



Nile Basin Initiative

Shared Vision Program

Water Resources Planning and Management Project

Water Policy Guidelines and Compendium of Good Practice

November 2006



Nile Basin Initiative–Water Resources Planning & Management Project

Water Policy Guidelines and Compendium of Good Practice

Final - November 2006

Table of Contents

List of Boxes	v
List of Tables	vi
List of Figures	vi
Glossary	vii
Preface	viii
Acknowledgments	ix
Executive Summary	x
I. Introduction	1
1 Nature and Purpose of Water Policy	1
2 The Policy Cycle	1
3 Objectives and Use of the Guidelines and Compendium	2
4 Linkage of National Policies to Regional and International Frameworks	3
5 Commitments Under the Nile Basin Initiative	5
II. Content of Water Policies	7
6 Objectives and Principles	7
7 Stakeholder Participation	10
8 Gender Mainstreaming	11
9 Capacity Building	13
10 Research and Development	13
11 Institutional Framework	13
12 Water Resources, Environment & Social Assessment	15
13 IWRM Planning, Sectoral Inter-linkages & Benefit-Sharing	17
14 Dams and Development	18
15 Water Resources Allocation	21
16 Inter-basin Transfers	22
17 Economic & Financial Instruments	23
18 Water Resource Pricing & Water Quality Control	25
19 Water Service Provision Pricing and Subsidy Policy	27

20 Vulnerable Group Policies	31
21 Demand Management and Efficient Water Use	34
22 Demand Management and Equitable Access to Water	36
23 Environmental Regulation	37
24 Service Provision Regulation	39
25 Policies for Different Water Usage Sectors	41
26 Protection Against & Mitigation of Natural Disasters (Droughts & Floods)	41
27 Information Sharing and Harmonisation of Units and Standards	43
28 Shared River Basins	44
29 Conflict Resolution	46
III. Process	49
30 From Policy Formulation to Implementation	49
31 Stakeholder Involvement	50
32 Procedures to Ensure Effective Process Management & Committed Stakeholder Involvement	53
33 Public Awareness, Transparency and Inclusiveness	55
34 Evaluating An Existing Water Policy or Strategy	55
35 Developing Policies, Strategies and Plans	56
36 National Legislative and Institutional Frameworks	57
37 Legal Framework in a Shared Basin	58
38 Human Resources and Capacity Building	59
39 Political Commitment and Resource Mobilisation	61
40 Roadmap for Policy Implementation in Shared Basins	61
41 Next Steps	63
IV. Additional Compendium Materials	66
42 Outline of Sudan National Water Policy Draft 2000	66
43 Contents of Burkina Faso IWRM Plan	71
References, Additional Readings and Useful Websites	73

List of Boxes

Box 1: Typical steps towards harmonisation – a problem-oriented approach	6
Box 2: The Dublin Principles	7
Box 3: Developing shared IWRM initiatives–some lessons on information exchange & participation	10
Box 4: The “Every River Has its People” Project – lessons in cross-country user participation	11
Box 5: Gender and poverty alleviation, Bangladesh	12
Box 6: Targeting men for hygiene education, Mexico	12
Box 7: Scope of water resource assessments	16
Box 8: Joint hydrological gauging on the Okavango and Kwando Rivers – an example of co-operation	16
Box 9: Scope of catchment management plans	17
Box 10: Assessing the development effectiveness of large dams	18
Box 11: Guidelines on Dam Safety	20
Box 12: Impacts of Inter-Basin Water Transfer Schemes in California	22
Box 13: Water resource pricing based on water scarcity and quality classifications	26
Box 14: Lake Victoria cooperation agreements	27
Box 15: Vulnerable Group Recommendations Kenya	31
Box 16: Self Supply: A Fresh Approach to Water in Rural Zambia	32
Box 17: Low-cost urban water delivery technologies in use in South Africa	33
Box 18: Water demand management & the allocation of water – an example from the Lower Orange River	34
Box 19: Water demand management – some lessons from the experience in Bulawayo, Zimbabwe	35
Box 20: Responding to poverty – promoting productive uses of water at the household level	37
Box 21: The regulation of water quantity – some lessons	38
Box 22: The regulation of water quality – some lessons	39
Box 23: Objectives, functions & responsibilities of an infrastructure regulator	40
Box 24: Safeguards to ensure independence of a regulator	40
Box 25: Sharing risks equitably – some guidelines	42
Box 26: Consequences of communication failure – Cyclone Eline	43
Box 27: Different levels in information exchange	43
Box 28: Sharing data – some lessons	44
Box 29: The value of water	45
Box 30: Conflict resolution tools – an overview and some lessons	46
Box 31: Conflict resolution in the Incomati Basin – some lessons	48
Box 32: Water sector targets – some possible examples	49
Box 33: Water stakeholders	51
Box 34: Issues of concern for primary stakeholders	53
Box 35: Achieving transboundary stakeholder participation	53
Box 36: Knowledge collection principles	55
Box 37: Summary of principles embodied in SADC Revised Protocol on Shared Watercourses	59
Box 38: Questions to determine capacity-building needs	60
Box 39: Gender and watershed management, Patan District, India	60
Box 40: Suggestions on building political commitment to IWRM	61
Box 41: Cooperation between Egypt and Uganda – the Aquatic Weed Control Project in The Equatorial Lake, Uganda	63

List of Tables

Table 1: Procedural and substantive principles for water policies	8
Table 2: Typology of water sector subsidies	30
Table 3: Types of participation	52
Table 4: Role of implementing institutions	54
Table 5: Changing approaches to developing policies and strategies	57

List of Figures

Figure 1: The policy cycle	2
Figure 2: Kenya – Institutional structure created by 2002 Water Act	14
Figure 3: Water prices and the water cycle	24
Figure 4: Examples of rising block tariff structures	30
Figure 5: A ‘continuous improvement’ approach to sustainable development strategies	57

Glossary

ADB	African Development Bank
AFUR	African Forum for Utility Regulation
AMCOW	African Ministers' Council on Water
AU	African Union
BWF	Basin-Wide Forum (refers to ERP and OKACOM)
CBO	community based organisation
CSD	Commission on Sustainable Development
DRC	Democratic Republic of Congo
DWAF	Department of Water Affairs & Forestry (South Africa)
EAC	East Africa Community
ECA	Economic Commission for Africa
ECE	Economic Commission for Europe
EIA	Environmental Impact Assessment
ERP	Every River has its People Project (Okavango River)
EU	European Union
GKF	Grameen Kishi Foundation
GWP	Global Water Partnership
HIPC	Highly Indebted Poor Country
IWRM	Integrated Water Resource Management
Lcd	Litres per capita per day
LRMC	Long-run marginal cost pricing
LVBC	Lake Victoria Basin Commission
LVEMP	Lake Victoria Environmental Management Programme
MAR	Mean annual runoff
MDGs	Millennium Development Goals
M&E	Monitoring and evaluation
NBI	Nile Basin Initiative
NEPAD	New Partnership for African Development
NGO	non-government organisation
OKACOM	Permanent Okavango River Basin Commission
PAGIRE	Action Plan for Integrated Water Resource Management (Burkina Faso)
PRSP	Poverty Reduction Strategy Paper
RISDP	Regional Indicative Strategic Development Plan (SADC)
RSAP	Regional Strategic Action Plan (for IWRM – SADC)
SADC	Southern African Development Community
SD	sustainable development
SNWP	Sudan National Water Policy
TPTC	Tri-partite Permanent Technical Committee (Incomati, Umbeluzi and Maputo Catchments, involving Mozambique, South Africa and Swaziland)
UAW	unaccounted for water
WCD	World Commission on Dams
WDM	Water Demand Management
WS&S	Water supply and sanitation
WSSD	World Summit on Sustainable Development
ZINWA	Zimbabwe National Water Authority

Preface

The Nile Basin Initiative (NBI) started with a participatory process of dialogue among the riparian representatives that resulted in their agreeing on a shared vision and an accompanying action plan. The Guidelines and Compendium of Good Practice is one of the outputs of a project entitled *Water Policy Good Practice Guides and Support* which falls under the *Water Resources Planning and Management* project, which in turn falls under the *Shared Vision Program*.

The terms of reference for the Guidelines note that “water, by its nature, intersects sectors and political borders. Hence, any water policy should take into consideration policies of other related sectors. Moreover, if countries share a river basin like the Nile, their national water policies should consider their impact beyond political borders as well as the influence of the policies in the other neighbouring countries.

As the Nile Basin Countries have embarked on a cooperative path, the water policy component aims to build a common technical foundation for water policy formulation and implementation with a cooperative regional perspective. It aims to enable the Nile Basin Countries to reach a common understanding of the relationship between their national policies, regional needs and cooperative development. The desired outcome of the component, therefore, is that national water policies and strategies are initiated or improved in Nile Basin countries according to sound Integrated Water Resources Management (IWRM) guidelines and good practices, especially those related to international river basins”.

The objective of the Water Policy Guidelines and Compendium of Good Practice is thus to help and support stakeholders in the Nile Basin Countries to enhance the formulation and implementation of their national water policies within a cooperative regional perspective. As the Guidelines are not in way prescriptive or binding, they do not need to be formally agreed upon by the NBI member countries. There are understandable and legitimate differences of approach on issues such as the fourth Dublin principle and associated matters (cost recovery, water pricing), tradeable water rights and transfers between basins. This document is provided as a set of source materials for countries to use to adopt informed policy positions on these contentious issues and all other key matters relating to water. They are only to be consulted to the extent that they are found to be useful and appropriate.

Acknowledgments

The consultant wishes to express his appreciation to the Lead Specialist, Dr Osman El Tom Hamad, members of the Task Force from each of the NBI countries, Dr Alan Nicol and the country specialists involved in the Needs Assessment Study, support agency representatives and other participants at the workshops held in Addis Ababa in January and June 2006. Following the June workshop, and again in November following another task force meeting in Addis, several National Country Task Forces sent written comments. In one instance case study material that forms a box in the text was also provided. The report has been sponsored by the German Government with funds provided through the Federal Ministry for Economic Cooperation and Development (BMZ) and facilitation through the German Development Cooperation (GTZ).

It is appropriate to note that I am also indebted to my colleagues from an earlier Guidelines study executed for SADC (Rolfe Eberhard, Piet Heyns and Jonathan Kampata). Although the materials have been extensively revised, the SADC Guidelines provided a starting point for some chapters, particularly in Part II. The starting point for several chapters in Part III was the ideas and excellent material available in the Cap-Net (2005) *IWRM Plans Training Manual and Operational Guide* (details in References R30).

Peter Robinson

Executive Summary

Context and Purpose

The *Water Policy Guidelines and Compendium of Good Practice* are a component of the *Water Resources Planning and Management* project of the Nile Basin Initiative.

'Policy' is a set of principles which is used as a basis for making decisions to further certain objectives. Public water policy may be codified in a formal document or may be reflected in actual practice. The purpose of water policy is to maximise the economic and social benefits of water while ensuring that these are shared in an equitable manner and that environmental sustainability is preserved.

The purpose of the Guidelines and Compendium is to assist NBI countries to formulate and implement policies that fully incorporate the transboundary aspects of water and further the commitments that they have made to cooperative development of shared water resources on the basis of the principles of IWRM (integrated water resource management). The Guidelines are not in any way binding on NBI member countries, but may be found useful by various stakeholders (non-state actors as well as government officials) in establishing and executing water policies. The materials (particularly those relating to 'process') also apply to instruments through which policies are implemented, notably water strategies and action plans.

Structure of the Guidelines & Compendium

The document is divided into five main sections:

Part I: Introduction

This covers the nature and purpose of water policy, describes the policy cycle (analysis, formulation, legal adoption, implementation, evaluation, review), discusses the objectives and usage of the Guidelines and draws out linkages to regional and international frameworks, including the Nile Basin Initiative itself.

Part II: Content of Water Policies

'Content' refers to the topic areas which might be covered in a comprehensive water policy statement. Part II has 24 chapters, covering both technical areas (such as water resources allocation or water pricing) and social areas (such as stakeholder participation and gender mainstreaming). The topic list attempts to cover all the main issues which might be considered for inclusion in a water policy statement, which is necessarily a *national* document, but with the emphasis throughout being on the transboundary dimensions which need to be taken into account by NBI countries. The technical descriptions are accompanied by illustrative examples of international best practice.

Part III: Process

'Process' refers to the procedures required for the formulation, legal adoption, implementation, monitoring, evaluation and review of a water policy, or indeed of a water strategy or action plan. In the context of water, the most important aspect of process is stakeholder involvement, and considerable attention is given to how this can best be achieved. The emphasis in Part III is again on shared river basin concerns, which in

respect of process poses additional challenges in areas such as public awareness, stakeholder participation, legal and institutional frameworks and political commitment.

Part IV: Additional Compendium Materials

Some longer compendium materials are presented in Part IV.

References, Additional Readings and Useful Websites

Reference material is provided under 30 topic headings.

Roadmap for Implementation and Next Steps

As indicated by the analysis and examples from other river basins given in Parts II and III, the development of co-operation in shared river basins is not an easy matter. Time, patience and perseverance are required to make fully develop shared water resources in a manner which is environmentally and economically sustainable and which ensures equitable sharing of the benefits. Experience from elsewhere highlights the need for complex cooperative processes to be broken down into stages and small steps, allowing confidence to be progressively developed over time. The successful carrying out of joint projects emerges as being essential for further co-operation. In this regard, the Nile is fortunate in having a history of successful cooperative projects to draw on. New cooperative projects are being developed under the NBI.

As regards the status of water policy, almost all countries have recent water policy statements based on IWRM principles, but relatively little attention is given to transboundary aspects. These will undoubtedly be addressed in the fullness of time, but at a pace and in a manner that is determined by each country. What the NBI can attempt to provide is capacity-building in transboundary water management and policy-making. Various forms are suggested, including formal and special purpose courses, study tours and attachments. The extent to which individual countries would wish to take advantage of such capacity-building opportunities is again a matter for each country to decide.

