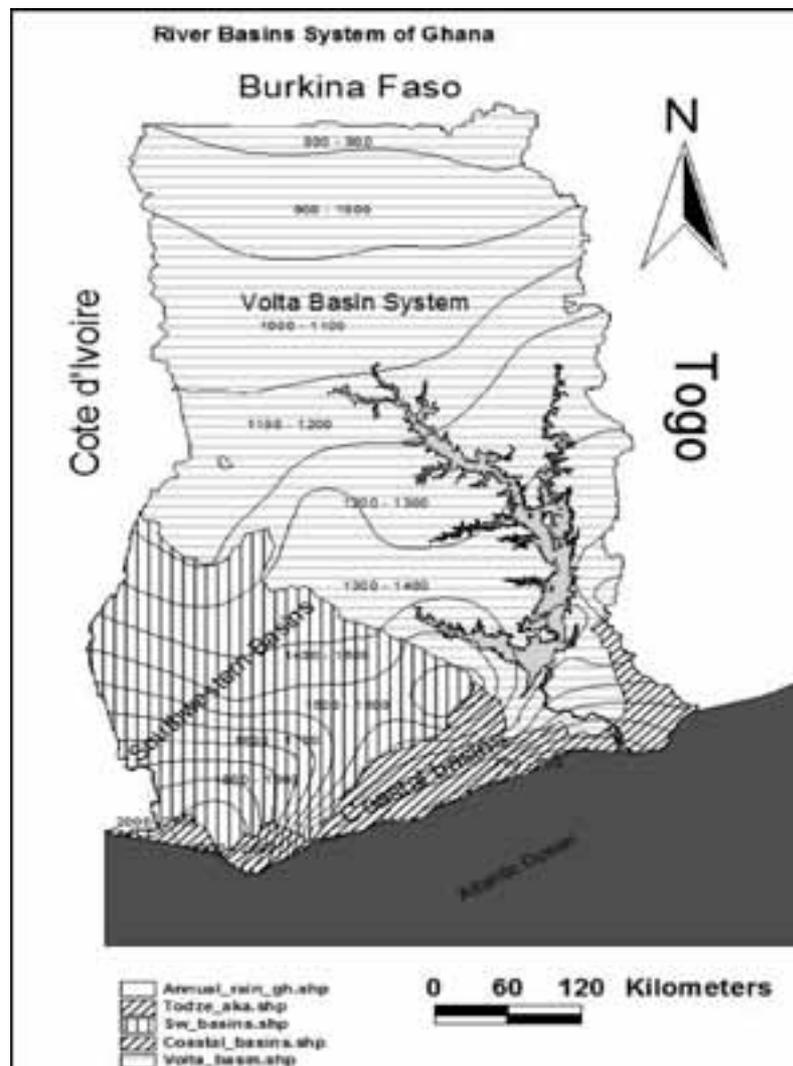
CWSA	Community Water and Sanitation Agency
DAs	District Assemblies
EPA	Environmental Protection Agency
FC	Forestry Commission
GWCL	Ghana Water Company Limited
HSD	Hydrological Services Department
IDA	Irrigation Development Authority
MC	Minerals Commission
MDAs	Decentralized Ministries, Departments and Agencies
MES	Ministry of Environment and Science
MLF	Ministry of Lands and Forestry
MM	Ministry of Mines
MOFA	Ministry of Food and Agriculture
MRT	Ministry of Roads and Transport
MSD	Meteorological Services Department
MWH	Ministry of Works and Housing
NDPC	National Development Planning Commission
VLTC	Volta Lake Transport Company
VRA	Volta River Authority
WRC	Water Resources Commission
WRI	Water Research Institute

### BACKGROUND

#### Water resources of Ghana

Ghana is well endowed with perennial rivers and groundwater, although seasonal shortages are quite common. The mean annual rainfall ranges from 2 150 mm in the extreme southwest of the country, reducing progressively eastwards and northwards to 800 mm in the southeast and about 1 000 mm in the northeast of the country (Figure 1).

**FIGURE 1**  
**Rainfall distribution in the major river basins of Ghana**



Source: Map produced in Arcview GIS with background shapefiles from Ghana Country at a Glance.

Ghana is drained by three main river systems; the Volta basin, the southwestern basins and the coastal basins river systems, which respectively cover 70, 22 and 8 percent of the total area of Ghana (Figure 1). The Volta River system is shared with Côte d’Ivoire, Burkina Faso, Togo, Benin and Mali. Two river basins in the southwestern system are also transboundary – the Bia River is shared with Côte d’Ivoire, while the lower reaches of the Tano river form part of the boundary with Côte d’Ivoire. The total annual runoff of the river basins is 56.4 billion m<sup>3</sup>. The Volta, southwestern and coastal systems contribute 73.7, 29.2 and 6.1 percent, respectively, of the annual runoff originating from Ghana (Ministry of Works and Housing, Ghana, 1998).

The groundwater resources of the country are found in two main rock formations: 1) the sedimentary formation made up of mainly Voltaian origin, which occupies about 43 percent of the total area of the country, with yields of 1.0 to 12.0 m<sup>3</sup>/ha at depths of 20 to 80 m; and 2) the

non-sedimentary formation made up mainly of the crystalline basement complex of pre-Cambrian origin, which occupies 57 percent of the total area of the country with yields of 1.5 to 32.0 m<sup>3</sup>/ha at depths of 20 to 100 m. The quality of groundwater resources in Ghana is generally good except for some cases of localized pollution with high levels of iron and fluoride, as well as high mineralization with total dissolved solids, especially in some coastal aquifers (Water Resources Commission, 2000).

## **HISTORICAL PERSPECTIVES OF WATER RESOURCES MANAGEMENT IN GHANA**

### **Customary land and water conservation practices**

Customary laws and practices in Ghana have existed over the years and covered the areas of water conservation, pollution control, protection of catchments and protection of fisheries. Kinship, reverence for ancestors and belief in the spiritual power of the earth combined to give land tenure and customary environmental protection their peculiar character.

Basically, the people believed that the earth has a spirit of its own, which can be helpful if propitiated or harmful if degraded. Even though the earth was regarded as possessing a spirit, the ancestors were believed to be the immediate spiritual custodians of the land and its resources. It was the ancestors, on behalf of the earth deity, who constantly kept watch to see that the land is judiciously used (Opoku-Agyeman, 2001).

