



# **SADC WATER SECTOR**

**RSAP Projects 9&10**

## **Guidelines for the development of national water policies and strategies to support IWRM**

*Updated August 2004*

## Preface

This project titled “Guidelines and Support for National Water Sector Policy and Strategy Formulation or Review in Member States” (AAA.9) is one of a suite of projects forming part of the Southern African Development Community (SADC) regional strategic action plan (RSAP) for the water sector. It falls within the Policy and Legislation grouping of projects along with project numbers AAA.1, 2, 8 and 11.

The primary intention of this project is to facilitate improved water resource management in member SADC countries specifically with respect to maximising the benefits, and improving the management, of transboundary water resources. Phase 1 of the project had four deliverables:

1. Review of existing policies and strategies (within their context – understanding of constraints, current and historical process). Reports are titled: “Angola Water Policy Review” (SADC, 2003), “Botswana Water Policy Review” (SADC, 2003), etc.
2. “Review of National Water Policies Synthesis Report” (SADC, 2003), a general summary of the country review with an emphasis on water sharing and the identification of gaps and incompatibilities or inconsistencies in national policies.
3. “Guidelines for the Development of National Water Policies and Strategies to Support IWRM” (SADC, 2003).
4. Draft process proposal for Phase 2 on how to promote IWRM (“Comprehensive plan”).

These “Guidelines for the Development of National Water Policies and Strategies”, corresponding to output 3 above, have a particular focus. This is to ensure that national water policies and strategies are fully compatible with the Revised Protocol on Shared Watercourses in the SADC and advance the objectives of regional co-operation in the water sector. These are not then general guidelines which would inform all aspects of national policy and strategy formulation.

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The team would like to acknowledge with thanks the inputs and comments received from SADC (WSCU) members and officials from SADC countries. GTZ funded this project and is thanked for its support and involvement in the project.

These guidelines were written by Rolfe Eberhard (of Palmer Development Group) and Peter Robinson (of Zimconsult) with inputs and comments from Piet Heyns, Jonathan Kampata and Klaus Erbel. To reflect subsequent SADC Water Sector documents (in particular the Regional Water Policy and the Consolidated SADC Regional Position on the report of the World Commission on Dams) and the valuable inputs from member state representatives at the 26-27 July 2004 workshop in Johannesburg, the guidelines were expanded and updated in early August 2004 by Peter Robinson.

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## Acronyms and abbreviations

ADB	African Development Bank
AMCOW	African Ministerial Conference on Water
AWIRU	African Water Issues Research Unit, Pretoria University
CAPNET	International Network for Capacity Building in IWRM
CBO	community-based organisation
CGIAR	Consultative Group on International Agricultural Research
DANIDA	Danish International Development Agency
DFID	Department for International Development (UK)
DRC	Democratic Republic of the Congo
ECA	Economic Commission for Africa
EIA	Environmental Impact Assessment
FAO	Food and Agricultural Organisation
GARNET	Global Applied Research Network
GIS	geographical information system
GLOBWINET	Information Network on IWRM focusing on transboundary river basin organisations, water legislation, and national water administration.
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit (German Technical Assistance Agency)
GWP	Global Water Partnership
HOMS	Hydrological Operational Multipurpose System (WMO)
ICOLD	International Commission on Large Dams
IEA	Institute of Environmental Assessment
IIWI	International Irrigation Management Institute
IRC	International Water and Sanitation Centre
ISKM	Integrated Systems for Knowledge Management
IUCN	International Union for Conservation of Nature & Natural Resources
IUCN-ROSA	IUCN's Regional Office for Southern Africa
IWMI	International Water Management Institute
IWRM	integrated water resources management
IWSD	Institute of Water & Sanitation Development, Harare
lcd	litres per capita per day
MDG	Millennium Development Goals
NEPAD	New Partnership for Africa's Development
NGO	non-government organisation
NRI	Natural Resources Institute
NWDMC	National Water Demand Management Centre (UK Environment Agency)
NWP	Netherlands Water Partnership

OECD	Organisation for Economic Cooperation and Development
OKACOM	Okavango River Basin Commission
PCN	Project number under SADC Water's RSAP
PSIRU	Public Services International Research Unit, University of Greenwich
RISDP	Regional Indicative Strategic Development Plan (all sectors)
RSAP	Regional Strategic Action Plan (water sector)
RWP	Regional Water Policy
SADC	Southern African Development Community
SARDC	Southern African Research and Documentation Centre
SAWINET	regional node of GLOBWINET in Southern Africa
SSA	sub-Saharan Africa
SWI	shared watercourse institution
TEC	Technical background papers (GWP Technical Advisory Committee)
UAW	unaccounted for water
UNDP	United Nations Development Program
UNEP	United Nations Environmental Program
UNESCO	United Nations Education, Scientific and Cultural Organisation
UNHSP	United Nations Human Settlements Programme (UN-Habitat)
UNICEF	United Nations Children's Fund
USBR	United Nations Bureau of Reclamation
WARFSA	Water Research Fund for Southern Africa
Waternet	Southern Africa regional network of university departments, research and training institutes specialising in water
WCD	World Commission on Dams
WHO	World Health Organisation
WHYCOS	World Hydrological Cycle Observing System
WIN	Water Information Network
WMO	World Meteorological Organisation
WSSCC	Water Supply and Sanitation Collaborative Council
WSSD	World Summit on Sustainable Development
WUP	Water Utilities Partnership
WWC	World Water Council



## Executive Summary

### Objective, scope and readership of the guidelines

The objective of the guidelines is to contribute to the development of national water policies and strategies that promote improved integrated water resource management (IWRM). For this to be achieved at the regional level, national policies and strategies need to be made compatible with each other and harmonised to facilitate the sharing of watercourses for mutual benefit.

The guidelines adopt the Global Water Partnership (GWP) definition of IWRM as “a process which promotes the co-ordinated development and management of water, land and related resources in order to maximise the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems”.

The guidelines are in no way prescriptive or binding on the member states. They are offered as a reference source to stimulate debate and thereby contribute to the formulation of national water policies and strategies. The target readership includes water users wishing to be informed about best practices and policies related to IWRM in the SADC region, but more particularly people inside and outside of government involved in formulating national water sector policies.

### The Process of Harmonisation

Although these guidelines focus on the harmonisation of *policies*, the development of policies is an intermediate objective. In the end, for harmonisation to be tangible and effective, it is the *IWRM practices* themselves which must be compatible amongst shared watercourse states.

There are two different approaches to achieve this goal. The ***vision-oriented approach*** to harmonisation starts with the development of a common vision, moves on to a common understanding of the principles of good IWRM practice, defined common goals and objectives, and then translates these into policies, legislation and IWRM practices. By contrast, the ***problem-oriented approach*** starts with the definition of a particular problem (problem statement) and develops a step-wise strategy to solve the problem.

Both approaches are compatible with each other and should be pursued in tandem wherever feasible. The vision-oriented approach is evident in the work of the SADC Secretariat while the problem-oriented approach tends to be initiated by the shared watercourse institutions.

### International and Regional Context

There is a high level of awareness of the crucial role of integrated water resource management in the alleviation of poverty, the fostering of economic development and the achievement of environmental sustainability. The guidelines (in Sections 3, 9.2, 9.3 and Annexure 1) describe some of the major milestones in this growing awareness. Events from the Global Consultation on Safe Water and Sanitation (New

Delhi, 1990) to Third World Water Forum (Kyoto, 2003) are covered. African initiatives (such as the Africa Water Facility being managed by the African Development Bank) and joint programmes with donors (such as the Millennium Development Goals and NEPAD) are given particular emphasis.

### **The Revised SADC Protocol on Shared Watercourses**

The guidelines summarise the objectives, principles and specific provisions of the Revised Protocol. Ensuring harmonisation with the Protocol requires compatibility of national policies and strategies, but does not imply uniformity.

### **IWRM principles and practice**

To achieve equitable and sustainable use of water resources, IWRM must be based on sound principles and tested practice. Section 5 of the guidelines presents essential elements of 10 topics of central concern to IWRM. These are:

1. Water Resources Assessment
2. IWRM Planning
3. Dams & Development
4. Demand Management – Usage & Allocative Efficiency
5. Demand Management – Equitable Access to Water
6. Participation
7. Conflict Resolution
8. Environmental & Service Provision Regulation
9. Economic & Financial Instruments
10. Information Exchange

### **National policy as an enabling environment**

National water *practice* in some countries is ahead of formal policy, but all member states seek to have a codified water policy that fully reflects IWRM principles and to pass accompanying legislation. The manner and pace at which this objective is achieved is entirely a national prerogative.

The guidelines are being made available to assist, both in respect of the *content* of water policies and strategies and the *process* of developing them. One of the main elements is the integration of the water sector with policies on land, environment, gender, agriculture, food security, energy etc. IWRM experience also points to the fundamental importance of the full participation by all interested and affected parties in the formulation of policies and subsequent implementation, monitoring and evaluation.

Based on the survey of existing water policies in all SADC member states, the guidelines recommend that the scope of national water policies include:

- Vision statement for the water sector
- Sector goals & targets
- Principles informing policies
- Institutional framework

- Financial framework
- Regulatory framework

### **Institutional mechanisms for implementing IWRM**

Establishing effective institutions, both at the national level and relating to shared river systems, is crucial to the successful implementation of IWRM. To date, SADC's shared watercourse institutions (SWIs) have a proud record of strengthening cooperation between member states.

The existing SWIs exhibit a wide array of formal & informal arrangements, generally appropriate for current purposes. The guidelines recommend that permanent institutions with full-time staff should only be created when these become absolutely necessary. Stakeholder involvement in shared watercourses is to be encouraged. The 'Every River has its People' project (described in Box 14) shows that it is possible to overcome the associated practical difficulties.

### **Conclusions**

The guidelines present a comprehensive outline of what is required in developing policies and strategies for integrated water resource management, with particular reference to harmonization between countries in the SADC region. The guidelines should be used in conjunction with other SADC water sector documents, such as the Regional Water Policy.

To broaden the usefulness of the guidelines by providing references to other materials, Section 9 presents an extensive bibliography, together with addresses of water-related websites. The references appear under various sub-headings (Sections 9.1 to 9.18), allowing easy cross-referencing in the main text.

## 1. Introduction

### 1.1 Objective

The objective of these guidelines is to contribute to the development of national water policies and strategies that promote improved integrated water resource management. For this to be achieved at the regional level, national policies and strategies need to be harmonised (in the sense given below) and made compatible with the SADC Revised Protocol on Shared Watercourses in the SADC.

‘Guidelines’ are defined as a set of principles put forward to set standards or suggest a course of action. The guidelines conform precisely to this definition. They are in no way prescriptive or binding on the member states. They are offered as a reference source to stimulate debate and thereby contribute to the formulation of national water policies and strategies.

### 1.2 Scope

**Definition of integrated water resource management.** For the purposes of these guidelines, the following definition of integrated water resource management (IWRM) is used:

*A process which promotes the co-ordinated development and management of water, land and related resources in order to maximise the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems.*  
(Global Water Partnership Technical Advisory Committee, 2000)

**Meaning of harmonisation.** Harmonisation means improving the compatibility of national policies and strategies with one another (both within and between countries) so that national water policies and strategies do not hinder the sharing of international water resources for mutual benefit. Harmonisation does not mean developing uniform water policies or a joint national water policy subscribed to by all SADC member countries.

**Key questions.** Some of the key questions these guidelines seek to address are as follows: *How can SADC promote the harmonisation of national water policies with the objective of promoting improved IWRM, specifically with respect to shared watercourses? What are the constraints? How should SADC promote the harmonisation of SADC water policies?*

### 1.3 Readership

The intended audience of these guidelines includes, but is not limited to, the following:

- People involved in formulating national water sector policies (including stakeholders outside of government as well as politicians and government officials).
- People involved in shared watercourse institutions.
- Water users wishing to be informed about best practices and policies related to IWRM in the SADC region.

## **1.4 Structure and use of the guidelines**

The guidelines are structured as follows:

**Section 2:** The process of harmonisation.

*How should the process of harmonisation of national water policies be promoted?*

**Section 3:** The international and regional context

*To what extent do the international and regional contexts create a rationale and momentum for harmonisation of national water policies?*

**Section 4:** The revised water protocol in SADC

*How does the Revised Protocol on Shared Watercourses in the Southern African Development Community support the regional objective of improved integrated water resource management (IWRM)?*

**Section 5:** IWRM principles and practice

*On what principles should IWRM be based and how should IWRM be practised?*

**Section 6:** National policy as an enabling environment

*What are the necessary policy conditions for IWRM to be promoted?*

**Section 7:** Institutional mechanisms

*What institutional mechanisms (both at the international and national levels) are necessary to promote IWRM of shared watercourses?*

To reiterate the point already made, these guidelines are not in any sense binding on Member States. They are intended to be used in a spirit of opening up debate on policy issues that is informed by theory and best practice within the region and internationally. The guidelines can never be comprehensive and should be complemented with other documents, notably the reviews of the water policies in each of the 14 members of SADC undertaken as part of RSAP Projects 9&10, together with the summary Synthesis Report and the SADC Regional Water Policy (full references are given in Section 9.1). In addition, the Global Water Partnership IWRM ToolBox, entitled *Policy Guidance and Operational Tools*, is an excellent resource covering all aspects of national water policy and strategy formulation (web address in Section 9.2).

**Section 9** provides an extensive bibliography and listing of useful websites (under 18 sub-headings). It is recommended that readers obtain this document in electronic form, as they will then be able to click on the links and Section 9 and get directly to the relevant websites, many of which provide a range of additional technical papers as well as other forms of information.

## 2. The process of harmonisation

*How should the process of harmonisation of national water policies be promoted?*

### 2.1 Understanding harmonisation

Harmonisation can apply at different levels:

- The development of a common **vision** (for the region, or for a specific shared watercourse).
- The development of a **common understanding** related to the fundamental **principles** informing IWRM policies and practices (for example, understanding what *reasonable use* is in different circumstances).
- The development of **compatible policies** related to, for example, water quality management, water allocations, water demand management and economic instruments (water pricing, markets).
- The development of **integrated policies** related to different sectors, for example, agricultural policy, food security, industrial policy and water policy.
- The development of **compatible legislation** related to, *inter alia*, water rights, regulation, the use of economic instruments, etc.
- The development of **IWRM practices** based on best international practice and appropriate to local and regional circumstances.

Although these guidelines focus on the harmonisation of *policies*, it can be readily seen that the development of policies is just one (necessarily incomplete) component of harmonisation. In the end, for harmonisation to be tangible and effective, it is the IWRM practices themselves which must be compatible amongst shared watercourse states and consistent with the best practices as outlined in Section 5 of these guidelines.

### 2.2 The need for harmonisation

**Harmonisation of policies between countries.** Significant policy inconsistencies have not been found in the text of existing water policy statements, inconsistencies that would constrain progress on improved IWRM through establishment of shared watercourse institutions. All water policies are relatively recent and appear to have been informed by international best practice principles (Dublin, etc.). However, it should be noted that these conclusions have been reached within the time and budget constraints of this project (PCN 9 & 10 Phase 1). The policy review did not extend to a detailed analysis of legislation.

**Harmonisation of policies between sectors.** There are likely to be conflicts of interest between significant water using sectors (for example, between agriculture and hydropower, between power production and flood control and between a protected environment and other water users) at both the policy and operational levels, nationally and regionally.

**Harmonisation of IWRM practices.** Countries differ significantly in the intensity and effectiveness of their implementation of national policies. *Therefore the main constraints to the effective implementation of national policies in regard to managing transboundary waters appear to be related to capacity constraints, available resources and strictness of implementation (and enforcement) of written policies rather than the policies themselves.*

**The need for harmonisation will increase over time.** As the intensity of water stress increases over time, conflicts arising out of policy differences, and more importantly out of differences in the intensity of the implementation of policies (that is, IWRM practices), are likely to become both more severe and longer lasting.

Some examples of the need for harmonisation are given below.

### **Quantity allocation**

- *Pricing of water and other inputs for irrigation.* See Box 11 on the allocation of water in the lower Orange. Water, and other inputs, for irrigated agriculture are priced differently in Namibia and South Africa. As a result there are differences in demand in a context where there is an overall water shortage in the lower Orange and no agreement concerning the appropriate allocation of water between Namibia and South Africa.
- *Water abstraction policies and practices.* Okavango: all bulk water supplied by the Namibia Water Corporation (Namwater) for use in Namibia is priced, however, on the Angolan side. There are no pricing policies in place and no prices are applied. Orange River: Weak or non-existent policies and controls related to water abstraction in Lesotho have a negative impact on the availability of water in the Caledon River which is shared between South Africa and Lesotho.
- *Groundwater and shared aquifers.* The definitions of the yield of an aquifer differ between Botswana and Namibia. As a result the countries differ in their assessment of what constitutes a safe yield of the aquifer. See also Box 18 for a discussion of harmonisation issues related to the shared aquifer between Malawi and Zambia.

### **Water quality and the environment**

- *Policies and practices related to wastewater treatment.* Water quality management policies and practices differ between South Africa and Lesotho, leading to a differential between impacts on the water quality in the Caledon River from both countries and hence on the availability of water and cost of treatment. See also Box 21 for a discussion of inadequate water quality management policies in Zambia which may have an impact on downstream states.
- *Policies and practices related to use and pricing of fertilisers and pesticides.* Fertilisers and pesticides have an important impact on water quality. Inadequate policies and poor implementation in South Africa may have a negative impact on the quality of water entering Mozambique. Expansion of agriculture is one of the policies being promoted in all SADC states as a means of fighting poverty and improving the economy. With this comes increased use of fertilisers and pesticides which eventually end up in watercourses. Capacity for water quality monitoring is generally weak in most states, and sources of such pollution are not

adequately identified in time. This results in serious problems, such as the eutrophication and proliferation of aquatic weeds in some water bodies such as Lake Malawi in Malawi and the Kafue River in Zambia.

- *Policies and understandings related to water requirements to protect the environment.* Differences in policies and strategies related to the need, value and consequences of abstraction on the Okavango Delta environment inhibit the development of water supply infrastructure in the Okavango River. The lack of a common agreement on the in-stream flow requirements of the Orange River inhibits an agreement on the allocation of water from the lower Orange River to Namibia and South Africa.

## **2.3 The process of harmonisation**

**An incremental process.** The process of harmonisation is about the *incremental adaptation* of policies and practices over time. This is not a once-off process, but rather an ongoing process.

Harmonisation can be vision oriented or problem oriented.