I. Introduction

1 Nature and Purpose of Water Policy

Policy is a set of principles which is used as a basis for making decisions to further certain objectives. Almost any institution, whether public or private, operating for profit or voluntary, requires a policy to guide its operations and provide a frame of reference for its members. What is of interest in these Guidelines is public policy, that is principles for guiding the management of public affairs by a government or some public agency operating on behalf of government. Ideally, a public policy is to be codified in the form of a written policy statement which has been formally endorsed by a body with the requisite authority (such as, in the case of a national policy statement, the cabinet). Particularly in the water sector, it is desirable that non-state actors to be involved in the formulation of policy. This ensures that the policy is adapted to the circumstances prevailing in the country and that people will be more aware and more committed to ensuring that the intentions enunciated in the policy statements are in fact implemented.

In many cases, policies are not codified in this *de jure* way. What actually happens in practice in the management of water can be analysed to deduce a *de facto* policy which may differ from what has been written, or (in the absence of a policy document) from what has been stated by government ministers or others who seek to enunciate water policies. Policy is also implicit in legislation. Ideally, the national water law will provide the legal framework for the implementation of national water policy, but again there may be observable differences between articulated policy, the codified legal framework and what is done in practice.

These differences are not surprising or entirely undesirable. As circumstances, national aspirations and the dominant ideological framework change, so must water policy change. A revision of policy may well start with an agreed water policy becoming less applicable and the level of adherence to the policy decreasing. To fill the gap, informal policy statements are made and debated. At some stage, a full-blown discussion of water policy becomes necessary, leading eventually to a new water policy statement, revised water law and new water sector institutions.

In recent years, this pattern of policy revision, leading to widespread water sector reform, has been followed in many countries because of two major shifts in thinking. The first of these affects the role of government in general – that governments should be much less directive and intrusive, relying more strongly on community and private sector ideas, initiatives, finance and capabilities. The second is specific to the water sector – to move from the ‘supply oriented’ approach to providing water, which was coupled in the past with neglect of the environment, to **integrated water resource management (IWRM)**.

In the current context, the **purpose** of a water policy statement or document is to establish principles of equitable, efficient and sustainable utilisation of water resources. Moving from document to implementation, the **purpose of water policy** itself is to maximise the economic and social benefits of water while ensuring that these are shared in an equitable manner and that environmental sustainability is preserved.

2 The Policy Cycle

As outlined in the previous chapter, the desirable situation is one in which a country has a formal water policy statement, backed by a legal framework, and that the policy is systematically implemented by central and local government, communities and the private sector. In due time, the implementation of the policy needs to be evaluated, and this may lead to a review of the policy.

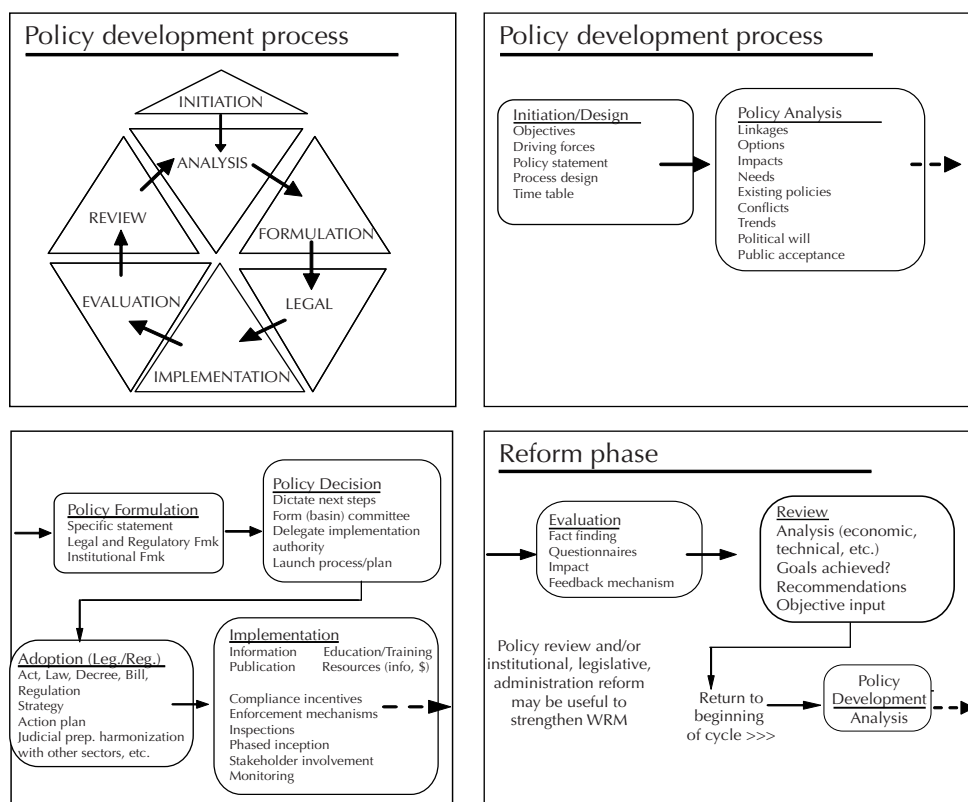


Figure 1. The Policy Cycle

Source: Powerpoint presentation to NBI by Dr Alavian, World Bank Institute

The process is thus ideally one of a **policy cycle**. As illustrated in Figure 1, the policy development and review process may be characterised as having 7 phases.

- Initiation phase: recognition of the need for a water policy and start of the process.
- Policy Analysis: careful scrutiny of the water sector 'landscape' to identify key issues and quantify tradeoffs where decisions between competing objectives will need to be made.
- Policy Formulation and Decision phase: the drafting of the policy statement, with intensive discussion with key stakeholders before the draft is finalised and agreed upon.
- Legal: formal adoption of the policy through establishment of the legal framework for its implementation.
- Implementation phase: by far the longest phase in the cycle, during which the institutional structure is established and all aspects of the policy are implemented.
- Evaluation: monitoring and evaluation of the implementation of a policy should ideally be a continuous process. After some time, a major evaluation may be needed in anticipation of identifying a need to change the policy.
- Review: assessment of the effectiveness of the policy in meeting the objectives and perhaps also of the need for a refinement of the objectives themselves.

The Review of a previous policy provides the initiating point for the cycle to commence with a new phase of Analysis.

Water strategies and action plans are often the channels through which policy is implemented. These instruments are also associated with cycles of analysis, formulation, adoption, implementation, evaluation and review. As will be emphasized in Part III, much the same steps and approaches as those adopted for a water policy can be applied to a water strategy or an action plan.

3 Objectives and Use of the Guidelines and Compendium

These Guidelines and Compendium of Good Practice are intended to assist in the formulation and implementation of *national* water policies (in the formal, codified sense of national policies) which are

consistent with the commitment that Nile Basin countries have made in respect of *shared* water resources. While the water policies are thus to be fundamentally national in character, one of the objectives of the Guidelines is to provide assistance in ensuring that the policies are harmonised so as to minimise any potential problems associated with transboundary water resources.

The Guidelines seek to fulfil two purposes. The first is to assist countries in achieving a comprehensive document which covers all essential elements for a national water policy statement based on IWRM principles. This is what is meant by **content** and is to be found in Part II of the Guidelines. The second purpose is to assist in the **process** of policy formulation, legal adoption, implementation, monitoring, evaluation and review. Process is the subject of Part III of the Guidelines.

To make the document more interesting and relevant, materials on good practice have been integrated into the text of the Guidelines mainly in the form of boxes, tables and figures. Additional Compendium materials are provided in Part IV. The coverage of each topic is necessarily rather brief. For more detail, the interested reader is referred to the references, additional readings and websites which are organised at the end of the document under 30 headings¹.

The policy scoping exercise has made clear that Nile Basin countries are at differing stages in policy development. A common problem is a gap between the articulated policy and what is actually implemented. This can in part be overcome by ensuring that all water sector stakeholders are involved in each stage of the policy-making process, not just with a token opportunity to make an input, but with a real opportunity to make changes which matter. In this regard, the *process* aspects of policy assume heightened importance.

How do stakeholders play a full role in policy formulation and implementation? One of the difficulties is that stakeholders who are not water sector professionals often find it difficult to understand what the issues are and to access the jargon-laden language used by those who are 'in the know'. One of the uses of these Guidelines and Compendium of Good Practice is precisely to fill this gap. In particular, the brief presentation of key issues in each of the topic areas in the Content section (Part II) is not intended to be comprehensive from the viewpoint of an expert in that subject area. The discussions are instead intended to inform a wide spectrum of users of the Guidelines about the main issues at stake and alert them to be able to probe each area with relevant questions when policy issues are being discussed. Interested users can use the bibliography to find detailed references in each subject area. By contrast, the Process chapters (Part III) are primarily intended to assist water sector experts in particular areas to be open to input from other stakeholders and creative in involving people in the policy-making and implementation process.

The Guidelines are intended to be exactly what they say they are – guidelines which can be used or discarded depending on whether the user finds any of the items useful. There is thus no obligation on any Nile Basin country to formally endorse any aspect of the Guidelines and Compendium of Good Practice, nor to incorporate any specific aspect into its national water policy statement.

4 Linkage of National Policies to Regional and International Frameworks

The formulation of water policy can no longer be considered in a purely national framework. Internationally, there has been increased emphasis in recent years on integrated water resource management (IWRM) and on the universal provision of adequate basic water and sanitation services. This concern has been captured in various international and regional fora including the following:

¹ References in the text are given in an abbreviated form with a note such as '*Refs R26*'. This indicates that the full reference is to be found in section R26 of the references section.

- 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 programmes of action, 1997.
- Nile Basin Initiative, Shared Vision and policy objectives for the Nile River Basin Strategic Action Program, 1999.
- World Water Vision, Second World Water Forum and Ministerial Conference, The Hague, 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, which included the 2005 target for countries to produce IWRM and Efficiency Plans.
- Third World Water Forum and Ministerial Declaration, Kyoto, March 2003.

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.
- The Earth Summit (Rio) moderated the emphasis on the economic value of water by asserting that water is a social good as well as an economic good and both were equally important. Integrated water resources management was put firmly on the international agenda.
- Earth Summit + 5 called for greater attention to IWRM of international basins through co-operation, and stressed the role of technical transfer and financial support from developed countries to assist with the development of IWRM at country and inter-country levels. At the same time, it emphasised the important role of greater cost recovery in developing countries with respect to water and sanitation services.
- The Nile Basin Initiative emphasized sustainable socio-economic development through equitable utilisation of and benefit from the common Nile Basin resources, with Shared Vision and Subsidiary Action Programs to bring this about.
- 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 are to act as enablers and regulators rather than players.
- 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, but is strongly supported under NEPAD.
- The Millennium Development Goals (MDGs) 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.

Developing countries, including those in Africa, have been fully involved in these international and regional events. They have set the agenda for national policies and strategies which is reflected in subsequent chapters of these Guidelines. Support for policy and strategy development is available to developing countries to develop national policies and strategies in terms of this international agenda.

5 Commitments Under the Nile Basin Initiative

The Nile Basin Initiative is guided by the shared vision which was adopted in 1999. The shared vision is “to achieve sustainable socio-economic development through the equitable utilization of, and benefit from, the common Nile Basin water resources”.

At the same meeting, the Nile Council of Ministers adopted the following policy objectives for the Nile River Basin Strategic Action Program:

- to develop the water resources of the Nile Basin in a sustainable and equitable way to ensure prosperity, security and peace for all its peoples;
- to ensure efficient water management and the optimal use of the resources;
- to ensure cooperation and joint action between riparian countries, seeking win-win gains;
- to target poverty eradication and promote economic integration;
- to ensure that the program results in a move from planning to action.

These objectives could be subverted if there were significant policy inconsistencies between NBI countries. The policy scoping exercise has clearly indicated that no glaring inconsistencies exist. Recently formulated water policies of member states have been informed by international best practice principles. Nonetheless, there may be need for greater harmonisation (in the sense of removal of contradictions or inconsistencies) in various different dimensions:

- 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. The main constraints to the effective implementation of national policies in regard to managing transboundary waters have more to do with capacity constraints, available resources and strictness of implementation (and enforcement) of written policies than with the policies themselves.

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, are likely to become more severe. The need for harmonisation can therefore be expected to increase in two main areas:

- Quantity allocation: abstraction and other uses will need to be reconciled against a background of possibly differing pricing, surface and groundwater abstraction control mechanisms being in place in different countries;
- Water quality and the environment : mechanisms will need to be put in place to reconcile different policies and practices in respect of wastewater control and treatment, the use and pricing of agricultural chemicals (fertilisers and pesticides) and different assessments of in-stream minimum flows needed to ensure environmental sustainability.

Specific problems can be solved by the sort of systematic, step-by-step approach to harmonisation that is suggested in Box 1. Success at this level helps to build the confidence and trust that is needed to consolidate harmonisation at the broad policy level.

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

- Develop compatible information systems which facilitate information exchange.
- Develop a common understanding of the problem.
- Agree on desirable end state (informed by a common vision).
- Set water quantity targets, taking into account reasonable per capita water shares.
- Set water quality targets.
- Agree on priorities for water use (basis for making allocations).
- 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.
- 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.
- Put in place the necessary institutional mechanisms.
- Amend policies and legislation as necessary.
- 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/>

II. Content of Water Policies

When drawing up a national water policy statement, Chapters 6-29 can be used as a check list of what the policy statement might contain. The emphasis and extent of coverage in the policy statement of the different topics will naturally differ between countries in accordance with national circumstances and priorities. The emphasis in what follows is on the technical aspects of the issues and identification of what is considered international best practice.

6 Objectives and Principles

A statement of water policy needs to present a **vision** of water's role in national development and lay out specific **goals** or **objectives** for the water sector. A typical set of objectives would include the following:

- ensure equitable access to and usage of water, including but going beyond satisfying the population's basic water needs;
- maximise the contribution of water to enhancing economic growth;
- promote the efficient use of water;
- ensure environmental sustainability;
- create an institutional structure in the water sector that is efficient, accountable and self-sustaining.

