

Governing Water Wisely

The institutional framework for water management should include the policy-making bodies that establish the rules or legislation on the development and use of water resources and the legislative bodies and agencies with regulatory and political functions and responsibilities. These bodies should strive to reconcile the various interests of water users at any given time and to ensure that policies and programmes on water resources are properly implemented. In general, the framework should include:

- (a) Specific rules and laws governing the assessment, development and use of water resources;
- (b) The bodies responsible for policies and decisions on the exploitation and use of water resources; and
- (c) The communication and information links between decision-making agencies, groups directly affected by water management programmes and the general public, at various levels.

The institutional structure for water management in any country is shaped not only by political and administrative bodies but also by the historical role of water in national development and the perceived desires, needs and value of water. Institutional involvement in water management takes various forms and is often dictated by the prevailing types and levels of water management problems such as irrigation management, drainage control or pollution control problems. The diversity also reflects the historical, political, economic, social, administrative, geographical, physiographical and climatic conditions of the territory concerned.

The increasing demands for and on water caused by population growth and the obvious reduction in water availability in time and space due to both natural and man-made causes such as pollution, call for regulatory actions considered the basis

for water management. According to Gonzalez Villarreal F.J (1980), such actions could include:

- (a) Regulation at the water system by taking measures aimed at increasing available supplies;
- (b) Regulation at the boundaries between the water system and user system, covering the phases of planning, construction and operation of the water infrastructure necessary to ensure adequate natural supply to meet the demand of the whole user system; assessing the impact of water consumption and groundwater use on the water system and minimizing such impact through erosion and pollution controls;
- (c) Regulation at the physical boundaries between inter-related users, especially in water stress regions. This could be by subjecting such users to a prioritization scheme in the form of differential pricing and allocation for different uses. It could also involve conflict resolution. Such a regulation is normally better effected if the physical water basin is taken as the basis for water management; and
- (d) Regulation of international costs and boundaries water activities to ensure adequate quantity and quality of water supply for various transboundary uses through international agreements on water allocation and pollution control.

The most recommended forms of water regulation include utilization concessions, waste discharge permits and tariffs. These must be established prior to water use. In fixing tariffs, the aim must not only be to recover capital and operating costs but also to promote efficient and beneficial use of water. The principle of compelling a polluter to bear the cost of de-pollution should be the economic basis for pollution control.

Institutional Capabilities for Integrated Water Resources Management (IWRM)

From an administrative point of view, the institutional (legislative, organizational and decision-

making) framework for water resources management must, according to Andah (2002a), strive to include:

- (a) Preparing an inventory, both quantitative and qualitative, of surface and groundwater supplies;
- (b) Policy-making on water;
- (c) Administration of water rights;
- (d) Planning of water use;
- (e) Launching projects for the improvement, use and conservation of water;
- (f) Operation, maintenance and supervision of water works;
- (g) Settling conflicts and disputes;
- (h) Coordination of water resources activities; and
- (i) Water resources research and technology transfer.

National and institutional capacities are needed for an integrated water resources management. This should include the capacity to produce knowledge and information bases through research and development in order to ensure timely availability of the skills and competences needed for:

- (a) Continuous collection of data on the relationship between the hydrological cycle and the environmental dynamics while maintaining a modern data base management system for archiving, control and retrieval of the data;
- (b) Assessment of water resources for the design and sustainable management of water resources projects in a way that is friendly with natural ecosystems;
- (c) Monitoring freshwater availability, desertification processes, environmental change and degradation, and hydrological disasters such as floods and droughts, taking into consideration predictions on climate change;
- (d) Development and dissemination of knowledge bases commensurate with the growing demands on water and the advances in sci-

- ence and technology;
- (e) Development of new technologies and adapting them to local conditions;
- (f) Creation of modern information communication systems for use at all levels of decision making, and further increasing public role in water management.

Proper assessment of the water resources of nations, regions or basins, in time and space, is of crucial importance to rational and sustainable development of global water resources. It allows for proper use and control of water resources right from the sources, providing knowledge about the quantity, extent, supply reliability and quality of the water. Through proper assessment and collection of reliable and adequate data and information on water resources status and trends, sound decisions can be made on how best to develop and manage these resources.

With the above facts in mind, the framework for water resources assessment includes the following:

- (a) **Resource supply assessment** to evaluate the quantity and quality of surface and ground water physically available;
- (b) **Demand assessment** to determine water requirements for different uses and development alternatives, often in conflict with natural ecosystems;
- (c) **Environmental impact assessment** to evaluate the impact of water resources development projects on natural and physical ecosystems;
- (d) **Social impact assessment** to examine how social and institutional structures affect water use and management; and
- (e) **Risk or vulnerability assessment** with regard to floods and droughts to provide information on the frequency and magnitude of their occurrence, ways of mitigating them and subsequently incorporating them into the general water resources management system.