As well as the earth deity, the natives also believed in river gods, tree deities and sacred groves. People were forbidden to hunt in certain periods of the year or to fish on Tuesdays, and were to refrain from farming along riverbanks, which were considered the resting abode of the river gods and children.

These laws were enforced through various sanctions usually dictated by fetish priests and priestesses. Today, however, it is difficult to identify any features of customary law beyond the priority given to water for domestic use, which is common throughout the country.

### **Pre-independence common laws**

As early as the 1900s, the government recognized the need to control the use of water. The first attempt comprehensively to regulate the use of water, other than for domestic use, was the enactment of the Rivers Ordinance (CAP 226 of 1903). Section 10 of this ordinance states that it shall be unlawful to pump, divert or by any means cause water to flow from any river, for purposes of irrigation, mines or factories or to generate power, without a licence from the Minister. There was no follow-up to this ordinance, neither were regulations made, and the ordinance was overtaken by time and other enactments. The other enactments that followed contained specific provisions that enabled agencies to perform certain specific functions, and some of these provisions were water-related. For example, the Forestry Ordinance of 1927 made provisions for catchment protection and control of water abstraction in forest reserves; the Land Planning and Soil Conservation Ordinance of 1953 had sections for checking soil erosion and for the control of watercourses.

### Post-independence common laws

A priority of government in the immediate post-independence era was to establish agencies and institutions with specific roles for water supply, irrigation and environmental management. Some legal enactments related to water management in post-independent Ghana are listed in Table 1.

**TABLE 1**  
**Legal enactments for setting up major water-related agencies**

INSTITUTION	RESPONSIBLE MINISTRY	LEGAL ENACTMENT
Meteorological Services Department	Communications	Administrative
Hydrological Services Division	Works and Housing	Administrative
Water Resources Research Institute*	Environment, Science and Technology	NLCD 293 of 1969
Institute of Aquatic Biology*	Environment, Science and Technology	NLCD 293 of 1969
Irrigation Development Authority	Agriculture	SMCD 85 of 1977
Ghana Water and Sewerage Corporation	Works and Housing	Act 310 of 1965
Volta River Authority	Mines and Energy	Act 46 of 1961
Volta Lake Transport Company	Transport and Communication	Registered under Company Code of 1970
Environmental Protection Agency	Environment, Science and Technology	Act 490 of 1994
Forestry Commission	Lands and Forestry	NRCD 239 of 1974

\* Two institutions now merged as Water Research Institute.  
Source: Ministry of Works and Housing, Ghana, 1998.

These attempts were sector-specific. Each sector agency managed, controlled and regulated its own activities with respect to water management, with little coordination and control. For example, the Ghana Water and Sewerage Corporation (GWSC), now the Ghana Water Company Limited (GWCL), developed, managed and controlled drinking-water supply and, to a very limited extent, sewerage services; the Volta River Authority uses raw water to produce electricity; the Irrigation Development Authority (IDA) develops and manages irrigation and associated land use for agricultural production; and the Environmental Protection Agency (EPA) concerns itself primarily with the environmental implications of water treatment and usage.

Subsequent water sector reviews identified institutional gaps regarding the coordination and integration of the various sector policies for water use in the country.

## **Water sector reforms**

Since the late 1980s and early 1990s, the water sector in Ghana has undergone various reviews. These reviews enabled the government to undertake a number of reforms. Among which are: 1) a rural water and sanitation strategy based on community ownership and management; 2) the restructuring of the urban water sector to bring in private sector participation in urban water delivery; 3) preparation of the national environmental action plan; and 4) strengthening of water resources information agencies, etc. For example, in the rural water delivery subsector, the Community Water and Sanitation Agency (CWSA) has been established with the mandate to act as a facilitator for the delivery of water and sanitation facilities and hygiene education to rural communities, and to oversee the accelerated provision of potable water and hygienic sanitation facilities in a congenial environment in rural areas. The Ghana Water and Sewerage Corporation (GWSC) has been turned into a limited liability company, Ghana Water Company Limited (GWCL), to facilitate partnership with the private sector in urban water supply.

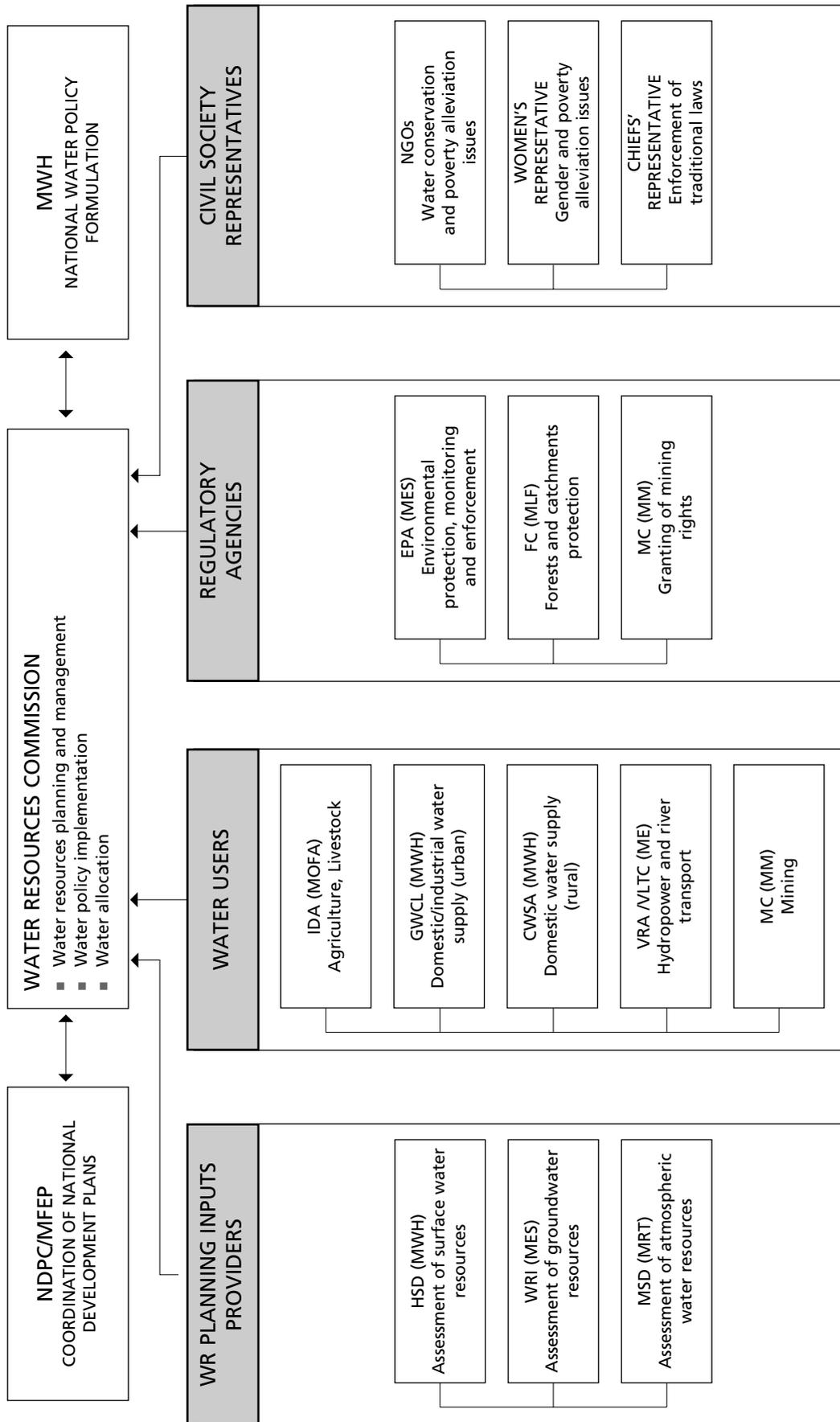
A major milestone event towards reforming water resources management was the Water Resources Management (WARM) study that was initiated in 1996 and carried out through consultative workshops with the participation of a broad spectrum of stakeholders in the public and private sectors, women's representatives, researchers, media personnel and the general public. The WARM study gives an overview of the major water resources issues. The recommendations presented in "building blocks" reports take a cross-sectoral perspective, identifying common issues and strategies that will promote an integrated approach to water resources management. The findings and recommendations of the WARM study provided the elements to set up an institutional framework for IWRM on a sustainable basis.