Basic needs for water are often thought of only in relation to domestic water for drinking and household use, with the emphasis being on improved health. Equally important is the provision of productive water for income generation. While domestic water and sanitation are highlighted as part of the 7th Millennium Development Goal (MDG), the primary MDG is concerned with poverty reduction. Decades of experience with health-oriented water and sanitation programs has clearly demonstrated that domestic water on its own is neither necessary nor sufficient for the reduction of poverty. Productive water, on the other hand, offers the opportunity to attack poverty at its roots. Successful productive water schemes (those that increase peoples' incomes) are associated with successful domestic water and sanitation interventions (those that are sustainable because maintenance is taken on by the users of the facilities).

Reflecting the widespread international consensus in the water sector, the **principles** to be enunciated in a national water policy statement are first and foremost those relating to integrated water resource management, starting with the four Dublin Principles given in Box 2. Other principles that could usefully appear in the water policy statement might also be general principles being pursued by in all sectors, such as independence of regulatory structures: regulation responsibilities are to be separated from operational responsibilities wherever practical.

Box 2: The Dublin Principles

Principle No. 1: Fresh water is a finite and vulnerable resource, essential to sustain life, development and the environment.

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

Box 2: Ctd...

Principle No. 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 involvement of users in the planning and implementation of water projects ('subsidiarity').

Principle No. 3: Women play a central part in the provision, management and safeguarding of water.

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

Principle No. 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.

Table 1 presents these and a number of other important principles under two main categories: **procedural principles**, relating to the achievement of good governance, and **substantive principles**, relating to the achievement of IWRM and environmental sustainability. The table provides a useful checklist of principles to consider when evaluating an existing water policy or strategy as well as when formulating new ones.

Table 1: Procedural and substantive principles for water policies

Features			
Concept: Good Governance			
Procedural Principles	Rule of law	Predictability Absence of arbitrary exercise of power	Impartial enforcement of laws Independency of judicial system
	Participation	Freedom of association and speech Access to information Mechanisms for accessing to participation	Legitimacy on decision process (from planning to implementation) Gender and Ethnical Equity in participation process
	Effectiveness	Knowledge about the water problem Knowledge about the causes of the water problem Aims of policies oriented to solve the causes of problems	Coherence among policies in diverse sectors Capacity of influence exertion over relevant actors Capacity of coordination of actions Capacity for implementation
	Efficiency	Minimization of financial, political, social and environmental cost	Minimization of transaction cost
	Equity	Reduction of differences in power distribution related with income, gender or ethnicity in access to resources or decisions	Impartial formulation and application of law
	Responsiveness	Coverage to all stakeholders Opportune delivery of decisions to stakeholders demands	Response to lowest appropriated level Subsidiary response
	Transparency	Access to knowledge of procedures Access to enough information	Understandable information

Features			
Concept: Good Governance			
Procedural Principles	Consensus orientation	Participatory approach for agreements Cooperative approach	Mediation mechanism to enhance territorial and sectoral cooperation
	Accountability	Obligation to answer for the discharge of responsibilities that affect others Access to a public forum in order to answer Clarity of rules Identification of the directing mind	Monitoring of policies Disclosure of achievements or lack of achievement Accountable private sector, civil society and government
	Peaceful resolution of disputes	Mediation mechanism for solving disputes among stakeholders	Arbitrage enforcement mechanism to resolve disputes that could not be mediated

Features				
Concept: IWRM				
Substantive Principles	Integrated nature of water	Recognition of relationship among ground-water and surface water Recognition of relationship among water quality and quantity and terrestrial and aquatic ecosystems	Recognition of limits in self purification capacity of water Recognition of upstream and downstream relations in water quality and quantity	
	Integrated development of water related policies	Consideration of all uses Consideration of all users Consideration of all water resources Coordination mechanism for enhance coherence	Integration of water and wastewater management Integration of supply and demand management Watershed management and water sources protection	
	Role of women	Gender mainstreaming in water issues	Promotion of women's empowerment	
	Water as economic good	Economic and environmental valuation of water Full cost of providing water as tool for deciding alternative uses	Full cost recovery Use of economic instrument to manage demand Discourage of wasteful use of water by pricing	
	Lowest appropriated level	Decisions made at lower level possible Participation at lower level possible	Resolution of disputes at lower level	
	Concept: Environmental Principles			
	Sustainable use	Optimum sustainable yield concept in planning and implementation of activities	Carrying capacity concept in planning and implementation of activities	
	Precautionary principle	Not delaying of actions to avoid environmental damage due to uncertainty	Prevention rather than mitigation measures	
	Polluter pays principle	Compensation of damage to third part due to environmental impacts	Internalization of environmental cost	
	Prior environm. assessment	Consideration of environmental impacts or projects and activities	Assessment in order to evaluate alternatives and reduce impacts	
Prior notification	Information to people affected by some activity or project	Grant of equal access and due process in administrative and judicial procedures in order to avoid/reduce affectation		
Environmental standards and Monitoring	Establishment of protection standards Monitoring changes	Publication of relevant data in state of environment		
Inter and intra generational equity	Long-term perspective in conservation and use			

Source: Cap-Net (2005), pg 69-70. Refs R30.

7 Stakeholder Participation

The national water policy statement needs to include a clearly stated commitment to participation of stakeholders in the planning and management of water resources, with particular emphasis on the participation of women. The driving force for the involvement of stakeholders is the realisation that 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, policies and strategies. This requires proceeding through joint diagnosis and joint creation of options to 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.

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 3. In Part III, chapters 31-33 provide further discussion of the issues at stake, giving suggestions on how to ensure that the involvement of stakeholders is meaningful and sustained right through the process.

Box 3: Developing shared IWRM initiatives – 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/>

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 are to be facilitated. The 'Every River has its People' project in the Okavango Basin, involving participants from Angola, Botswana and Namibia, provides a good example - see Box 4.

Box 4: 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

8 Gender Mainstreaming

It is easy for the important role of women in water to be acknowledged, but difficult to include a commitment in policy that will ensure that women do in fact become more involved in policy-making and implementation of water strategies. Experience has shown that water programmes which from the start do not adequately take into account the needs of women run the risk of being ineffective, inefficient and unsustainable.

To avoid this problem, there is no better place to start than with mainstreaming gender in the water policy itself. This can be done by continually reviewing each aspect of policy in relation to the following types of questions:

- How are the needs of men and women reflected?
- Who has been consulted?
- How was consultation done to facilitate input from men and women?
- Are the policy provisions based on an understanding of gender differences?
- Have gender indicators been identified to clarify objectives and facilitate monitoring?
- How will objectives for gender equality and women’s participation be pursued? Have specific strategies been provided for?

- Have obstacles that may hinder participation of men and women been identified and strategies put in place to deal with these?
- Does the policy formulation management structure provide the necessary expertise on gender issues and equality?

A key gender test of a water policy is whether it provides women with equal (or even preferential) access to water. Access alone is not sufficient, however. As discussed in Box 5, for the Bangladeshi women to really benefit from water, it was necessary also to overcome inequitable access to land, credit, seeds and fertilisers.

Box 5: Gender and poverty alleviation, Bangladesh

In 1987, the Grameen Bank and its sister organization, the Grameen Krishi Foundation (GKF), purchased 790 deep tube wells from public organizations. Management of this irrigation equipment and the supply of agricultural inputs and credits to farm households became the core activities of GKF. The approach was to explicitly link agricultural productivity and efficiency objectives with poverty alleviation and women's empowerment, targeting the so-called 'land-poor' who owned between half and three acres of land.

The GKF began to recognize that women would be able to make much more income if given adequate support, compared with returns on labour in traditional female activities. GKF made irrigation available to either groups or individuals in the form of access to deep tube wells or shallow tube wells and to irrigation technology (shallow tube wells, treadle pumps, or hand tube wells). It was found that women experienced problems in enjoying the full benefit of access to irrigation water due to poor access to other inputs - land, credit, seeds and fertilizer. Therefore GKF attempted to provide these inputs as well as negotiate with landowners to secure lease arrangements on behalf of women.

The result was that female involvement in irrigation activities increased dramatically, as did their income. Whereas, as wage labourers, they would have earned around Tk500, seasonal net income from irrigation ranged from Tk1000 (with a treadle pump) to Tk5000. Increased income –generating capacity strengthened their self-confidence and reduced dependence on male intermediaries, in spite of some initial problems due to loss of social status for contravening purdah norms.

Source: UNDP (2003): Mainstreaming Gender in Water Management (Refs R6)

Gender concerns in water are not just about righting the balance of past discriminatory policies which adversely affected women. The goal is to achieve a proper balance in the roles of both men and women. The example from Mexico given in Box 6 gives a good illustration of the value of involving men as well as women even in areas that are conventionally thought of as the preserve of women. This example may seem far from the situation in some parts of Africa, but social realities on the continent are changing as a result of urbanisation and demographic shifts.

Box 6: Targeting men for hygiene education, Mexico

A health programme in Mexico found that breaking through gender stereotypes was easier than previously thought and was welcomed by both men and women in the programme villages. When designing its materials to promote sanitation and oral rehydration, the organization took the usual steps. Programme researchers visited homes and learned about healthcare habits. They consulted sociologists and other experts about customs. They tested the education materials and made adjustments.

Box 6: Ctd...

The final product was an illustrated brochure that depicted only women as everyone took for granted that only women performed these duties. Some researchers still wondered about this and asked 60 mothers and 30 fathers of young children whether fathers helped. Sixty-three percent of the mothers and 70 percent of the fathers answered in the affirmative.

A second brochure was produced with fathers and mothers involved, and tested both versions. Everyone understood both brochures equally well. None thought it unusual or silly to see men help. Two-thirds of the men and women preferred the second version. Many explained that the presence of both parents made the pictures more complete. Some said that men will see that not only women can take care of the children. Based on this development, the second brochure was chosen and used.

Source: UNDP (2003): Mainstreaming Gender in Water Management (Refs R6)

9 Capacity Building

Integrated water resource management has significantly raised the awareness and skill requirements in the water sector. The water policy statement would do well to include specific policies on capacity building, taking account of different areas of need:

- technical training of full-time staff of water sector institutions;
- sensitisation of existing water sector professionals to the broader requirements of IWRM, including the benefits of stakeholder participation;
- capacity building of part-time participants in water sector processes, so that water users and civic society groups can play their full role in the formulation and implementation of water policy;
- sensitisation of people in other sectors to the requirements of IWRM.

Capacity building is discussed further in Part III, Chapter 38.

10 Research and Development

Good policy formulation and implementation depends on having an understanding of all aspects of the water sector and its linkages with other sectors. Research and development (R&D) work is thus vital. To ensure that R&D is given sufficient emphasis in on-going national activities, it is advisable for the water policy statement to make specific mention of its importance.

The policy may also highlight priority areas for R&D. Research priorities could range from technical areas (such as hydrology, hydrogeology and ecosystems) to socio-economic concerns (acceptability of different technologies, willingness to pay, price elasticity of demand). Adaptation and development of approaches (such as community-based maintenance) and technologies (such as handpumps and drip irrigation systems) to local conditions might warrant being highlighted. In the context of shared water, joint efforts in R&D would further the goal of enhanced transboundary cooperation and understanding.

11 Institutional Framework

The water policy statement needs to provide a clear definition of the roles and responsibilities of organisations involved in the sector, including responsibility for co-ordination. Key activities that need to be allocated to different institutions include the following:

Water resource management

- Allocation of water rights (or rights to use water)
- Management and control of abstractions
- Management and control of water quality
- Responsibility for developing water resources
- Catchment management roles and responsibilities (including land-use management and the management of water quality).

Water supply provision

- Management of bulk infrastructure (transmission, storage, treatment)
- Management of retail water and sanitation services (distribution)
- Setting of tariffs and standards for service delivery.

Sector functions

- Monitoring of water resources and water usage
- Information management
- Education, training and capacity development.

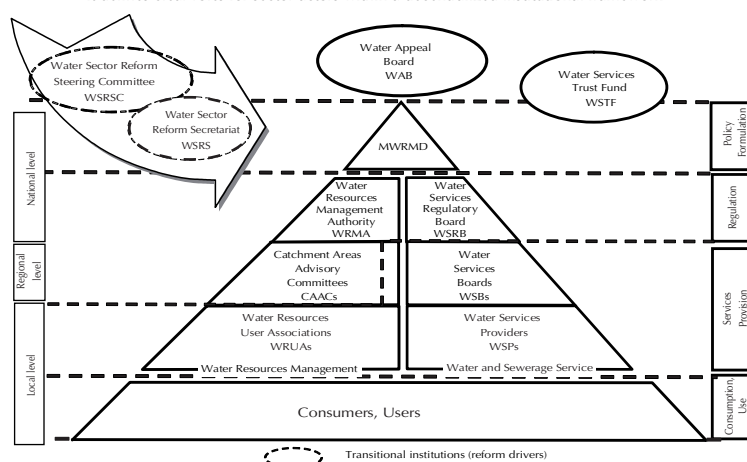
A major challenge is to specify clearly the respective roles of central and local government. Due to the nature of water and the contemporary importance laid on decentralisation, **local government** will be a key player in the water sector, but there still needs to be a coordinating framework provided by central government. Local government structures must at the same time be willing to work with non-state actors at the local level, both in respect of service provision and resource management.

It can be said that one of the principal achievements of the IWRM approach is to focus attention on the benefits of water management, starting at river basin level. Water policy needs to carefully specify how user-level water institutions are to be established and to ensure that ordinary users of water can be involved in their management. The statement also needs to specify policies with respect to the institutional **roles of non-state actors**:

- roles of NGOs and CBOs in both rural and urban areas
- role of the for-profit private sector in water supply (policies for full spectrum ranging from informal traders and small-scale enterprises to large probably foreign-owned water utilities)
- role of the private sector providing ancillary services (e.g.. pump and pump spare part suppliers and installers, plumbers, irrigation contractors, consulting engineers)
- role of international development agencies.

KENYA INSTITUTIONAL STRUCTURE CREATED BY WATER ACT 2002

The Kenya Water Act 2002 separates policy formulation, regulation and services provision; it defines clear roles for sector actors within a decentralized institutional framework



Source: Water Sector Reform Secretariat

Figure 2: Kenya-Institutional Structure Created by Water Act 2002

For the institutional structure to be effective and sustainable, the water policy must specify the financing and funding arrangements for the sector. These issues are discussed in more detail in subsequent chapters.