Enabling Institutional Environment

The importance of an institutional framework for rational and effective water resources development and management has been growing in the last few decades following deeper perceptions about the physical and socio-economic variables controlling this vital resource and the complex interactions between these variables. As already mentioned good water management depends on good water quantification. It also depends on good water resources planning which likewise depends on assessment, in our case, of the hydrological and water cycles. From the hydrological point of view, water resources institutions can be grouped into two: those engaged in physical quantification of the components of the hydrological cycle e.g. the meteorological and hydrological services, and those managing the user systems, such as irrigation, water supply and hydropower development.

The nature of the water resources institutions in a country is influenced by many factors, including climate and the level of water resources development. As can be seen, countries with semi-arid and arid climatic water flows, such as Egypt and the Sudan, have central irrigation bodies such as ministries or authorities for the development of their water resources, whereas in the tropical humid regions that do not have oil resources, the main body is an authority for hydropower development. However, in any given country, many are the institutions and agencies responsible for water legislation and management. The result is conflicts of jurisdiction and inter-institutional rivalries which are detrimental to the rational development and management of water resources. A water authority may exist at the national, regional, or local level or function at the political, executive, technical, or legal level. This makes it indispensable to legally specify the functions of and relationships between the various authorities responsible for water.

Legal Bases for Preparing Water Legislation

Any water use that is not properly planned and managed on the bases of water law and administrative procedures may cause problems not only for the water body itself, but also for other natural resources and the environment. There is an increase in the complexity of the problems associated with water use and development, including the social conflicts caused by a growing imbalance between fixed or diminishing water supply and an ever-increasing water demand. This, combined with the impact of water-utilizing technologies on the resource itself, call for an adequate response from lawmakers. In this connection, while the developed countries have concerned themselves more with modernizing legislation, the developing countries are mainly at the stage of establishing the necessary legal framework for proper administration of water resources.

Two main considerations are necessary for the legal administration of water resources. Firstly, all water distribution and use must reconcile quantitative and qualitative requirements with acquired rights and long-established practices. Secondly, the legal arrangements must take into account existing and future water variations, excesses and shortages, in order to avoid conflicts and disasters.

Box: 15.1

Existing Legal Acts on water resources management in the Republic of the Congo

1. Law n° 05/07 of 5 July 1967 establishing the Société Nationale de Distribution d'Eau.
2. Law n° 23/82 of 7 July 1982 on Mining Code.
3. Law n° 52/83 of 21 April 1983 on State and Land Code.
4. Law n° 003/91 of April 23 1991 on the protection of the environment.
5. Law n° 021/88 of 17 September 1988 on town planning.
6. Law n° 014/92 of 29 April 1992 instituting the National Sanitary Development Plan (PNDS).
7. Law n° 16-2000 of 20 November 2000 on the forest Code.
Law n° 13-2003 of 10 April 2003, a comprehensive new water law establishing a Consultative Council on Water

Source: National AWDR Report, 2003

According to Caponera D (1988), the legal framework must include:

- (a) Ownership of or other legal authority for water resources, covering surface water, groundwater and all other water resources;
- (b) Distinguishing between private and public ownerships. The latter can also be subdivided into national, regional or local as and when applicable;
- (c) Granting rights for the use of water through authorizations, permits, licenses, or concessions subject to some regulations that vary from country to country;
- (d) Modern water rights flexible enough to introduce functional criteria for the use of water by giving the water authority concerned sufficiently wide discretionary powers;
- (e) Ordering of water use on a priority basis and including this in the legal framework for municipal, agricultural, industrial, hydropower, aquaculture, navigational and recreational uses, especially in water stress areas;
- (f) Making the legal ordering flexible enough to allow for alterations and modifications in response to national economic, social, and

environmental changes;

- (g) Grouping beneficial uses of water under a unified code as against the present practice of specifying them under their respective water uses;
- (h) Incorporating in a basic water code or a coordinated list of provisions, the adverse effects of both natural and man-induced water, such as flood damage, submergence of riverbanks, soil erosion and siltation and salinization, as an integral part of the general water management.
- (i) Formulating legal provisions on water quality and pollution control possibly as part of a central water code to cater for water wastage and wrongful use, water recycling and reuse, sanitation and protection against pollution and the environment in general;
- (j) Making groundwater resources an indivisible component of the water cycle through special provisions and legislation covering drilling of boreholes and aquifer risk to depreciation and pollution;
- (k) Including protection of waterworks and hydraulic installations in legislation on operation, maintenance and general protection of the water system;
- (l) Making special legislation for protected regions or zones such as drainage basin boundaries and smaller zones such as land development units, flood protection or drought emergency zones, national parks and reserves and areas of pollution;
- (m) Modernizing water legislation to provide for enforcement procedures to protect water rights. Such procedures could even include the use of sanctions and other legal measures in case of infringement of the water code.