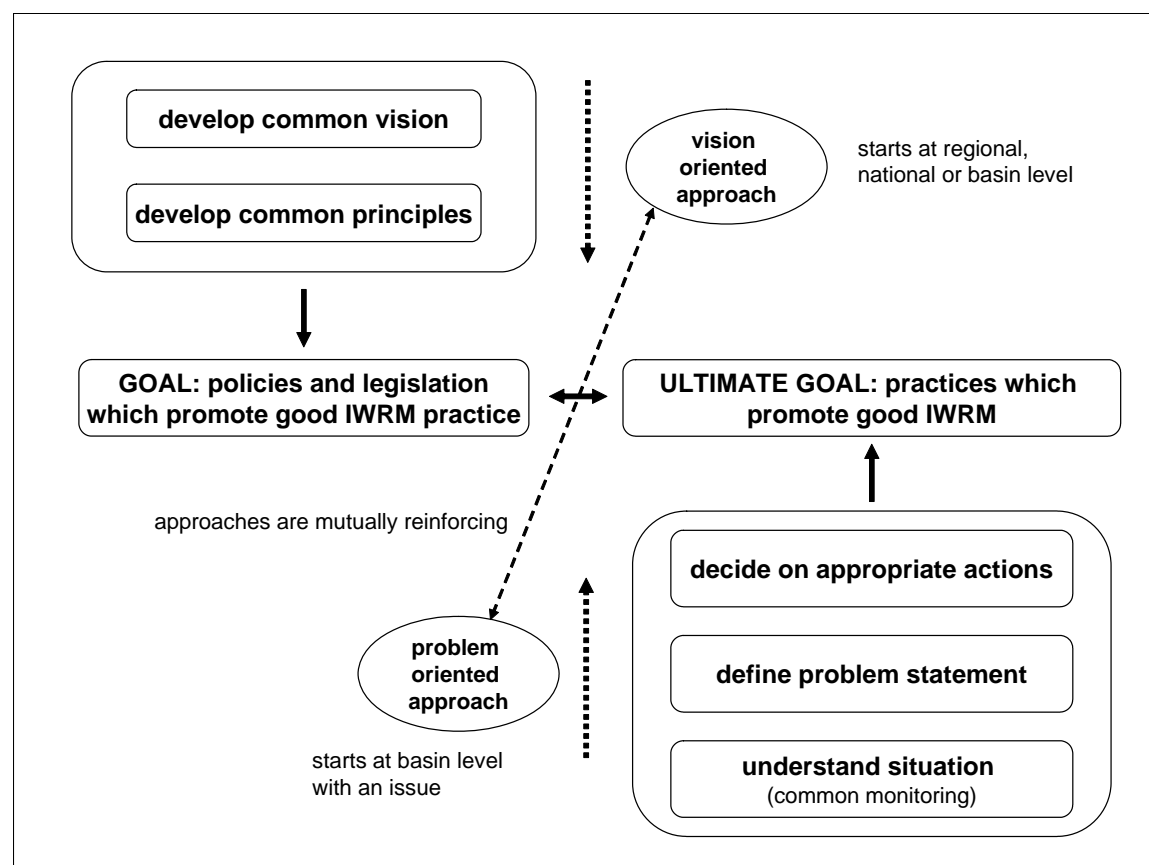
**Vision-oriented approach.** The vision-oriented approach starts with the development of a common vision, moves on to a common understanding of the principles of good IWRM practice, defined common goals and objectives, and translates these into policies, legislation and IWRM practices. The vision-oriented approach can be applied at a regional (inter-country) level, a shared watercourse level (internal river basin), a national level or a local level (sub-catchment). The Revised SADC Water Protocol is an example of a vision-oriented approach taking place at the regional (inter-country) level.

**Problem-oriented approach.** A problem-oriented approach starts with the definition of a problem (problem statement) and develops a strategy to solve the problem. The “Every River has its People” project is an example of a problem-oriented project. (See Box 14.)

Both approaches are compatible with each other and should be pursued in tandem wherever practically feasible. Problem-oriented approaches are, in fact, most likely to be adopted where a common vision can be developed. And a vision-oriented approach is more likely to be initiated and developed where there are real underlying problems to be solved. The symbiotic relationship between the two approaches is illustrated in Figure 1.

Both approaches with respect to the harmonisation of water policies and practices are, in fact, being pursued in the SADC region:





**Figure 1: Two mutually reinforcing approaches to harmonisation**

**Vision-oriented approaches to the harmonisation of water policies and practices are evident in the following initiatives in the SADC region<sup>1</sup>:**

- The SADC mission statement and vision of a common future within a regional community to promote sustainable and equitable economic growth and socio-economic development.
- The draft SADC Regional Indicative Strategic Development Plan (RISDP). (See Section 3.2.)
- Water for the 21<sup>st</sup> Century: Vision to Action – Southern Africa, 2000. (See Section 3.2.)
- The SADC Regional Strategic Action Plan (RSAP) which is the main Programme of Action for the SADC Water Sector for the period 1999-2004. (See Section 3.2.)
- Formulation of regional water policy and strategy (AAA.10). (See Section 3.2.)
- The Revised Protocol on Shared Watercourses in the Southern African Development Community. (See Section 4.)

**Problem-oriented approaches to the harmonisation of water policies and practices are evident in the following initiatives in the SADC region:**

- Support for the implementation programme for the Protocol on Shared Watercourses (AAA.8), specifically support for the establishment of shared watercourse institutions.

<sup>1</sup> References are to be found in Sections 9.1-9.3.

- RSAP Group 2 projects related to capacity building and training.
- RSAP Group 3 projects related to Awareness Creation, Consultation and Public Participation.
- RSAP Group 4 projects related to Information Collection, Analysis, Management and Dissemination and Improved National and Transboundary River Basin Management, Planning and Co-ordination.
- RSAP Group 5 projects related to Infrastructure Investment.
- RSAP Group 6 projects related to Stand Alone projects for Special Priority Areas.

*The key question here is how best can national water policies and practices (particularly those related to IWRM) be harmonised? In the light of the above discussion, the answer must be through both vision-oriented and problem-oriented approaches.*

## **2.4 The role of SADC in harmonisation**

SADC supports the harmonisation of water policies and IWRM practices through a twofold approach:

1. Vision-oriented approach anchored in the Revised Water Protocol (AAA.8), the RSAP, the regional policy and strategy development (AAA.10):

These initiatives constitute support at a reasonably high and all-encompassing level. No specific new initiatives are proposed.

Specific policy support may be offered to countries wishing to undertake policy reform so as to improve compatibility with the Revised Water Protocol and hence to increase compatibility with other SADC countries.

2. Problem-oriented approach anchored through the shared watercourse institutions (AAA.8):

Additional support may be provided (through this project AAA.9) to countries involved in the implementation of shared watercourse institutions to enable them to adapt and amend water policies as necessary to facilitate improved water resource management and enhanced regional co-operation.

Box 1 sets out the typical steps towards harmonisation in the problem-oriented approach. It is evident from the nature of these activities that shared watercourse institutions are in the best position to identify any real and significant inconsistencies in detailed policy and practices which hinder effective IWRM between countries. The most appropriate and effective anchor for harmonisation is likely to be through these shared watercourse institutions.

**Box 1: Typical steps towards harmonisation – a problem-oriented approach**

- 1 Develop compatible information systems which facilitate information exchange.
- 2 Develop a common understanding of the problem.
- 3 Agree on desirable end state (informed by a common vision):
  - Set water quantity targets.
  - Set water quality targets.
  - Agree on allocations.
- 4 Agree on actions to achieve end state (informed by common principles):
  - Develop a water demand management plan.
  - Develop a water resource development plan (infrastructure projects, operation of river and infrastructure).
  - Develop a water quality management plan.
- 5 Plan to achieve end state (informed by commitment to integrated water resource management):
  - Develop an integrated catchment management plan or strategy.
  - Integrate the financial resource requirements and economic incentives in the planning.
  - Assess policy and legislative impediments.
- 6 Put in place the necessary institutional mechanisms.
- 7 Amend policies and legislation as necessary.
- 8 Enact the plan in a flexible and strategic way, refining and amending as necessary along the way.

*Source:* Adapted from the GWP IWRM Toolbox <http://gwpforum.netmasters05.netmasters.nl/en/>

### 3. Context

*To what extent do the international and regional contexts create a rationale and momentum for harmonisation of national water policies?*

#### 3.1 International context<sup>2</sup>

Internationally there has been an increased realisation in recent years of the importance of improved IWRM and the universal provision of adequate basic water and sanitation services. This concern has been captured in various international and regional fora including the following:

- Global Consultation on Safe Water and Sanitation for the 1990s, **New Delhi**, 1990.
- International Conference on Water and the Environment, **Dublin**, 1992.
- United National Conference on Environment and Development (**Earth Summit**), **Rio de Janeiro**, 1992.
- **Earth Summit + 5** programme of action, 1997.
- **World Water Vision, Second World Water Forum** and Ministerial Conference, **The Hague**, 2000.
- Water for the 21<sup>st</sup> Century: **Vision to Action – Southern Africa**, 2000.
- The Millennium Summit and the **Millennium Development Goals**, September 2000.
- **Dams & Development: A New Framework for Decision-Making**, final report of the World Commission on Dams, November 2000.
- International Conference on Fresh Water, **Bonn**, December 2001.
- The **African Ministerial Conference on Water (AMCOW)**, **Abuja**, 2002, which has led to the subsequent establishment of the **Africa Water Facility** managed by the African Development Bank..
- Water and Sustainable Development in Africa – Regional Stakeholders' Conference for Priority Setting (**Accra declaration**), **Accra**, April 2002.
- The World Summit of Sustainable Development (WSSD), **Johannesburg**, September 2002.
- **Third World Water Forum** and Ministerial Declaration, **Kyoto**, March 2003.

Key outcomes are summarised in Annexure 1. The reader is referred to the original sources for further information.

**The international agenda.** These international and regional events can be thought of as setting the “international agenda” for the water sector. It is instructive to examine how this agenda has changed over time and what has remained constant:

- The New Delhi Principles established the principles of “some for all” (rather than “all for some”) and community management.
- The Dublin Principles emphasised the economic value of water, gender, participation and the need for the integrated management of water.

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<sup>2</sup> References and websites in Section 9.3.

- The Earth Summit (Rio) moderated the emphasis on the economic value of water by asserting that water was a social good as well as an economic good and both were equally important. Integrated water resources management (IWRM) was put firmly on the international agenda.
- Earth Summit + 5 called for greater attention to IWRM of international watercourses through co-operation, and stressed the role of technical transfer and financial support from developed countries to assist with the development of IWRM and country and inter-country levels, but at the same time emphasised the important role of greater cost recovery in developing countries with respect to water and sanitation services.
- The World Water Vision called for full cost recovery, massive increases in investments, and a much greater role for the private sector (though this was heavily contested at the conference), but recognised water as a basic need and proposed targeted subsidies for the poor. Governments should act as enablers and regulators rather than players.
- The consequent Southern Africa Vision to Action focused on the right to basic services and appeared soft on the issue of pricing and cost-recovery although it did promote the “polluter pays” principle.
- The Bonn Ministerial declaration repeated many of the previous themes but emphasised the important role of good governance and the responsibility of governments to promote and ensure IWRM, improved transboundary management of water and access to basic services. The need for capacity building was stressed. The role of the private sector was again heavily contested at the Bonn conference.
- Interestingly, NEPAD appears very supportive of increased private sector involvement in the water sector.
- The Millennium development goals stressed the importance of substantially reducing poverty and improving conditions in urban slums.
- The final report of the World Commission on Dams argued the importance of adopting a holistic approach to dam development to ensure the maximisation and equitable sharing of benefits, environmental sustainability and full involvement of stakeholders in decision making.
- The WSSD added the target of reducing by half the number of people in the world without adequate sanitation by 2015 and stressed the integration of sanitation into IWRM strategies. The Johannesburg Plan of Implementation agreed *to develop integrated water resources management and water efficiency plans by 2005*. The comprehensive list of actions required to realise this are spelt out in the Plan, noting the priority of satisfying basic needs and protecting fragile environments.

**The involvement of African countries.** Developing countries (including African and Southern African countries) have been involved and have participated in these international and regional events.

**An agenda for developing countries.** These international and regional events have tended to set the agenda for national policies and strategies, especially within developing countries.

**Support for developing countries.** Support is available to developing countries to develop national policies and strategies in terms of this international agenda.

### **3.2 Regional context<sup>3</sup>**

The draft SADC **Regional Indicative Strategic Development Plan (RISDP)** is underpinned by the SADC mission statement and vision of a common future within a regional community to promote sustainable and equitable economic growth and socio-economic development. The ultimate objective of RISDP is to *deepen the integration agenda* of SADC.

Within the water sector, the overall SADC goal is the attainment of sustainable, integrated planning, development, utilisation and management of water resources that contribute to the overall SADC objective of an integrated regional economy on the basis of balance, equity and mutual benefit for all member states. The SADC Protocol on Shared Watercourse Systems provides the legal and broad policy framework for co-operation on water issues in the region. This protocol is consistent with the broader SADC objectives and Common Agenda. The emphasis on equitable sharing is consistent with the objectives of peace and security, and the strategic priority of conflict prevention.

**SADC Regional Strategic Action Plan (RSAP).** The RSAP is the main Programme of Action for the SADC Water Sector for the period 1999-2004. It gives practical effect to the implementation of the SADC Protocol on Shared Watercourses. It contains 44 Projects in all. The main focus of the Projects is to create and establish an enabling environment for the integrated management of water resources in the region in support of the achievement of other regional objectives. SADC has since prioritised the implementation of 31 Projects in the RSAP. These have been grouped as follows:

- Group 1: Legislation, Policy and Strategic Planning
- Group 2: Capacity building and training
- Group 3: Awareness Creation, Consultation and Public Participation
- Group 4: Information Collection, Analysis, Management and Dissemination and Improved National and Transboundary River Basin Management, Planning and Co-ordination.
- Group 5: Infrastructure Investment
- Group 6: Stand Alone – Special Priority Areas

This project falls into Group 1 together with the following projects:

- Guidelines for the review and formulation of national legislation (AAA.1)
- Guidelines for dam safety (AAA.2)
- Support for the implementation programme for the Protocol on Shared Watercourses (AAA.8)
- Formulation of regional water policy and strategy (AAA.10)

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<sup>3</sup> References and websites in Sections 9.2 and 9.3.

## 4. The Revised SADC Protocol on Shared Watercourses

*How does the revised SADC Protocol on Shared Watercourses in the Southern African Development Community support the regional objective of improved integrated water resource management?*

### 4.1 Introduction

Integrated water resource management applies to river basins and entire catchments. National policies and strategies which are based on IWRM therefore do not stop at political boundaries when shared watercourses are involved because the implications of all actions for downstream and riparian neighbours need to be taken into account.

With this in mind, the SADC Protocol on Shared Watercourse Systems was signed in 1995. Signatories to the agreement were: Angola, Botswana, Lesotho, Malawi, Mozambique, South Africa, Swaziland, Tanzania, Zambia and Zimbabwe. Since 1995 Mauritius, Seychelles and the Democratic Republic of Congo (DRC) have joined SADC, and as a result have acceded to the Protocol. The Protocol came into force in September 1998 after being ratified by the two-thirds majority of SADC member states.

An amendment process began in April 1998 and resulted in a Revised Water Protocol. This Revised Water Protocol has a closer fit with the *United Nations Convention on the Law of Non Navigable Uses of International Watercourses*. To date, eight member states, namely Botswana, Lesotho, Mauritius, Mozambique, Namibia, South Africa, Malawi and Swaziland have ratified the protocol. When two-thirds of member states have ratified the revised water protocol it will automatically come into force. These guidelines are based on the revised water protocol entitled “*Revised Protocol on Shared Watercourses in the Southern African Development Community*” hereafter referred to as “the Water Protocol” (or as the Revised SADC Water Protocol or the SADC Water Protocol or as the Revised Water Protocol).

The objectives, principles and specific provisions of the Water Protocol are outlined below. The Water Protocol provides a sound basis for the IWRM of shared watercourses in the SADC region.

### 4.2 Protocol objectives

The starting point for harmonisation in SADC is to ensure full compatibility of national policies and strategies with the objectives of the Water Protocol. These objectives (drawn from Article 2 of the Water Protocol) are summarised in Box 2. They are fully consistent with the international IWRM agenda.

### 4.3 Protocol principles

The general principles of the Water Protocol are summarised in Box 3.

**Box 2: The objectives of the Protocol**

The overall objectives of the Protocol are to foster close and co-ordinated co-operation in the management, protection and utilisation of shared watercourses and to advance the SADC agenda of regional integration and poverty alleviation.

The Protocol seeks to:

- (a) promote the establishment of shared watercourse agreements and institutions for the management of shared watercourses;
- (b) advance the equitable, sustainable and reasonable utilisation of the shared watercourses;
- (c) promote a co-ordinated and integrated environmentally sound development and management of shared watercourses;
- (d) promote the harmonisation and monitoring of legislation and policies for planning, development, conservation, protection of shared watercourses, and the allocation of the resources thereof; and
- (e) promote research and technology development, information exchange, capacity building, and the application of appropriate technologies in shared watercourse management.

*Source:* Revised SADC Protocol on Shared Watercourses

**Box 3: The principles of the Protocol (a summary)**

- Recognise the unity and coherence of each shared watercourse and undertake to harmonise water uses
- Ensure that the utilisation of shared watercourses is open to each watercourse state, without prejudice to its sovereign rights and in accordance with the principles contained in the Protocol.
- Observe the objectives of regional integration in the SADC.
- Ensure all interventions are consistent with sustainable development.
- Respect the existing rules of customary or general international water law.
- Recognise the unity and coherence of each shared watercourse system.
- Maintain a balance between water resource development and conservation.
- Pursue close co-operation in the study and execution of all projects on a shared watercourse. Exchange information and data about the shared watercourse.
- Utilise a shared watercourse in an equitable and reasonable manner.
- Maximise the benefits from a shared watercourse through optimal and sustainable utilisation.
- Participate and co-operate in the use, development and protection of a shared watercourse.
- Take all appropriate measures when utilising a shared watercourse to prevent significant harm to other watercourse states. Eliminate or mitigate against such harm and, where appropriate, discuss and negotiate the possibility of compensation.
- No state shall deny anyone the right to claim compensation or other relief in respect of significant harm caused by any activity carried out in a shared watercourse.

*Source:* Revised SADC Protocol on Shared Watercourses



All of the points are relevant as expressions of intent in a policy statement, but more careful treatment is required when codifying policy in a sector-wide water law. A statement of commitment to the SADC Revised Water Protocol and to other international water treaties and conventions which may have been signed and ratified by the country needs to be included in the law, but at a more general level the law needs to be drafted in such a way that there is sufficient flexibility in the system of water allocations (usually involving usage rights) and environmental management provisions to ensure that the country can meet its Water Protocol obligations. These include not just the formal “specific provisions” contained in Article 4 (see below), but the broader set of obligations implicit in the principles given above.

#### ***4.4 Specific provisions of the protocol***

The Water Protocol also contains specific provisions which are summarised below.

**Planned Measures.** States shall inform each other about planned measures on a shared watercourse, exchange information and enter into consultations. Planned measures shall not be implemented without the consent of the notified states. If the notifying state receives no communication from the notified states, it may proceed with the implementation. In the event that the implementation of planned measures is of the utmost urgency, the notifying state may immediately proceed to implementation, but must enter into consultations with the other states about the matter.

**Environmental Protection.** The ecosystems and aquatic environment of a shared watercourse shall be protected and preserved, and actions shall be taken specifically with respect to the reduction in significant harm through pollution control, through harmonised policies and legislation. State parties shall take all necessary measures to prevent the introduction of species, alien or new, into a shared watercourse which may have detrimental effects to the ecosystem resulting in significant harm.

**Management.** Watercourse states shall enter into consultations concerning the management of a shared watercourse and shall participate on an equitable and reasonable basis in the funding, construction, operation and maintenance of shared infrastructure.

**Installations.** States shall employ their best efforts to maintain, operate and protect installations, facilities and other works related to a shared watercourse.

**Harmful Conditions.** States shall take appropriate measures to prevent or mitigate conditions related to a shared watercourse that may be harmful to other watercourse states.

**Emergency Situations.** All potentially affected states and competent international organisations shall be informed of any emergency situation originating within the territory of any state with a view to co-operating to prevent, mitigate or eliminate any harmful effects.

**Shared Watercourse Institutions.** Watercourse states undertake to establish appropriate watercourse institutions to manage shared watercourses.

**Shared Watercourse Agreements.** Watercourse states may enter into agreements, to apply the provisions of the Water Protocol.

These specific provisions are intended to ensure that there is co-operation between shared watercourse states in fulfilment of the general principles and in pursuit of the objectives of the Water Protocol.

## **5. IWRM principles and practice**

*On what principles should IWRM be based and how should IWRM be practised?*

### **5.1 Introduction**

If integrated water resource management (IWRM) is to achieve its intended outcomes (optimal, equitable and sustainable utilisation of resources), then the practice of IWRM must be consistent with sound principles.