Many countries undertaking IWRM-inspired water sector reforms have sought to separate regulatory and service provision functions. Kenya, for example, has firmly entrenched this separation in its policy and legislation, as well as separating water resource management and water services. The resulting parallel pyramidal institutional structure is currently being established – see Figure 2. This is but one example of a possible institutional structure for the water sector and other countries may well opt for a different structure.

12 Water Resources, Environment & Social Assessment

As needs to be made clear in the water policy statement, water resource assessment is the essential starting point for IWRM. As far as possible, the resources, capacities and efforts of basin states are to be pooled in the assessment of shared water resources. Previous Nile cooperation initiatives, such as the Hydromet Project, show the promise of what can be achieved through joint efforts.

Water resources assessment needs to 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. The aim is to identify the pertinent parameters of the hydrological cycle, and evaluate the water requirement of different development alternatives. The assessment pinpoints 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 7. References and websites are given separately for water resource assessment in Section R9, for environmental assessment in R10 and for social assessment in R11.

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 not always adequately covered in all countries and to be effective 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, an example of which is given in Box 8. 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 Chapter 27.

Box 7: 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 8: 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 (Refs R2)

13 IWRM Planning, Sectoral Inter-linkages & Benefit-sharing

A water policy statement will identify national priority water uses. In addition to water for drinking and household purposes, these would typically include water for agricultural, pastoral and industrial development, hydroelectricity generation and environmental requirements (which are often linked to tourism potential). Where these uses do not directly compete with one another, there will not be a basis for conflict, but in many cases there is already inter-sectoral competition for water in Nile Basin countries. Looking into the future, competition is bound to increase and with it the need to make rational choices on how best to allocate scarce water. Water policy thus needs to include a commitment to IWRM planning.

Recognising the primary principle of the unity and coherence of each basin, 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 by different sectors will maximise economic and social welfare without compromising the sustainability of vital ecosystems. The scope of a typical river catchment management plan is outlined in Box 9.

Box 9: 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 also 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 R13.

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. As discussed in Chapter 35, it is part of the broad concept of 'continuous improvement', which has emerged as part of efforts to promote sustainable development. As a result, a catchment management plan is more of a strategic

plan than a directive plan in the old masterplan style. Positive economic and social developments can be facilitated by a flexible plan and not impeded by a rigid one.

Where river basins or catchments span the territory of two or more 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. It may be more practical and beneficial to negotiate an equitable share of the *benefits* of shared water use rather than to limit the options to an equitable share in the water itself.

14 Dams and Development

The future development of dams is a particularly important instance where integrated planning is required. National policy-makers need to take into account the World Commission on Dams (WCD) Report as well as criticisms and debate arising from it (for example from the International Commission on Large Dams – see references in Section R14). 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 considerations become 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 basin or is a national project on a 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 are to 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 Africa, with a consequent dilution of the development impact – see Box 10.

Box 10: 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 need to 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

Box 10: Ctd...

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 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.

Box 10: Ctd...

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 (Refs R14)

Kariba is a case in point. The box summarises the salient questions stakeholders at a WCD Kariba workshop felt should in future be asked about the effectiveness of a large dam.

Box 11: 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, discussed and practiced with those who may be affected.

Reservoir Safety

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

Box 11: Ctd...

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 (Refs R14)

Policy on dams needs to embrace existing as well as future dam developments. There is considerable scope for Nile Basin states to negotiate and develop consensus on operating rules for dams on shared basins 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 11 above refers.

15 Water Resources Allocation

One of the most fundamental areas to be clarified in a national water policy is how water resources are to be allocated in order to achieve the objectives of equity, efficiency and sustainability. This is generally achieved through the granting of **rights** to abstract and use water from public water sources, and to discharge wastewater or effluent (of a defined quality) back into public water sources. Water rights can be permanent (from inexhaustible sources) or contingent (from surplus water) and can be granted for either consumptive or non-consumptive uses. Granting rights in perpetuity is not desirable, because it is desirable to have the flexibility to adapt to changing conditions.

The allocation of rights is typically administered via the issuance of **permits**. The main allocation principles are as follows:

- permit issuance is to take account of the priorities and future investment intentions identified in basin development plans;
- the maximisation of socio-economic benefits is not to be at the expense of environmental sustainability, and at all times an adequate environmental flow must be maintained in river systems;
- primary usage (which will not require a permit) is always to be given priority and as primary usage grows existing permits may have to be reduced;
- in the case of more than one application for the use of the same water, consideration is to be given to the need to achieve, as far as possible, an equitable distribution of the available water resources, the needs of each applicant, and the likely economic and social benefits of the proposed use;
- in granting a permit for the use of water for agricultural purposes, consideration is to be given to the extent and suitability for irrigation of the land and the efficiency of the proposed method or possible methods of using the water;
- in the case of applications for storage permits, consideration is to be given to the economic aspects of the proposed project and to the availability of water.

The main problem with a permit system is that it inevitably lacks flexibility, with the danger of significant social costs arising as conditions change over time. A more appealing approach from an economic viewpoint

is to allow rights to be **tradable**. This introduces an element of competition into the allocation system, with the rights being bought by those best able to use them, thereby improving allocative efficiency.

Tradable water rights are increasingly being used in countries such as Australia to allow market-determined reallocations of irrigation water in river basins where permits for the entire sustainable yield of the water source have been issued. The idea of tradable water rights in Africa remains controversial because of the large social disparities which exist and the resultant fear that the rich and powerful will appropriate a disproportionate share of the water, by quickly buying up allocations to vulnerable groups. An administrative allocation system protects against this. Such fears would be legitimate if all water permits were to be made tradable without any restraints. Limited application of tradability in situations where the interests of the poor are protected and the trading is oriented to enhancing the economic uses of water could be beneficial from a national viewpoint.

16 Inter-basin Transfers

In accordance with the principle of subsidiarity (see Chapter 6), the issuance of water permits within a country may be delegated to river basin organisations. In Zimbabwe, for example, the 1988 Water Act gives Catchment Councils the power to issue permits. In so doing, they are to be guided by the Catchment Outline Plans, which map out beneficial utilisation of water to achieve the development potential of the catchment. In other countries, local institutions are advisory, rather than decision-making, but the intention is nonetheless there for water allocation decisions to be made at the local level. Kenya's Catchment Area Advisory Committees are a case in point.

In the case of allocations of water which would result in inter-basin transfers, a more centralised approach would be warranted. This is because inter-basin transfers generally imply much higher level of environmental risk than intra-basin uses, and a detailed environmental impact assessment would always be justified. Box 12 provides an illustration from 2 inter-basin transfer schemes in California.

Box 12: Impacts of inter-basin water transfer schemes in California

The 1930s Central Valley Project and the 1960s State Water Project are major inter-basin water transfer schemes in California. They have had a number of serious and interrelated environmental impacts in both northern and southern California.

In the North:

The San Joaquin delta is a habitat for 25 percent of the state's warm water and anadromous sport fish and 80 percent of its commercial fish industry. The large amounts of water pumped from the delta to southern California have contributed to: low fresh water outflows in dry years, intrusion of sea water and high salinity in water supplies for farmers, urban communities and wildlife. In addition, large-scale irrigation in the San Joaquin Valley has resulted in the conversion of 95 percent of the state's wetlands to farms, causing the migratory bird and waterfowl population to decline from 60 million in the late 1940s to 3 million in the early 1990s. Irrigation has also accelerated the leeching of selenium into wildlife refuge ponds, causing many deaths and deformations.

In the South:

The diversion by the city of Los Angeles of 4 of the 7 Mono Lake tributaries in the Owens Valley has caused the lake to drop 40 feet, increasing the lake's salinity, threatening its unique shrimp and bird

Box 12: Ctd...

population, and uncovering stretches of the lake bed that contain high levels of alkali. During wind and dust storms, alkali particulates, which are harmful to the respiratory system, pose a major public health hazard.

Source: R Hirji "Inter-Basin Water Transfers – Emerging Trends" (Refs R16)

The paper from which the box is drawn concludes for inter-basin transfers that "Water policy reforms are needed to ensure that instream uses of water are given as high a priority as industrial, agricultural and other uses, and that EIAs are required well before projects are designed". In a shared river basin context, environmental concerns are more than ever important, because the adverse consequences, if any, of inter-basin transfers may occur downstream or upstream in another country. To further the spirit of regional cooperation, a Nile Basin Initiative country considering an inter-basin transfer scheme may decide to keep its riparian neighbours informed, and may want to include the intention to do this in its national water policy statement.

17 Economic & Financial Instruments

Economic and financial instruments 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. These terms may be explained as follows:

- **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 will be discussed in Chapter 24, 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.

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 3. The implied prices affect user incentives and the viability of institutions in the water sector.

Catchment management, abstraction and effluent charges normally accrue to water resource management entities, while water supply institutions impose water tariffs, sanitation fees and bulk wastewater charges.

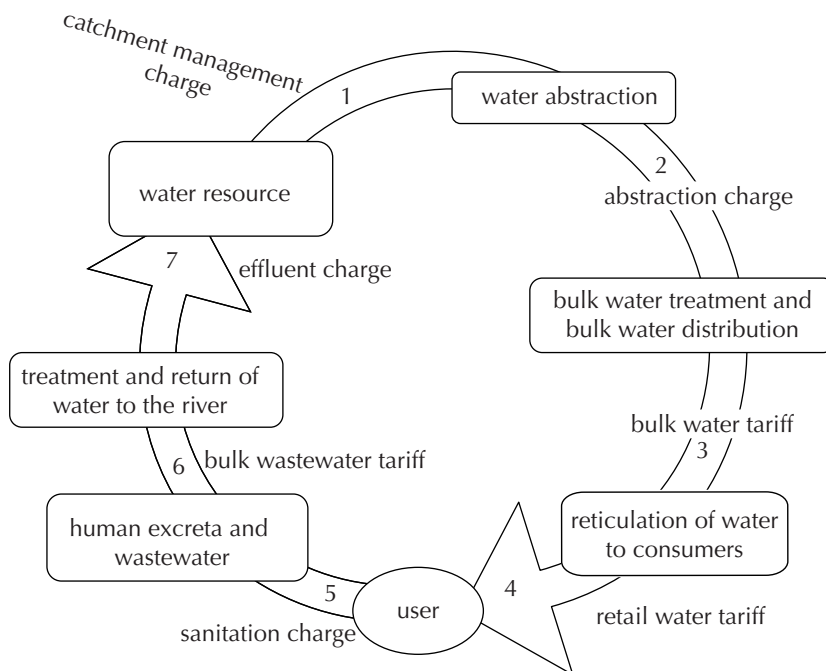


Figure 3: Water prices and the water cycle

The financial viability of water sector institutions is crucial to the sustainability of water sector strategies, in both their environmental and service delivery aspects. In the past, the philosophy of free water has had a corrosive effect on viability of water utilities, resulting not just in sharply declining standards of supply to existing customers, but sharply curtailed capital expenditure programmes. The people who have suffered most have been the poor who remain unserved and often have to purchase water from informal suppliers at many times the cost per litre of households with access to piped water.

The need for viability to improve standards of service delivery and to massively increase investment has been highlighted by calculations of what is required to reach the MDG goals of halving those without access to clean water and decent sanitation by 2015. Policies to attain the levels of financing required in the water sector will likely have to embrace several complementary elements:

- **Increased cost recovery:** more extensive and rigorously collected charges for both water resource management and water service delivery (as discussed in more detail in Chapters 18 and 19)
- **Much better use of existing supplies via water demand management:** water efficiency in agriculture is low and in urban areas, non-revenue water in Nile Basin countries is typically above 50% - as discussed in Chapter 21, it makes sense for existing water supplies to be much more efficiently used before new sources are developed. One of the principal means of invoking WDM is to raise water tariffs.
- **Leveraging local skills & financial resources:** much can be achieved in a cost effective manner by encouraging and promoting water and sanitation initiatives by communities and NGOs and formalising the role of the local private sector in water supply. This is discussed further in Chapter 20.
- **Tapping market-based finance:** in the past, water sector financing has been predominantly through public channels. There is considerable potential to tap micro-finance for small operators and community schemes, to facilitate crop pre-financing for productive water schemes and to work towards local or international capital market financing (bond floatations and stock exchange listings) for large urban water providers.
- **Grants from central government budgets and from NGOs and donors:** these grants have traditionally been the sole source of financing, but have often been declining in real terms, despite rising need. With complementary sources of finance in place, and the water sector generally better placed to make good use of resources, the level of grants from these sources can be expected to increase.

It is important to ensure that cost recovery and other financing strategies do not undermine the position of the poor and other vulnerable groups. As will be discussed in Chapter 20, carefully designed financing-cum-subsidy policies can considerably improve the position of vulnerable groups. Innovative policies in these areas are potentially highly rewarding.

18 Water Resource Pricing & Water Quality Control

Charges are to be levied on the use of water resources firstly to cover the direct costs involved, such as the administrative costs associated with issuing and administering the permit system, or the costs of building and operating a dam from which the abstracted water is drawn. However, even in the absence of such costs, charges for water are justified if they are properly designed to achieve the efficient allocation of water between competing uses and environmental sustainability.

The principal categories of water use may be divided between consumptive and non-consumptive uses. In the first category, the main abstractions are for domestic and income generating purposes (irrigation, livestock watering, mining, industry, construction, commerce and other services etc). As economies grow, profligate use of water in agriculture has to give way to more efficient use of water in high value activities, which are generally in urban areas (domestic consumption, industrial water demand etc). A proper system of pricing may help to facilitate this sort of change while also considering flows needed for environmental integrity and sustainability.

The main economic principle to be applied is that abstraction or use is to be priced to reflect the **opportunity cost** on other abstractors or users. This principle is obvious in a river system, where without a charging system some users may use water wastefully, thereby depriving others of the water they require for domestic purposes or for economic activities. There is also the necessary **environmental flow** to be considered to ensure the sustainability of the aquatic and related ecosystems. By having a pricing system applicable to water resources, abstractors and non-consumptive users are given a signal about the costs of their water use on others and on the environment. Particularly if applied on a volumetric rather than flat fee basis, pricing is intended to lead to more efficient use of water in both the technical and allocative senses of 'efficiency'.