Box 15.2

The National Water Act of South Africa

The most important of these acts, from an environment and water point of view, includes Section 2(g): *protecting aquatic and associated ecosystems and their biological diversity*; and Section 2 (h): *reducing and preventing pollution and degradation of water resources*.

It also includes recognizing the need for an integrated management of all aspects of water resources and, where appropriate, delegating management functions to a regional or catchment level *so as to enable everyone to participate*.

Perhaps the most important provision in the National Water Act is that for the "Reserve", defined as: *"the quantity and quality of water required (a) to satisfy basic human needs ... and (b) to protect aquatic ecosystems in order to secure ecologically sustainable development and use of the relevant water resource"*.

A water use licence may not be granted unless there is sufficient water for the reserve.

The nature of water resources institutions in a country is influenced by many factors, including climate and the level of water resources development

Organizational Structure

The institutional structure for water management in a country is shaped by the country's political and administrative organization, the historical role of water in national development and the perceived desires and needs for or value of water. In addition to such factors as climate and level of water resources development mentioned earlier on, historical and cultural link with water (as in semi-arid and arid regions) also influences, markedly, the structure and evolution of water institutions. The organizational structure of these institutions is expected to be more decentralized in a federal or region-conscious State, but not in a unitary state with differing levels of coordination. The prevailing water policy also plays a major role in shaping these institutions.

The activities of many decentralized institutional water management structures are linked to water-basin finance agencies and coordinated at the national and regional levels by public and private technical and research bodies as well as representatives of bodies with water-related economic interests as in the case of the Volta River Authority of Ghana. Institutional structures can also be based on territorial divisions defined by the main water basins with some form of integrated water resources administration.

Centralized institutional structures are normally found (with separate terms of reference) within State ministries, such as the Ministry of Public Works (Ghana) and the Ministry of Irrigation (Egypt and the Sudan). Other countries place their administrative structure for water management in accordance with the degree of importance attached to water problems in ministries, in which case they can be in the Ministry of Internal Affairs, the Ministry of Health or the Ministry of Environment and Agriculture. In some countries, a centralized administrative function is exercised through a national water resources authority or commission, composed of representatives of all sector interests. This has been practised in Ethiopia and is presently being

Box 15.3

Organization of the Ministry of Water Resources and Energy of Mauritania

This Ministry is fully responsible for:

- (a) Defining national policies on water;
- (b) Water prospecting and extraction, notably through:
 - (i) Geophysical and hydro-geological studies;
 - (ii) Village and pastoral water projects such as wells, boreholes and other sources;
 - (iii) Urban water projects involving water production, adduction, distribution of drinking water and setting up of purification stations and networks;
- © Conservation of water resources by establishing schedules and rules for water resources exploitation and by drafting legislations and legal texts while monitoring the application of the water laws and regulations in force.

The Water Department is responsible for research, identification and management of water resources, mainly by:

- (b) Undertaking hydro-geological and hydro-geophysical studies;
- (c) Examining the establishment of hydro-geological networks and their operations;
- (d) Establishing schedules for exploiting water resources;
- (e) Promoting village and pastoral water projects such as wells, boreholes and other water sources and seeing to their maintenance;
- (f) Undertaking surveys necessary for the production, transportation and distribution of drinking water and for water purification in farming and urban centres.

practised in Ghana and the Niger. Another form of a centralized water administration is through the formation of an actual Ministry for Water Resources as in Kenya, Ethiopia and Nigeria. Some existing types of water resources institutions are shown in table 15.1.

In practice, the institutional structures for water resources management are generally a mix of centralization and decentralization. The distribution of authority either from the centre or amongst the sub-national structures varies from country to country, depending on the individual circumstances of these countries. It is important to note that limiting government authority on centralized water resources management and planning

Box 15.4:**Advantages and Disadvantages of a Centralized Institutional Framework**

Centralization of water administration has advantages as well as disadvantages which also depend on the degree of flexibility and involvement of water resources activities. In listing its advantages and disadvantages, Andah (2002c), maintains that centralization:

- (a) Unites sectoral interests and multi-level decision-making in a legal and institutional framework consistent with national aims and objectives;
- (b) Enhances allocation of human and financial resources for the evaluation and control of water programmes and policies;
- (c) Provides a national framework for the estimation of supply and demand and programmes for overcoming future imbalances;
- (d) Facilitates the adoption of standards and procedures for water activities, including types, installation and maintenance of equipment and common bases for comparison of different project feasibility studies;
- (e) Harmonizes inter-regional and international problems with national interests;
- (f) Evolves models common to different regions towards better use of technical capacity and expertise;
- (g) Establishes a hierarchical order of projects in accordance with national priorities;
- (h) Develops training and research programmes within a national policy of capacity building and enhancement, taking into consideration the scientific and technological requirements;
- (i) Avoids duplication of work of regional and sectoral agencies through the establishment of information systems and analytical tools for common use;
- (j) Provides a central framework for minimizing local pressures in resource allocation and hence guarantees a more equitable and efficient use of the resources;