The basic building blocks for IWRM (that is, water resource management approaches and activities which are consistent with sound IWRM principles) are set out in this section. The enabling policy and institutional environments which support these activities are discussed in the Sections 6 and 6.7 respectively. The reader is also referred to the references and websites given in Section 9, subsection 9.4 giving general IWRM references.

### **5.2 Water resources assessment**

A water resource assessment is the essential starting point for integrated water resources management. As far as possible, the resources, capacities and efforts of watercourse states should be pooled in the assessment of shared water resources. Existing projects, such as SADC-HYCOS, show the promise of what can be achieved through joint efforts.

Water resources assessment should examine the quantity and quality of both surface and groundwater as well as the potential for utilising unconventional sources emanating from reclamation, re-use, recycling, desalination and water demand management. It should identify the pertinent parameters of the hydrological cycle, and evaluate the water requirement of different development alternatives. The assessment should pinpoint the major water resources issues and potential conflicts, their severity and social implications, as well as risks and hazards such as flood and drought. A summary of the main areas to be covered is given in Box 4. References and websites for water resource assessment are given in Section 9.5, for environmental assessment in Section 9.6 and for social assessment in Section 9.7.

The understanding of the terrestrial and aquatic ecosystems is an essential element of resource assessment. A sound water resources assessment needs to be based on good physical and socio-economic data. Routine physical measurements at monitoring and gauging stations need to be made at appropriate times and with sufficient frequency to allow the assessment to draw valid conclusions. This is a neglected area and requires adequate financing of the monitoring system by government.

Socio-economic aspects must include analysis of user behaviour, elasticity of demand, and the potential effects of demand management. Water resources assessment for IWRM sets hydrology in a wider context and considers social and economic development issues such as urban growth and changing land-use patterns.

The above approach is of central importance to regional co-operation in IWRM. The relevant unit of analysis is the catchment as a whole, irrespective of whether it crosses national boundaries. National policies and strategies need to make a particular

commitment to pursuing water resources assessment on this holistic basis, because without this the inevitable difficulties which arise could derail the process. These difficulties include the different levels of skills and resources which can be devoted to the exercise, language incompatibilities and different ways of collecting and processing data. This last aspect is discussed in more detail in Section 5.11, below.

**Box 4: Scope of water resource assessments**

- *Hydrological and hydrogeological assessment* examines the extent of the surface and groundwater resources available, taking account of seasonality and long-term trends in supply.
- *Demand assessment* examines the competing uses of water with the physical resource base and assesses demand for water (at various prices), thus helping also to determine the financial resources available from tariff revenues for water resource management in different development scenarios.
- *Environmental impact assessments* (EIA) collect data on the social and environmental implications of development programmes and projects. EIA is an important tool for cross-sectional integration involving project developers, water managers, decision-makers and the public. It can be seen as a special form of water resources assessment.
- *Social assessment* examines how social and institutional structures affect water use and management, degree of equitable access to water and how specific projects might affect the social structure.
- *Risk or vulnerability assessment* analyses the likelihood of extreme events, such as flood assessment; the environmental implications of development programmes and projects; management, or how a specific project might affect social structures; and droughts, and the vulnerability of society to them.
- *Demand management assessment* assesses the potential for water savings through water conservation and demand management.
- *Unconventional sources assessment* examines the potential for water reclamation, re-use, recycling and desalination.

Source: Adapted from the GWP IWRM Toolbox <http://gwpforum.netmasters05.netmasters.nl/en/>

**Box 5: Joint hydrological gauging on the Okavango and Kwando Rivers – an example of co-operation**

The assessment of the potential of water resources is dependent on the availability of reliable information. In the case of transboundary water sources, where more than one party is involved, it is clear that the methodology to measure stream flows, the accuracy of the measurements and the results of the resource assessments must be acceptable to all parties concerned.

In order to facilitate a transparent process in this regard, hydrologists from the Departments of Water Affairs in Botswana and Namibia have been participating in joint hydrological measurements at the gauging stations on the Okavango and the Kwando-Linyanti-Chobe river systems. These activities have taken place under the auspices of the relevant Water Commissions of the countries sharing those rivers. It enabled the technical staff to understand the operation of the different gauging stations and improve their confidence in the accuracy of the measured results. This has resulted in agreement between countries on the resource assessments and hence the availability of water. This work also provided an opportunity for the training of staff and the development and strengthening of the professional relationship between the participants.

Source: Botswana and Namibia Water Policy Reviews (Section 9.1)

### 5.3 Integrated Water Resource Management Planning

Recognising the primary principle of the unity and coherence of each watercourse, as enshrined in the Protocol, IWRM plans must necessarily be formulated at the river catchment or sub-catchment level. The river catchment plan sets out how the concept of integrated water resources management is going to be implemented in that catchment, that is, how the co-ordinated use of water, land and related resources will maximise economic and social welfare without compromising the sustainability of vital ecosystems. The topics of a typical river catchment management plan are outlined in Box 6. References and websites are given in Section 9.8.

#### Box 6: Scope of catchment management plans

- Physical description of the basin/catchment and land use inventories.
- Current water availability and current water use.
- Pollution source inventories.
- Aquatic and terrestrial ecosystem needs.
- Vulnerability to extreme meteorological events such as floods and droughts.
- Identification of interested and affected parties.
- Implications of changing land use.
- Identification of priority issues (impact issues or user requirement issues).
- Short- and long-term goals for the river basin/catchment.
- Water-related development scenarios; future water demands.
- Water allocation and water quality objectives.
- Strategy, measures and action plan for achievement of goals.
- Financing of water use and management.
- Responsibility and schedule for implementation.
- Mechanisms for monitoring and updating.

Source: Adapted from the GWP IWRM Toolbox <http://gwpforum.netmasters05.netmasters.nl/en/>

In the context of IWRM, the management of land use is as important as managing the water resource itself, since it will affect flows, patterns of demand and pollution loads. When considering a specific catchment plan, it may be necessary to plan to regulate land use in upstream recharge areas and around reservoirs to prevent pollution, siltation and changed run-off regimes. Land use planning is vital for safeguarding environmentally vulnerable areas, wetlands and also for riverine ecosystems. Land use development decisions in urban areas (such as industrial sites or housing developments) also need to take water supply and pollution issues into account in the planning process. Over the longer term, effective land use planning can help promote water recycling and planned reuse. References and websites on land use planning in relation to water are given in Section 9.9.

The IWRM planning approach differs from the old masterplan concept in invoking a more flexible and dynamic approach to planning the development and management of water resources. That is, a catchment management plan is more of a strategic plan than a directive plan in the old masterplan style. Positive economic and social developments should be facilitated by a flexible plan and not impeded by a rigid one.

**The planning process.** Where river basins or catchments span the territory of two or more neighbouring countries, properly formulated IWRM plans are indispensable for widening and deepening regional co-operation in water resource management. The

process of planning itself serves to bring the parties together and requires them to think through water usage options from differing national viewpoints. This is important when it comes to discussing and negotiating trade-offs in water utilisation.

**Participation.** The best catchment plans are those which have involved interested and affected parties in their formulation and later in their implementation. This is more difficult to achieve when users are located in different countries, but it would be worth spending time and effort to bring users from different countries together. (This is discussed further in Sections 5.7 and 6.5 below.)

**Risk management.** A planning issue of particular importance for watercourse states is how to assess and manage risks. Upstream and downstream countries may have very different perceptions of how to manage floods, for example, and without detailed planning studies being carried out there is likely to be inefficient and inequitable allocations of risk and hence also of benefits of increased security and of the mitigation costs when disasters occur. Some guidelines are given in Box 7.

**Box 7: Sharing risks equitably – some guidelines**

Risk management should address five key questions:

- *What principles should govern risk mitigation decisions?* Should risk decisions be based on a precautionary approach, uniform safety standards or subsidiarity principles? Should decisions on risk bearing and mitigation be made by private individuals and communities or by professional experts? Who should pay for risk mitigation?
- *What is the appropriate scale and strictness of regulation?* This should depend on the nature of the hazard and the socio-economic characteristics of the related risks.
- *What is the appropriate mitigation strategy?* Options include complete hazard avoidance, structural measures, soft hazard reduction measures (e.g. catchment management), vulnerability reductions, risk pooling, loss bearing or sharing and post-event harm alleviation.
- *What are the appropriate policy tools?* These include direct government provision of safety regulations, economic incentives, land use planning, information provision, community participation and action.
- *What organisations need to be in place?* Examples would include stakeholder fora, co-ordination mechanisms as well as hazard regulators and safety providers.

*Source:* Adapted from the GWP IWRM Toolbox <http://gwpforum.netmasters05.netmasters.nl/en/>

**Complexities arising from asymmetrical risks.** This is probably an area where a lot of learning can take place within the SADC region. For example, there are asymmetrical risks related to flooding and water resource management between Mozambique and its upstream neighbours. These risks need to be better understood in order to better manage them in the future.

**Climate change.** The indications from a number of studies are that global changes in climate are likely to have adverse effects on southern Africa, particularly in respect of increasing the likelihood of droughts and floods. SADC member states will in future need to devote more time and attention to forecasting and risk mitigation through developing and implementing contingency plans.

## **5.4 Dams and development**

The future development of dams is a particularly important instance where integrated planning is required. National policies need to take into account the Consolidated SADC Regional Position on the World Commission on Dams (WCD) Report and reflect what countries have accepted as being relevant on dams and development for their particular circumstances<sup>4</sup>. The five core values enunciated in the WCD report – equity, efficiency, participatory decision-making, sustainability and accountability – are universally acceptable and applicable. It is in the implementation of the WCD's seven strategic priorities that national and SADC considerations are relevant. The strategic priorities are:

- gaining public acceptance
- comprehensive options assessment
- addressing existing dams
- sustaining rivers and livelihoods
- recognising entitlements and sharing benefits
- ensuring compliance and
- sharing rivers for peace, development and security.

Integrated planning, development and management of dams is to be promoted so as to optimise the use of the water resources, maximise derived benefits (such as hydropower, tourism, flood control, irrigation, water supply) and take both positive and negative externalities into account. This is crucially important in a regional context whether the dam is being jointly developed on a shared watercourse or is a national project on an upstream tributary entirely within the territory of one country.

Mechanisms need to be put in place to ensure the participation of all stakeholders in the decision-making process for dam development and, where appropriate, with adequate facilitation and empowerment of vulnerable groups to ensure their effective involvement in decision-making. Policy and legislation should provide for proper compensation and resettlement of communities directly affected by dam construction, so that they will not be worse off as a result of the project.

These principles have not been adhered to in past development of major dams in the SADC region, with a consequent dilution of the development impact. Kariba is a case in point – Box 8 summarises the salient questions stakeholders at a WCD workshop felt should in future be asked about the effectiveness of a large dam.

Policy on dams needs to embrace existing as well as future dam developments. There is considerable scope within SADC for watercourse states to negotiate and develop consensus on operating rules for dams on shared watercourses so as to optimise the socio-economic and environmental benefits in an equitable manner. Clearer policies and standards need also to be formulated on dam safety issues. Box 9 refers.

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<sup>4</sup> The reader is also referred to other reactions to the WCD report, in particular the criticisms of the International Commission on Large Dams (ICOLD). References and websites are available in Section 9.10.

**Box 8: Assessing the development effectiveness of large dams**

The following summary is drawn from a WCD workshop involving people with a stake in the Kariba Dam. The questions are those the Kariba stakeholders believed should be used in assessing the development effectiveness of large dams:

- **Has every possible development option been considered and exploited in the planning and implementation of the dam project?** In the case of Kariba, one of the main weaknesses of the project was the failure by the project planners to look beyond the provision of hydropower to the two participating countries. The stakeholders were of the view that development options in fisheries, tourism, irrigation and rural electrification should have been considered at the planning stage and implemented as part of the project.
- **Does the project increase regional co-operation?** In the view of the stakeholders, a dam is more effective if it promotes regional co-operation and large dams are best implemented in a regional rather than national context. In this regard, Kariba was viewed as being effective by the stakeholders because it became the nucleus for the development of the Southern African Power Pool and the power from the dam led to the industrial development of Zimbabwe and Zambia.
- **If people are to be displaced by the dam project, how will these displaced people benefit from the dam project?** For a dam to be considered effective, the benefits from the dam must be enjoyed by those displaced by the dam. This is one area in which the stakeholders found Kariba to have failed the test of development effectiveness, because the Tongas who were displaced by the dam benefited little from the project.
- **Does the project meet the required rate of return?** This is a purely financial and economic consideration, whereby an effective dam project should meet the predicted economic performance targets.
- **Is there an equitable distribution of benefits from the project?** This was another one of the issues that were most hotly debated at the stakeholder workshop. The stakeholders were reacting to the fact that most of the benefits from Kariba were not being enjoyed by local people who had suffered most as a result of the lake. In the view of the stakeholders, an effective dam project is one in which an effort is made to ensure that the benefits are distributed as equitably as possible. This was one area in which the stakeholders believed that the Kariba Dam project had not been effective.
- **Will the living standards of the people improve as a result of the project?** An effective dam project should be associated with an improvement of the living standards of the people, especially those displaced by the dam. Again, the Kariba Dam project was viewed by the most of the stakeholders as not having been entirely effective because the living standards of the displaced people were prejudiced.
- **Do the affected people participate in the decisions that related to the project?** In an effective dam project, the local affected people must be allowed to participate in decisions that relate to them. In the case of Kariba, the people were not afforded the opportunity to participate in the decisions that related to them and the dam, and stakeholders were mainly of the view that the Kariba project was not effective here.
- **Has an EIA and a costing of impacts been carried out?** An effective dam project should have an EIA and an environmental management plan. Since no EIA was carried out at Kariba, this was one area where the project failed. However, the stakeholders excused Kariba on this issue because at the time, environmental issues were not yet in vogue.
- **Is the dam project multi-purpose?** This question is linked to the one where the stakeholders believed that all development options must be investigated in the planning of a large dam project. The stakeholders felt that because the planners for Kariba confined themselves to hydropower issues, some opportunities for multi-purpose use were lost.
- **What efforts are to be made to minimise the displacement of people?** The decisions that were made on the size of Kariba were aimed at maximising the amount of power from the project through the construction of the largest dam possible. No analysis was carried out to reconcile the need for a large dam and power station; and the need to minimise the number of people to be displaced. In fact the Federal Power Board went on to increase the height of the dam wall by 20 feet resulting in the increase in the area inundation and a concomitant increase in the number of people to be displaced.

*Source:* Adapted from WCD Case Study on Kariba Dam (Section 9.10)



### Box 9: Guidelines on Dam Safety

#### Dam Safety – design

- Structural adequacy of the dam itself;
- Differential settlement causing cracking and allowing seepage and deterioration;
- Ability to withstand particular incidents - earthquake shock, sabotage attempts;
- Adequate evaluation in the design for small “failures” and the incorporation in the design of safety factors suitable for the degree of unknowns and expertise required in the construction or lack of diligence anticipated;
- Adequacy of materials e.g., possible deterioration of concrete, corrosion of steel, piping of seepage through impermeable earthfill zones;
- Adequacy and longevity of monitoring equipment (monitoring dam and foundation behaviour)
- Suitability for repair and refurbishing or upgrading;
- Adequacy and permanence of foundations – potential leaching by seepage, piping, loss of bearing capacity etc.;
- Adequacy of spillways to pass the designated Safety Evaluation Floods;
- Adequacy of spillway returns to withstand discharges without critical erosion damage;
- Protection at spillways against boats or swimmers being washed over and against ingress of trash and occlusion;
- Adequacy of trash screening at outlets;
- Minimum vulnerability to human error or failure of power supplies or incidences of lightning strikes (and even incursions of animals and animal detritus) in operating systems, especially of spillway or outlet gates;

#### Dam Safety - operation

- Diligent on- and off-site management, - inspection and monitoring (especially seepage and instrumentation), operation, outlet trash monitoring, rehearsal of emergency situations, maintenance, security, etc.
- Communication with upstream and downstream communities on operations, warnings of releases and flood probabilities as well as possible water restrictions;
- Fully detailed emergency action plan for downstream riparian areas, distributed, workshopped and practiced with those who may be affected.

#### Reservoir Safety

- Safety of geological formations against earth, mud or rock slides;
- Potential for reservoir induced seismicity and possible resulting damage;
- Safety of people and animals from lake hazards.

#### Environmental Design

- Adequacy of outlets to discharge downstream from layers within the reservoir at acceptable temperatures, state of oxygenation etc.
- Adequacy of outlets to release maximum demand flows with partial mechanical failure or blockage (i.e. redundancy).
- Sufficient discharge capacity to release short environmental freshets (floods) to trigger breeding cycles etc.
- Provision for the passage of fish (including eels) upstream;
- Possibility to pass incoming silt loads during flood periods, or to de-silt through bottom outlets.
- Adequacy of flow measurement – particularly releases, but also inflow and evaporation, which is a substantial loss.

*Source:* Key Dam Issues in the SADC Region (Section 9.10)

## 5.5 Demand management and efficiency of water use

The traditional approach to water management in Southern Africa (and also in many other parts of the world) has been **supply-oriented**. The emphasis of a supply-oriented approach is on the provision of physical infrastructure (for example, by constructing more dams) in response to projected increases in water demand. When new infrastructure projects are planned, projected water demand does not take into account the effects of prices (current and future) on water demand. As the least expensive sources of supply are exhausted, new more expensive projects must be implemented. Prices do not reflect true costs resulting in the overuse of water and environmental problems. The low water tariffs render the water supply entities

financially unviable, which, in turn, leads to a decline in the quality of the service provided (for example, lack of reliability) and in inadequate investment resources to extend access to water to the growing numbers of people not covered by a utility's reticulation system.

In contrast to the above approach, and partly in direct response to the outcomes of this approach, a **water demand management** (WDM) oriented approach focuses on *economic demand* (the demand for water at a price which reflects the full economic costs), on increasing the efficiency of water use and on conservation, recycling and re-use of water.

The most obvious dimension of WDM is **consumer-oriented WDM**, which aims to change the consumption practices of existing consumers. Consumers are made aware of the importance of using water efficiently through a combination of awareness campaigns, incentives (rising block tariff structures) and, where necessary (for example in times of drought), punitive measures (for example, the imposition of penalties). The provision of water-efficient devices (such as low flush toilets) is another important aspect of consumer-oriented WDM policies. The term WDM is also (though somewhat confusingly) applied to efficiency measures to be taken by water supply companies. This could be called **utility-oriented WDM**. Box 10 on Bulawayo provides a good example of what can be achieved in terms of reduced unaccounted for water (UAW) by improved management of a utility's pipe network. Stretching the meaning even further, WDM can also be applied to activities which **increase water use from non-traditional sources**. This can be at the level of the water consumer (e.g. rainwater harvesting, plant-level recycling) or at the level of the utility (e.g. wastewater treatment which enables water re-use).

“Efficiency” has been used here in the conventional sense of users avoiding waste and using the minimum amount of water that meets users' needs. In the case of water supply companies, the corresponding interpretation of efficiency is operational efficiency through, for example, efficient (least cost) use of resources to achieve specified goals. This type of efficiency might be called **technical efficiency** or, in the jargon of economics, “**X-efficiency**”.

Another crucial concept in economics is “**allocative efficiency**” which is associated with what is called “Pareto optimality”. A distribution of water to different users is regarded as an efficient or Pareto-optimal allocation if there is no possible improvement that could raise the welfare of one user without reducing the welfare of another. This concept takes no account of the fairness of the distribution of resources, and thus is certainly not “optimal” when equity issues are taken into account. (This is explored in more detail in the next section.) Allocative efficiency has immediate relevance in respect of decisions about intra- and inter-sectoral water allocations, in particular within the agricultural sector (changing the cropping mix) and between sectors (to choose between, say, irrigated agriculture and urban water requirements). The significance of changing the cropping mix and associated irrigation technology is illustrated by a pertinent regional example in Box 11.