## **COORDINATION OF WATER RESOURCES MANAGEMENT AND POLICIES AT THE NATIONAL LEVEL**

In 1996, a significant step was taken by government to address the diffused state of functions and authority in water resources management and to put them into an integrated form. The Water Resources Commission (WRC) was established by an Act of Parliament (Act 522 of 1996), with the mandate to regulate and manage the country's water resources and coordinate government policies in relation to them. The commission is comprised of the major regulators and users in the water sector, and provides a forum for the integration and balancing of different interests. The composition of WRC is made up of technical representatives of key institutions involved in water utilization and water services delivery, i.e. Hydrological Services, Water Supply, Irrigation Development, Water Research, Environmental Protection, Forestry, and Minerals. Traditional chiefs, NGOs and women are represented in order to take care of civil society interests. The institutional representation and linkages at the strategic level are shown in Figure 2.

At the ministerial level, a Water Directorate is being created at the Ministry of Works and Housing to coordinate policies effectively and monitor donor support in the water sector

**FIGURE 2**  
**Institutional framework for IWRM in Ghana**



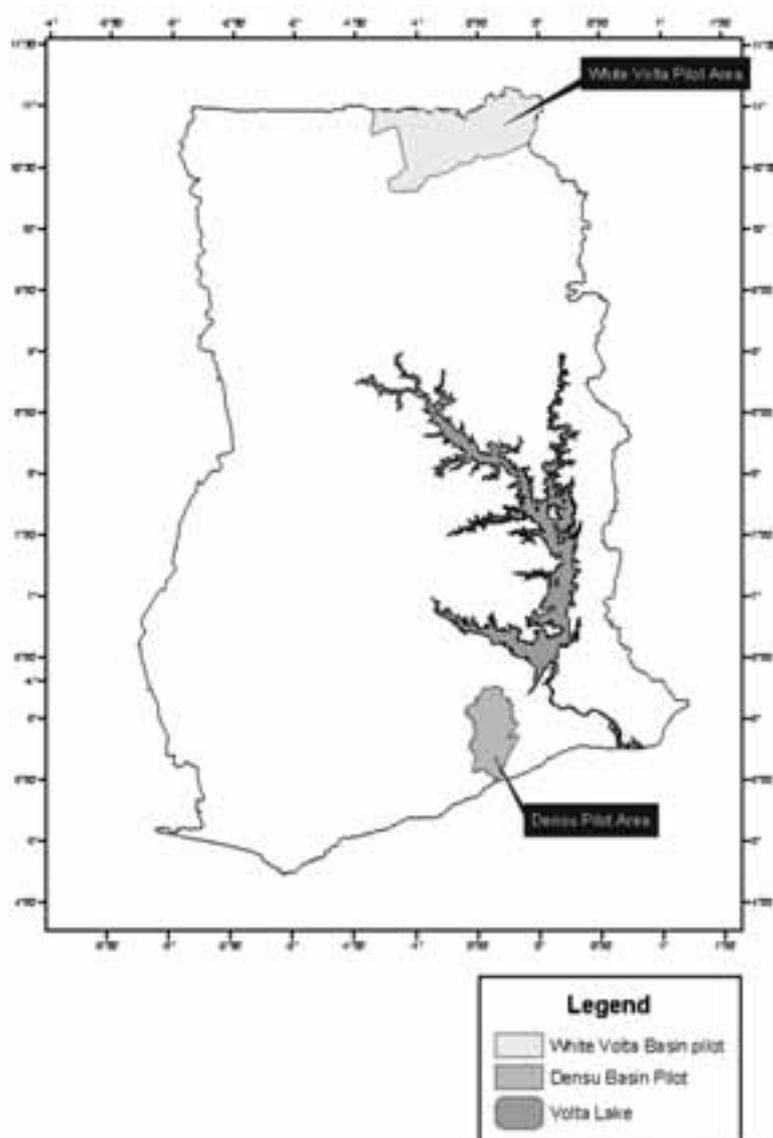
Source: Water Resources Commission, 2000.

## STRATEGIES FOR IWRM IMPLEMENTATION

### Pilot interventions

Since its establishment, WRC has developed short- and medium-term strategies for the management of water resources in Ghana. As part of these strategies, two river basins have been selected for pilot studies. These are the Densu basin in the south, which is a major source of potable water supply to parts of Accra, the national capital, and the White Volta basin in the north, which is shared with neighbouring Burkina Faso (Figure 3).