But that centralization, if excessive and without regional and sectoral feed-back can, on the other hand, result in:

- (a) Standard policies that are too restrictive and hence inappropriate for tackling particular regional and local problems;
- (b) Limited participation of users in project formulation, decision-making and the financing of measures;
- (c) Loose contact with users, local exigencies leading to decisions based on incomplete information, and ineffective execution and operation of projects;
- (d) A large, central bureaucracy which can result in slow decision making and inefficiency in programme execution;
- (e) Formulation and execution of multi-sectoral regional plans which can be hampered by central authority obstacles;
- (j) Restriction of regional negotiating capacity in the absence of proper reconciliation of national interests with prospects for regional development.

structures can lead to a more expeditious re-allocation of existing resources among uses and/or users as conditions change and facilitate the execution of water development projects as it will reduce state, regional or local claims of authority over the resources. On the other hand, preparing plans at the central level without proper consultation with and participation of the regions and users could result in failure to fully take into account the specific needs and aspirations of the latter. Furthermore, centralized structures could, like decentralized ones, suffer from the organizational diffusion that results from scattering centrally held governmental authority for water management and planning among a number of

ministries, departments, or agencies, without institutional coordination.

All countries have some sort of central authority, permanent or ad hoc, that implicitly or explicitly coordinates water resources activities. Such institutional frameworks function in different ways in different environments, such as:

- (a) Playing a critical role in identifying the socio-economic determinants of water development policy and objectives;
- (b) Acting as an advisory body with a limited power to harmonise and coordinate actions; and

Table 15.1: Types of Water Resources Institutions in Some African Countries

TYPE	CHARACTERISTICS	COUNTRIES
Loose or Uncoordinated Institutions	Policies fragmented in various ministries with water interests	Ghana Sierra Leone Niger Cameroon Tunisia Botswana
Water Commission / Board	Overall policy-making and coordination with agencies, public corporations and departments of ministries being subordinated or affiliated	Ghana Niger Sudan Congo Republic Nigeria Zimbabwe
Ministry with mixed authority (Ministry of Water Resources, Forestry and Fisheries) Ministry of Mines, Water and Energy	Partial or overall policy-making or coordinating body for water	Gambia Uganda Zambia Malawi Cameroon South Africa Guinea Liberia Burkina Faso Benin Ghana Mali Niger Senegal Sierra Leone Togo Togo
Ministry of Water Resources	Solely responsible for planning and coordination of water resources activities	Sudan Egypt Burkina Faso Ethiopia Kenya Nigeria Algeria
River Basin Authorities	Responsible for coordinating development projects within basins	Nigeria Ghana Algeria Ethiopia Zimbabwe

- (c) Performing a major executive and administrative role, such as following up the execution of water plans.

It has been noted that State intervention in water management increases as the need for proper coordination of planning, development and control of water administration grows. Such an in-

tervention becomes more effective if water users and beneficiaries are involved in the administration of water and are interested in paying for its development.

Since Rio (1992), many African countries have

Box 15.5**The National Council for Water Resources (NCWR) – Nigeria**

The NCWR is the highest policy organ on water resources in Nigeria. It is chaired by the Federal Minister of Water Resources and Rural Development and has as members State government Commissioners responsible for water resources development and the Chairpersons of DFRRRI and the Federal Capital Territory (FCT) Water Resources Agency. The Council was established in 1980 as a technical arm of the National Technical Committee on Water Resources (NTCWR), which meets biannually.

Other members include: Federal General Managers of RBDAs, NWRI, NEPA and State Water Boards/Corporations; Federal Department Directors of Inland Waterways and Meteorology; ADP Management Unit/Project Manager; representatives of universities, the National Society of Engineers and the consulting industry. The NTCWR meets to take decisions, to advise the NCWR, to deliberate on strategies or to adopt and implement the decisions of NCWR.

The six sub-committees established for detailed implementation of the NTCWR decisions comprise water experts brought together to discuss and exchange ideas on pressing problems of water resources development promotion. They often set up working groups to carry out field studies and submit recommendations. They are:

- (a) The Sub-Committee on Hydrology and Hydrogeology;
- (b) The Sub-Committee on Irrigation and Drainage;
- (c) The Sub-Committee on Manpower;
- (d) The Sub-Committee on Dams; and
- (e) The Sub-Committee on Erosion and Flood Control.

The policy issues originate from proposals made by the various specialized agencies responsible for water resources development. These proposals are then considered by the relevant Sub-Committees of the NTCWR and subsequently sent to the NTCWR for critical and technical analyses after which they are passed on to the NCWR for consideration and adoption. The adopted policies are sent to the Federal Ministry of Water Resources where they are packaged as a memorandum to the Federal Executive Council which discusses them for inclusion as a national policy.

been working, through ministries, to establish national coordinating institutions in the form of water commissions or directorates, as in Ghana, Cameroon, the Republic of the Congo, South Africa, Mauritius, Egypt, the Sudan and, to some extent, Ethiopia.