**Box 10: Water demand management – some lessons from the experience in Bulawayo**

Bulawayo is located in a dry part of Zimbabwe which is vulnerable to drought. The 1992 once-in-a-century drought had a very severe impact on Bulawayo. Extraordinary measures were taken by both domestic and industrial water users in response to this situation. These measures have had lasting consequences:

- Water conservation has become part of the ethos of the city.
- The rising block tariff system (introduced in the wake of the drought) combined with water conservation has resulted in very low domestic per capita water consumption figures (36 litres per capita per day in high density areas and 75 litres per capita per day in low density areas).
- There is a degree of complacency within the Water Department of the Bulawayo City Council (BCC) about the supply situation because the City coped so well with such a severe shortage of water, and water demand has remained at surprisingly low levels.

**A major water demand management project**

Bulawayo's drought story, coupled with its ongoing battle to have a major investment project executed to secure the City's water supplies (Gwayi-Shangani Dam being next, with a pipeline to the Zambezi the ultimate goal) made it possible to secure a grant from Norway for a WDM project. Started in 1999, the Bulawayo Water Conservation & Sector Services Upgrading Project introduced new management tools, conducted studies to enhance understanding of what needs to be done in the area of WDM and made a start on replacing corroded parts of the network. It also introduced sophisticated GIS-based utility mapping, network modelling, pressure and meter zoning and water loss control systems. Although some of the impetus may be lost (the project officially came to an end in the first quarter of 2002), much of what has been done has become embedded in the planning and operations of the Water Department as a lasting legacy.

WDM measures were ranked by staff as follows:

- Pressure management (including mapping, network modelling, maintenance and system upgrades) to reduce pipe bursts and water leakage.
- Improved operations and maintenance management system.
- A tariff structure which is equitable but also conservation-oriented.
- The establishment of a leak detection unit.
- An asset management strategy which provides for the progressive replacement of old parts of the transmission and distribution network.

*Source:* Adapted from Norplan et al, 2001 (Section 9.11)

**Box 11: Water demand management and the allocation of water – an example from the lower Orange River**

A recent review of the lower Orange River shows that there is an overall shortage of water in the lower stretch of the river if South Africa's commitments to Namibia are to be met at the same time as providing appropriately for in-stream flow requirements to protect the environment. Water demand management provides one possible solution to this problem.

At present, irrigation in the middle Orange River uses wasteful flood irrigation for low value-added crops. This is occurring at the same time that constraints apply to higher value-added crop production using drip irrigation technology in the lower Orange.

In the light of the shortage of water in the lower Orange, to meet requirements, one solution would be for South Africa to invest (or require farmers to invest) in water saving irrigation technology in the middle Orange. This initiative would make more water available for the lower Orange River and could provide at least a partial solution to the problem of water deficits in this stretch of the river.

*Source:* South Africa and Namibia Water Policy Reviews (Section 9.1)

**Inter-sector allocations.** The issue of inter-sectoral allocations needs to be handled with care. At an aggregate level, it is the case that the largest sector user of water in all SADC countries is the agricultural sector. This is not to say, however, that it will necessarily be practicable or economic to simply reallocate water from agriculture as urban demand grows. Furthermore, except in the heavily committed catchments in the world, it may not be desirable to make *permanent transfers* from agriculture to other sectors. More appropriate, especially in drought-prone Southern Africa, is to have legal and institutional systems in place to make *temporary transfers* of water between agriculture and urban areas when low water availability makes this imperative. In normal times, agriculture can draw its full requirements while paying a lower price which reflects the willingness of farmers (under such a system) to accept a high level of risk.<sup>5</sup>

**A paradigm shift.** In formulating national water policies and strategies, water demand management should have a central place. As can be seen from the review of WDM in SADC countries given in the Synthesis Report, much needs to be done to achieve the “paradigm shift” described above.<sup>6</sup> The potential benefits are significant, both from a national viewpoint and in terms of creating an appropriate framework for regional co-operation with shared watercourse states. One of the fundamental aspects in a regional setting is that upstream countries should be making the best use of the water being extracted from shared watercourses. Before negotiating for higher levels of extraction, a full programme of water demand management (involving appropriate levels of both technical and allocative efficiency) should be evaluated and implemented.

**Dynamic considerations.** The level and intensity of WDM effort that is appropriate and economically efficient will change over time. When demands on shared water are modest, it would not make sense to require extreme forms of WDM to be applied by upstream users. Many WDM measures involve a cost, for example the investment costs associated with moving to a more sophisticated water efficient irrigation technology. There is a trade-off to be made between the investment costs incurred upstream and the value of the water made available downstream. As pressure on the shared resource grows, a higher level of efficiency of use, and thus higher WDM effort, will become appropriate in the upstream country.<sup>7</sup> Storage capacity needs to be increased so as to exceed growth in demand, but demand that reflects efficient use.

**Food security.** The co-ordination and harmonisation of water and related development policies should not be limited to countries sharing contiguous watercourses. The concept of virtual water makes it possible for water stressed countries to obtain water from those with abundant water and it is thus appropriate to look at efficient use of water for the SADC region as a whole<sup>8</sup>. The challenge that this raises - to incorporate comparative water advantages and disadvantages into the spatial planning of economic activities - is one which invites a far higher level of regional integration than merely co-operating in particular sectors.

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<sup>5</sup> This promising concept is elaborated further in Savenije and Van der Zaag, 2003 (Section 9.11).

<sup>6</sup> There are a number of specific studies on WDM in the SADC region – see references in Section 9.11.

<sup>7</sup> See also Section 5.9 (Economic and financial instruments).

<sup>8</sup> The concept of virtual water was subject to a controversial interpretation at the July 2004 SADC workshop. It is discussed in more detail in RWP, section 4.1.4.

“Water intensive sectors should be located in countries with adequate water resources. Dry countries should specialise in activities that require little water. There is need to study the benefits of regional specialisation based on water, taking into account other production factors and policy goals such as food security.”<sup>9</sup> For this approach to be adopted, dry countries would have to accept that food security is best served by having a strong economy. Equating food security with food self-sufficiency is a misplaced idea which has led in the past and continues to lead to patterns of water use which are inefficient and unsustainable.

## **5.6 Demand management and equitable access to water**

The very significant problem in Southern Africa is not that most households use too much water, but rather that they use *too little*. Rural people struggle for clean water for domestic purposes, while at the same typically having to depend on rainfed agriculture rather than having access to water for productive purposes to enhance their cropping potential. In the urban areas, in many SADC counties it is only a minority which enjoys access to piped treated water, and again people without access (who typically have to pay exorbitant prices to water vendors when there is deficient public supply) also consume shocking little water.

It is in this context of deprivation that the real water demand challenge in SADC is to ensure that water is allocated more equitably to the population as a whole, in the process raising the consumption levels of those presently without reasonable access to water. The WDM concept thus needs to be broadened to deal with the issue of equity, the objective being to extend access to both domestic and productive water to those not properly served at present. Turning “suppressed” demand into effective demand will lead to an increase in water consumption by households. However, if these initiatives are combined with the WDM approaches for those already with access outlined in Section 5.5, this should not require a very significant increase in overall water demand (and the consequent investments in infrastructure with negative consequences for environmental sustainability).

Taking equity seriously would give rise to enormous social and economic benefits. In respect of potable water, for example, there are important health benefits to be derived from people having adequate access to clean, safe supplies. These benefits are not limited to improved quality of life for those directly affected, but to lower costs within the public health system and higher economic production at the national level from a healthier workforce. In this context, there is a need to increase clean water use to at least 25 litres per person per day (lpcd), and preferably 40 lpcd, as recommended by the World Health Organisation (WHO). Inexpensive and sustainable technologies for quickly reaching these targets include kiosk systems in peri-urban areas (regulated public standpipes, with water being paid for by users) and upgraded family wells in rural areas.

Emphasising clean water for domestic purposes but excluding water for productive purposes would be a lost opportunity, however. As outlined in Box 12, there is an international initiative, derived largely from the Southern African experience, to push for a change from what is largely a health-oriented paradigm to one that emphasises poverty reduction through access to water for productive purposes.

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<sup>9</sup> See Arntzen, 2003 (Section 9.11).

**Box 12: Responding to poverty – promoting productive uses of water at the household level**

The suggestion that promoting productive uses of water at the household level should be a fundamental component of strategies to reduce poverty is elaborated upon in a statement arising from an international meeting held in Muldersdrift in South Africa in January 2003. The main steps in the proposed argument are as follows:

- Productive use of water at the household level by poor people reduces poverty.
- In rural areas particularly, people need more than their basic domestic water requirement to be productive.
- Productive use enhances the sustainability of water supply systems and services.
- People need local solutions and multiple sources for multiple uses.
- An integrated approach is essential to achieve significant impacts on poverty.

The full statement and the papers presented at the meeting are available at [www.irc.nl/prodwat](http://www.irc.nl/prodwat). See also other references given in Section 9.12.

The conceptual foundations for this initiative are best captured in Amartya Sen's concept of "entitlements" and his assertion that development should be conceived of as a process of expanding the "capabilities" of people. It is particularly through his work in uncovering the real reasons for famines (which often have little to do with shortages of food, but arise because of inadequate access to food) that Sen's idea of entitlements has taken root.<sup>10</sup> In Southern Africa the obvious extension is to combine entitlement to both food and water by proposing that access to sufficient water to use for productive as well as household purposes be recognised as an entitlement for rural people. In some parts of the region, the cost of supplying water for production may be prohibitive. However, in many parts of the region households could be assisted to obtain at least sufficient water for household gardens and livestock watering, often at very modest costs. A variety of technologies and approaches needs to be embraced to achieve this objective.

This approach would represent a significant departure from the dominant approach in rural water supply and sanitation, which emphasises clean water for domestic usage and effectively precludes exploring the possibilities of providing productive water first, despite the obvious benefits of tackling the root poverty. In this context, the capabilities approach would surely mean giving priority to access to water in order to allow new income-earning opportunities. Households with enhanced capabilities would themselves be able to ensure adequate domestic water and sanitation, reducing dependence on governments and outside agencies and ensuring real sustainability of narrow health-centred interventions. This statement should not be taken to imply that the provision of water and sanitation is an objective in its own right: it should rather be seen as part of a capabilities-based strategy to tackle poverty as comprehensively as possible in the rural areas of Southern Africa. In the water sector, this involves shifting from a "health driven paradigm" to a "putting productive water first" paradigm.

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<sup>10</sup> See, in particular, Sen's *Poverty and Famines: An Essay on Entitlement and Deprivation* (Section 9.12). For a useful discussion of Sen's ideas in the context of water pricing, see Eberhard, 2000 (Section 9.11).

## 5.7 Participation<sup>11</sup>

Changing water practices to achieve IWRM requires changes in the deeply held attitudes of individuals, institutions, professionals and social organisations within civil society. The key to encouraging an IWRM-oriented civil society lies in the creation of shared visions, through joint diagnosis, joint creation of options, joint implementation, and joint monitoring. Participatory approaches in IWRM are powerful instruments for social change. To make these effective, education, training and awareness raising are necessary.

National policies and strategies need to ensure that, where river basins and aquifers cross national boundaries, shared IWRM visions do so as well. This is an area that hitherto has attracted little attention. It is already difficult and consuming of time and resources to ensure that water user groups and other interested parties are adequately included in national IWRM strategy formulation and implementation. Such groups need to be sensitised to the importance of looking at catchments as a whole, and taking into consideration the interests of users in neighbouring countries. Where possible, cross-border meetings should be facilitated.

The key to successful social change lies in good communication between water sector professionals and civil society stakeholders and in ensuring a broad base of participation, particularly in respect of the inclusion of women. Some lessons in these areas are summarised in Box 13.

### Box 13: Developing shared IWRM visions – some lessons on information exchange and participation

Good information exchange with stakeholders is enhanced by the following principles:

- *Appropriateness*: Providing information that is relevant to the IWRM task at hand has been tested in the field and rigorously proven through research and development. Information must also be applicable to the type of problem, the level of institutional capacity and the technical ability of the practitioners. If capacity is lacking, special efforts will be needed to facilitate information exchange. Internet based information is key but where it is not easily accessible, alternatives must be used.
- *Accessibility*: It is important to build on the current capacity of practitioners rather than to require major upgrades in individual or organisational or technical ability.
- *Equity*: Information exchange should respect cultural needs and gender issues, and take care not to discriminate against users or providers because of their remote locations.

Lessons from broadening participation in IWRM:

- Involving women in water project planning is a powerful way of transforming social gender roles, resulting in more sustainable projects.
- Experience has shown that projects that involve disadvantaged and previously overlooked groups (such as women and indigenous groups) in planning and decision making, are implemented faster, with fewer problems and with less costly maintenance once operational.

The level of participation should take the form appropriate to the scale of the problem or service in question.

Source: Adapted from the GWP IWRM Toolbox <http://gwpforum.netmasters05.netmasters.nl/en/>

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<sup>11</sup> See also Section 6.5 and references/websites in Sections 9.7 and 9.13.

**Box 14: The “Every River Has its People” Project – lessons in cross-country user participation**

The sustainable management of the resources of the Okavango Basin rests at the grassroots level with the people living along the river and with those who depend on the wetlands resources for their everyday livelihood. A watercourse system is an hydraulic unit with shared ecosystems: it is clear that political boundaries are essentially artificial as far as the natural environment is concerned. It is therefore imperative that the people in the Okavango Basin should be involved and consulted because they are the most important interested and effected group of stakeholders in the Basin.

The “Every River has its People” Project (ERP) was established to promote the sustainable management of the natural resources in the Okavango Basin and to facilitate the participation of the river stakeholders in the decision-making processes concerning the river. The Project is a partnership between the stakeholders in all three riparian states, the implementing NGOs and the Permanent Okavango River Basin Commission (OKACOM).

Through consultations and discussions with the local people, the ERP managed to establish a Basin-Wide Forum (BWF) comprising representatives from the Okavango River in each basin state. The first meeting where all the representatives from Angola, Botswana and Namibia were together, at one occasion, took place in February 2003 at Rundu, Namibia. Certainly, history was made as far as integrated river basin management in Southern Africa is concerned because the BWF met the commissioners of OKACOM and had the opportunity to discuss a number of issues of concern. They could address questions to the commissioners and the commissioners could reciprocate by giving their views, providing clarification and asking for information. It was also agreed that the BWF could be represented at the commission level.

This new process was met with great enthusiasm and has the potential to assist in developing mutual trust, understanding and co-operation between all parties in the three basin states.

*Source:* OKACOM Participants

## **5.8 Conflict resolution**

Procedures for consensus building and conflict management are central to the success of regional co-operation in water. In a national context, conflicts associated with IWRM can ultimately be resolved with recourse to the law and legal procedures. By contrast, in the transboundary context, it is only in the most extreme circumstances that there would or could be recourse to international legal mechanisms. This makes it imperative for all parties to be familiar with and to use the wide array of tools available to anticipate, prevent and react to conflicts over shared water resources.

National water policies need to make clear a willingness and commitment to resolve conflicts, particularly possible conflicts which might arise on shared watercourses. The Regional Water Policy (Section 3.5) commits member states to pursue all avenues of amicable prevention and resolution of conflicts in accordance with the principles enshrined in the SADC Treaty. Where amicable resolution cannot be achieved, conciliation, mediation and arbitration mechanisms are to be pursued, with use of the SADC Tribunal or other recognised international arbitration structures only as the last resort.

National water strategies need to incorporate conflict management tools. Three kinds of tools are briefly described in Box 15. Lessons from the practical example of conflict resolution in the Incomati Basin are given in Box 16. Other references and websites relating to conflict resolution are given in Section 9.14.



**Box 15: Conflict resolution tools – an overview and some lessons**

**Facilitation, mediation, fact-finding and arbitration:**

- Water experts often view disputes as factual problems of information and misunderstanding of data. But in many cases disagreements are usually over interests, values and perceptions rather than facts. Fact finding in such cases may be of limited use.
- Dispute panels have been successful (even in very acrimonious situations) where the number of parties is small and the issues tend to be technical. They also offer a useful model for forming dispute clauses in agreements between parties who will be working with each other.

**Shared vision planning:**

- The best modelling applications try to show parties an overall picture of the situation and to put the water conflict situation in its context.
- A shared vision can also be useful to begin to illustrate how benefits can be generated from co-operation and thus begin to push parties towards a focus on sharing benefits, rather than simply sharing flows.

**Building consensus:**

- Start by defining the problem rather than proposing solutions or taking stands.
- Focus on interests; identify numerous alternatives.
- Separate the generation of alternatives from their evaluation.
- Agree on principles or criteria to evaluate alternatives.
- Expect agreements to go through a number of iterations; document agreements to reduce misunderstanding.
- Agree on the process whereby agreements can be revised and disagreements solved.
- Use the process to create agreement.
- Create a commitment to implementation by allowing all stakeholders to participate in decision making.
- Accept the legitimacy of other parties' feelings.

Source: Adapted from the GWP IWRM Toolbox <http://gwpforum.netmasters05.netmasters.nl/en/>

## **5.9 Environmental and service provision regulation**

Regulation in the water sector takes two main forms: regulation related to the water resource itself (allocations, abstractions, returns, water quality) and regulation of water entities (the organisations involved in managing water supply infrastructure and wastewater infrastructure). While both forms of regulation can affect the quantity and quality of water available for sharing in shared watercourses, the regulation related to the water resource itself has a more direct and immediate impact.

It is important that national policies and strategies on the regulation of water resources should take into account the interests of shared watercourse states in the regulation of both the quantity and the quality of water.

**Water quantity** is typically regulated through a system of permits or licences. These are managed through an administrative system. Systems for trading permits or licences between water users are also evolving but have had very limited use to date in the SADC region.

**Water quality** is typically managed by means of national water quality standards. These can be applied in a more targeted way through a permit system which allows for the relaxation or the strengthening of standards in specific circumstances. Quality standards can be set for effluent quality and for the receiving environment. Systems enabling “pollution permits” (the right to pollute to a certain extent) to be traded are also in the process of evolving but have had very limited use to date within the SADC region.

**Box 16: Conflict resolution in the Incomati Basin – some lessons**

The Incomati River Basin lies in South Africa, Swaziland and Mozambique. Water use is intense with half of the water generated in the basin being withdrawn for consumptive purposes (mainly irrigation of sugar cane). Mozambique has had the keenest interest in co-operation in the sharing of water from the Incomati River because it is downstream and hence most vulnerable to the actions of the two upstream countries. Of major concern to Mozambique has been the reduction of flows in the Incomati, with dry spells becoming a common occurrence in a river that was once perennial.

In several respects, Mozambique has always been the weakest party, particularly in relation to the regional giant, South Africa. However, even during the apartheid era when South Africa was actively destabilising the frontline states, South Africa nonetheless took Mozambique's interests into account to some extent in matters relating to shared watercourses. This was evident from Mozambique's inclusion in the regional committee formed in 1983 to deal with the Incomati, Umbeluzi and Maputo catchments (Tripartite Permanent Technical Committee, or TPTC).

The work of the TPTC led to the signing of the Pigg's Peak Agreement in 1991. This gave Swaziland the go-ahead for the construction of two new irrigation dams, but in return Mozambique negotiated assured perennial flows of water at Ressano Garcia and a requirement that new storage projects be brought to the TPTC for discussion and joint decision making. The recent Tripartite Interim Agreement (August 2002) relating to both the Maputo and Incomati Rivers provides evidence of further progress in balancing the interest of the riparian states in their access to shared water resources.