In principle, the pricing might also attempt to accommodate such factors as **seasonality** and **risk** arising from droughts and floods. Users who need to minimize supply disruption pay a premium as compared with users who can tolerate a higher level of risk and will be required to cede part or all of their rights when the system comes under stress. This type of mechanism can be used to provide raw water at an acceptable risk factor to urban supply utilities without at the same time precluding the water in periods of surplus being used for agricultural uses.

In respect of effluent (polluted wastewater), it is the **polluter pays principle** which is to be applied. The idea is that the sustainability of ecosystems for society as a whole should not be prejudiced by the actions of those responsible for degrading the quality of water resources. The polluter pays principle thus requires that costs of pollution prevention, control and reduction measures are to be borne by the polluter. Effluent discharge fees are to be related to the costs of treating the water to restore it to an acceptable quality. Where the public authority does not have the means to treat the effluent, the objective is to force the polluter (by a combination of regulations, backed by significant penalties) to install adequate water treatment at source, so that the wastewater discharge is no longer an environmental threat.

The degree of environmental threat is directly related to the assimilative capacity of the water body into which the discharge is made. Ideally, therefore, effluent regulations, discharge fees and penalties should be

based on **receiving water criteria**. In practice, many water resource management authorities have found this difficult to do and have maintained instead a **uniform standards** approach to pollution control. The problem with the latter is that uniform standards may prove inadequate in cases where the water quality is already under heavy stress and excessive when the system is not very stressed. Ideally, there should be data on pollution levels for various water bodies, distinguishing as necessary different types of pollution (e.g. faecal material, organic wastes, salinisation, heavy metals, sediments etc), as these may cause different types of environmental problems in different regions.

To minimise the costs of water quality control, it is highly desirable for principles of **self-regulation** to be built into the management structure. Under self regulation, dischargers are made to bear the burden of monitoring and submitting regular results to the authority on discharge volumes, quality of discharge and ambient water quality. The authority is thereby relieved of routine monitoring but instead inspects randomly and imposes punitive fines for non-compliance. Tradability of wastewater permits has the potential to reduce the costs of managing water quality. It would allow, for example, the water resource management authority to set and monitor overall pollution levels in a certain water body while leaving the polluters to negotiate and bargain for the implied discharge rights (the **load cap** approach). This is a specific example of the self-regulation principle.

Box 13: Water resource pricing based on water scarcity and quality classifications

Water scarcity classification – this would classify water sources according to current and projected future use. In Kenya, a three-fold classification water scarcity classification has been proposed:

Category 1: Alarm

Category 2: Alert

Category 3: Satisfactory

It has been recommended that Kenya's Water Resource Management Authority base its abstraction and user permit fees (paid on application and on annual renewal) and more importantly the monthly abstraction or user fees on these categories, depending on the degree of utilisation of the water source (surface or groundwater) in question.

Water quality classification – a similar approach can be used for water quality. In this case, the classification might be coded as Red-Orange-Green-Blue. This classification would form the basis for effluent discharge permit fees, monthly effluent charges, and pollution penalties. The concept here is that if a polluter has a permit to discharge effluent in the 'green' category, but is found to be discharging in the 'orange' or 'red' categories, pollution penalties become payable on a monthly basis until such time as the quality of the effluent is restored to the permitted 'green' level. The penalties obviously have to be set at a level which is adequate to give an incentive for the polluter to 'clean up his act' and abide by the agreed quality of discharge. A system using this classification has been successfully established in Zimbabwe.

Sources: Rural Focus (2005) and ZINWA (2000) (Refs R18).

The principles outlined above for water resource pricing are difficult to apply in practice. For example, pricing water at its opportunity cost, with account being taken of both environmental sustainability and competing uses would strictly speaking require detailed studies to be made of every source of water, with continuous updates as the opportunity costs will change over time. In practice, a pragmatic approach is

required to achieve a charging structure based on the underlying principles but which is workable in the current context. Policy statements may want to refer to the idea of establishing water scarcity and water quality classifications – see Box 13 above.

In a shared basin context, water quality control needs to follow the same principles, including being subject to pricing, as is the case in a national setting. In practice, however, there is a greater need for cooperation and collaborative effort to achieve water allocation and quality objectives. In this, Nile Basin countries already have considerable successful experience from Lake Victoria cooperation on which to build – see Box 14.

Box 14: Lake Victoria cooperation agreements

The Lake Victoria Basin Commission:

The recently endorsed “Protocol for Sustainable Development of Lake Victoria Basin (signed 29 November 2003)” governs the partner states cooperation in the Lake Victoria Basin. Through this Protocol, Lake Victoria Basin Commission has been established as an institution of the East Africa Community (EAC) for the sustainable development and management of the Lake Victoria Basin. Partner States of the EAC are Kenya, Tanzania and Uganda. Arrangements are in advanced stage for Rwanda and later Burundi to join the Bloc.

A Vision and Strategy Framework for Management and Sustainable Development of Lake Victoria Basin has already been developed. The Regional Vision for the Lake Victoria Basin is as follows: “A prosperous population living in a healthy and sustainably managed environment providing equitable opportunities and benefits.”

Under section 33 of LVBC, the Commission can enter into negotiations with NBI or the proposed Nile River Basin Commission to come up with arrangements on the sustainable utilization of the Nile Basin waters within the EAC territories. The protocol further states that any existing arrangements on the management and utilization of the Lake Victoria water resources which are inconsistent with protocol shall be null and void to the extent of their inconsistency.

Lake Victoria Environmental Management Programme (LVEMP, 1997- 2004):

LVEMP is a regional and comprehensive environmental development program, with the objectives of restoring a healthy, varied lake ecosystem that is inherently stable and can support in a sustainable way, the many human activities in the catchment and in the lake itself.

Source: Nyaoro (2005) (Refs R1)

19 Water Service Provision Pricing and Subsidy Policy

In the past, the approach to the supply of water in Nile Basin countries, as in most other parts of the world, can be characterised as supply-oriented. The **supply-oriented approach** started from the presumption that water was an entitlement, with the role of the authorities being to supply enough water to satisfy the requirements of a growing population. Cost was treated as a secondary consideration and very little attention was paid to cost recovery. Water was not infrequently supplied without charge, but where tariffs were in place they were seldom high enough to adequately cover operational and maintenance costs, let alone to recover capital costs and provide for future expansion.

A number of major problems arose from this approach. Water tended to be over-used, and with hydrological limits being reached in many catchments, fears have been raised of growing water stress. Unrestrained water supply has also resulted in environmental costs, such as aquifer depletion, loss of wetlands and damage to river flows, and (from high levels of wastewater discharge) rising levels of pollution of streams and groundwater. Low tariffs have resulted in water supply entities becoming progressively less able to maintain an adequate level of service to existing customers, much less make the investments necessary to extend supply to potential new customers. Water subsidies which used to be absorbed in national budgets have often been cut as a result of the need to reduce budget deficits, but with considerable problems in the water sector. One of the main issues has been a lack of financing of new investments to respond to growth and provide more equitable access to water.

Under IWRM, an **economic approach** is now being adopted to water pricing. The starting point in the economic approach is the fourth Dublin Principle, involving the recognition that water is both an economic and a social good and that the first basic right of all human beings is to have access to clean water and sanitation at an affordable price. The most obvious implication of the fourth principle is that water that is processed and delivered to customers needs to be charged for, with the prices or tariffs being set to inform consumers of the real economic opportunity costs of using water, but with social protection mechanisms in place to ensure basic access for all. Given high levels of poverty, the price may have to be zero, with the implication that adequate subsidy mechanisms (discussed later in this chapter) need to be in place so as to sustain the supply system. The opportunity cost approach is forward looking, taking account of future investment requirements arising from consumers increasing their demand for water – this is the so-called long-run marginal cost (LRMC) approach.

In setting water pricing policy, it is necessary for a commitment to be made to the degree of cost recovery that is to be achieved when water tariffs are set. The basic level is the recovery of the direct operation and maintenance costs of the supply infrastructure. There is widespread agreement on these costs being covered by consumer tariffs. What is more controversial and needs to be clarified as a matter of policy is the degree to which the tariffs will contribute to capital costs. On a rising scale, possible levels are as follows:

- recovery of historical capital costs (the costs of servicing the debt incurred to build a dam or other bulk infrastructure, treatment works and water delivery system, etc);
- provision for replacement of assets (this could be in the form of a **depreciation** charge related to the present costs of replacing the supply system, the costs rising over time due to inflation);
- tariff established to bring supply and long-run demand into balance, this allowing for the accumulation of an investment fund for future capital expenditures (the LRMC approach).

In practice, the economic approach may not be equivalent to strict LRMC-pricing, but would typically take the form of tariffs being set high enough to cover the above items plus provide a **return on capital**. Where the supply of water involves privatisation, the return on capital would cover both a profit element as well as investment requirements (normally specified as part of the licence granted to the private operator).

The above concerns relate to the **average level** of tariffs within the jurisdiction of a particular water supply entity (e.g.. a water and sanitation department of a municipality, or a commercialised or privatised water utility). The policy statement may want to explicitly state that tariffs will vary across water suppliers (reflecting differing underlying cost structures), but also want to stipulate a common **structure of tariffs** which is to apply. The most common structure for urban water pricing is the so-called **rising block tariff**. This aims to achieve:

- (1) Efficiency of use of water

- (2) Equitable access (at least in respect of affordable access for all to a basic needs quantity of household water)
- (3) Cost recovery for the utility (at least of operation and maintenance costs if not also of capital costs).

These objectives are simultaneously achieved by having a basic volume of water (the so-called **lifeline** amount) available at a very low tariffs, and subsequent tranches of demand at ever higher tariffs which progressively increase the incentive for efficient use of water. Affluent customers with high levels of consumption charged at the highest tariffs provide the resources to cross-subsidise poor customers who can only afford to consume minimal quantities of water. Revenues from all customers in aggregate cover the overall costs of the utility.

Rising block tariff structures are very appealing in theory, but do involve the practical difficulty that they can only be properly implemented when all consumers are **metered**, the meters give accurate readings and there is an efficient billing and collection system. Even when these conditions are fulfilled, there are a number of inherent difficulties with rising block tariffs relating to lack of targeting, lack of transparency and problems when poor households share a connection. Collectively such families will consume more than the lifeline level and thus end up paying a higher average tariff than was intended for poor households. It is to avoid this problem that utilities may have special **shared connection tariff regimes**, allowing institutions such as schools and health facilities as well as community water suppliers, such as kiosks, to buy water at a fixed tariff and not be subject to the rising block structure.

As noted previously, poverty levels are such that the initial tariff level may have to be zero. To complement the multi-objective pricing structure, it may be useful to have public awareness campaigns to promote more efficient use of water.

Windhoek 1997		Harare 1999		
Consumption (m ³ /month/connection)	Tariff (US\$/m ³)	Consumption (m ³ /month/connection)	Tariff	Unit US\$
0-8	0.44	Fixed charge	0.68	US\$
8-15	0.62	0-14	0.11	US\$/m ³
15-36	0.76	14-40	0.20	US\$/m ³
36-45	1.00	40-70	0.28	US\$/m ³
45+	1.30	70-300	0.42	US\$/m ³
		300+	0.50	US\$/m ³

Rising block tariffs allow low income consumers to pay minimal prices for lifeline quantities of water through **cross-subsidies**. Another possibility would be to have **direct consumption subsidies**, but as already explained blanket subsidies for water are most unsatisfactory, leading to a number of problems, while direct targeting is difficult to do in practice. The most often quoted example where this has been successfully done is the means-tested subsidy system in Chile. An individual urban household applies to the municipality and, if found eligible, is awarded a subsidy which lasts for 3 years, at which point a fresh application can be made. The subsidy itself is paid to the water utility when it provides the required service to the target households. This approach provides an incentive to the utility to provide service to the poor. This system has reportedly worked well in Chile, but in most countries the institutional structures are not in place to achieve such precise targeting, and the administrative costs may anyway make such an approach infeasible. The alternative of a system of indirect cross-subsidies is very appealing from an administrative viewpoint.

If there are resources for direct subsidies, and the subsidies are targeted to reach poor household, then the resources are much better devoted to **access subsidies** rather than consumption subsidies. This is because a poor household which does not have access to a clean water source is clearly not going to benefit at all

from a consumption subsidy. Access and consumption subsidies are compared in Table 2. **Access subsidies** are capital in nature. They may be channelled through a water service provider to enable, for example, an urban utility to extend its piped network, including establishing kiosks in peri-urban areas. In the rural areas, the subsidy may cover the costs of drilling a borehole and installing a pump for a communal supply. Access subsidies may also go to households to assist in meeting the initial up-front cost of connecting to a piped water scheme, or the costs of digging and protecting a family well or constructing a latrine. Per capita ceilings are often imposed in order to provide incentives for least cost options to be chosen. Capital subsidies are typically once-off, have clearly identified beneficiaries and thus tend to be transparent.