Decision-making structure

Given the diversity of water resources use, it is almost impracticable for decisions on water management to be made by a single body. Decisions on water supply and development affect various interests and cover sectoral, organizational and regional issues. The sectoral interests involve water supply for domestic use, irrigation, hydropower generation, transport and recreation while the organizational interests concern the bureaucratic bodies dealing with water use and development. An example of a structure based on sectoral interests is shown in figure 15.1 for

Mauritius. Both types of interests even exist side by side in some cases. Regional interests are usually manifested through identifiable physical entities or political divisions. Decisions that favour specific interests over others can lead to imbalances and conflicts. Hence the need for water management decisions to be made through the interaction of several bodies and interest groups which should work collectively to balance the benefits and disadvantages to each and every party. Experience has shown that establishing a national or regional authority does not necessarily unify the process since, as already mentioned, no one body can alone cater for all facets of water management. Rather, decision-making on water is easier under a multi-purpose planning of water development based on coordination.

Since institutional structures generally vary from country to country and sometimes even within the same country, the following criteria should

Box 15.6**Advisory and Consultative Institutions in Cameroon**

Cameroon has two inter-ministerial committees responsible for coordinating various aspects of water and sanitation in the country. These are:

1. *The National Water Committee (NWC)*

This committee was set up in 1985 as a State consultative body to define and establish a water policy for Cameroon. The 1998 law on water and the subsequent decrees of May 2001 specify the following roles for the Committee:

- (a) To study and recommend to the State all necessary measures for the conservation, protection and sustainable use of water;
- (b) To advise the State on matters relating to water;
- (c) To make proposals to the State on water management in Cameroon. The Minister of Mines, Water and Energy chairs the Committee and the Director of Water is its secretary.

All the ministries involved in water management are statutory members of the committee. Other members are: the president of the Chamber of Agriculture, a representative of the Association of Mayors, representatives of public utility companies (one for water and one for energy). Since its establishment in 1985, the committee has met very infrequently and has failed to live up to the role defined for it in its constitutive decree. It is hoped that the recently signed decrees to reactivate the water law will give a new impetus to this organ to play its role effectively.

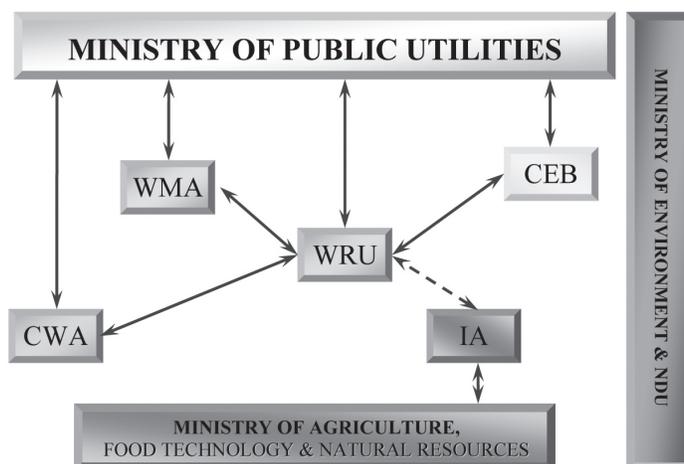
2. *National Committee on the Environment (NCE)*

This Committee is responsible for coordinating environmental policies with the Ministry of Environment and Forests which plays the leading role. The committee is expected to assist the Government in formulating, coordinating, implementing and monitoring environmental policies. The decree establishing this Committee has just been signed, six years after the enactment of the law on the environment. Like its sister inter-ministerial committee, this organ exists only on paper and has not fulfilled its role.

be considered in designing institutional structures for water planning and administration:

- (a) Ability to apply a broad range of alternatives in solving problems;
- (b) Ability to combine efficiency and fairness in water administration, consistent with the national policy;
- (c) Embodiment and provision of continuity by adapting plans to changing local, regional and national priorities;
- (d) Involvement of all stakeholders concerned with specific development and management plans; and
- (e) Ability to continue the learning process through project and post-project analysis in order to improve effectiveness.

Figure 15.1: Institutional Setting for Water Resources in Mauritius



Note: Water Resources Unit (WRU), the Central Water Authority (CWA) Wastewater Management Authority (WMA), Irrigation Authority (IA). **Source:** AWDR National Report, 2005

The institutional structures must ensure compliance with construction and operational plans and be able to link planning to resource allocation. It must see to it that the implementation stage includes arrangements for adequate supply of good quality water as well as the services

needed by other structures to continue to operate and to undertake repairs and maintenance. The structures must be dynamic to enable them to adjust to national and regional changes.