Given the antagonistic relations between South Africa and its neighbours in the 1980s and the rapidly growing demand for the water, a relevant question to ask is "*why didn't open conflict emerge between the riparian countries over the water resources of the Incomati and why did co-operation prevail?*" In answering this question, a recent study gives reasons which lend support to the thesis that "water drives peoples and countries towards co-operation": (1) riparian countries comprise people who share a common space and a common history, and thus also a common future; (2) political developments resulted in a thawing of relations between South Africa and Mozambique; (3) Swaziland was able to play a useful mediating role between these two countries, while at the same time pushing its own interests; and (4) potential conflicts were evaded by allowing more water to be abstracted and more dams to be built in the Incomati catchment.

However, as demands continue to grow and water stress increases, it is not certain that increased use will continue to be associated with rising co-operation.

*Source:* Carmo Vaz and van der Zaag, 2003 (Section 9.14)

**Sediment loads** are an important, but often neglected, component of water quality regulation. For example, sediment loads can be significantly affected by activities such as river-bed mining, over-grazing and deforestation. Sediment loads can affect both water quality and quantity (for example through reduced storage capacity due to increased siltation in dams). Another major environmental concern relates to **alien invasive species**. Regional cooperation will be essential in the eradication of non-economic alien species which are presently colonising catchments and water bodies, posing a key challenge to water resources development and management.

Relevant lessons on the management of water quantity and quality are highlighted in Boxes 17 and 19.

**Box 17: The regulation of water quantity – some lessons**

- Both **surface and ground water** abstractions should be regulated in conjunction to prevent undesirable shifts between the two.
- Both water **quantity and quality** should be regulated in conjunction since the two are intimately related.
- Water abstraction regulation should take into account **non-consumptive uses of water**, including aquatic ecosystems, recreation and navigation.
- Water quantity (and quality) regulation should include the **regulation of land use** and related activities which significantly affect water quantity (for example, forestation, deforestation, dry-land sugar cane farming, overgrazing and in-river mining).
- Agreements related to the allocation of water between countries with shared watercourses should be based primarily on the principles of the **maximisation and sharing of benefits in an equitable and reasonable manner**.
- The method of regulation should be appropriate in the light of the **institutional capacity** required for effective monitoring and enforcement. This capacity should preferably be consistent across shared watercourses.

*Source:* Adapted from the GWP IWRM Toolbox <http://gwpforum.netmasters05.netmasters.nl/en/>

**Box 18: Regulating groundwater extraction in shared aquifers – Malawi and Zambia**

Groundwater development and abstractions are regulated in Malawi by means of a permit system while in Zambia they are not. Where there are shared aquifers, this would mean that one country is regulating abstractions to a predetermined safe yield while the other is not, thus compromising the sustainability of the utilisation of the groundwater. It is therefore necessary that shared aquifers be assessed jointly and that riparian states adopt common management processes.

*Source:* Malawi and Zambia Water Policy Reviews (Section 9.1)

**Box 19: The regulation of water quality – some lessons**

- Regulation of **ambient water quality** is more satisfactory because it is based on outcomes (the quality of the water in the environment) rather than inputs (effluent quality). However, this approach is more complex and demanding than an emissions-based approach, requiring greater technical and institutional capacity. Furthermore, an ambient water quality approach can lead to different regulatory conditions for similar polluters (and pollutants) in different parts of a shared watercourse because the condition of the receiving environment, which is used to determine the discharge or abstraction standards, is likely to differ in different locations.
- Regulation of **emissions** through effluent standards is likely to be a more appropriate method of regulation where significant capacity constraints exist and in the case of shared watercourses because it may be politically more difficult to implement ambient water quality standards across shared watercourses.
- An emission approach or pollution control based on **Best Available Technology** is essential for pollutants that accumulate in the environment.
- Product standards are appropriate for **diffuse pollution** because emissions are difficult to monitor.
- **Standards** should be achievable in the short term, but they should also stimulate further improvements in the long term through progressive tightening.
- Wherever practical, the regulation of emissions should be based on **self-monitoring and reporting**, with the regulating body undertaking random audits of these activities rather than being directly involved in the routine activities itself.
- The **implementation** of regulation needs to be **strategic**, focusing initially on those regulations and interventions that would have the most impact for the least cost and progressively improving and extending regulatory interventions over time (but always with a view to their effectiveness and appropriateness).
- The method of regulation should be appropriate in the light of the **institutional capacity** required for effective monitoring and enforcement.

*Source:* Adapted from the GWP IWRM Toolbox <http://gwpforum.netmasters05.netmasters.nl/en/>

**Box 20: In-stream flow requirements and water allocations – an example from the lower Orange River**

A key question to be addressed in the allocation of water between Namibia and South Africa in the lower Orange River is the determination of the appropriate in-stream flow requirements necessary to protect the environment. This, by its very nature, is not an objective assessment. Different determinations of the in-stream flow requirement will have different consequences for the environment and will come with different financial costs and political implications related to how additional water can be made available and allocated between South Africa and Namibia.

The lesson to be learnt here is that arriving at a common understanding of ecological requirements of the river (and the consequences of not meeting these requirements) and agreeing on a common regulatory approach to the management of the environment in the lower Orange River, are important prerequisites to reaching an agreement on the allocation of water between South Africa and Namibia.

*Source:* Namibia and South Africa Water Policy Reviews (Section 9.1)

**Box 21: Regulating water quality in the Zambezi River**

Water quality guidelines for livestock watering, irrigation and aquatic biota have been prepared by the Zambezi River Authority for the environment monitoring of the Zambezi River common to Zambia and Zimbabwe. Similar compliance to maintain the water course within the guidelines is required upstream from where the water originates in order to maintain these standards. To protect and preserve the basin ecosystem it is necessary to increase the scope of such guidelines by influencing the common guidelines that cover an entire shared watercourse.

Countries formulating any national guidelines that will be applied in a shared watercourse would need to develop these to conform with Article 4 (2) of the Revised Protocol on Shared Watercourses in the SADC Region which provides for environmental protection and preservation. Article 4 (2) (ii) specifically provides that "watercourse states shall take steps to harmonise their policies and legislation in this connection".

*Source:* Zambia Water Policy Review (Section 9.1)

While all countries have a need for environmental regulation to manage water as a natural resource, the concept of a regulator for water services has arisen in the context of the commercialisation and/or privatisation of urban water and sewerage services. While an autonomous, professional water services regulator would by now be considered essential for a country contemplating privatising water supply, such institutions have proved their worth even where utilities are only to be commercialised (the assets remaining 100% in state hands). Zambia's water services regulator, the National Water and Sanitation Council, is a case in point.

SADC countries are increasingly interested in exploring public-private-civil partnerships in order to achieve social and economic objectives in the water sector. Whatever structure of ownership and management responsibility is chosen, the objective in the establishment of a water services regulator is to provide a reliable and predictable framework in which the interests of consumers and suppliers are balanced. The regulator must ensure that suppliers of water attain the quality and other standards of delivery that consumers have a right to expect at prices that provide an adequate but not excessive return to the utility, while also meeting defined social

goals (such as lifeline tariffs for poor consumers and achieving network expansion targets to improve access). Regulation may also extend to wastewater.

Professionalism and autonomy of the regulator from the executive arm of government are important to protect both consumers and suppliers from water continuously being used for short-term political purposes. The long-term interests of consumers, and more especially potential consumers presently without access to treated, piped water, are best served by having a coherent and predictable framework in which the utilities can be properly run, the potential of water demand management exploited and orderly expansion of the network and supply system planned and implemented.

Further discussion of pricing and other aspects of regulation are given in Sections 5.10 and 6.4. References and websites are to be found in Sections 9.16 and 9.17.

## **5.10 Economic and financial instruments<sup>12</sup>**

### **5.10.1 Introduction**

Economic and financial instruments (defined below) affect behaviour (through the creation of incentives and disincentives related to IWRM activities and water use) and determine to a large extent the financial viability of water resource management activities.

**Economic instruments** (prices and other incentive-based measures such as water trading, subsidies and effluent charges) are typically used to promote the efficient allocation and use of the water resource. Economic instruments may also be used to achieve the broader objectives of equitable allocation and the sustainable use of the water resource. Economic instruments work best when they complement (and are complemented by) appropriate policy, regulatory, institutional, technical and social instruments.

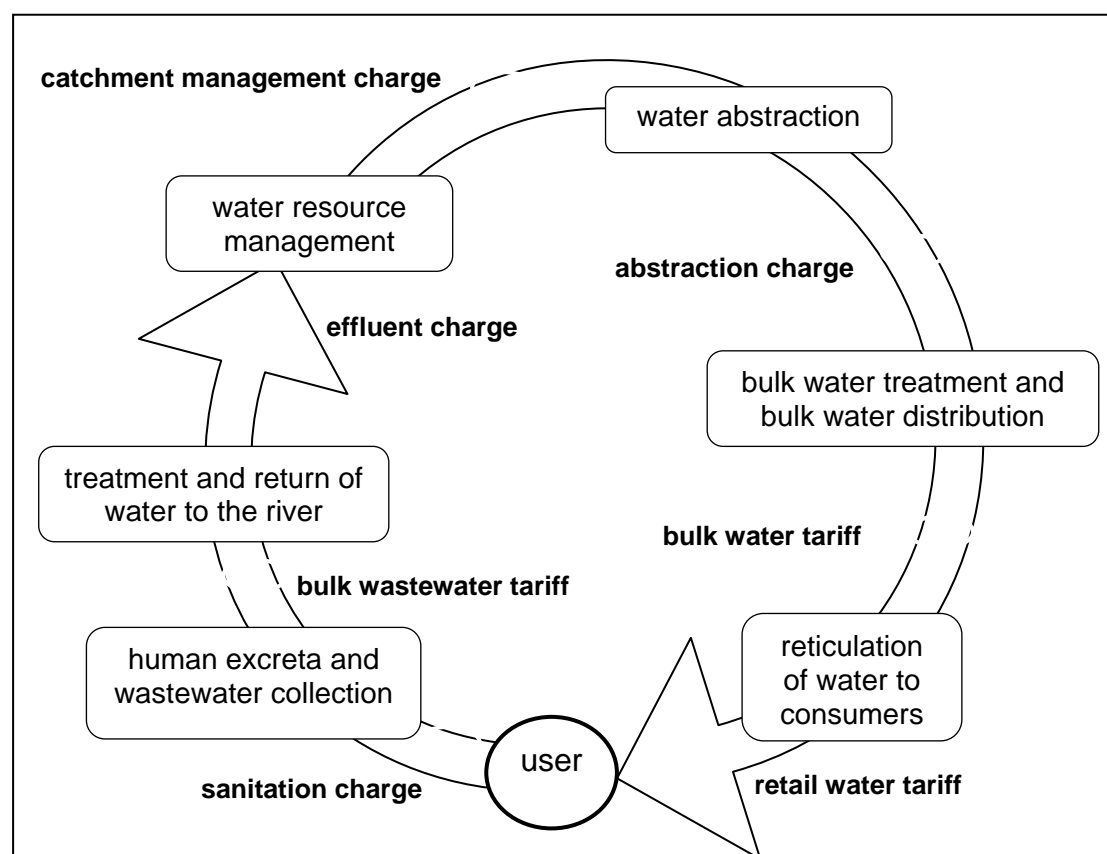
**Financial instruments** refer to mechanisms that are used to raise money to finance activities (of both an operating and capital nature). Whereas economic instruments are primarily concerned with the behaviour that results from a set of incentives, financial instruments are primarily concerned with the income that will result and how this relates to the financial costs of the activities that must be funded.

These distinctions are not as neat as the above definitions imply. There are important overlaps between economic and financial instruments, water tariffs being a clear case in point. A commercially-oriented water utility would set tariffs to meet its financial objectives of adequately covering operation, maintenance and capital costs. The utility's performance would be measured by various financial indicators, such as net profit, return on capital, credit worthiness (ability to service loans) etc. By contrast, the economic viewpoint on tariffs is to assess their contribution to a combination of water sector objectives, not just limited to ensuring adequate service delivery to existing water consumers, but also requiring equity improvements (increasing peoples' access to water) and ensuring environmental sustainability. As already discussed in Section 5.9, an independent regulator with adequate powers is the best way of ensuring that the financial orientation of a water utility is tempered by the economic or national interest viewpoint.

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<sup>12</sup> References and websites in Section 9.17.

The typical relationship between economic and financial instruments can be conveniently illustrated in relation to the various water charges imposed on consumers at different stages of the water cycle – see Figure 2. The implied prices affect institutional and user incentives in the water sector.



**Figure 2: Water prices and the water cycle**

**Catchment management or water resource management charge.** The catchment management charge is primarily a financial instrument to finance water resource management activities at the local level. In principle, it covers the costs of river basin or catchment management institutions and is collected by those institutions or by some national parent body. In some cases, the amounts raised from catchment management charges may be less than the associated costs, the difference being funded by central government subventions (from general tax revenues) or donor funds.

**Abstraction charges.** Abstraction charges (for ground and surface water) relate to both the right and cost of abstracting water from its natural environment. Abstraction charges are likely to have a significant influence on water allocations and use and are one of the primary economic instruments in the water sector. The abstraction charge can be thought of as comprising two components:

- **An “economic charge”** relating to the right to abstract and the economic value of the water itself. This should be based on the *opportunity cost* of using water for

this use rather than its next best alternative. (See Box 22.) It may be collected by the national or local water resource management institutions.

- **An infrastructure charge** relating to the marginal cost of abstracting the water. Depending on the circumstances, this could be either a short-run marginal cost or a long-run marginal cost. (See Box 22.) This charge is collected by the institution responsible for the operation, management and future investment in the supply infrastructure.

**Box 22: Economic concepts related to water pricing and other economic instruments**

**Marginal cost pricing**

**Definition.** A marginal cost refers to the cost of supplying the “next unit”. This is a future-oriented cost and is different to an average (historical) cost which is the average cost of all the units supplied up to this point over a defined period of time in the past.

**Neo-classical economic theory** asserts that prices promote the efficient allocation of resources when they are equal to the marginal cost of production.

**Short-run and long-run costs.** When water infrastructure is provided in large “lumps” (for example, dams), then short-run and long-run marginal costs are different. Economists recommend that long-run marginal costs are used for water pricing. For practical reasons, these are calculated as an average incremental cost.

**Average incremental cost** is the average cost of providing future infrastructure (for example, a series of lumpy future investments) discounted to a present day cost.

**Opportunity cost.** An opportunity cost is the value of an alternative foregone. For example, when allocating water to an urban water use from the irrigation of sugar, the opportunity cost is the value of the water as an input to sugar production.

**Externality** is the cost or benefit not taken into account in a “market transaction”. For example, when a household expresses a willingness to pay for a sanitation service, that household only considers the private benefit (to the household) derived from the sanitation service and not the public benefit to the community as a whole arising when private households in the community practise safe sanitation. This is a positive externality. Water pollution which adversely affects downstream users is an example of a negative externality.

*References:* Eberhard, 2001 and Robinson, 2003 (Sections 9.17 and 9.4)

**Bulk water tariff.** This is the tariff for supplying bulk or wholesale water from one institution to another and is collected by the supplying entity. It is primarily a financial instrument used to recover the cost of the bulk infrastructure and the attendant operation of this infrastructure. Where a separate bulk water entity does not exist, this tariff will typically not exist as a separate tariff. Nevertheless, the costs associated with this activity must still be reflected in the retail water tariff.

The water pricing structure adopted in Botswana is described in Box 23:

**Box 23: Water pricing in Botswana – good intentions make a difference**

The water pricing policy in Botswana is based on principles of equity and affordability. Those who can afford it should pay the full cost price, and those who cannot afford it do not pay for water consumed. There is no government subsidy on water in urban areas, but those who use large quantities, effectively pay more in order to subsidise those who use less.

The Water Utilities Corporation (WUC) was established with the intention that its activities should be restricted to the urban areas where the full cost for public water supply services could be recovered. In urban areas the levy on the water tariffs is regulated by the Water Utilities Corporation Act. The Act stipulates that the WUC has to be commercially viable and has to contribute to the expansion of the water supply system. This means that the tariff rates have to be set in line with the long-run marginal cost of the water supply systems in urban areas. The Act regulates the commercially aligned principles of the financial operations to be followed and the activities are governed by the Waterworks Act which requires, *inter alia*, that all tariffs be subject to ministerial approval.

The WUC supplies water to six urban/mining centres in Botswana and manages the Phase I assets of the North South Carrier Water Project (NSCWP) for operation and maintenance. The NSCWP has resulted in significant increases in urban water supply costs.

Tariff adjustments took place in 1993 and 1996 and kept the operating cost increases far below the rate of inflation, but these adjustments were not enough to meet the requirements of the Act. This problem will be further compounded by the increased costs as a result of the NSCWP.

The main objective behind the initial water tariff increases was to try and recover the full recurrent costs of all the major village water supply schemes. However, this objective was far from achieved. Cost recovery has been slightly above 50 % to date. A number of strategies to improve cost recovery, including cutting down on recurrent costs while maintaining high quality services, are planned.

Water from communal standpipes is free to consumers in major villages and rural villages, thus ensuring that everyone has access to safe drinking water. Those with private connections in rural areas who use only a minimal amount of domestic water pay a price that is lower than the cost of production. Those who use higher quantities pay a price that is roughly equal to the production cost.

Although major village water tariffs were increased by up to 45 % over the last ten years, the effect of the tariff increase on water consumption was not very significant. The main water consumers in major villages are public institutions, such as schools and hospitals, whose bills are paid through public funds. The majority of domestic consumption falls in the lowest bands, (40% falling in the less than 5 m<sup>3</sup>/month consumption range), and hence was hardly affected by the water tariff increases, which were directed at large consumers. Standpipe water remained free and this will be continued.

Due to the large increase of close to 60 % in the number of private water connections in major villages, a project was implemented to improve the efficiency of the billing system. This will also assist with the maintenance of records relating to water sales and revenues, which are very important for future planning purposes.

**Not pricing water leads to wastage**

In contrast to the water pricing practices in much of Botswana, some households in Selebi-Phikwe do not pay for water directly (because the mining company foots the bill). Water usage by these households is very high compared to other households where users pay for water themselves.

*Source: Arntzen et al, 2000 (Section 9.17)*

**Consumer retail water tariff.** This is the tariff experienced by the water user and is collected by the utility supplying water to retail customers. This is the primary economic instrument for influencing water use. This tariff should reflect the full costs of supply (in other words, be inclusive of the abstraction charge and the bulk water tariff, and also reflect the costs of distributing water to the user).



**Consumer sanitation charge.** This is the tariff charged to the user by the provider of sanitation services. In the case of waterborne sanitation, this tariff should reflect the financial and economic costs of wastewater collection, treatment and discharge back into the river.

**Bulk wastewater treatment charge.** Where a separate entity undertakes the treatment of wastewater, this charge reflects the cost of this activity.

**Effluent or pollution charges.** These charges relate to the allocation of pollution permits (the “right to pollute”) and effluent charges. They should be imposed and collected by the environmental regulatory body, but they may be lumped with the treatment charges and paid to the body responsible for effluent treatment or disposal.

The following principles should inform the development of specific tariff policies and practices:

- **Cost-reflective.** Tariffs should reflect full economic costs (including opportunity costs, externalities and marginal costs).
- **Cost-recovery.** Tariffs should aim to recover the full financial costs.
- **Affordable.** Tariffs should be affordable, and should recognise the vital role of water, the special needs of socially deserving cases, and the importance of safe water and sanitation for public health. Subsidies should be targeted. (See below.)
- **Practical.** Tariffs should be administratively feasible and cost-effective.
- **Fair.** Tariffs should be implemented in a fair manner and not discriminate between consumers in an arbitrary or unfair way.
- **Effective.** Tariffs must be supported by effective implementation mechanisms linked to measurement, revenue collection and credit control.