FIGURE 3  
WRC pilot basins

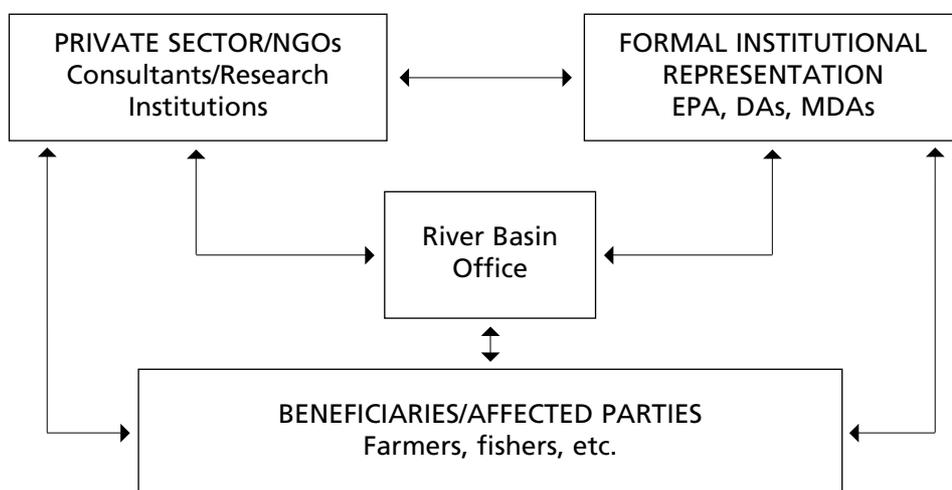


Source: K. Odame-Ababio, 2002.

The main components of the pilot interventions include institutional development and capacity building, coordination of the water sector at the river basin level, participation of stakeholders, regulation of water use, allocation of water resources, and management of international water resources.

Through the pilot interventions, WRC is exploring ways to institutionalize its functions and how most appropriately to use the decentralized local government structure, i.e. the Regional and District Assemblies. Within the districts, a number of planning-related bodies exist, which are being targeted and harnessed as units for IWRM at the river basin level. Institutional linkages at the basin level are shown in Figure 4.

**FIGURE 4**  
**Institutional framework at the river basin level**



Source: Adapted from Water Resources Commission, 1999.

A Densu Basin Office and a Basin Board have been established after a number of stakeholder consultations and workshops, and will be inaugurated soon.

The framework for the setting up of the White Volta Basin Board was formulated at a workshop held towards the end of 2002. Most of the initiatives on transboundary issues, particularly with Burkina Faso, will be pilot tested in the White Volta Basin.

### **Institution of water use charge**

The cost of managing water resources in the WRC context comprises four elements:

- activities to promote rational use and conservation of water resources;
- maintaining a hydrological database to ensure efficient service delivery;
- strengthening the institutions for IWRM;
- funding research that would be beneficial to the overall management of water resources.

A Water Management Fund (WMF) has been created to cover such expenses. The passage of the Water Use Regulation LI 1692 towards the end of 2001 gave a boost to the sustainable financing of water resources management activities.

The planned income of this fund will come from a raw water charge, a licence fee, an application fee, and penalties and fines for offences as prescribed under LI 1692. The fund has been developed through a number of stakeholder consultative meetings. For an average household, the raw water charge translates to an increase of tariff for potable water supply in the order of about 0.7 percent.

### **Allocation of water**

Water allocation is one of the main tasks of WRC. The commission is in the process of licensing all the major commercial users, such as the mining industry, irrigation schemes, Ghana Water Company Limited and the hydropower industry. The smaller users, such as community groundwater schemes established by the Community Water and Sanitation Agency and managed by the District Assemblies, would normally fall below the threshold to attract the payment of raw water charges, but would be licensed through the registration of the drilling companies. A database of water users is being created using Arcview GIS. In this way, WRC will ensure that the bulk of water abstraction in Ghana will be under licence in order to help in the assessment of the resource, and abstraction charges can be collected to contribute to the implementation and sustainability of IWRM.

### **A decision support system (DSS)**

A major output of the water allocation pilot will be the development of appropriate planning tools, including a decision support system (DSS) for efficient water allocation. The development of the DSS will involve a substantial amount of information collection and storage, hydrological and socio-economic assessments and modelling of future scenarios. A Water Resources Information Systems (WRIS) project has been initiated to improve the capacity of data generation and research institutions for the improvement of data collection networks and assessment techniques. This is being pursued with regard to equipment, processing, storage, retrieval and dissemination in order to improve the adequacy, accuracy and regularity of data.

WRC, with the help of institutions and organizations with relevant expertise, will develop the DSS, which will be tested when implementing the first basin action plan for Densu.

### **Communication strategy**

Public awareness and education campaign plans with different components according to the segments of the public to be addressed have been developed by WRC and are being implemented. A comprehensive communication strategy for the commission is also being developed.

## CONCLUSIONS

IWRM implementation is still at its formative stage in Ghana. The creation of WRC in 1996 was a significant step taken by the government to address the diffused state of functions and authority in water resources management in Ghana. WRC is learning from the experiences gained in other places in Africa, and is using pilot studies to develop appropriate tools to ensure sustainable water resources management.

The lessons from pilot studies will be replicated in other river basins in the country, taking account of the differences in industrial development, cultural traditions and natural resources of each river basin. This implies that the approach to planning, monitoring and enforcement will have to be adapted to the actual situation on the ground.

## REFERENCES

- Ministry of Works and Housing, Ghana.** 1998. *Water Resources Management (WARM) study – information building block*. Accra, Ghana.
- Odame-Ababio, K.** 2002. The changing focus in the development and management of Ghana's water resources. A communication presented at the 11<sup>th</sup> Congress of the Union of Africa Water Suppliers (UAWS) held in Libreville, Gabon in March 2002.
- Odame-Ababio, K.** 2002. Integrated water resources management, environment and equity in national water laws: Ghana's perspective. A paper presented at the Workshop on Water Governance: Legal and Institutional Aspects of Water Resources Management in West Africa. Organized in Ouagadougou 25–27 September 2002 by IUCN-West Africa Office and IUCN Center for Environmental Law.
- Opoku-Agyeman, M.** 2001. Shifting paradigms: towards the integration of customary practices into the environmental law and policy in Ghana. Paper presented by the Water Resources Commission at the Conference on Securing the Future organized by the Swedish Mining Association, 25 May–1 June 2001 in Skellefteå, Sweden.
- Water Resources Commission.** 1999. *Institutional framework for water resources management in Ghana*. Accra, Ghana.
- Water Resources Commission.** 2000. *Water resources management problems identification and prioritisation*. Accra, Ghana.