These multifaceted actions and responsibilities justify, once again, the need for a coordinating mechanism, rather than a single body, to unite efforts, ensure consistency of decisions and employ an integrated or balanced approach to problems and activities in pursuing a nation's water policy.

Box 15.7

Fragmentation of Water Competence among Ministries - Cameroon

Cameroon serves as a good example of how responsibility for water management is distributed among various authorities. It has 12 ministries that can be placed under this category, as follows:

1. Ministry of Mines, Water and Energy (MINMEE): This ministry is responsible for the definition and application of water policies in Cameroon and is the country's main water coordinating institution.
2. Ministry of Town Planning and Housing (MINUH): This ministry is responsible for planning of water and sanitation networks in urban areas with a population of less than 100,000 persons, and controls the construction of urban water supply projects in such towns.
3. Ministry of Towns (MINVILLE): This ministry plays the role of MINUH in towns with a population exceeding 100 000 inhabitants. It defines water supply and sanitation policy in such towns and is the ministry in charge of the Cameroon Housing Cooperation (SIC), which manages secondary water supply and sanitation programmes in its housing estates.
4. Ministry of Agriculture (MINAGRIC): It acts through the Directorate of Agricultural Engineering (Génie Rural) and community development especially for irrigation, and provision of water supplies and adequate sanitation in rural areas.
5. Ministry of Livestock, Fisheries and Animal Industries (MINEPIA): This ministry is concerned with water management in fisheries, and water supply for livestock.
6. Ministry of Environment and Forests (MINEF): This is the executing, planning and control institution as concerns management of the environment (air, water and soil). The functions of this ministry relating to water, a key element of the environment, therefore overlap with that of MINMEE. Among other functions, MINEF is responsible for the preparation of the National Environmental Action Plan and proposes measures for the rational and sustainable management of natural resources and protection of the environment.
7. Ministry of Public Investment and Territorial Development (MINPAT): This ministry controls and approves public investment in water and sanitation programmes in Cameroon.
8. Ministry of Public Health (MINSANTE): is responsible for drawing up government policies on hygiene and sanitation in urban and rural areas, ensures environmental cleanliness and is responsible for identifying and resolving all major sanitary problems in the country.
9. Ministry of Commercial and Industrial Development (MINDIC), controls the mineral water sector in Cameroon. This includes authorization to bottle water, quality control and collection of taxes. This ministry fixes the price of domestic water in cooperation with other ministries.
10. Ministry of Territorial Administration and Decentralization (MINAT): This ministry manages municipalities, which ensure cleanliness in their areas of jurisdiction, the collection and treatment of wastes, and the maintenance of drainage networks. MINAT also has a Directorate of Civil Protection responsible for managing all disasters in the country including those relating to water e.g. floods, droughts and epidemics.
11. Ministry of Economy and Finance (MINEFI): This ministry acts through the directorate of treasury in the financing of projects with funds from the Public Investment Budget (BIP).
12. Ministry of Transport (MINTRANS): This ministry is involved in water management since the meteorological service is under its jurisdiction.

This recalls the role of national water commissions, boards or authorities, in other words, the Consultative Council on Water in the case of the Congo (Table 15.1).

Towards an Effective Institutional Framework for Water Management

Given the complexity and multi-disciplinary nature of water resources management and planning worsened by the problems of pollution and environmental degradation a centralized institutional structure is required for an effective and integrated management of water and land resources. What is important about centralization is the fact that it helps this type of management as it facilitates coordination or execution of projects.

Water resources planning and administration is part of national economic planning and activities and should include national water management institutions whose responsibilities must include:

- (a) Unifying perceptions about national water concerns and interests to allow for adjustments in the legal and institutional framework;
- (b) Establishing a national framework for water management, including evaluation and control that can allow regional and national programmes to be carried out bearing in mind national socio-economic and environmental objectives;
- (c) Changing rules and procedures for programming water management activities;
- (d) Provision of estimates on water supply and demand and forecasting needs and problems;
- (e) Creation of conditions for efficient and effective water resources management at all levels, especially the lowest levels;
- (f) Setting up of administrative and coordinating mechanisms to deal with inter-regional and international water management problems;
- (g) Coordination and promotion of national information, research, and training programmes for information and technology transfer; and
- (h) Participation, when necessary, in the execution of regional and/or river basin projects or programmes.