**Box 24: Pollution charges – lessons from good practice**

**Point source pollution**

- Charges should reflect the environmental costs of wastewater pollution.
- Charges should bear some relation to marginal abatement costs faced by the polluter (for example, an industrial enterprise or the municipality) and be high enough to induce some investment in pollution reduction.
- Charges should generate useful amounts of revenue for clean-up actions.
- Credits should be given to polluters for the release of clean effluent for dilution and mixing.

**Diffuse pollution**

- Levying charges on diffuse (non-point) pollution, for example from farms, is difficult to carry out directly, and tends to be done by proxy (acreage, number of cattle, etc.) or product (e.g. tax on fertiliser).

*Source:* World Bank, 1998 (Section 9.17)

## 5.10.2 Economic instruments

### Water Tariffs

Water pricing is the single most important economic instrument in the water sector. As already highlighted, the main focus is on the retail water tariff as it is this tariff which has to cover all the upstream financial costs in the system (abstraction, bulk treatment and transmission as well as local reticulation etc). The retail tariff also has to encourage efficiency of use in relation to future investment costs and hence should on average be related to the long-run marginal costs of supply (Box 22). Superimposed on this average is the need for a structure which allows poor people access to basic water at a minimal price. This is most commonly achieved by having a 'rising block' tariff structure, although there are other mechanisms which in principle would achieve the same goals while offering additional advantages. In particular, the cost rebate / surcharging method offers greater transparency to the consumer<sup>13</sup>. Multiple objective tariff structures are very attractive from a theoretical perspective, but one of the practical difficulties in a southern African setting is achieving the requirement of a universal, reliable metering system for all customers.

### Trading – emergence of water markets

The trading of the *right to use water* and the *right to pollute* is another important economic instrument. In this case, the price of the right is determined by a willing-buyer and willing-seller market. In theory, markets accurately capture the opportunity costs of water in its different uses. However, water markets are complex and difficult to establish because significant externalities exist in the water sector. A well developed policy and institutional environment are necessary for efficient and effective water markets.

### Subsidies

Subsidies are an important economic instrument to promote the equitable distribution of resources. By changing the relative prices in the water sector, they also influence economic behaviour. In order to maximise their effectiveness and minimise their distorting effect on incentives to use water resources efficiently, subsidies should be developed in accordance with the following principles. Subsidies should be:

- targeted to the poor;
- as close to the user as possible;
- transparent; and
- sustainable.

**Cross-subsidies.** Mechanisms to protect the poorest from high charges, while avoiding subsidies to the better off, are necessary. The urban poor often pay more (per unit) for water via the informal private sector than the wealthier pay to the official water utility. Appropriate and sustainable cross-subsidies between rich and poor users

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<sup>13</sup> See Hazelton, 2002 (Section 9.17).

could be considered to assist in providing the poor with affordable water. These should preferably be implemented at a local or regional level.

Subsidies can come from private rather than public sources, with perverse results, as described in Box 25.

**Box 25: The impact of private subsidies on water consumption – a lesson from Botswana**

A study of the impact of water pricing was carried out in Selebi-Phikwe, an urban mining town in North-Eastern Botswana, and in the Matsheng villages in western Botswana. In the case study the extent to which pricing instruments contributed to a reduced conventional water demand, an increased non-conventional water supply sources and/or the increased efficiency of conventional supply sources was examined. Another water use and affordability study had found that the domestic consumption in Selebi-Phikwe was much higher than in the other urban areas of Botswana. This was attributed to the lower water tariffs, the fact that the BCL mine pays the water bills of some of its employees, and possible cultural factors. The case study investigated the effect of the subsidisation of water by the BCL mine. During the study it was found that there was a 100% subsidy on charges of water used in BCL houses without water meters. In addition, the low-income employees in the category of "standard staff" did not pay for the first 150 m<sup>3</sup> of water per month, whereas the high-income employees in the category of "senior and executive" did not pay for the first 200 m<sup>3</sup> of water per month. It is reported in the case study that high water consumption figures were recorded as a result of the subsidies on water charges combined with a culture of wasteful use of water and insensitivity to report any water leakage.

A statistical analysis of the data showed a significant relationship between water consumption figures, income and water subsidies. It was apparent that those who had access to water subsidies and who were BCL employees living in BCL houses, tended to consume more water than those who lived in non-BCL houses and had no access to water subsidies. A household with an income of P3,000 per month not receiving any water subsidy consumed 22 m<sup>3</sup> per month compared to a household with the same income and access to water subsidy that consumed between 40 m<sup>3</sup> to 60 m<sup>3</sup> per month (Arntzen et al, 1999). The study observed that although BCL offers an incentive that encourages wastage of water it is also actively involved in re-using and recycling water in its mining operations. The effect of high charges in controlling demand was demonstrated in this study.

Source: Goldblatt, M et al, 1999 (Section 9.17)

**Prioritisation of access to basic services.** Subsidies which promote greater access by poor households to basic water and sanitation services should be prioritised above other kinds of subsidies. This applies to both access to productive water and to clean water for domestic use. For sustainability and equity, once off capital subsidies are preferable to on-going recurrent subsidies<sup>14</sup>.

### 5.10.3 Financial instruments

Box 26 provides a summary of the main instruments used to provide water sector financing, over and above that which is made available through water tariffs. This emphasizes the point made in the discussion of Figure 2 that the various water cycle charges which may be levied can always be supplemented by tax revenues or donor funds. From a narrow water sector perspective, maximising inflows from these sources might seem tempting, but from a national viewpoint tax revenues and donor

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<sup>14</sup> Participants at the July 2004 SADC workshop were strongly of the view that even users who are targeted for subsidies should be charged something for water. The principle that was enunciated is that 'the ultimate user must know that water is not free'.

funding always have opportunity costs elsewhere. In addition, any dilution of the signal which true cost-recovery prices give to consumers will tend to lead to excessive consumption of water, adding to pressure on water resources and exacerbating wastewater and pollution problems.

**Box 26: Financial instruments for water resource management**

It is obviously important that the activities necessary to undertake integrated water resource management are adequately funded. The primary funding sources of IWRM in developing countries are as follows:

- **National taxes.** IWRM can be considered to be a public good. Hence it is appropriate that IWRM be funded from the national tax base.
- **Catchment management charge.** An alternative (or perhaps complementary) source of funds for catchment management is a catchment management charge which can be levied on all water users in a catchment, as well as on land-use activities which affect water resources. This has the advantage of being an ear-marked fund which can be dedicated to catchment management activities in the basin. Such a charge can be used to finance the activities of a shared watercourse institution where the catchment traverses national boundaries.
- **Abstraction charges.** Abstraction charges can be an important source of finance to fund water resource infrastructure development. Abstraction charges also influence behaviour (water use) and hence are an important economic instrument. Fines for non-compliance also influence behaviour but should not be relied on as a primary source of income.
- **Pollution charges and fines.** Charges related to the allocation of pollution permits, effluent charges and fines relating to non-compliance are also sources of revenue which can be used to fund IWRM activities. However, these should be regarded primarily as economic instruments intended to influence behaviour. It is not appropriate for these charges to be relied upon as a primary source of income to fund IWRM.
- **International donor funds.** Grants are an important source of funding for IWRM activities in many developing countries. This has arisen as a result of the high profile that IWRM has achieved on the international water agenda. (See Section 3.) Although these funds are important and are likely to continue for some time, they should not be relied on as a primary and sustainable source of funding for IWRM activities.

*Source:* Adapted from the GWP IWRM Toolbox <http://gwpforum.netmasters05.netmasters.nl/en/>

#### **5.10.4 Implications for shared watercourses**

In the context of shared watercourses, the water pricing policies of neighbouring countries are relevant to the extent that their presence (or absence) encourages (or discourages) the efficient use of water and adherence to mutually agreed water quality and environmental standards.

In particular, upstream countries should not be asking for higher allocations of water (where this is to the detriment of their downstream riparian neighbours) when they have not implemented appropriate economic and WDM instruments and are not making efficient use of the water they are already extracting.

Similarly, in respect of pollution, upstream countries should have mechanisms in place, including economic instruments, to ensure that quality standards are maintained in water discharged to downstream riparian countries.

*National water and wastewater pricing policies and strategies need to be formulated in a consultative fashion to ensure that downstream countries do not have substantive cause to feel that they are being prejudiced.* The shared watercourse institution needs to reach a consensus on what is “reasonable” in this regard, taking into account policies and strategies in all the countries involved. The agreed standards need to be kept under review so that, as pressure on the resource grows, a higher level of

efficiency of use and higher quality standards come to be required of the upstream country.

As the water sector develops in SADC countries, in time water markets may come to be seen as attractive means to achieve allocative and managerial efficiency in the use of water resources. Before a policy endorsing water markets is adopted, however, the implications need to be analysed and discussed with transboundary partners.

### **5.11 Information exchange<sup>15</sup>**

Effective sharing of information is a fundamental requirement for deepening regional co-operation in the water sector, not least in the areas of IWRM planning and contingency preparedness. This has been amply demonstrated by the success of the SADC-HYCOS project, which provides transboundary hydrological information through its Data Collection Platforms installed throughout the major basins.

**Understanding information exchange.** Information exchange can take place at different levels:

- The exchange of raw *data* (for example, rainfall records, river gauge level readings etc.).
- The exchange of processed and analysed *information* (for example, river hydrology, 1:50 year flood level, etc.).
- The exchange of *codified knowledge* (for example, river response to simulated extreme rainfall or pollution events).
- The exchange of *uncodified knowledge* (through, for example, the sharing of professional experience).

The most appropriate mechanisms for information exchange will depend both on the kind of information being exchanged and institutional capacity. The kind of information exchanged is also likely to be time-dependent.

**Progressive development.** When developing international co-operation, it would be appropriate to commence information exchange at the lowest level (the exchange of data) and progress to “higher” levels of information exchange as trust is developed and the need for a more sophisticated understanding of the shared watercourse arises.

**Shared values.** Information exchange would be facilitated by the development of a common vision for the shared watercourse as well as agreement on the principles for co-operation. To this end, the SADC Water Protocol can play a significant role.

**Common standards.** When data is being collected by a number of different organisations in different countries, it is important to achieve compatibility with respect to standards, quality assurance, electronic access and data transfer.

**Making use of internet technology.** The internet offers an effective platform for the exchange of information and should be much more widely used in the region than it is at present. Proper provision needs to be made, however, for adequate security and the preservation of integrity of data made available via the internet.

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<sup>15</sup> References and websites in Section 9.18.

**Box 27: Sharing data – some lessons**

**Building trust.** Sharing knowledge requires an open mind, stimulated by suitable incentives. Mutual understanding and confidence may take time to build, but are essential.

**Culture.** Transferring knowledge from one country to another must take account of specific cultural and political contexts.

At a technical level, information and data sharing systems should be:

- **Demand-driven** so that system design and construction, and outputs are directed toward the end users.
- **People-focused** and integrated with the management of people and human resource strategies (with a view to the empowerment and capacity building of organisations).
- **Integrated** with the available level of technology and with other information systems.
- **Flexible** so that the sharing system can be used in a variety of locations or situations.
- **Transparent** and rigorous so that technical and non-technical persons (a wide range of stakeholders) can follow the process of information generation and evaluation.
- **Interactive**, to ensure a participatory decision-making process.
- **Easy to understand** and helpful in increasing awareness of the issues.
- **Secure** with adequate data security and back-up .
- **Sustainable** with sufficient resources to be properly maintained.

*Source:* Adapted from the GWP IWRM Toolbox <http://gwforum.netmasters05.netmasters.nl/en/>

**Box 28: Consequences of communication failure – Cyclone Eline**

In February 2000 tropical cyclone Eline hit Mozambique and Zimbabwe. Unprecedented quantities and intensities of rain fell in these countries and led to catastrophic floods, particularly in "downstream" Mozambique. The dams in the catchments of the Runde and Save Rivers in Zimbabwe were full and flood waters had to be released downstream. This led to the destruction of practically all gauging stations. (In some instances traces of the maximum flood levels were later found up to 10 metres above the zero mark of the river level measuring devices.) Information on these flood levels was not communicated to Mozambique ostensibly because there was no data available. While this was formally correct (the levels were either above any reading mark or gauging stations were inaccessible altogether), the communication of approximate information that certain river levels were greatly above normal levels (with a rough order of magnitude estimate of levels) would certainly have helped the downstream country at least to get a rough idea of the magnitude of the expected flood and to be warned accordingly.

*Source:* Research for Mozambique and Zambia Water Policy Reviews (Section 9.1)

**Box 29: A case of being too ambitious – South Africa**

The National Water Act makes provision for a National Information System (NIS) to be developed. Unfortunately, the NIS has been designed so as to be all things to all people. As a result, very basic information on the water sector in South Africa is not available nationally through the database.

It would have been much better for South Africa to have had more modest ambitions with respect to its national database, to get this working properly (consistently and comprehensively populated with data) and to have progressively extended the reach of the database over time.

*Source:* South Africa Water Policy Review (Section 9.1)

**Clearing house.** SADC is planning to establish a focal point and clearing house for regional water sector information. This will cover a wide spectrum of information. Rights of access, as well as a mechanism for covering the costs through some form of charging structure, are to be investigated.

## 6. National policy as an enabling environment

*What are the necessary policy conditions for IWRM to be promoted?*

### 6.1 Understanding national policy

Policy can be understood to operate at four different levels:<sup>16</sup>

- **Informal policy statements** made by members of the executive would typically be in the form of oral statements or press releases. They could be stated as intentions (that is, a promise to be fulfilled in the future).
- **Formal policy statements** made by the executive of the government would typically be written statements and would take the form of formal white papers, cabinet memoranda or ministerial statements.
- **Legislation** or codified policy would normally have clearly stated rights and obligations and would set out the consequences where these rights are abused or the identified obligations are not fulfilled.
- **Practice** (what actually takes place) could be the de facto policy and may differ from any or all of the above.

It is important to note that **policy is a dynamic process**.

**The policy cycle.** An ideal policy cycle would commence with an informal policy statement (for example, a stated intention of government), proceed to a formal policy statement (for example, a white paper), be enacted in law and (only) then be put in practice. This requires the establishment of a stable administration with established procedures and documentation processes, and adequate staffing and financial resources.

In practice, things are typically more complicated for a number of reasons:

- Practice may differ from both formal policy and existing legislation. (For example, sometimes policies and legislation are never acted upon and remain goals to strive for, or are impractical to implement.)
- Legislation may differ from formal policy. (For example, sometimes legislation precedes policy or proceeds in the absence of formal policy.)
- Informal policy may differ from formal policy. (Informal policy statements may never be formalised or legislated but nevertheless acted on.)
- During the development of procedures to give effect to formal policies, legislation and regulations, informal interpretations and adaptations may be adopted to facilitate the process.

**Necessary policy conditions.** In light of the above, it is hard to answer the question “*What are the necessary policy conditions for IWRM to be promoted?*” definitively. Undoubtedly, good national policy (expressed formally) in the form of formal policy

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<sup>16</sup> Note that the scope of the SADC water policy review that was undertaken as part of this project was restricted primarily to formal policy statements and existing practice. No legislative review was undertaken due to resource constraints and because a legislative review is part of a separate project under RSAP.

papers, and backed by a proper regulatory framework, can play a significant role in promoting good IWRM practice. It is therefore better to have formal policies and adequate and consistent legislation. However, in its absence, common sense can prevail and IWRM can be achieved in an informal way and within an informal policy environment. Nevertheless, it is appropriate to consider both the *process* of developing national water policies as well as the appropriate *content* of such policies.

## **6.2 The process of developing national water policies**

**National prerogative.** The SADC Water Protocol recognises the national prerogative for countries to develop water policies which take into account their own circumstances and aspirations. The policy process must therefore be a national process by definition.

**Incremental approach.** In almost all circumstances, some form of water policy (as broadly defined in the previous section) will exist. It is almost always a good idea to commence a policy reform and development process by understanding in detail what policies exist, how well these are working and what is not working and why. That is, it is important to develop a problem statement (what needs to change and why) and to establish the objectives of the policy reform (what is to be achieved).

**Integration.** Policies related to IWRM need to be integrated with other policies and policy processes including *inter alia* land-use planning, environment, agriculture, energy, gender and food security. (See Box 30.)

### **Box 30: Lessons for integrated policy development**

- Ensure policies clarify the roles of government and other stakeholders in achieving overall goals. In particular, policies should define the role of government as regulator, as organiser of the participatory process and as a last resort adjudicator in cases of conflict.
- Identify and set priorities for key water resources issues to ensure a focused policy.
- Recognise that considering water as a social and economic good means designing policies to allocate resources to where they offer the greatest value to society, starting with the fulfilment of basic needs.
- Make explicit in the policy the links between land use and other economic activities.
- Engage stakeholders in policy dialogue, recognising potential conflicts and the need for tools for conflict resolution.
- Recognise the importance of subsidiarity, so that water resource allocation decisions are taken at the lowest appropriate level.
- Take into account trade-offs between short-term costs and long-term gains.
- Make functional arrangements and cost allocation explicit.

*Source:* Adapted from the GWP IWRM Toolbox <http://gwpforum.netmasters05.netmasters.nl/en/>

**Participation.** Policy development should include participation by interested and affected parties. This usually means that policy development is more time and resource intensive than would otherwise be the case but will result in a better product and implementation. The extent of public participation should be determined by the availability of time and resources. In some circumstances it may be better to have a faster process to get some basic policy reforms in place before embarking on a more extensive policy development or policy refinement process.



**Clear language.** Policies should be written in clear uncomplicated language and be made available in all significant local languages.

**Accessibility and technology.** Policies should be available and easily accessible to water users and to the public. Consideration should be given to making policies available over the internet and at public libraries. Policies could be in the form of “new generation” documents with hypertext links to legislation, relevant resources, etc.

**Continuous improvement.** Policy is a dynamic process which is never complete. Policy should be periodically reviewed in the light of new developments with a view to improvement.

**Box 31: Water policy reform in South Africa – an example**

**Water and sanitation policy.** When the first democratic government was elected in 1994, a new Water and Sanitation White Paper was produced. This was significantly influenced by the Namibia water and sanitation policy that had been recently developed. (See Box 30.) This paper was developed with minimal consultation in view of the urgency felt at the time to deliver basic water and sanitation services to (largely) rural communities. The policy established the necessary framework for the allocation of substantial government resources to the delivery of basic water and sanitation services. However, at the time no new water legislation was enacted. The water legislation was amended in 1997 to take account of the new Constitution (giving local government responsibility for the delivery of water services). This amendment took place without a formal policy document. In 2002 a process was initiated to review the water and sanitation policy, taking into account policy and legislative changes in other sectors and establishing the policy basis for the sector over the next ten or so years. This process has involved extensive consultation and will result in a review of the water services legislation.

**Water resources policy.** A water resources policy paper was developed in 1997 following an extensive consultation process. The Water Act was revised in light of the new policy which established a new basis for water rights and the allocation of water.

The South African experience shows that the way in which the policy and legislative processes interact depends on the particular political circumstances which also affect the extent of consultation undertaken. South Africa has the resources to undertake extensive consultation which may not be the case in all other SADC countries.

*Source:* South Africa Water Policy Review (Section 9.1)

**Box 32: Water policy reform in Namibia – an example**

The Namibian Water and Sanitation Policy process and the National Water Policy process were similar to those in South Africa, especially as far as the consultations with stakeholders are concerned. In fact, the first process in Namibia preceded the one in South Africa. South Africa was interested to obtain more information about the procedures followed in Namibia by approaching the Ministry responsible for water through the sharing mechanism created by the Permanent Water Commission on the Orange River. However, the formalisation of the new water policy into law has been slower in Namibia than in South Africa due to capacity constraints.