## CHAPTER 14

# WATER SECTOR REFORMS IN ZIMBABWE: THE IMPORTANCE OF POLICY AND INSTITUTIONAL COORDINATION ON IMPLEMENTATION

**H. Makurira**

University of Zimbabwe, Civil Engineering Department, Harare, Zimbabwe

**M. Mugumo**

Zimbabwe National Water Authority, Harare, Zimbabwe

### ACRONYMS

CC	Catchment Councils
COP	Catchment Outline Plans
SADC	Southern African Development Community
SCC	Sub-Catchment Councils
ZINWA	Zimbabwe National Water Authority

Over the past decade, a large number of African countries have undergone or are in the process of implementing water sector reforms. The reforms have generally been driven by international calls for more efficient and sustainable water management approaches. The need for a global water management review has gathered momentum since the United Nations Convention on Sustainable Development – the Earth Summit – held in Rio de Janeiro in 1992.

The modern focus of water management efforts has been to consider the environment as a legitimate user. In the process, efforts towards pollution control have intensified, with the “user pays” principle being adopted by many countries. Water management functions have also been decentralized to the catchment or watershed scale where stakeholders have a larger say in the management of water in their own areas. Ghana, Zimbabwe, South Africa, Zambia, Swaziland, Malawi, Uganda, Kenya and the United Republic of Tanzania are typical examples of African countries where water sector reforms are being implemented. The formation of basin commissions, as evidenced by river basin commissions in the Southern African Development Community (SADC), is also in line with a watershed approach to water management that is involving all riparian countries.

One way of promoting more efficient and sustainable utilization of water is through stakeholder involvement in water management at the catchment scale. The idea behind this approach is to enhance greater participation at the catchment level, thereby increasing the sense of ownership among users and promoting sustainable and efficient use and environmental protection.

## **WATER SECTOR REFORMS IN ZIMBABWE**

Two different processes drove the water sector reforms of 1994 in Zimbabwe (Pazvakavambwa, 2002), ahead of other sub-Saharan countries in Africa. The first factor was the general global concern pressing for a more efficient and sustainable approach to water management.

The second factor was water legislation that was perceived to be inconsistent with present trends in Zimbabwe. More water users were applying for water rights, yet the existing legislation was not sufficiently flexible to accommodate more players. This was evident in highly committed areas, where almost all available water had already been allocated and therefore new users could not be accommodated. The 1976 Water Act was intended to protect the interests of commercial farmers, but these constituted less than 1 percent of the country's population of 13 million (Manzungu, 2002).

## **WATER LEGISLATION IN ZIMBABWE**

The Water Act governs the use of water in Zimbabwe. Until the recent revision of the Water Act (1998), the prevailing act was the Water Act of 1976. In general, the Water Act of 1976 was a good piece of legislation that brought any form of water use under control and aimed at the systematic allocation of water among users. According to the act, anyone was entitled to access to water, as long as the water was for primary use (basic human sustenance). Any use of water from which the user would derive a benefit was deemed commercial use, and required a water right. All water rights were issued in Harare by the Water Court, which was based at the Administrative Court of Zimbabwe.

The following were the main weaknesses of the Water Act (1976):

- The issue of all water rights was centralized at the Water Court in Harare.
- A water right was issued in perpetuity on a first-come-first-served basis. This meant that when water resources were fully allocated, no further water rights would be issued, regardless of the need.
- In the event of water shortage, the process of reallocation was very long and complex.
- A water right would not be revised, even if the right holder was not exercising his or her water rights. The water rights could only be revised if the holder volunteered to do so.
- The process of acquiring a water right was very long. Once granted, there was no requirement to pay for the possession of the water right or to contribute towards general water service provision.
- The act was silent on water quality and factors relating to the environment.
- There was little consideration given to groundwater supplies. The Secretary of Water had to be informed if a deep borehole was drilled, but there was no control on the amounts of groundwater pumped, or the number and spacing of such boreholes.

The Water Act (1976) was amended several times, and global modern trends pushed for a review of existing approaches to water management in Zimbabwe. This led to the complete overhaul of the Water Act (1976), which was replaced with the Water Act (1998), conforming to global trends and addressing pressing national issues.

### **The Water Act (1998)**

The Water Act (1998) was signed into law after considerable consultation with stakeholders. The new act is founded on economic efficiency, environmental sustainability and equity of use. The following are its main features:

- Water rights have been replaced with water use permits. The permits are issued for a limited period and can only be renewed subject to water availability and evidence of efficient use.
- The priority principle has been done away with.
- Water can no longer be privately owned.
- Water is to be viewed from the complete hydrological perspective, i.e. groundwater and surface water are treated as part of one hydrological system.
- Stakeholder-driven institutions have been formed that will have more say on water allocation and general water management on a day-to-day basis.
- There is greater consideration of the environment, with environmental water use now recognized as a legitimate user.
- There is more control over pollution, with the “polluter pays” principle being introduced.

Water management has been decentralized to stakeholder-managed Catchment Councils (CCs) and Sub-Catchment Councils (SCCs). Under the present arrangements, a new framework for water management has been formed to:

- involve stakeholders in water management;
- replace water rights with water permits, which expire after a set period;
- create more efficient water allocation processes;
- develop catchment water use plans, with the full participation of stakeholders;
- treat the environment as a legitimate user;
- form new stakeholder-driven institutions to facilitate more efficient water management.

As a result of these developments, CCs and SCCs were formed as key institutions to manage water affairs on the ground on a day-to-day basis. The Zimbabwe National Water Authority (ZINWA) was formed with the primary role of taking over the commercial functions of the Department of Water Development.

### **Summary of institutions formed**

ZINWA was formed to provide water services on a commercial basis. All fees charged for commercial water services are retained by the water authority for the provision of water services. Services of a statutory nature, provided by ZINWA, will be funded through the Water Fund, as directed by the minister responsible for water.

CCs were established for the management of the seven demarcated catchment areas in Zimbabwe. A CC consists of representatives of lower-level catchment management institutions.

The main responsibilities of CCs are to:

- prepare a catchment management plan, in consultation with the stakeholders, for the river system;

- grant permits for water use;
- regulate and supervise water use;
- supervise the performance of SCCs;
- resolve conflicts within their areas of jurisdiction.