Table 15.2: Organisational Structure of Water Institutions in Ethiopia

Institution	Competence
Ministry of Water Resources (MOWR)	Established as the highest water organ in 1995, this ministry has the power and duty to optimise the allocation and use of trans-regional water. It drafts laws for its protection and use; issues permits to construct, operate and regulate waterworks; conducts water tariff studies and collects bulk charges; undertakes studies for the use of transboundary waters and monitors their implementation; prepares plans for the proper use of water resources and for monitoring implementation; provides necessary assistance in water resources development; signs international agreements in relation to transboundary rivers; prepares water quality standards for various purposes; and undertakes supervision to ensure that meteorological services are adequate.
River Basin Authorities	River Basin Authorities are to be established in due time and will take over all the duties of planning and management of water resources within the various river basins. For the Awash River Basin, which is the most developed, an agency called "Awash Basin Water Resources Administration Agency" was established in 1998 to coordinate, administer, allocate and regulate the use of the surface water resources of the Awash River Basin.
Regional Water Bureaus	With the new Federal Government system, water supply activities and small-scale irrigation have been decentralized and handed over to regional states. The regional states have their "Regional Water Bureaus", which are responsible for all their individual water activities

Extracted from AWDR National Report, 2005

For countries with decentralized institutional frameworks as referred to in table 15.2, recent experience shows that water management tends to be most efficient if regional agencies operate within the limits of water basins and are made responsible for regional water planning and for the administration of both water resources and water services. There are three broad categories of administrative agencies in water basins and the classification is based on their terms of reference and functions, as follows:

- (a) Those with only planning and coordination authority;
- (b) Those with coordination and finance responsibilities; and
- (c) Those with powers to draw up development plans execute them and operate the systems within the basin.

River basin management in Africa seems to be based on specific sectoral focuses, as in the case of the Volta River Authority in Ghana, dominated by hydropower generation, and the Awash Basin Authority in Ethiopia, with predominance of irrigation (Andah, 2002c). It is important to

emphasize that in Africa, the presence and powers of purely regional water agencies, if they exist, are very limited as water resources are often under national control and use. However, there are a wide variety of functions for regional institutions which makes it necessary to consider the following recommendations:

1. The national water institution should have the necessary authority to guide, integrate and coordinate efficiently all water resources activities at the regional and basin levels, bringing together all sectoral interests in water management.
2. The institutional relationship between regional or water basin agencies and the national authority must be well defined. In order to facilitate gradual integration of water management into the management of the environment, a close link must be established between water resources management and general regional planning.

The characteristics and jurisdiction of the water basin agencies and their responsibilities to water users must be defined in a legal and administra-

Box 15.8 **Legal Basis for IWRM in Zimbabwe**

The Water Act of 1998 which replaced the 1976 legislation was drafted after a long process of stakeholder involvement. Several consultative workshops at the local, provincial and national levels were conducted to capture the views of stakeholders. The drafting of the 1998 Water Act was guided by the following principles which incorporate the Dublin Principles and those of the Africa Water Vision:

1. Ownership of all surface and ground water is vested in the State.
2. Stakeholders have to be involved in decision-making during water resources planning and management.
3. Water resources planning and management have to be undertaken on a catchment or river basin level, and not using political or administrative units. Surface water and groundwater were regarded as part of a single hydrological system/cycle, and there should not be a distinction in the management of water irrespective of the state in which it water occurs.
4. Water resources planning and management has to be environmentally sustainable, and the environment is a legitimate user of water.
5. There has to be equity in terms of access to water by all water users.
6. Water prices have to be based on the user pays and polluter pays principle, and water prices have to be socially acceptable to the different water users.
7. Water is an economic value in all its competing uses and should be recognized as an economic good.

By adopting the Dublin Principles, and those of the Africa Water Vision in reforming the legislation, Zimbabwe can be considered as having achieved one of the targets of creating a legal and institutional framework aimed at achieving equitable distribution of water.

tive framework, and could include the formulation of up-to-date databases on the region's water supply and use, the operation and maintenance of hydro meteorological networks, planning, de-

sign, construction and operation of water installations as well as the establishment of a charging and tariff system to recover capital investment and operational and maintenance costs.

Box 15.9: Statement of the African Ministerial Council on Water (AMCOW)

Water – A Key to Sustainable Development in Africa - 12 May 2003

Towards achieving the targets set at the Millennium Summit and the World Summit on Sustainable Development (WSSD)

Introduction

We, the Members of the Steering Committee of the African Ministerial Council on Water (AMCOW), having met in Dakar, Senegal, from 20 to 24 May 2003, adopt the "NEPAD Statement on International Solidarity with Africa for the achievement of the water-related targets in the Millennium Development Goals and the outcomes of the World Summit on Sustainable Development". Our meeting is part of our quest for implementation actions in line with the expectations of the Johannesburg Summit.

For over 30 years, numerous conferences and international agreements have built the framework for today's water resource policies and decisions. The international community, in both the millennium goals and the outcomes of the World Summit on Sustainable Development, underlined that the global water crisis is a threat to economic development, poverty reduction and the environment, and hence to peace.

I. Time for Action: Towards a new regional and global compact for achieving the targets on water in Africa

We note that the supply and quality of freshwater in Africa remains one of the most critical issues of the twenty-first century.