*Source:* Namibia Water Policy Review (Section 9.1)

### **6.3 The scope of national water policies**

National water policies should address at least the following main components:

- **Vision:** a common vision for the sector which expresses what the sector hopes to achieve in broad terms. This would include co-operation around shared watercourses.
- **Sector goals and targets:** more specific sector goals (linked if possible to targets with timeframes).
- **Principles informing policies:** a set of key principles informing the policies.
- **Institutional framework:** a clear definition of the roles and responsibilities of key organisations involved in the sector. Key activities that need to be addressed include the following:
  - Allocation of water rights (or rights to use water).
  - Management and control of abstractions.
  - Responsibility for developing water resources.
  - Catchment management roles and responsibilities (including land-use management and the management of water quality).
  - Management of bulk infrastructure (transmission, storage, treatment).
  - Management of retail water and sanitation services (distribution).
  - Monitoring.
  - Information management.
  - Education, training and capacity development.
  - The role of the private sector.
  - The role of international development agencies.
- **Financial framework:** a clear definition of financing and funding arrangements for the sector, including how water will be priced and how subsidies will be applied.
- **Regulatory framework:** how the sector will be regulated.

### **6.4 The content of national water policies**

Notwithstanding the fact that both the form and content of national water policies are the prerogative of national governments, it may nevertheless be useful to provide some suggestions for the possible content of national water policies based on international best practice. These are given below.

**Sector vision.** The World Water Vision, the Africa Water Vision and the Water for the 21<sup>st</sup> Century: Vision to Action – Southern Africa (2000) could be useful starting points in developing a sector vision for a country.

**Box 33: Water sector vision – an example from South Africa for water services**

**Water is life, sanitation is dignity**

All people living in South Africa have access to adequate, safe, appropriate and affordable water and sanitation services, use water wisely and practise safe sanitation.

Water supply and sanitation services are sustainable and are provided by effective and efficient institutions that are accountable and responsive to those whom they serve.

*Water is used effectively, efficiently and sustainably in order to promote economic development, and to reduce poverty.*

Source: South Africa Water Policy Review (Section 9.1)

**Sector goals and objectives.** National water policies and strategies start with a clear formulation of goals and objectives. In the water sector, these are invariably based on the goals of meeting the needs of people and the economy in an equitable manner and of achieving environmental sustainability in the management of water resources. Specific objectives follow from these goals. No national policy should start from scratch, however. With the heightened global awareness of water, there are a number of cardinal ideas which should guide national water policy formulation. (See Section 3.)

**Box 34: Water sector goals – some possible examples**

**Access to services**

- To provide x million households with access to a basic water service by t1.
- To provide y million households with access to a basic sanitation service by t2
- To ensure x clinics and y schools have adequate water supply and sanitation by t3.

**Education**

- To teach x school children about safe sanitation practices as part of their formal curriculum by t4.

**Integrated water resource management**

- To develop a national integrated water resources management plan by t5.
- To develop a catchment level integrated water resources management plan for x and y catchments by t6.
- To develop a national water demand management plan with specific measures to improve efficiency by t7.
- To increase recycling of water to x% of total water use by t8.

**Principles informing policies.** These principles should draw on international best practice but be suitable to local circumstances. For example, the New Delhi and Dublin Principles could be used as a starting point. (See Annexure 1.) The principles should also be consistent with the principles in the Water Protocol (see Section 4.3) and with any other international treaty obligations. Some examples of principles are given in Box 35.

**Box 35: Principles informing policy – some examples**

**Regulation**

Regulation responsibilities should be separated from operational responsibilities wherever practical.

**Subsidiarity**

Management, decision making and control of water services projects should be devolved as far as practical to the lowest appropriate level, but taking into account efficiency benefits related to economics of scale.

**Gender**

Women should play a central role in the planning, provision and management of water services.

**The institutional framework** is discussed in Section 6.7.

**The financial framework** should consider at least the following:

- Sources and conditions of funding and financing.
- Water pricing.
- Pollution charges.
- Economic instruments for the allocation of water (if applicable), for example, water trading, licensing, permits, etc.
- Subsidies (sources, conditions).
- Credit control.
- Ownership of assets.

**The regulatory framework** should consider at the least how the following are regulated:

- Abstractions
- Water quality
- Water prices
- Investments
- Contracts
- Public monopolies
- The private sector

Regulatory policies should be based on a set of sound principles. Some examples of appropriate principles are given in Box 36.

**Box 36: Principles for regulation – some examples**

**Institutional clarity.** There must be a clear definition of the respective roles and responsibilities of those involved in regulation.

**Completeness and consistency.** The regulatory framework should be complete and apply consistently across the sector (water services and water resources).

**Representation of stakeholders.** Regulation must ensure that the interests of all stakeholders are adequately heard, while none of them should have excessive influence.

**Capability.** The regulatory framework should be neither complex nor onerous and should be matched to capabilities.

**Regulating outcomes.** Wherever practical and appropriate, emphasis should be placed on the regulation of outcomes rather than inputs.

**Balancing standards and costs.** An appropriate balance needs to be struck between desirable standards and the costs associated with meeting these standards.

*Source:* Adapted from the GWP IWRM Toolbox <http://gwpforum.netmasters05.netmasters.nl/en/>

**Box 37: Water quality regulation – the consequences of a policy gap**

In Zambia there are no national receiving water quality standards. Standards for the discharge of effluents that finally end up in the aquatic ecosystem were set in 1993: the Water Pollution Control (Effluent and Waste Water) Regulations set effluent quality standards, including the limits to physical, bacteriological and chemical content, listing 59 items. The absence of water quality standards for the receiving water is a drawback to effective water quality management since the capacity and the desired state of the receiving waters are not adequately related to the set effluent standard, the state of the river system and the seasonal river flow variations.

*Source:* Zambia Water Policy Review (Section 9.1)

## **6.5 Stakeholder participation in policy development**

The importance of stakeholder participation in formulating national water policies and law has already been stressed (see also references and websites in Sections 9.7 and 9.13). The appropriate extent of public consultation will differ between countries depending on local circumstances, including the availability of resources.

As a minimum, it would normally be appropriate to develop a draft policy and to make this draft available to interested and affected parties for comment. In addition to this, formal and informal consultations can be held with interested and affected parties through the holding of public meetings and through workshops attended by open or closed invitation.

In some countries, public consultation has been a *pro forma* exercise, with little attention being paid to the ideas arising from the consultations. In these instances the final document is essentially the same as the initial draft. In other cases, various drafts have been produced and sent back for further discussion, and the final policy statement has incorporated diverse inputs. The approach adopted by South Africa in formulating its Water Act of 1997 is described in Box 38. Pre-announced dates for specific stakeholder inputs and iterations of the policy document ensured a coherent but time-bound consultation process.

**Box 38: Consultation in the development of water law – an example from South Africa**

South Africa's Constitution requires that the National Assembly facilitate public involvement in its legislative and other committees and that it conduct its business in an open manner.

The Water Law Review process commenced with a detailed review of all South African water law. In March 1995 a document entitled "You and Your Water Rights" was published by the Department of Water Affairs and Forestry. It constituted a call by the Government for everyone to contribute to this historic process, from "the boardrooms of industry to the local village development forum". The document sought to assist the public in making meaningful contributions and sought to raise certain questions about the water laws which South Africa's new democracy had inherited from the apartheid past. In April 1996 the Fundamental Principles and Objectives for a new water law in South Africa were published for comment. These principles were designed to focus attention on the primary areas of water resource management that required urgent reform and transformation. The principles were simple and concise statements which would constitute a framework or paradigm for the development of a new detailed water policy and a new national water statute. In April 1997 Cabinet approved the White Paper on a National Water Policy of South Africa which was a comprehensive and detailed document addressing resource management. The White Paper identified key proposals which would guide the management of water in South Africa. It served as an official, democratically developed and approved guideline for the drafting of the new National Water Act.

The National Water Act (1998) itself commits national government and all the institutions established by the Act to pursue proper and effective consultation and public participation throughout the process of the implementation of the Act and its enforcement as national law.

*Source:* Stein (Section 9.2).

Stakeholder involvement is important not only to ensure a "better" final document (for example, a water policy statement or water law) but because it ensures a sense of involvement and ownership of the objectives and principles that are codified in the document. Securing such involvement in advance of promulgating an official policy or passing a law gives much greater assurance that things will work smoothly in the implementation phase. Donors are well aware of this, and are far more amenable to supporting water sector programmes and projects in countries where there is a high level of stakeholder participation.

**Translating policy into strategy.** A similar process is advisable for the formulation of national water development strategies. While a policy is often a statement of intent, the essential difference in a strategy is that it seeks to meet certain goals through specific investments. In a strategy the investment resources available have to be assessed and a programme devised for these resources to be spent in an equitable but at the same time economically efficient manner. Stakeholders may have much stronger views they would like to express about the trade-off decisions which need to be made in designing a strategy, yet it is much more rare for thorough stakeholder consultations to take place on strategies than it is on policies and legislation.

Many policies fail because of inadequate institutional arrangements and a lack of capacity (both human and financial resources) for effective implementation.

## **6.6 National policies and shared watercourses**

National water policies should be consistent with international obligations, specifically with respect to the following:

- The *United Nations Convention on the Law of Non Navigable Uses of International Watercourses*, and

- The *Revised Protocol on Shared Watercourses in the Southern African Development Community*.

The key principles in this respect are as follows:

- The sharing of water in a reasonable and equitable manner.
- The maximisation of benefits.
- The prevention of significant harm.

National policies should support *and give content to* these important principles. The legislation can provide for this.

### **6.7 Necessary policy conditions**

In summary, the necessary policy conditions for IWRM to be promoted could be considered to include the following:

- There should be a formal statement that the country will support and adhere to the principles of IWRM as set out in the Revised Water Protocol.
- The relevant legislation (for example, a Water Act) should identify a responsible person (the Minister) to ensure that IWRM is implemented.
- The minister must promulgate regulations which set out the responsibilities of the different stakeholders with respect to IWRM.
- An institutional structure must be established which will monitor compliance with the IWRM policies and practices set out in national policy and legislation.

## 7. Institutional mechanisms for implementation of IWRM

*What institutional mechanisms (both at the international and national levels) are necessary to promote IWRM of shared watercourses?*

### 7.1 National institutional mechanisms

One of the main conclusions of the SADC country reports on national water policies and strategies is that these can at most provide a supportive, enabling environment for regional co-operation in water to be pursued. The real “action” inevitably takes place under the rubric of shared watercourse institutions. This conclusion is borne out by international experience.

The form of water sector institutions will differ between countries as a result of a whole range of factors including historical legacy, geography and capacity. It is therefore not appropriate for these guidelines to be at all prescriptive about the appropriate form of water sector institutions in different countries. Nevertheless, it is possible to formulate a number of principles which should be considered with respect to how national level institutions support and facilitate the management of shared watercourses in general and support shared watercourse institutions in particular. These are given in Box 39:

**Box 39: National level support for shared watercourse institutions – principles of good practice**

**Maximise use of existing capacity.** Wherever possible, make use of existing capacity within existing institutions rather than establishing new institutions.

**Create co-ordinating mechanisms.** It may be appropriate to create one “international water office” (or another suitable mechanism) which co-ordinates the involvement of countries in shared watercourses.

**Knowledge management.** Good co-ordination should facilitate and maximise the learning across and between shared watercourses and consequently enable more efficient use of resources.

*Source:* Adapted from the GWP IWRM Toolbox <http://gwpforum.netmasters05.netmasters.nl/en/>

### 7.2 Shared watercourse institutions

Article 5(3) of the Revised Protocol on Shared Watercourses in the Southern African Development Community places an obligation on watercourse states to establish shared watercourse institutions when required and “as appropriate”. Watercourse commissions, water authorities or water boards are specifically mentioned. Considerable flexibility about the role of these institutions is also provided for: “The responsibilities of such institutions shall be determined by the nature of their objectives”, the only stipulation being that these must be “in conformity with the principles set out in this Protocol”.

The shared watercourses of SADC and the situation of the riparian partners are very different. Some countries have many more shared watercourses to cope with than



others. (Mozambique, for example, has nine shared rivers.) There are also vastly different levels of capacity between neighbouring states. While this can partly be remedied by capacity building programmes, the respective abilities of governments to finance technical expertise on an ongoing and sustainable basis is another source of disparity.

It is not surprising that existing institutions are very diverse. (See Box 40.) It is also not necessarily desirable that each and every shared watercourse should be managed in the same way by a similar institution. Rather, in all likelihood there will continue to be a range of appropriate institutional mechanisms to serve the diverse contexts and needs of the region.

A particular watercourse institution is normally established by an agreement between the watercourse states. It is important that the formulation of the agreement not be further complicated by the attempt to address issues that should rather be resolved by the watercourse institution as part of its work. Prolonged negotiations about an agreement leads to unnecessary delays (for example, the proposed Zambezi Watercourse Commission). The content of the agreement should rather focus on the objectives, functions, powers, structure, procedures, financing and operation of the institution in order to allow the parties to meet around the table as quickly as possible to deal with the specific watercourse issues delegated to the institution for consideration.

In order to clarify the understanding of what an appropriate watercourse institution might be, it is useful to examine the activities of a number of the existing institutions. These are described in Box 40. It can be seen from the examples given in Box 40 that there are a range of institutional mechanisms that can be implemented:

- **Ad hoc committees** are committees from the involved countries which meet on an *ad hoc* basis to discuss specific issues that arise from time to time. These could be of a technical or political nature and are normally constituted within so-called bilateral “commissions of co-operation” which deal with a wider range of issues between countries.
- **Permanent joint technical commissions or committees** are comprised of technical people from the involved countries who meet regularly to discuss matters of mutual interest and concern. The term “permanent (technical) commission” does not necessarily imply that the commission employs full time staff. Typically, the members of the commission or committee meet only periodically and do this on a very much part-time basis. Members are typically drawn from the water departments in the respective countries to keep the functioning of the commission simple and inexpensive.
- **River basin commissions** are more formally constituted with political representation. They could be supported by joint permanent technical committees (where practical) or dedicated secretariats (when necessary).
- **Operating agencies** are agencies set up to manage the operation of specific stretches of river and/or components of infrastructure. Where possible, operations should be done by existing agencies rather than establishing new ones.
- **Other mechanisms.** In addition to the above, other kinds of mechanisms may be appropriate as agreed by the shared watercourse states.

**Box 40: Shared watercourse institutions – some examples**

The Permanent Joint Technical Commission (PJTC) between Angola and Namibia was established to implement the **Cunene Project**. The Commission comprises three permanent members appointed by each state. Provision has been made in the agreement to co-opt any number of experts to advise the Commission. The responsibility of the Commission was to implement the Cunene Project (three dams in Angola and a hydropower station in Namibia), on behalf of the two governments and to create an operating authority to operate and maintain the water regulating and hydropower infrastructure. During a recent study to investigate the feasibility of an additional hydropower scheme on the lower Cunene River, the PJTC appointed a Steering Committee for the Feasibility Study (SCFS) to direct the consultants who executed the study. The PJTC also appointed a joint task force (TFC) to manage the operation and maintenance of the water supply infrastructure that supplies water from the Calueque Dam in Angola to northern Namibia.

The bilateral Permanent Water Commission on the Orange River between Namibia and South Africa deals with water matters of mutual interest on the **lower Orange River**. The Commission also monitors and advises the respective governments on the activities of the irrigation authority that is in charge of the operation and maintenance of the joint Vioolsdrift and Noordoewer Irrigation Scheme.

The Permanent Joint Technical Commission between Lesotho and South Africa was established *inter alia* to deal with the implementation of the **Lesotho Highlands Water Project (LHWP)**. This led to the creation of the Lesotho Highlands Development Authority in Lesotho and the Trans Caledon Transfer Authority in South Africa to manage the LHWP.

A Joint Permanent Technical Commission was established between Botswana and Namibia to deal with water matters of mutual interest. This Commission specifically deals with joint hydrological gauging on the **Okavango River** and in the **Kwando-Linyanti-Chobe river system**, a tributary of the Zambezi River on the southern border between the Caprivi Region in Namibia and Botswana. The Commission also monitors the activities in each country to contain the Kariba Weed (*Salvinia Molesta*) in the Kwando-Linyanti-Chobe river system.

The **Zambezi River Authority (ZRA)** was established as the residual institution when the Central African Power Corporation was dissolved. ZRA is a joint institution between only two of the Zambezi riparian states (Zambia and Zimbabwe) to maintain the Kariba Dam and manage the environment along the common part of the river. ZRA operates in isolation because there is no watercourse institution on the Zambezi that deals with water matters of joint interest between all the riparian States. Until such time as the Zambezi Watercourse Commission is formed, there will continue to be limited possibilities for integrated water resource management in the Zambezi basin, including, for example, no joint co-ordination of power generation at Kariba and Cahora Bassa.

The **Komati Basin Water Authority (KOBWA)** has been established by the Joint Water Commission (JWC) between South Africa and Swaziland to develop a multi-purpose (water supply, irrigation and hydropower) water scheme, known as the Maguga Dam Project. This project was successfully completed recently and serves as an example of another type of watercourse institution that can be established to achieve the objectives of the watercourse states.

*Source:* Synthesis Report (Section 9.1)

When deciding on appropriate shared watercourse mechanisms, the principle set out in Box 41 and the lessons from international experience given in Box 42 should be considered.

While there may be merit in having a permanent operating agency for day-to-day management of water in common catchments, when it comes to strategic negotiations about the allocation of water, looser institutional arrangements which invite negotiations across a broader spectrum may prove to be more useful. These could take place at a technical level (for example, the joint technical committees) or at a higher political level. For example, widening negotiations over more than one shared catchment opens a much bigger range of possibilities for agreements to be reached, involving trade-offs between catchments.

**Box 41: Principles to be applied when establishing shared watercourse institutions**

**Incremental.** It is better to start small and to develop the institutional mechanisms as appropriate and as the need arises.

**Consistency.** There should be a core group of members (achieved through consistent representation at meetings) to build trust and co-operation over time. This core group can be complemented by co-opted technical and other experts to advise the core group.

**Fit for purpose.** The institutions should be suited to the purpose at hand. The objectives should be clearly defined before establishing any institutional mechanism and the mechanism should be designed accordingly.

**Maximise use of existing capacity.** Wherever possible, make use of existing capacity within existing institutions instead of establishing new institutions.

**Representation.** The kind and intensity of representation on the commissions and committees should be suited to the problem at hand. Rather than having everybody who may (at some point) be needed to sit on the committee, it is better to co-opt members for specific tasks on a temporary basis.

**Sustainability.** Any institutions that are formed must be financially viable and sustainable, using local resources.

**The role of donor agencies.** While donor agencies can play an important part in the establishment and support of shared watercourse institutions, their activities should not compromise nor substitute the principle of sustainability.

**Stakeholder involvement.** Where appropriate and practical, interested and affected parties (including water users) should be involved in the formation and activities of shared watercourse institutions.

*Source:* Adapted from the GWP IWRM Toolbox <http://gwpforum.netmasters05.netmasters.nl/en/>

**Box 42: Establishing shared watercourse institutions – lessons from international experience**

- Once established, transboundary organisations and water agreements are remarkably robust. Contrary to popular belief, they often act as a moderating factor within a conflict situation.
- Establishing the conditions for agreement can be time-consuming and costly in terms of money and resources (for example, requiring brokers and negotiators to build confidence). Donor support can be helpful here to kick-start the process.
- The use of a respected external party or organisation to act as an honest broker is useful. (Multilateral agencies such as the UNDP and World Bank have both fulfilled these roles in the past.)
- National water policy needs to support inter-agency co-ordination for the transboundary organisation and may need to be modified to align with the other parties in the agreement.
- Citizen, media and NGO pressure frequently galvanises action, for example, to reduce environmental problems from water overuse.
- Once established, transboundary water management needs to move beyond visions, and develop specific regulatory mechanisms, data- and information-sharing protocols and financing mechanisms to put shared watercourse water management firmly in place.
- Experience shows that technical secretariats are essential in this respect.
- It is a good idea to focus attention initially on projects which will yield additional benefits which can be shared between shared watercourse states.