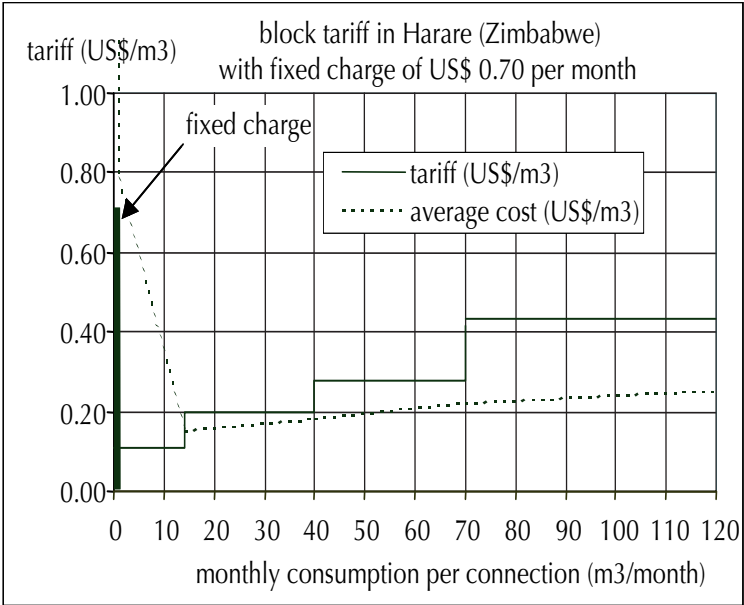
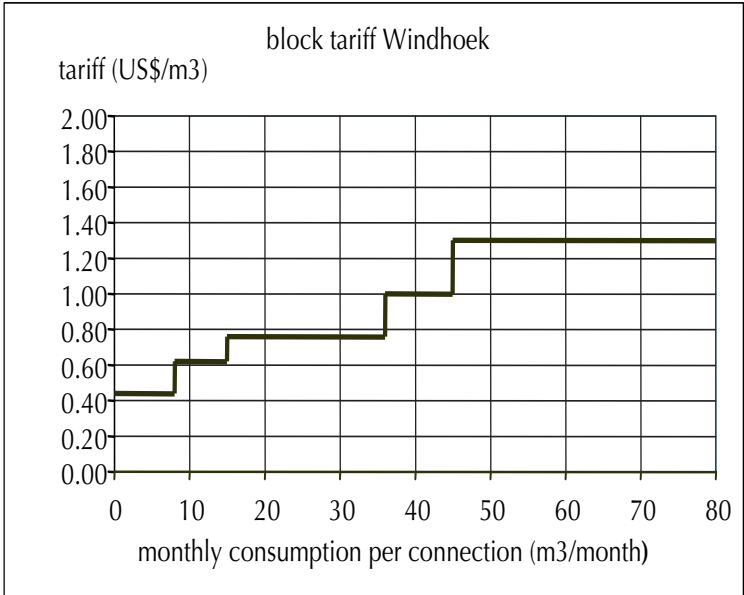


Figure 4: Examples of rising block tariff structures

Table 2: Typology of water sector subsidies

Subsidy purpose	Type of subsidy	Duration of subsidy	Subsidy mechanism	Visibility/transparency
Access	Capital	Once-off	Direct subsidy	High
Consumption	Recurrent	On-going	Cross subsidy	Low

A statement on water pricing policy needs to include the assignment of institutional responsibility for the **setting and adjustment of tariffs**. If there is an independent regulator (discussed in Chapter 24), setting water tariffs will be one of its main responsibilities, but even then it needs to be specified how this is to be done. It will usually be impractical for the regulator to scrutinise and approve each and every tariff proposal from individual water supply entities. The policy may specify that the regulator sets tariff principles and leaves the details to be worked out by the supplier (with checks and over-sight in place to protect the interests of consumers) or that tariff-setting functions are delegated by the regulator to other entities. The period between major tariff reviews (e.g. 3 to 5 year intervals) need to be specified and allowance made for automatic tariff increases in the interim (e.g.. an indexation formula designed to automatically compensate for inflationary increases in input costs).

20 Vulnerable Group Policies

Because water plays such a crucial role in people's lives, it is important to specify policies which will relieve the lot of groups who are vulnerable due to disease, disability or poverty. The idea that the needs of vulnerable groups are best met by low tariffs and large subsidies has been found in many countries to be inappropriate. Box 15 records some summary points on these issues from a study on the Economics and Financing of the Water Sector in Kenya.

Box 15: Vulnerable Group Recommendations, Kenya

- (1) It is in the interests of the poor for cost-recovery tariffs to be charged for water and sanitation
 - Poor people in Kenya are cornered, being forced to pay very high prices and hence consuming far too little water.
 - This provides an opportunity to provide a greatly improved level of service at cost recovery prices which are well below what the poor are paying at present.
 - The temptation to use pro-poor arguments to avoid increasing water tariffs should be avoided – the substantial tariff increases which are required by 2015 can only benefit the poor.
- (2) The poor will benefit from greater private sector involvement in the supply of water and sanitation services
 - Most poor households presently obtain water from a parallel supply system, run by unregulated private operators, at very high prices with the water often being of poor quality.
 - The revenue in this parallel supply system is larger than that in the formal sector – reducing the role of the parallel system will require confronting the vested interests that benefit from its perpetuation.
 - Creating space for the local private sector to provide water and sanitation services on a fair basis (assured by establishing 'light-handed' regulation) has a crucial role to play in improving the situation of poor households.
- (3) Sustainability of water and sanitation projects and the reduction of poverty require supply of productive as well as potable water.
 - People need improved livelihoods to have sustainable benefit from improved water and sanitation – water is frequently the key to working their way out of poverty.
 - Providing water for multiple uses, particularly income generation, has the potential to address all of the key issues on the MDG agenda (poverty, health, education, gender equality and the environment).

Source: Zimconsult & CMTS (2005) (Refs R1)

To effectively address the needs of vulnerable groups, a multi-faceted approach will be needed, involving the coordinated effort of agencies inside and outside government structures. The starting point is to be

the enunciation of a **pro-poor subsidy policy** that gives priority to access over price and limits recurrent subsidies to exceptional cases which are kept under constant review. To ensure that the available resources for capital subsidies are used to best effect, subsidies themselves should be designed to incorporate incentives. In the **output-based** or **'smart' subsidy** approach, water service providers are given incentives to extend access more rapidly and at lower costs. Examples are:

- **performance-based subsidy:** the amount of the subsidy paid to service providers is linked to the number of connections achieved in poorer areas;
- **competitive bidding:** service providers are invited to bid for extension of service in a defined area – the winner is the bidder requiring the lowest subsidy to do the job.

The competitive bidding approach can most obviously be applied when there are private sector bidders, but could also be effective in sharpening the project planning and implementation of community groups and NGOs. The intention is for governments to provide the minimum capital subsidy possible to each project, with the remainder of the capital costs and the subsequent operation and maintenance costs being the entire responsibility of the recipient. The government does not get burdened with on-going subsidy commitments, so that the public resources available for subsidies can continue to be devoted to access subsidies.

Vulnerable group strategies need to be flexible and adapted to local conditions. However, some general principles have emerged from recent experience in many countries. For example, a sense of **ownership** of water and sanitation projects is crucial if the beneficiaries are to take on the responsibility for maintaining the facilities – and without this happening, the projects are most unlikely to be sustainable. Having communities 'owning' projects does not, however, preclude private sector involvement to facilitate cost-efficient, reliable supplies. The legal ownership of the facilities can still reside with the community, which is in control, with the private sector performing management and technical functions.

The provision of clean water for household use (as is captured in the MDG-7 goal that relates to **potable water**) is intended to reduce poverty by improving people's health status. However, to address poverty directly, there is justification for much greater emphasis in water policies to be placed on **productive water**. This concept is elaborated in Chapter 22.

The range of technologies which are accessible by vulnerable groups in most countries is unnecessarily limited. In rural areas, the promotion of **self-supply options**, which involve a high degree of effectiveness and sustainability due to family ownership, is to be considered (see Box 16).

Box 16: Self Supply: A fresh approach to water in Rural Zambia

Research in Zambia found widespread grassroots demand for improvements to traditional small-scale water supplies, such as shallow wells and scoop holes. More than half the individuals in the study paid over US\$100 for their own supply. Preference for ownership of and direct control over the investment and its outputs, with naturally-sized units of management, appears to be fundamental characteristic favouring self supply initiatives.

Well users remarked on being able to propagate crops (such as tomatoes) and seedlings (such as tobacco) before the rains came, giving them a head start. Others mentioned that they could now make bricks nearer to where they lived which made theft less likely. In addition, they could make beer without having to carry water long distances. All these factors have increased the perceived value of water, encouraging the sustainability of supplies.

Box 16: Ctd...

Low-cost pumps were in particular demand as a result of the interest in easier lifting of water for domestic use and small-scale irrigation. After demonstration pumps were installed, the remainder were auctioned for more than the market value, suggesting that those investing in wells are prepared to pay a premium to have low-cost lifting in addition to safe water. Pump costs can usually be repaid in two seasons without endangering food security.

Source: Water & Sanitation Program Field Note, November 2004 (Refs R22)

Box 17: Low-cost urban water delivery technologies in use in South Africa

South Africa has experience with a number of low-cost urban water supply options. A guide prepared by the Department of Water Affairs & Forestry (DWAFF) provides a useful profile of the technical, social, managerial and environmental advantages and disadvantages of each option, together with details of the associated capital and operating costs. The options covered are as follows:

Full pressure (volumetric payments):

- House connection with pre-payment meter
- House connection with conventional metering and monthly billing

Medium pressure:

- Regulated roof tank (volume controlled by 'equity' valves at key nodes in supply network; customer receives water at roof pressure; flat rate monthly payments)
- Metered roof tank (customer receives unlimited volume of water at roof pressure; conventional metering and monthly billing)

Low pressure (flat rate monthly payments - water supply shut off if customer fails to pay):

- Regulated yard tank (volume controlled by 'equity' valves at key nodes in supply network)
- Manual yard tank (water bailiff opens valve and fills tank on a daily basis)
- Trickle feed yard tank (inlet flow regulator designed for say 25 litres per capita per day)

Basic service:

- Street tap with pre-payment meter (allows 24 hour access and volumetric payment, but prepayment meters are disproportionately expensive at this level of supply)
- Communal street tap (in South Africa payments for access to street taps are on a monthly, flat fee basis; design criteria are taps to be within 200 metres of each dwelling and be capable of supplying 25-60 litres per capita per day with 98% reliability)

According to the DWAFF paper, monthly costs of supply for the consumer range from the equivalent of \$2 per household per month for 25 litres per capita per day collected by the customer from a shared street tap to \$8.75 per household per month for 120 litres per capita per day for a prepaid full pressure house connection. These charges are rather low because they include a fixed capital cost grant from the government which is equivalent to about \$7 per household per month.

Source: DWAFF (2000) (Refs R22)

In urban areas, off-peak trickle systems of supply can offer on-site water to households at a much reduced cost as compared with a normal house connection - see Box 17 above. Households, whether rural or urban, can increase availability of water and security of supply by investing in **rainwater harvesting** technologies.

21 Demand Management and Efficient Water Use

Water demand management (WDM) may be defined as the development and implementation of strategies aimed at influencing water demand in order to achieve water consumption levels that are consistent with the equitable, efficient and sustainable use of the finite water resource. This chapter deals with the efficiency aspects of WDM, while the next chapter tackles the equity objective.

'Efficiency' is used in different ways by economists. **Usage efficiency** (which is also called X-efficiency) is the same as the everyday meaning: it refers (in the context of WDM) to each person with access to water avoiding waste and using the minimum amount of water that they can to meet the need for which water is required. **Allocative efficiency**, on the other hand, refers to changing the distribution of water so as to maximise the utility of consumers. 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 18.

Box 18: Water demand management & 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 (Refs R2)

The issue of inter-sectoral allocations to improve allocative efficiency needs to be handled with care. At an aggregate level, it is the case that the largest sector user of water in Nile Basin 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 areas, 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.

These arrangements could well extend over national boundaries, but the co-ordination and harmonisation of water and related development policies need not be limited to countries sharing contiguous basins. The concept of **virtual water** makes it possible for water stressed countries to obtain water from those with abundant water through importing water as an embedded component of cereal or other foodstuff imports.

This concept makes it possible to look at efficient use of water for the Nile Basin region as a whole. The long-term 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.

Virtual water encourages regional specialisation, with water intensive activities (including irrigated agriculture) being located in countries with adequate water resources and dry countries focusing on activities that require little water. The problem with maximising the benefits of regional specialisation based on water is that political policy goals tend to intervene. **Food security**, for example, is often erroneously equated to **food self-sufficiency**. The regional solution is for countries with limited agricultural potential to accept that food security is best served by having a strong economy. An insistence by all countries on food self-sufficiency would perpetuate and exacerbate patterns of water use which are inefficient and unsustainable.

In view of the WDM aim of making use of existing water, including rainwater, a salient distinction to make for policy-making is between so-called 'blue' and 'green' water. **Blue water** refers to water in rivers, lakes and shallow aquifers and tends to receive most of the attention from planners, engineers and policy makers because of its association with established forms of irrigation. **Green water**, on the other hand, refers to water in unsaturated soil responsible for the production of biomass that accounts for 60% of the world food production and all the biomass. In agriculture it is mainly associated with rainfed crop production and tends to be much cheaper and more productive per unit of water than blue water. Even in drought-prone countries, potential green water dwarfs blue water volumes, yet has generally been relatively neglected in the past. An important way of increasing food security and improving rural livelihoods is for policymakers and planners to give more attention to green water and associated water-related technologies such as improved tillage systems, composting techniques that conserve water, rainwater harvesting etc.

In urban areas, 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), the imposition of penalties. The provision of water-efficient devices (such as low flush toilets) is another important aspect of consumer-oriented WDM policies.

Box 19: Water demand management – some lessons from the experience in Bulawayo, Zimbabwe

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.

Box 19: Ctd...

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 (Refs R21)

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 19 above 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 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).

22 Demand Management and Equitable Access to Water

The efficiency approach to WDM is premised on existing supplies of water being used less wastefully, so that on average there is less usage per capita. WDM of this type is an important objective amongst those who already have good access to water, but the main problem in 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 of Nile Basin countries, 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 shockingly little water.

It is in this context of deprivation that the real water demand challenge 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 the previous chapter; this is unlikely to 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, as mentioned in Chapter 20, 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 capita per day (lcd), and preferably 40 lcd, as recommended by the World Health Organisation (WHO).

Emphasising clean water for domestic purposes but excluding water for productive purposes would be a lost opportunity, however. As outlined in Box 20, there is an international initiative, derived largely from 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. This is because emphasizing **productive water** would bring useful synergies into play, helping to address directly the poverty millennium goal (MDG-1) and giving people the resources to maintain their own potable water supply systems, this giving rise to greater sustainability of water programmes

Box 20: 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. See also other references given in Section R22.

23 Environmental 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 supply and wastewater entities (the organisations involved in managing water supply and wastewater infrastructure). To achieve professional regulation, high level skills are required, and these are in short supply in African countries. In view of the fact that there are many common elements in regulation, better use could be made of scarce skills by

having an **environmental regulator** (under which water resource management would fall) and a **multi-sectoral infrastructural regulator** (with water service provision being one of its responsibilities, along with telecommunications, electricity, transport services etc). Successful examples from around the world of multi-faceted environmental regulatory bodies are provided by the USA and UK and of multi-sectoral services regulators by Jamaica and Ghana.