In Africa close to 40 per cent of the population are without access to safe water supply and even more lack adequate sanitation. A number of partnership initiatives as well as a new water policy framework were announced at the WSSD, including the recent reform of EU water policy and the new Water Framework Directive of the EU. The need to integrate sustainable water management in national and regional development strategies is now widely recognized as a prerequisite for achieving the MDGs on water in Africa.

We welcome the international community's recognition that, in Africa, over 40 per cent of our people have no access to water. We call on the international community, in conformity with the NEPAD goals, to work with Africa in addressing the myriad challenges inherent in long-term water management. They should support regional efforts to develop coherent water management strategies, set up appropriate bodies at the national, regional and local levels, and attract the necessary public and private investment.

In this regard, we applaud the solidarity of the EU with Africa in the water sector, as manifested in the launch, on the occasion of the World Summit on Sustainable Development in Johannesburg, of a major initiative to help achieve, in our region, the targets set at the Millennium Summit and in Johannesburg to reduce by half the number of people without access to drinking water and sanitation by the year 2015.

We recognize that the achievement of those targets calls for measures and initiatives of a very special character on the part of all concerned, including our countries and civil societies as well as bilateral and multilateral agencies, the private sector and other stakeholders, if we are to mobilize the resources needed. We also fully realize the urgent need for innovative mechanisms to enable us to mobilize significant sources of financing from public, private and international resources.

As part of our commitment to the achievement of the targets on water in the Millennium Development Goals and the Johannesburg Action Plan, the African Governments along with representatives of the international community will convene the Pan-African Implementation and Partnership Conference on Water, in Addis Ababa, 9 – 14 December 2003.

At the Conference, we shall agree on a roadmap to expedite the translation of commitments into action, through a series of concrete measures and initiatives in the water sector. In this regard, the Conference will address the implications of the WSSD on regional water initiatives, and the continent's role in the implementation of the Summit's outcomes. The Conference will provide a unique opportunity to determine how to collectively meet the WSSD targets on water and to achieve the Millennium Development Goals. Our objective is to focus attention on the implementation requirements as well as the means of implementing, in Africa, the many regional and international targets in the water sector. The Pan-African Conference will seek to secure inter/intra African commitments to the implementation of targets, and build international solidarity in the form of meaningful partnerships.

Under the aegis of NEPAD/AMCOW, we shall, at the Pan African Conference launch:

- The African Water Development Report;
- A regional initiative for integrated water resources management in each country;
- A master plan for trans-boundary basins management;
- An innovative programme for strengthening national and sub-regional water policies, laws, institutions and other instruments;
- Specific modalities for the effective implementation, at the national, subregional and regional levels, of the EU-Africa strategic partnership on water;
- Modalities for the full implementation of the African Water Facility for mobilization of public and private as well as international financing essential to the achievement of the targets in the water supply and sanitation sector at the national and subregional levels; and
- *A regional initiative for financing groundwater assessment and management.*

II. Support to Africa by the Group of Eight Industrialized Countries (G 8)

At its Summit in Kananaskis, Canada in 2002, the G8 Group of Industrialized Countries noted that the importance of water spans over a wide range of critical uses – from drinking water, to sanitation, to food security and agriculture, to economic activity, to protecting the natural environment. The G8 Leaders also noted that water management is sometimes at the centre of threats to regional peace and security. The African Ministerial Council on Water notes the measures taken by the Kananaskis Summit to encourage efforts to improve water resources development and management in Africa. That Summit laid a firm basis for supporting Africa's water-related initiatives.

Nine months ago, at the World Summit on Sustainable Development, the international community committed itself to specific goals, targets and time-bound measures aimed at accelerating the transition to sustainable development. While some of these targets constitute a reaffirmation of the Millennium Development Goals, most represent new commitments.

As the G8 Leaders met in Evian-les-Bains, France, at their first Summit since Johannesburg, a key question demanding urgent attention was the partnership needed to help Africa achieve specific time-bound measures, particularly within the context of the following water and sanitation targets agreed to at the WSSD:

- *Establishment of a world solidarity fund to eradicate poverty and promote social and human development, making community level water and sanitation projects eligible for funding;*
- *Elements for a programme of action on sanitation;*
- *A mandate to launch a programme of action, with financial and technical assistance to achieve the MDG on safe drinking water and the additional target on sanitation;*
- *Development of integrated water resource management and water efficiency plans by 2005 with support to developing countries;*

- Support to activities for the International Year of Freshwater in 2003 and beyond; and
- A call for effective coordination among the various international and intergovernmental bodies and processes working on water-related issues.

The international community has underlined that the global water crisis is a threat to economic development, poverty reduction and the environment and hence to peace.

We invite the leaders of the G8 Countries to build a new compact with our region in the field of water - a key to sustainable development in Africa. We call on the leaders of the G8 group of Countries to endorse, at its 2003 Summit, an action plan on support to the water sector in Africa.

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