SCCs were formed to facilitate water management on a smaller scale. SCCs consist of representatives of the various water users within the sub-catchment. Representatives from each SCC form the CC, thereby representing their constituents at the sub-catchment scale.

The main functions of SCCs are to:

- regulate and supervise the implementation of permits, including groundwater use;
- monitor water flows and use, in accordance with allocations by the CC;
- provide representatives for the CC;
- promote catchment protection;
- monitor water discharge;
- assist in data collection and participate in catchment planning;
- collect rates and fees for all permits issued.

The Water Act (1998) has also paved the way for better institutional coordination to facilitate more efficient water management. For instance, approval from several institutions is a prerequisite before a water permit can be issued.

The theory behind the Water Act (1998) is commendable, however, when transformed to the reality on the ground, the practice is not always so successful.

### **Why have water sector reforms not performed as expected?**

While the framework for a perfect water management system exists, the situation on the ground does not reflect this common belief. The reform process has not taken off as expected owing to a combination of factors ranging from conflicting policies and weak institutional linkages, to insufficient funding. The reasons given in the following subsections help to explain why a properly developed legal framework can only function with the support of other critical pillars, such as technical and institutional support.

*Donor withdrawal:* The water sector reforms in Zimbabwe were largely donor-driven. Several donors pledged to support the reform process. This was very positive, considering that a particular donor would be supporting at most two catchments. There was therefore an opportunity for maximum interaction between the donor organizations and the beneficiary catchments.

However, by the time the CCs were to be fully launched, only one donor remained available to support two of the seven catchments, and that donor was in the process of withdrawing its support. A number of stakeholders began to lose confidence in the whole reform process, and they too began to pull out.

CCs were not yet financially self-sufficient, and this sudden withdrawal of donor support in both financial and technical areas was unexpected.

Without a good financial base, CC activities were doomed to fail, with participation restricted to voluntary work. Volunteers tended to be those who had already established themselves in water management, and therefore had interests to protect. Representation therefore continued to be skewed.

*Other national programmes:* The launching of the water reform process coincided with the land reform process in Zimbabwe. The water sector reforms were aimed at promoting equitable and sustainable utilization with more participation of stakeholders and the introduction of the user pays principle. The land reform programme aimed to redistribute land and to encourage greater utilization of the national land resource. On paper, these two policies complemented each other.

There was a great amount of movement, especially in the commercial sector, with established farmers moving away and new farmers coming in. This process happened so quickly that the water sector lost track of who was utilizing water. The problems were more complex in cases where there were more settlers on a property for which a permit had previously been issued to one user. The reallocation of such a permit to more users resulted in many conflicts. Moreover, new settlers were more interested in consolidating their claim to the new properties than in attending water management meetings. Water issues were therefore thrown aside as the land reform exercise attracted greater attention.

*Financial stability:* The water sector reforms intended to implement the user pays and polluter pays principles. In this respect, permit holders would pay a fee, which was to contribute to water services provision. The Water Fund was created through the Water Act (1998) to facilitate the collection of levies, fees, government contributions and any other support towards water service provision. This was to be deposited into a common pool from where the minister would identify areas of greatest need for the benefit of the water sector. The government would also contribute to the Water Fund, using public funds allocated from the main government budget. The Water Fund had a potential to realize substantial revenue to be used to improve the provision of water services, as directed by the minister responsible for the provision and management of water.

Inflows into the Water Fund have been minimal, with a contributing factor being the cessation of donor contributions. Unease ensued, resulting in many established farmers not paying for their permits, as they were uncertain as to their continuing occupancy on their land with respect to the new land reforms. Increased government responsibilities meant that less and less money was allocated to the Water Fund from the national budget. Similarly, new farmers were reluctant to pay for water use, as water rights had not been paid for previously. Most of the new commercial water users believed that water is a God-given resource, and therefore there is no need to pay for access to it.

The diminishing sources of contributions into the Water Fund therefore meant that there was very little money available to support water service provision and management.

*Weak institutional linkages:* The new Water Act provided a better framework for stronger institutional linkages. It is now a requirement that a number of institutions be consulted before permits for water use can be issued. However, there is little evidence to prove that this is bearing fruit. Not all institutions give priority to water issues. Some continue with their

previous approach to water management where their support cannot be fully guaranteed unless they are certain of deriving substantial and direct benefits from their participation.

***Lack of capacity within key institutions:*** Key institutions, especially ZINWA, are not adequately staffed to cope with the sudden demands for the provision of expert services. The staffing levels of ZINWA fall short of expected levels, as does the level of expertise. The result is that ZINWA cannot provide sufficient personnel to provide commercial services, nor can it provide statutory functions with funding sourced from the Water Fund. With staffing levels inadequate and depth of expertise questionable, it is uncertain if sufficient funds from the Water Fund would have made much difference to this situation.

Other key institutions, such as the Department of Natural Resources, Agricultural Research and Extension Services (AREX), the Ministry of Water and Rural Development and the Ministry of Lands and Resettlement, are also experiencing inadequate staffing levels that have a negative impact on the whole process.

***Remuneration for participants:*** CC and SCC representatives have not been paid directly for their input into water affairs. They were only compensated for travel and subsistence. When finances became scarce, the frequency of meetings was reduced, and user groups were merged to cut down on expenses. This meant that stakeholders could not meet as often as was desirable to discuss water management issues. This new approach was designed to cut down costs, however, consideration was not given to the main objective of providing more efficient water management at the catchment level.

***Lack of enforcement of legislation:*** The new Water Act has been described as technically sound with a solid base for sustainable and efficient utilization of water resources. However, some vital sections of the act have not been fully enforced, hence, its founding principles cannot be supported. The Water Fund is collecting insufficient revenue adequately to support statutory functions. ZINWA is not financially viable, as the four main accounts that were created (raw water account, clear water account, engineering services account and water levy account) are not self-sustaining, hence the new institution has to rely on the government for financial support. In the process, key and experienced staff have left the organization owing to the working environment.

Similarly, Catchment Outline Plans (COPs) have not been developed in accordance with Section 12 of the Water Act (1998). COPs are to be developed by stakeholders, and should serve as a guide on water management within their catchment areas, as well as on the interventions to take in the event of scarcity, and therefore excess demand. Water quality issues and environmental aspects are also covered in the COPs. The reasons for non-development of the COPs range from a lack of capacity for their development, financial constraints and general lack of coordination among stakeholders.