The joint regulatory approach has a particularly strong rationale in the sphere of natural resources. The present situation is often one of a number of overlapping environmental laws and regulations, making it very difficult for effective environmental regulation of the different natural resources, let alone exploit the potential for synergies between them. Combining water with other aspects of environmental regulation would be very much in the spirit of integrated water resource management. It would also enable the best use to be made of local level structures - river boards could take on responsibilities for the environment as a whole and not just meet to deliberate on issues pertaining to water.

While both forms of regulation can affect the quantity and quality of water available in shared basins, 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 basin states in the regulation of both the quantity and the quality of water.

The main instruments of water resource regulation – permits, pricing and penalties – have been discussed in Chapters 15-18, together with instruments that are not yet in widespread use (such as the tradability of water rights). Relevant lessons on the management of water quantity and quality are highlighted in Boxes 21 and 22.

Box 21: 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 hydropower generation, 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 and quality (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 22: 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/>

24 Service Provision Regulation

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). Kenya's Water Services Regulatory Board and Zambia's water services regulator, the National Water and Sanitation Council, provide good examples.

African 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 will typically also extend to wastewater services.

The objectives and typical functions and responsibilities assigned to infrastructure regulators are summarised in Box 23. While the exact scope and extent of functions and responsibilities will vary from country to

country, it is important for these to be clearly laid out in the regulatory agency's enabling legislation. Given that existing consumers are relatively privileged, pushing for rapid attainment of universal access is perhaps the most important function if regulation is to be 'pro-poor'².

Box 23: Objectives, functions & responsibilities of an infrastructure regulator

Objectives:

- to protect the interests of users, particularly in respect of ensuring that demand is met with reliable infrastructural services at least cost;
- to ensure the rapid attainment of universal access, with tariffs being structured so that poor people can afford at least a 'lifeline' level of service;
- to promote competition or otherwise ensure efficiency in service provision;
- to encourage substantive indigenous participation in infrastructure supply industries;
- to protect investors' rights.

Functions & Responsibilities:

- issue licences to companies to provide infrastructural services (these may be global licences or separate licences for each component in the supply chain);
- regulate tariff levels to prevent monopolistic exploitation by the infrastructural industries and tariff structures to promote equity objectives;
- establish, monitor and enforce engineering, environmental and worker health and safety standards;
- consult with and be accountable to stakeholders, paying particular attention to the interests of present customers of infrastructural services and those yet to gain access, while at the same time safeguarding rights of investors;
- advise government on matters pertaining to the infrastructure industries;
- arbitrate and offer dispute resolution procedures for conflicts which may arise within infrastructural industries.

Source: Robinson (2005), Refs R24

Box 24: Safeguards to ensure independence of a regulator

- Provide the regulator with a clear legal mandate, free of Ministerial control.
- Prescribe professional criteria and a transparent, competitive application process for the selection of the regulator(s) and the staff of the regulatory agency.
- Make Parliament responsible for the selection of the regulator(s), for approving the regulatory agency budget and for receiving the formal annual report from the regulator. This recognises the unique representativeness of the legislature, but does not preclude the executive having a role and the president from making the formal appointment.
- Appoint regulators for fixed terms and protect them from arbitrary removal.
- Stagger terms for regulators so that they do not coincide with the election cycle, and, for a Board or Commission, staggering the terms of members.
- Exempt the infrastructure regulatory agency from civil service salary rules that make it difficult to attract and retain well qualified staff.
- Provide the agency with a reliable, independent source of funding, usually earmarked levies on regulated firms and consumers.

Source: Robinson (2005), Refs R24

² Ideas on 'Making Regulation Pro-Poor' are elaborated in a provocative way in Samarajiva, 2002 (Refs R24).

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.

Safeguards which would protect the independence of the regulator are given in Box 24 above. Those vested with the formal powers laid out in the legislation may be an individual regulator or a Board or Commission with several members. The regulator or regulators may be full-time or part-time, but they need to be supported by full-time staff. As can be seen from the box, to ensure independence the safeguards need to span both the regulator(s) and the agency staff.

25 Policies for Different Water Usage Sectors

In addition to laying out general principles and policy positions applying to all water usage sectors, the water policy statement may also want to detail how these relate to certain sectors and to add further sector-specific policies. Other countries may prefer to issue separate, detailed policy statements, for example a policy on Water for Agriculture. Such statements would normally be drafted after the main national water policy, thereby allowing the sectoral statements to refer to key principles which have been established and elaborated in the framework policy for water.

As an example, the Sudan Water Policy (included in the materials in Part IV) gives policy positions on the following sectors:

- Water supply and sanitation
- Agriculture and land use
- Hydropower
- Industry
- Navigation
- Fisheries

In the next section, the statement goes on to elaborate policy on environmental usage of water.

26 Protection Against & Mitigation of Natural Disasters (Droughts & Floods)

A national water policy statement should include policies on the avoidance and mitigation of the effects of droughts and floods. These events are already disruptive of development efforts in the region and climate change is predicted to increase the frequency and severity of droughts and floods. Nile Basin states will in future need to devote more time and attention to forecasting and risk mitigation through developing and implementing contingency plans.

Policies need to include commitments to the protection of human life, livestock, property and the environment against the effects of water-related natural disasters. To provide such protection, the policy statement needs to emphasize enhancing capacity for predicting or forecasting a flood or drought, as prior warning is fundamental to their effective management and mitigation. Flooding within a shared basin requires the development of predictive capabilities for the entire basin, whereas the management of droughts requires regional early detection capability, to address the implications on food security, economic integration and poverty. The development of these capabilities includes the institutional mechanisms and capacity, as well as forecasting systems and technologies.

Natural water-related disasters have significant impacts on and are impacted by other sectors, including agriculture, food security, energy security, domestic supply and industrial development. Alignment between water sector disaster management plans and those of other sectors is essential for coherent management of the impacts of disasters (particularly for droughts). At a minimum, this requires water sector plans to address and be addressed by other sectors' plans. The development of these plans needs to involve consultation with these sectors, as well as relevant stakeholders with an interest in disaster management.

Assessment and joint management of risks is a planning issue of particular importance for shared basin states. 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 25.

Box 25: Sharing risks equitably – some guidelines

Risk management can usefully start by addressing 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/>

In a shared river basin, countries have an obligation to notify and share knowledge and information with neighbours in the event of actual or pending water related disasters. The consequences of not doing so are described in Box 26. Mitigation of the impacts of droughts and floods requires all parties to have information to support decisions. This includes notification of an imminent or actual disaster, as well as sharing of information during the event to facilitate the effective implementation of pre-agreed disaster management and emergency preparedness plans and procedures.

Box 26: 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 leads 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 (Refs R2)

27 Information Sharing and Harmonisation of Units and Standards

National water policy needs to make an explicit commitment to the sharing of data with neighbouring countries. 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 (as just discussed) contingency preparedness. There is already considerable information exchange within the Nile Basin, but as the Needs Assessment makes clear, much remains to be done to improve the comprehensiveness and availability of information and data on water resource management and other trans-boundary environmental issues. A more coordinated approach is recommended, emphasizing broad consultations, information dissemination, research and development.

As shown in Box 27, information exchange can take place at different levels. 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. When developing international co-operation, it is 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 basin arises.

Box 27: Different levels in information exchange

- 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).

Source: SADC Guidelines (2003), Refs R30.

Information exchange is facilitated by the development of a common vision for the shared basin as well as agreement on the principles for co-operation. Some lessons useful for regional data sharing are given in Box 28.

Box 28: 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 need to 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://gwpforum.netmasters05.netmasters.nl/en/>

When data is being collected by a number of different organisations in different countries, it is necessary to have a consensus on the **units** to be used and to agree on compatible **methods and standards** for data collection so as to give assurance on the quality of the data. It is desirable to allow electronic access for instant, on-demand data transfer. In this regard, the internet offers an effective platform for the exchange of information and could 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.

28 Shared River Basins

Each of the policy areas covered so far in Part II of these Guidelines has emphasized the regional dimension. Besides topic-specific references to issues pertaining to shared basins, a national policy statement also needs to contain endorsement of regional agreements already entered into (such as the Nile Basin Initiative) and an overall statement of commitment to the goals of sustainable socio-economic development through the efficient utilisation and equitable sharing of the benefits from transboundary water management.

Some policy areas – such as flood mitigation – have obvious and direct implications in shared river basins, while in other cases the linkages are more indirect. This may be illustrated by considering the implications for shared river basins of national water pricing policies. These are relevant to neighbouring countries to the extent that WDM-oriented water prices encourage the efficient use of water. The absence of good pricing policies has the opposite effect – profligate use of water, which reduces the amount available for environmental flows and other users. In this regard, countries are to be encouraged to implement appropriate economic and other WDM instruments before asking for additional allocations. Making efficient use of the water already being extracted from a shared river is obviously to the benefit of all.

As noted in Section 21, usage efficiency is only one aspect of economic efficiency, and allocative efficiency is often more important. Allocating water in a way which maximises the benefits of water usage equitably and efficiently lies at the heart of cooperation in a shared river basin. It is to be stressed that it is the proper sharing of the benefits that is important rather than sharing the water itself. To achieve this, it is important to have agreed means and approaches to the measurement of the value of water in different uses. As is discussed in Box 29, this is not a trivial matter.

Box 29: The value of water

The fourth Dublin Principle states that “water has an economic value in all its competing uses”. The most obvious value is the direct use value, where water is required as an input to production, such as water that is required to irrigate crops. The value of water for the user is clearly related to the value of the crops produced. From the viewpoint of all users, there is also the **system value** to be considered. This is the aggregate value that a unit of water can generate within the river system before it is consumed, lost through evaporation or discharged to the sea.

In considering alternative allocations of water, it may well be that an ordering of the basis of user values differs from an ordering on the basis of the system value. Allocations decisions, such as choosing between upstream and downstream abstractions, are further complicated and may well change once other aspects of the value of water, such as the **environmental value**, are considered. Maintaining environmental flows in order to protect vital ecosystems is now a widely accepted principle, but the benefits of these flows need to be evaluated and balanced against the benefits of other competing uses. There are often also important **social, cultural and spiritual values** to be considered.

Bringing in aspects of water beyond the direct use value is problematic because of the difficulties of quantifying values where there are no markets and hence no observable prices. There are, however, approaches which make use of so-called ‘**surrogate markets**’. These are techniques to obtain information from revealed preferences: for example, the higher price of a house close to a lake reveals the value to the purchaser of the amenity of being situated there as compared with the price of a similar house located away from the lake.

Another valuation approach depends on a **hypothetical market**: this is the ‘**contingent valuation**’ technique which obtains information from interview responses involving a ‘bidding game’ process of determining the amount the respondent would be willing to pay. There are many potential sources of bias in the contingent valuation approach, but it is nonetheless frequently used because it is often the only way of quantifying environmental, social, cultural and spiritual values of natural resources including water.

Source: Interwies (2006) Refs R12 and Robinson (2003) Refs R4..

Pollution is another important issue on a shared river. Riparian countries need to reach a consensus on pollution standards which are “reasonable”, 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 contributing countries.

29 Conflict Resolution

A national water policy statement needs to make clear a willingness and commitment to resolve conflicts, including a commitment to following certain principles and procedures particularly in the shared water context. In a national situation, conflicts associated with water can ultimately be resolved with recourse to national law and legal procedures. In the transboundary context, as will be discussed in more detail in Part III, it is only in the most extreme circumstances that there would or could be recourse to international legal mechanisms. This makes it imperative in regional water co-operation for there to be a willingness to be flexible and imaginative, but within this there also needs to be agreed procedures for consensus building and conflict management.

For this, it is useful 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. Three kinds of tools are briefly described in Box 30.

Box 30: 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/>

In a shared basin context, creativity may be invaluable when it comes to dispute resolution. An example of this is provided from the Mozambique-Swaziland-South Africa negotiations in the Incomati basin (see

Box 31). The discussions were at one stage stalled when limited solely to the Incomati. By bringing in the Maputo basin, and allowing trade-offs between river basins, Mozambique was given an opportunity to pursue its interests in the Maputo basin, while in return being prepared to be more flexible in respect of the Incomati. This led to the conclusion of a set of agreements which was satisfactory to all parties.

A number of lessons can be drawn from the Incomati experience, including the following:

- Stalled negotiations might be revived by broadening the scope to encompass not just the whole of the basin in question but also other shared basins and joint projects with significant benefits (irrigation, hydropower etc).
- Intermediate countries can be encouraged to mediate between the main protagonists.
- It is useful to structure negotiations in a systematic way (from information exchange, via shared understanding to reaching an agreement).

The above points are drawn from the Mozambique policy review (Refs R2), which goes on to add that “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”.

Box 31: 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 Piggs 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 (Refs R27)

III. Process

Part III presents the 'how to' of policy-making. The topics which follow are intended to assist countries in completing the policy cycle that is outlined in Chapter 2 – how to plan and execute a process which will lead to the successful completion, implementation, evaluation and review of a water policy statement. The same approaches, principles and techniques apply to components of the policy process, notably to instruments such as an implementation strategy or an action plan. In particular, whether it be a water policy, water strategy or water plan that is being developed, a high level of stakeholder involvement is necessary. Many of the topics already covered in Part II are relevant to the process elements of the project cycle, so in practice there is not as sharp a distinction between 'content' and 'process' as the layout of these Guidelines seems to imply.

30 From Policy Formulation to Implementation

In Part I, **policy** was defined as a set of principles which is used as a basis for making decisions to further certain objectives. What counts is not the elegance with which the policy is presented, but whether it is effectively implemented. As was noted in Part I, the **purpose** of water policy is to maximise the economic and social benefits of water while ensuring these are shared in an equitable manner and that environmental sustainability is preserved. The practical steps required are to move from policy to the formulation of a water **strategy**, which may include a number of **action plans** and then to ensure that these are carried out by the responsible institutions. A formal legal framework (**water law** and associated **regulations**) may be required to give a proper legal framework to implement the policy.

Moving from policy to strategy and action plans involves moving from general principles to **strategic goals** and specific, measurable **targets**. The strategic goals would include, for example, achieving universal access to clean water and improved sanitation. The targets associated with this goal would be much more specific and time-bound, as indicated in Box 32 under 'access to services'.