*Source:* Adapted from the GWP IWRM Toolbox <http://gwpforum.netmasters05.netmasters.nl/en/>

While day-to-day management in a particular shared watercourse is a matter that eventually might be provided by a dedicated operating agency with oversight by a joint technical committee, strategic decisions on matters such as the overall allocation of shared water resources are best done at a higher level with suitable political commitment and appropriate agreements. International water offices in different countries and river basin commissions should facilitate this kind of decision making.

### **7.3 Stakeholder involvement in shared watercourses**

In principle, the same process of stakeholder participation should be used in the formulation of shared watercourse policies and strategies, as described in Section 5. In practice, this is more difficult (but not impossible) to achieve across national boundaries. Parallel consultations with stakeholders in neighbouring countries may not be that difficult to organise, but this is yet to become the norm in the SADC region. The more ambitious but potentially rewarding goal of bringing water user groups from different countries together has not often been achieved. For an example, see Box 14.

#### **Box 43: Taking capacity constraints into account – the case of Mozambique**

Mozambique is the downstream recipient of water from nine shared river basins. Because this water constitutes more than half of its total surface resources, Mozambique is vulnerable to decisions made without its agreement by upstream riparian countries. Consequently, the government has created an Office of International Rivers (*Gabinete de Rios Internacionais* - GRI). This office co-ordinates Mozambique's input to technical activities and negotiations on shared water related to the implementation of the Revised Protocol on Shared Watercourses. The office faces an enormous task. The lack of personnel with the requisite technical training and experience is a considerable and significant constraint. A considerable effort needs to be devoted to capacity building activities to overcome this constraint. For example, it would not be feasible for Mozambique to involve itself in permanent river basin commissions in all nine of its shared watercourses. In some cases, looser institutional arrangements which invite negotiations across a broader spectrum, may prove to be more useful. In the case of the Incomati, for example, the negotiations leading up to the September 2002 agreement were at one stage stalled when limited solely to the Incomati. By bringing in the Maputo basin, Mozambique was given an opportunity to pursue its interests in that catchment, while in return being prepared to be more flexible in respect of the Incomati.

Other important lessons from the Incomati experience point to the importance of broadening negotiations to encompass not just the catchment in question but also other shared catchments, allowing intermediate countries to mediate between the main protagonists, and structuring negotiations in a systematic way, whether the negotiations involve information exchange to reach a shared understanding of the facts, or reaching an agreement about a shared vision (Carmo Vaz and Van der Zaag, 2003). An important challenge for the future is to find ways of including in the shared water discussions both users and the local water resource management structures (such as, in Mozambique's case, the basin committees and the regional water administrations).

*Source:* Mozambique Water Policy Review (Section 9.1)

Within common river basins and catchments, a start can be made by ensuring that the nascent user representative bodies are made aware of shared watercourse perspectives. Instead of governments always taking the lead on transboundary issues, it would be desirable for a stage to be reached where users put pressure on governments to ensure proper co-operation in the management of shared water resources.

In the institutional framework section of the Water Protocol (Article 5), all of the institutions provided for are comprised entirely of state officials (the Committee of Water Ministers, the Committee of Water Senior Officials, the Water Sector Co-ordinating Unit, the Water Resources Technical Committee and the Shared Watercourse Institutions). However, the SADC Water Sector Co-ordinating Unit is encouraging countries to form national steering committees with members being drawn from a cross-section of users, technical experts, private sector representatives and other stakeholders who can interact with the national component of the international commission.

## **8. Conclusions**

The intention of these guidelines is to set out a comprehensive outline of what is required in developing policies and strategies for integrated water resource management based on international best practice, whilst taking into account regional experiences and local constraints. Rather than being read in isolation, they should be used in conjunction with other SADC documents (in particular the Regional Water Policy) and materials available from a wide variety of other sources.

The guidelines should not be seen as having been “cast in concrete”, but should rather be regarded as a tool to assist in the development of policies, especially in areas where there are possibilities to improve the harmonization of policies and strategies between countries in the SADC region.

## **9. References, additional readings and useful websites**

### **9.1 SADC water documents**

SADC, 1999. *Regional Strategic Action Plan (RSAP) 1999-2004* (and subsequent Progress Reports)

SADC, 2000. *Revised Protocol on Shared Water Courses in the Southern African Development Community*.

SADC, 2003. *Regional Indicative Strategic Development Plan (RISDP)*.

SADC, 2003. *Review of National Water Policies – Synthesis Report*.

SADC, 2003. *(Member State) Water Policy Review* (available for all 14 SADC member states).

SADC, 2004. *Consolidated SADC Position on the World Commission Dams and Development Report* (April draft).

SADC, 2004. *Regional Water Policy (RWP)* (May draft).

### **9.2 Southern Africa water**

African Water Issues Research Unit (AWIRU), Pretoria University  
[www.up.ac.za](http://www.up.ac.za)

Department of Water Affairs and Forestry, South Africa  
[www.dwaf.gov.za](http://www.dwaf.gov.za)

Global Water Partnership, 2002. *Water for the 21<sup>st</sup> Century. Vision to Action – Southern Africa*. Stockholm, Sweden and Harare, Zimbabwe.

Institute of Water and Sanitation Development (IWSD), Harare  
[www.iwsd.co.zw](http://www.iwsd.co.zw)

Kampata, J M , Mondoka, A and Nundwe, C. 1999. *Water Resources Management – Law, Policy and Practice*. Paper presented to the workshop on Harmonisation of Environmental Legislation. September 1999.

Lesotho Highlands Water Project  
[www.sametsi.com](http://www.sametsi.com)

MacGregor, James; Simon Masirembu, Rick Williams and Christopher Munikasu, 2000. *Estimating the economic value of water in Namibia*. Paper presented at 1st WARFSA/Waternet Symposium, Sustainable Use of Water Resources, Maputo

Pallett, J., (ed) 1997. *Sharing Water in Southern Africa*, Desert Research Foundation of Namibia, Windhoek.

SADC/IUCN/SARDC, 1996. *Water in Southern Africa*.

SADC/IUCN/SARDC, 2002. *The Zambezi Basin: The State of the Environment*.

SADC/IUCN/SARDC, 2002. *Defining and mainstreaming environmental sustainability in water resources management in Southern Africa*.

Stein, R, 2000 *Reforming the water and sanitation sector in South Africa*. Pretoria

WaterNet

[www.waternetonline.org](http://www.waternetonline.org)

### **9.3 International Context (in date order)**

Milestones: <http://www.un.org/esa/sustdev/index.html>

New Delhi Statement (1990)

<http://www.jiscmail.ac.uk/files/WSSCC/NEWDELHI.DOC>

Dublin Principles (1992)

<http://www.gwpforum.org/servlet/PSP?iNodeID=1345>

<http://www.wmo.ch/web/homs/documents/english/icwedece.html>

Earth Summit (Rio 1992, +5 in 1997)

<http://www.un.org/esa/sustdev/agenda21text.htm>

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<http://www.africanwater.org/amcow.htm>

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UN Commission on Sustainable Development

[www.un.org/esa/sustdev/csd.htm](http://www.un.org/esa/sustdev/csd.htm)

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[www.thewaterpage.com/](http://www.thewaterpage.com/)

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[Hyd@gateway.wmo.ch](mailto:Hyd@gateway.wmo.ch) or [www.wmo.ch/web/homs/whycos.html](http://www.wmo.ch/web/homs/whycos.html)

See under 'information exchange' for SADC-HYCOS websites.

World Meteorological Organisation (co-ordinates global scientific activity to allow increasingly prompt and accurate weather prediction, air pollution research, climate change related activities, ozone layer depletion studies and tropical storm forecasting)

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## **9.18 Information exchange**

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<http://www.fao.org/sd/eidirect/gis/EIgis000.htm>

Integrated Systems for Knowledge Management (ISKM): - participatory approach to environmental research and development initiatives.

[www.landcareresearch.co.nz/research/social/iskm.asp](http://www.landcareresearch.co.nz/research/social/iskm.asp)

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SADC-HYCOS Project and

<http://www-sadchyco.pwv.gov.za/sadc/textes/ukSADC.htm>

<http://www-sadchyco.pwv.gov.za/sadc/>

<http://grdc.bafg.de/>

Water Information Network (WIN), the information system of the Netherlands Water Partnership (NWP).

[www.nwp.nl](http://www.nwp.nl)

WCA infoNET information system is an integrated information on water conservation in agriculture with direct access to publications, documents, data, computer programmes and discussion.

[www.wcainfo.net.org](http://www.wcainfo.net.org)

## Annexure 1: International initiatives related to IWRM

Key outcomes from international initiatives related to IWRM are summarised below.

The **New Delhi Statement** formalised the need to provide, on a sustainable basis, access to safe water in sufficient quantities and proper sanitation for all, emphasising the “some for all rather than more for some” approach. Four guiding principles were put forward:

- Protection of the environment and the safeguarding of health through the integrated management of water resources and liquid and solid wastes.
- Institutional reforms promoting an integrated approach.
- Community management of services.
- Sound financial practices.

The **Dublin Principles** (set out in Box 44 below) emphasise the need for holistic management of land and water, the importance of user participation, particularly women, and the need to treat water as an economic as well as a social good.

### Box 44: The Dublin Principles

1. Fresh water is a finite and vulnerable resource, essential to sustain life, development and the environment.

Since water sustains life, the effective management of water demands an holistic approach, linking social and economic development with the protection of natural ecosystems. Effective management links land and water uses across the whole of a catchment area or groundwater aquifer.

2. Water development and management should be based on a participatory approach, involving users, planners and policy-makers at all levels.

The participatory approach involves raising awareness of the importance of water among policy-makers and the general public. It means that decisions are taken at the lowest appropriate level, with full public consultation and the involvement of users in the planning and implementation of water projects.

3. Woman play a central part in the provision, management and safeguarding of water.

The pivotal role of women as providers and users of water and as guardians of the living environment has seldom been reflected in institutional arrangements for the development and management of water resources.

4. Water has an economic value in all its competing uses and should be recognised as an economic good.

Within this principle it is vital to recognise first the basic right of all human beings to have access to clean water and sanitation at an affordable price.

These principles were also captured at the **Earth Summit** in Rio (which also emphasised the nature of water as a social good) and formed the basis for a proposed programme of action in seven areas:

- Integrated water resources development and management.
- Water resources assessment.

- The protection of water resources (including water quality).
- Drinking water supply and sanitation.
- Water and sustainable urban development.
- Water for sustainable food production and rural development.
- The impacts of climate change on water resources.

The outcomes of the Earth Summit were reviewed five years later (**Earth Summit + 5**) and a revised programme of action was developed. This programme emphasised the following concerns:

- The need to strengthen regional and international co-operation for technological transfer and the financing of integrated water resources programmes and projects.
- The importance of cost-recovery.
- The need for water conservation.
- The need to strengthen the capability of governments and international institutions to collect and manage information.
- The need for the international community to support developing countries in their efforts to improve IWRM and to encourage watercourse states to develop international watercourses with a view to attaining the sustainable utilisation and appropriate protection of these water resources, taking into account the interests of the watercourse states.

A **World Water Vision**, which was presented at the **Second World Water Forum**, defined three primary objectives:

- To empower people and communities to decide how to use water.
- To get more crops and jobs per drop.
- To manage use to conserve freshwater and terrestrial ecosystems.

It deemed five actions critical to the achievement of these objectives:

- Involving all stakeholders in integrated management.
- Moving to full cost pricing.
- Increasing public funding for research and innovation.
- Co-operating to manage international basins.
- Massively increasing investments in water.

Other key messages emanating from the forum included the following:

- A holistic, systemic approach relying on integrated water resources management must replace the current fragmentation in managing water.
- Participatory institutional mechanisms must be put in place to involve all sectors of society in decision making.
- Fresh water must be recognised as a scarce commodity and managed accordingly.

- Full cost pricing of water services with targeted subsidies for the poor must be implemented.
- Fresh water must be recognised as a basic need, with adequate access ensured for the poor.
- Incentives for resource mobilisation and technology change are needed.
- Institutional, technological and financial innovation is needed.
- There is a need for private investment and community action.
- Political will is needed, going beyond Dublin and Rio.
- Governments are key actors – as enablers and regulators.
- Behavioural change is needed by all – no more business as usual.

**Vision to Action – Southern Africa.** The vision has the following components:

- Equitable and sustainable social and economic development in Southern Africa.
- Equitable access to water of an acceptable quantity and quality.
- Proper sanitation for all and safe waste disposal.
- Food security for all households.
- Energy security for all households.
- A sustainable environment.
- Security from natural disasters.
- Integrated water resources development and management.

Each of these components has a separate vision statement. The vision statement of integrated water resources development and management is as follows: “The people of Southern Africa call for a desirable future in which there is integrated water resources and development and management that results in efficient utilisation, equitable access and sharing of the region’s water resources to ensure sustainable social, environmental and economic benefits for all.” The vision adopts the following accepted water management principles:

- Effective public consultation and involvement of users.
- Focus on integrated, people-centred planning.
- Efficient use of water through demand management, conservation and re-use, and the efficient use of water for agriculture.
- Recognition of the environment as a legitimate user of water.
- The protection of the environment through appropriate user charges and the enforcement of the polluter pays principle, taking into account equity and social justice.
- Integration of water supply, sanitation and health and hygiene education programmes.

- Capacity building to ensure that managers of water, waste and sanitation have the requisite knowledge and tools.
- Ensuring that waste is safely managed close to the point of generation.
- Preventing the export (and import) of harmful waste across the national and regional boundaries.

The Ministerial Declaration arising out of the International Conference on Freshwater in **Bonn** identified five themes:

- Governance: primary responsibility rests with government; riparian states need to co-operate on matters related to international watercourses.
- Funding Gap: making more efficient use of existing sources; raising additional funds from all sources (public finances, capital markets, community-based finance, increased international development finance); poverty alleviation; and increased opportunities for trade.
- The role of the international community: the need for official development assistance to reach the target of 0.7% of GDP (overall development assistance) and to strengthen its commitment and efforts in enabling developing countries to manage water sustainably.
- Capacity building and technology transfer.
- Gender: the role of women in water-related areas needs to be strengthened and their participation broadened.

The **African Ministerial Conference on Water** (AMCOW, Abuja) noted that African countries should strive to assess and where appropriate adopt best practices in global and regional programmes dealing with water and sanitation. AMCOW would support measures which do the following:

- Encourage stronger and better performing institutional arrangements for the water sector.
- Strengthen the monitoring and assessment of available water resources.
- Ensure sustainable water and sanitation infrastructure and services delivery.
- Promote policies for the appropriate allocation of water for domestic use and food security and other competing demands.

The initiative which has arisen from AMCOW is the **Africa Water Facility**, which is managed by the African Development Bank. It is to provide the means for African countries to achieve Millennium Development and Nepad water goals.

**Accra Declaration on Water and Sustainable Development.** “Given clear policies and strategies and real commitments to implementation, we can use water to help eradicate poverty, reduce water-related diseases and achieve sustainable development in Africa. This can be achieved through the following strategies:

- Improved access to potable water services and sanitation.
- Water use to address food security and income generation.
- IWRM in national and shared basins.
- Water-related disaster prevention, mitigation and management.



- Empowerment and capacity building focused on improving equity and gender sensitivity.
- Pro-poor water governance and water policies.

These strategies should all be undertaken in a manner that protects the natural environment. In addition, the Accra Declaration emphasised the following:

- Governance should be delegated to the lowest appropriate level.
- Monitoring: Action plans are more likely to succeed if there are effective systems for monitoring, evaluation and accounting.
- Funds need to be mobilised for investment.

With respect to mobilising funds, the Declaration stated that water should be recognised as a public good used for social and economic purposes. Furthermore, water service providers should aim for financial sustainability, charging the full cost to those who can afford to pay, with transparent subsidy arrangements from public funds and cross-subsidies where the poor cannot afford the full cost. Governments must ensure resources are mobilised first from internal sources, using public funds for services for the poor, and from private sector funds to meet national objectives. As much funding attention should be paid to environmental sustainability and ongoing operations and maintenance costs as to initial investment.

**Nepad.** The New Partnership for Africa's Development recognises the important role of water in development, endorses the Africa Water Vision and the implementation of IWRM best-practice principles (management at the river basin level, management at the lowest appropriate level, demand-driven approaches, ownership and participation by all stakeholders), and supports the promotion of knowledge and management exchange. Priority actions identified include support for the role of the private sector in water service provision, improving water governance, promoting the definition of property and use rights regimes for water within countries and between transboundary water basins, improving performance monitoring and developing institutional and technical capacity.

The **Millennium development goals** include a specific target for 2015, reducing by half the proportion of people without access to safe drinking water. Other relevant goals include by 2015 the reduction of the number of people living on less than one dollar a day by half and by 2020 significant improvement in the lives of at least 100 million slum dwellers.

The final report of the World Commission on Dams, published in November 2000, was entitled **Dams & Development: A New Framework for Decision-Making**. It set an agenda for the integrated development of dams in future, through applying the core values of equity, efficiency, participatory decision-making, sustainability and accountability. Its recommendations are captured in seven strategic priorities: gaining public acceptance, comprehensive options assessment, addressing existing dams, sustaining rivers and livelihoods, recognising entitlements and sharing benefits, ensuring compliance and sharing rivers for peace, development and security.

**World Summit on Sustainable Development in Johannesburg (WSSD).** The Plan of Implementation affirmed the millennium development goal with respect to water

and also agreed to halve the proportion of people who do not have access to basic sanitation. These goals would require actions at all levels to achieve the following objectives:

- Develop and implement efficient household sanitation systems.
- Improve sanitation in public institutions, especially schools.
- Promote safe hygiene practices.
- Promote education and outreach focused on children, as agents of behavioural change.
- Promote affordable and socially and culturally acceptable technologies and practices.
- Develop innovative financing and partnership mechanisms.
- Integrate sanitation into water resources management strategies.

The Plan of Implementation undertakes to *develop integrated water resources management and water efficiency plans by 2005*, with support to developing countries through actions at all levels to achieve *inter alia* the following objectives:

- Develop and implement national/regional strategies, plans and programmes with regard to integrated river basin, watershed and groundwater management, and introduce measures to improve the efficiency of water infrastructure to reduce losses and increase recycling of water.
- Employ the full range of policy instruments, including regulation, monitoring, voluntary measures, market and information-based tools, land-use management and cost recovery of water services, without cost recovery objectives becoming a barrier to access to safe water by poor people, and adopt an integrated water basin approach.
- Improve the efficient use of water resources and promote their allocation among competing uses in a way that gives priority to the satisfaction of basic human needs and balances the requirement of preserving or restoring ecosystems and their functions, in particular in fragile environments, with human domestic, industrial and agriculture needs, including safeguarding drinking water quality.
- Develop programmes concerned with mitigating the effects of extreme water-related events.
- Support the diffusion of technology and capacity building for non-conventional water resources and conservation technologies, to developing countries and regions facing water scarcity conditions or subject to drought and desertification, through technical and financial support and capacity building.
- Facilitate the establishment of public-private partnerships and other forms of partnership that give priority to the needs of the poor, within stable and transparent national regulatory frameworks provided by governments, while respecting local conditions, involving all concerned stakeholders, and monitoring the performance and improving accountability of public institutions and private companies.

**World Water Forum 3, Kyoto, March 2003.** The main debate at the World Water Forum was around the role of the private sector in water provision. Water for productive use was discussed. Outside of this, not much new was added to the international agenda.

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