In the meantime, water permits cannot be issued in the absence of approved plans, and the objectives of the reform process cannot be fully realized.

***Different levels of appreciation of water:*** Water management representatives are from local authorities, industry, commercial farmers, communal farmers and other interested parties. While all representatives were expected to sit at the same table to discuss water affairs, it was

clear that the priority of each group was to protect its own interests. Communal farmers were the weakest and most disadvantaged sector, with the least appreciation of water for commercial use. They were not given equal access to the resource, despite management being conducted through SCCs, which were believed to involve such vulnerable user groups.

*Political interference:* Politics always plays a role in the success or failure of any process. In this case, there was a marked political influence in the pricing of water. In a bid to retain popularity, politicians aimed to keep the price of water as low as possible. Politicians frustrated the implementation of the pricing policy, which cannot afford to subsidize water service provision to maintain standards in good water service delivery. Defaulters of payments for water permits were protected against disconnection through the political influence of politicians. Political influence is also a factor in project choice and implementation where development is driven by political balance rather than economics. It has been noted by Shwatak (2002) that the government was adding to its expenditure on military interventions in other countries when there were no public funds available for reticulation and sanitation systems.

## **LESSONS LEARNED THAT COULD BENEFIT OTHER COUNTRIES**

A recommendation is made that those countries that have still to implement water sector reforms – and therefore meaningful watershed management systems – fully learn from the Zimbabwean experience. The following issues are of major interest:

- Stakeholders will have different agendas, and it will take time for them to sit down to develop a management plan openly and honestly.
- Financially powerful stakeholders will always want to dominate the process, while protecting their own interests.
- Political influence should always be kept at minimum levels.
- Management systems that are financed from stakeholder involvement are more likely to succeed than externally supported programmes.
- Implementation of reforms should not take too much time, as problems will be experienced, no matter how much time was put into preparation.
- Reforms are costly and time-consuming. Stakeholders will need to be convinced of the immediate and long-term benefits of their participation before they fully commit themselves to the process.

## **CONCLUSION AND RECOMMENDATIONS**

The water sector reforms in Zimbabwe were initiated to deal with an increasingly complex and unsustainable water management structure. Global momentum was also pressing for change in the general approaches towards watershed management, especially in sub-Saharan Africa. The Water Act (1998) in Zimbabwe provided an excellent framework for good and sustainable watershed management where all major stakeholders were given an opportunity for input. However, without sound technical, financial and political backing, any good policy or legislation will prove difficult to implement. The introduction of conflicting policies has proved to be detrimental and retrogressive, as evidenced by the land reform process, which despite possible good intentions has created greater confusion in water management circles.

Such setbacks imply that it would take much longer to realize set targets within the water sector. Population pressure and an increase in commercial activities will increase the demand for water use, hence creating a potential for more conflicts and more stakeholder interest.

## REFERENCES

- Government of Zimbabwe.** (undated). *Towards integrated water resources management*. Harare, Ministry of Rural Resources and Water Development. Government Printers.
- Government of Zimbabwe.** 1998. *Zimbabwe National Water Authority Act*. Chapter 20: 24. Harare, Government Printers.
- Government of Zimbabwe.** 1998. *Zimbabwe National Water Authority Act*. Chapter 20: 25. Harare, Government Printers.
- Manzungu, E.** 2002. *The process and dynamics of catchment management in Zimbabwe*. Harare, Save Africa Trust Publications.
- Pazvakambwa, S.** 2002. *The process and dynamics of catchment management in Zimbabwe*. Harare, Save Africa Trust Publications.
- Shwatuk, L.A.** 2002. *The process and dynamics of catchment management in Zimbabwe*. Harare, Save Africa Trust Publications.

# CHAPTER 15

## WATER EROSION AND SILTING IN THE NIGER RIVER BASIN IN THE CONTEXT OF WATERSHED MANAGEMENT

**Ousmane S. Diallo**

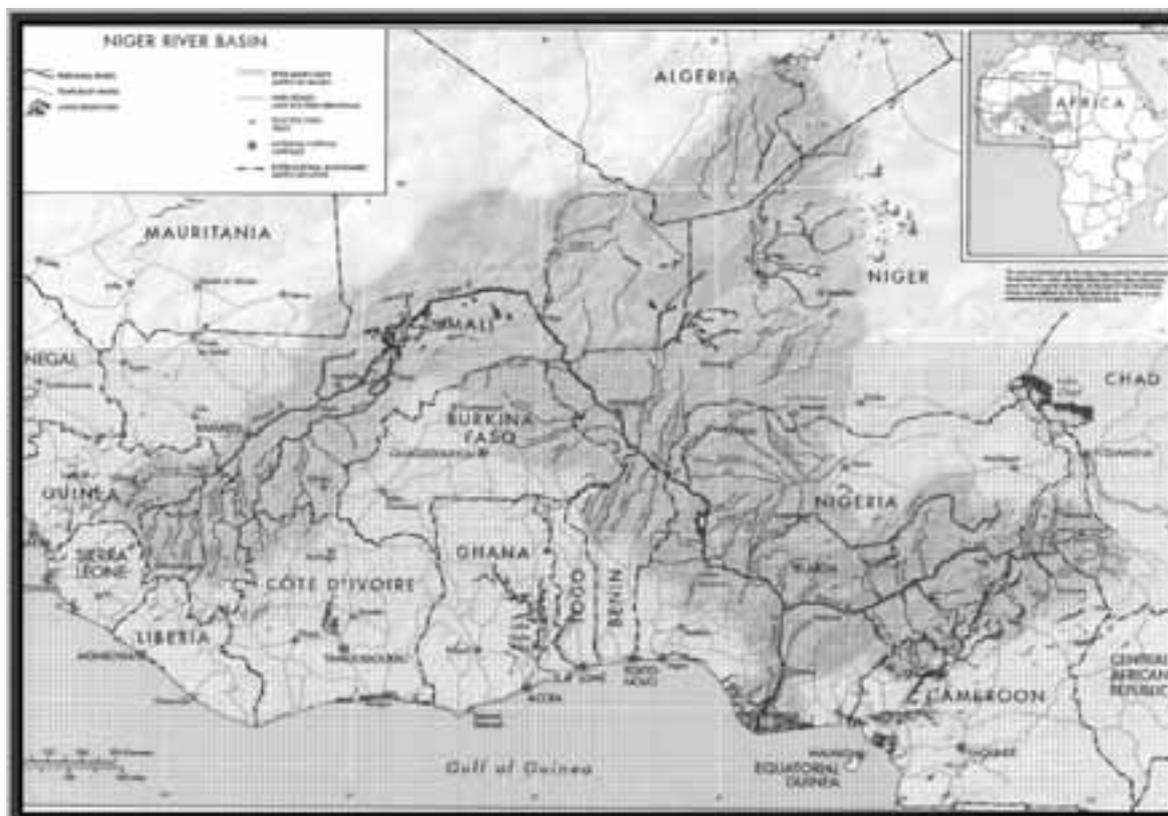
Autorité du Bassin du Niger (ABN), Niamey, Niger

Located in the heart of West Africa, the Niger River basin is an important asset for the nine ABN countries (Bénin, Burkina Faso, Cameroon, Côte d'Ivoire, Guinea, Mali, the Niger, Nigeria and Chad). Niger water is essential for ecosystems, life and socio-economic development.

The Niger is the third longer river in Africa (4 200 km<sup>2</sup>: see Figure 1). With a total surface of 2.2 million km<sup>2</sup>, its basin is the ninth largest in the world. Moreover, the Niger is an important linkage between West and Central Africa and among the nine ABN countries, some of which are among the poorest in the world.

FIGURE 1

Map of the Niger River basin



The Niger River crosses four climatic zones (humid tropical, dry tropical, semi-arid and arid zones). Ranging from 4 000 mm in the Guinea Gulf to 200 mm in the Sahel, rainfall is very variable in time and space. The basin is affected by a widespread environmental degradation process and by a deterioration of the natural resource base. Major environmental threats include: unsustainable agricultural and ranching practices; bush fires and deforestation; pollution from different sources; water and aeolian erosion of rangelands; silting of water courses; and the proliferation of aquatic plants (water hyacinth, water lettuce, etc.).

Land degradation is a major threat for land productivity and food production. This process affects the whole basin, but the Sahelian part (corresponding to the mid-watershed) is severely affected. The local fragile ecosystem is exposed to intense desertification, soil erosion and silting of water courses. Climate aridification and sediment decrease, which are associated with an increasing demand for agricultural land, have significantly contributed to the destruction of vegetation cover. Stream flow and ecosystems are seriously threatened, as well as socio-economic activities.

The combatting of hydrological erosion and silting is a major political, economic, social and environmental issue and major justification for this programme. The initiative is expected to develop in two phases: the five-year first phase focuses on the mid-Niger watershed, corresponding to the northern Niger, stretch, and the right bank upstream from Nyamey (Burkina Faso, Mali, the Niger).

This paper presents the programme, and in particular its approach, and political and institutional arrangements for integrated management of the Niger River basin.

The general long-term objectives of the programme are to protect the natural resources of the basin and to conserve its hydrological potential in order to foster development, decrease food insecurity and poverty and preserve local ecosystems. Specific objectives for phase 1 are as follows:

1. to strengthen the institutional capacity at the subregional and national levels in collaborative management of basin shared resources;
2. to alleviate the effects of desertification and to slow down the silting process;
3. to assist national governments in developing programmes against hydraulic erosion and in raising funds;
4. to promote participation and involvement of affected local populations and communities.

The programme was conceived as a response to the urgent need for scale actions against silting.

Natural resource degradation in the basin is largely caused by human factors; the programme adopts a participatory, gender sensitive approach, aimed at strengthening local stakeholders' responsibility and at involving them in rehabilitation actions.

The programme includes a regional component working at the basin level and three national components working with each of the concerned countries.

The regional component aims at strengthening ABN at the regional and national levels. It includes two sub-components: development of an operational framework for combatting

siltation; and institutional strengthening of ABN and ABN member state watershed management agencies. This component is expected to consolidate capacity in designing, coordinating, implementing, monitoring and evaluating watershed management activities. It also includes the development and implementation of a capacity building programme, targeting ABN member state officers; the creation of a research and development network; the systematization and diffusion of results achieved; and the operation of a programme management and coordination unit.

Programme national components focus on priority actions in environmental protection and combatting siltation in Burkina Faso, Mali and the Niger. These national components are of special interest because they are geographically closer to the intervention sites and play a significant role in developing inter-governmental collaboration. They were designed as investment projects. The three national components share common development objectives, but each of them enjoys a significant degree of autonomy. Their activities are based on the participatory approach and aim at raising the awareness and commitment of local stakeholders in different stages of the implementation process. Each national component includes actions aimed at:

- supporting the implementation of the programme's action plans for hydraulic erosion control, combatting siltation and reclaiming agroforestry and rangeland;
- strengthening local populations' and stakeholders' technical, organizational and financial capacity to ensure ownership and sustainability of watershed management works;
- implementing a monitoring and evaluation system at different levels and a "light" and autonomous coordination body.

The programme is expected to have multiple impacts, including dune stabilization in 3 000 to 5 000 ha, management/protection works on rangeland and catchments, agroforestry rehabilitation of 13 500 ha of degraded land, enhancement of watershed management capacity among local institutions and people, and institutional strengthening of ABN.

Other expected results include: development of a toolkit for identification, planning, coordination and monitoring and evaluation; creation of a management plan for hydraulic erosion protection and combat against siltation; improvement of agroforestry and range management systems; sustainable use of natural resources; rehabilitation of stream flow and ecosystems; enhancement of food security and livelihoods of local people; income generation and diversification; rural employment; and women's empowerment (through vegetable production in irrigated gardens, other income-generating activities and literacy).

The implementation strategy is based on the following:

- twofold intervention in policy implementation (inter-regional component) and field programmes (national components);
- awareness raising on soil degradation and siltation risks and processes, in society at large;
- participatory approach and local capacity building;
- collaborative research and collaborative management;
- development of subregional and national expertise.

The programme is being implemented in coordination with a GEF project on rehabilitation of the Niger River basin. Important synergies exist between the two initiatives.

A regional committee and national committees in each country supervise the programme. Implementation of field action is being entrusted to local collaborative management bodies. The programme is in the process of developing a monitoring and evaluation system focusing on both performance and outcomes. This will provide information useful for project management and reporting to donors. The project also aims at developing human capital, through learning activities, facilitated by experienced trainers. Human capital development will be extended to focus in particular on local men and women with the aim of incorporating gender issues in watershed management.