Box 32: Water sector targets – some possible examples

Access to services

To provide x million households with access to a basic water service by t1 & 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

Source: SADC Guidelines (2003), Refs R30

The definition of specific targets allows the resource requirements to be calculated and a budget for the implementation of the action plan or a broader strategy to be defined. Formulating a budget, or at least a budget which has a realistic chance of being financed, is an essential step in sharpening the design of strategies and plans and thus making it more likely that they will be successfully implemented.

The **process** requirements associated with water policies share many common elements with similar processes of formulation, implementation, monitoring and evaluation of water sector strategies and action plans. Strategies and action plans are important because the translation of policy intentions into concrete implementation is currently a focus not just of national but international concern. For example, as noted in Chapter 4, the Johannesburg WSSD set 2005 as a target for countries to produce IWRM and Efficiency Plans. The focus of these Guidelines nonetheless remains primarily on policy, but in Part III the process elements which are common to policies, strategies and plans are emphasized, starting in the next chapter with the crucial issue of stakeholder involvement.

The recommendations on process apply equally to the formulation and implementation of policies in a **shared basin context**. However, in a transboundary setting, considerable patience is needed to agree on common goals and pursue realistic targets in a step-by-step fashion that helps build trust and consolidate commitment to the principle of equitable benefit-sharing. As will be discussed in more detail later, the existence of legal frameworks and basin or sub-basin institutions is crucial to effectively implement the shared basin agenda. In this regard, shared **river basin organisations** have the immediate responsibilities for ensuring that common goals are pursued and any problems which arise quickly dealt with. The structure and functions of such organisation need to be carefully considered. In many shared basins and sub-basins, there are calls for the formation of permanent basin institutions, but experience from southern Africa suggests that this may be neither feasible nor desirable. Looser institutional arrangements not only are less demanding of scarce financial and human resources, but may also allow for greater flexibility which can be invaluable when tensions arise. The example in the box at the end of Chapter 29 is a case in point. A solution was found when negotiations were extended across a broader spectrum than just the initial dispute in the primary basin.

31 Stakeholder Involvement

As already highlighted, one of the cardinal principles of integrated water resource management is the involvement of stakeholders. This is not simply a contemporary fad: in the water sector, involvement of stakeholders is crucial for a variety of reasons. The following benefits are expected to arise from stakeholder involvement:

- **more informed decision-making**, as stakeholders possess a breadth of information that cannot be matched by centralized structures, such as a government water department;
- **more appropriate solution to problems**: stakeholders are the most affected by lack of water resources or poor management of water resources and have the keenest interest in ensuring that solutions are appropriate;
- **reduced potential for conflicts**: consensus at early stages of the project can reduce the likelihood of conflicts which can harm the implementation and success of the project;
- **greater public confidence**: stakeholder involvement contributes to the transparency of public and private actions, as these actions are monitored by the different stakeholders involved;
- **greater trust by civic society**: the involvement of stakeholders can build trust between the government and civil society, which can lead to long-term collaborative relationships;
- **greater commitment by cooperating partners**: a process where stakeholders are fully and meaningfully involved is more likely to attract support from donors and other cooperating partners.

In the water sector, stakeholder involvement needs to be carefully managed if it is to be valuable, that is delivering the benefits just outlined. Four steps can usefully be identified³:

- (1) Identify the key stakeholders from the large array of groups and individuals that could potentially affect or be affected by changes in water management.
 - Who are the potential beneficiaries?
 - Who might be adversely impacted?
 - Have vulnerable groups been identified?
 - Have supporters and opponents of changes to water management systems been identified?
 - Are gender interests adequately identified and represented?
 - What are the relationships among the stakeholders?
- (2) Assess stakeholder interests and the potential impact of changes arising from new policies, strategies or plans on these interests.
 - What are the stakeholder expectations?
 - What benefits are likely to result for the stakeholder?
 - What resources might the stakeholder be able and willing to mobilize?
 - What stakeholder interests conflict with IWRM goals?
- (3) Assess the influence and importance of the identified stakeholders.
 - The power and status (political, social and economic) of the stakeholder.
 - The degree of organization of the stakeholder.
 - The control the stakeholder has over strategic resources.
 - The informal influence of the stakeholder (personal connections, etc.).
 - The importance of these stakeholders to the success of the venture at hand.
- (4) Outline a stakeholder participation strategy (a plan to involve the stakeholders in different stages).
 - Interests, importance, and influence of each stakeholder.
 - Particular efforts needed to involve important stakeholders who lack influence.
 - Appropriate forms of participation throughout the policy, strategy, plan or project cycle.

In the water sector, a wide range of stakeholders need to be involved – see Box 33. On the government side, the requirements of integrated water resource management imply that it is not just the Ministry of Water which is to be involved, but the ministries and related institutions dealing with national planning, the environment and with the key water-using sectors. Non-state stakeholders range from local communities and CBOs involved with water, farmers' association and women's groups to private sector organisations, individual firms, research organisations and cooperating partners. A ***national forum*** needs to be created where there is broad representation. From this, a ***national working group*** will emerge which will take on the responsibility of concretising the views and concerns of all stakeholders. As is discussed later in this chapter, the existence of a national working group is particularly important when cross-border stakeholder participation is being targeted.

Box 33. Water Stakeholders

Core stakeholders

- Government Ministries and related institutions involved in national development planning and policy making
- Government Ministries and related institutions involved in key water-related sectors, including domestic water supply and sanitation, irrigation, agriculture, energy, health, industry, transport, fisheries and tourism
- Water utilities, agencies and related bodies (e.g., Water Development Boards)

³ Each of these is spelt out in more detail in Cap-Net (2005), pg 32 (Refs R30).

Box 33: Ctd...

Essential stakeholder to be brought into the process

- Local communities and community-based organizations
- The private sector, including but not limited to water supply and sanitation service providers
- Sectoral interest groups such as farmers and fishermen
- Women's groups and associations
- Representatives of indigenous communities
- Non-government organizations
- Media representatives
- Research and training institutions, including Universities
- Facilitating partners (e.g. UN agency country offices, Global Water Partnership country water partnerships)

Source: Cap-Net (2005) pg 48 (Refs R30)

It is important to identify stakeholders and their representatives carefully and to design a participation strategy so as to ensure that stakeholder involvement is meaningful. As illustrated in Table 3, there are many different levels of participation, ranging from token involvement, which entails an element of manipulation, to interactive and self-mobilising involvement in which stakeholders play substantive roles on an on-going basis. The strategy necessary to achieve deeper forms of involvement are discussed in subsequent chapters.

Table 3: Types of participation

Type	Characteristics
Manipulative participation	Participation is simply a pretence
Passive participation	People participate by being told what has been decided or has already happened. Information shared belongs only to external professionals
Participation by consultation	People participate by being consulted or by answering questions. No share in decision-making is conceded and professionals are under no obligation to take on board people's views
Participation for material incentives	People participate in return for food, cash or other material incentives. Local people have no stake in prolonging practices when the incentives end
Functional participation	Participation is seen by external agencies as a means to achieve project goals, especially reduced cost. People may participate by forming groups to meet predetermined project objectives
Interactive participation	People participate in joint analysis, which leads to action plans and the formation or strengthening of local groups or institutions that determine how available resources are used. Learning method are used to seek multiple viewpoints
Self-mobilization	People participate by taking initiatives independently of external institutions. They develop contacts with external institutions for resources and technical advice but retain control over how resources are used

Source: Sustainable Development Strategies: A Resource Book, Cap-Net pg 32

As highlighted earlier, the biggest challenge is to ensure that water users, who are the primary stakeholders but who typically lack influence, have a voice in the system. There are typically two main areas of concern for users, relating to access to water for livelihood enhancement and threats to usage from poor environmental practices. These are spelt out in more detail in Box 34.

Box 34: Issues of concern for primary stakeholders

Livelihood or demand issues

In many countries the challenges to be dealt with comprise issues such as securing access to safe drinking water and basic sanitation for the presently unserved; the challenge of rapidly growing urban water demands and wastewater discharges; securing water for increased food production; reducing vulnerability to floods and droughts (including considerations of possible impact of climate change); reducing risk to human health and production from diseases and hazards; meeting increased demands from irrigated agriculture, industry and other economic activities; protecting the resource base and vital ecosystems; and the prioritisation among these often conflicting demands. Providing equal opportunity for men and women in dealing with these issues is an important challenge.

Resource-impact issues

The above livelihood/demand issues need to be balanced based on an understanding of the resource base and the threats to this resource base: the impact of human activities and land management causing for instance deforestation, erosion and siltation, pollution and ecosystem deterioration, reduction of wetland areas, declining groundwater tables and salt water intrusion, the impact of natural phenomena such as climate variability and change, desertification, floods and droughts.

Source: Cap-Net (2005), pg 49 (Refs R30)

Achieving transboundary stakeholder participation is clearly even more of a challenge than the already daunting task of having national stakeholders make an effective contribution to water policies and strategies. The main steps that need to be tackled are laid out in Box 35. In Chapter 7, Box 4, a successful example of transboundary stakeholder participation is documented.

Box 35: Achieving transboundary stakeholder participation

- Identification of all stakeholder groups from government to the lowest level in each country
- Clear identification and articulation of issues in the basin
- Creation of a national forum where all the stakeholders are represented
- Formation of a national working group representing all stakeholders
- Clear public awareness campaign at national level targeting all stakeholders
- Basin wide stakeholder involvement via representation from national working groups.

Source: Discussion Group, NBI Water Policy Workshop, Addis Ababa, January 2006

32 Procedures to Ensure Effective Process Management & Committed Stakeholder Involvement

The involvement of all parties has to take place within a clear management framework with agreed roles and responsibilities. Key institutions for managing a process to achieve a defined output (national water policy, strategy or action plan) would typically include:

- The National Government
- A Steering Committee
- A Management Team
- Where appropriate, a facilitating institution

The role of the different organisations managing the process has to be clarified and agreed upon at a very early stage. Table 4 provides a suggested outline.

Table 4: Role of Implementing Institutions

Institution	Role
National Government	Lead role, ultimate responsibility for the process Mobilize funding Set macro-economic and development policy environment
Steering Committee	Guide the process (group with wide representation) Mobilize support across sectors and interest groups Guarantee quality output Monitor implementation progress
Management (group of qualified professionals)	Manage day-to-day processes for strategy development, implementation and capacity building
Facilitating Institution (e.g. national NGOs, GWP country or regional partnerships, UN teams)	Provide neutral platform for dialogue (where appropriate - not always needed) Support strategy development process by providing advice and sharing knowledge Foster capacity building and training

The Steering Committee and Management Team are established for the specific purpose at hand, and cease to exist when this is accomplished such as when the policy has been published. The membership of and terms of reference for these temporary institutions are crucial. The **Steering Committee**, in particular, needs to include both the authorities and institutions involved in decision making in the water sector, and a balanced selection of other key stakeholders from the private sector and civil society, with prominence being given to women members. The role of the **Management Team** or **Secretariat** for the process is to carry out the work programme mandated by the Steering Committee, while at the same time giving feedback on progress and any emerging issues (which may be opportunities or problems). It is the Management Team which will actually prepare the drafts of the policy document, strategy or plan for the Steering Committee and broad stakeholder forum to consider. When the document has been finalised, it will be the Management Team which is responsible for its dissemination in a variety of forms. This is discussed further in the next chapter.

The composition of the Management Team will vary according to the scope of the work, the degree to which there is in-house capacity to execute it and the manner and extent of out-sourcing of particular aspects. Effective management of the process requires tasks to be programmed and specific milestones set. It is particularly important for stakeholders to know when their inputs will be required and how and when these will be incorporated in the process. This might include stakeholder workshops in different parts of the country, local consultations in particular catchments, household surveys, water use surveys, consultations with and invitations to make written submissions from representative organisations (such as farmers' groups), NGOs involved in the water sector and research organisations.

The approach adopted by South Africa in formulating its Water Act of 1997 provides a good example: pre-announced dates for specific stakeholder inputs gave people confidence that it was worth being conscientious in making the inputs they were being called upon to make. Successive iterations of the policy document were planned and executed. In this way, a coherent, time-bound consultation process was achieved.

33 Public Awareness, Transparency and Inclusiveness

Effective stakeholder involvement is far more likely in a situation where there is a high level of public awareness about the issues at stake and transparency and inclusiveness in the process at hand. Part of the responsibilities of the Management Team and the Steering Committee needs to be to establish a communications strategy, both within the system (keeping all the stakeholders informed and enthusiastic about the process in which they are involved) and in the general public. For the latter, good relations need to be maintained with the press and the electronic media. When the policy document is being written, editorial staff should ensure that the language used is as clear and jargon-free as possible. A strategy to launch and disseminate the document (full and summary versions, in vernacular as well as national languages) needs to be considered.

The problem of public awareness is part of the broader issue of sensitising the population at large to the notion of IWRM as an approach to achieve the goal of sustainable management of water resources. This is a long-term, on-going activity. A particular target group that it is difficult to reach are senior politicians. Opportunities to do so are rare – when they arise, full advantage needs to be taken to get key messages across. Political commitment is the ingredient which ultimately determines the success or failure of water sector initiatives. This is discussed further in Chapter 39 below.

34 Evaluating an Existing Water Policy or Strategy

Monitoring and evaluating the implementation of water policy or strategy requires defining **indicators** that are relevant measures to assess progress towards the **targets** associated with the ultimate **goals** and **objectives**. Establishing this framework of analysis is not a trivial matter. Indicators, for example, may need to be further subdivided into:

- **Process indicators**, which monitor the basic progress of implementing the actions outlined in the strategy. This includes monitoring implementation processes and also the tracking of inputs - the people, money, equipment needed to achieve actions.
- **Outcome indicators**, which monitor the direct results of actions (sometimes used interchangeably with impact indicators).
- **Impact indicators**, which monitor progress towards achieving goals and objectives⁴.

Ideally, a policy that is being implemented should be subject to continuous monitoring and evaluation. It is more common for policies to be periodically re-considered, and it is at the stage of starting to formulate a new water policy or strategy that an evaluation of what is already in place is undertaken. This may grow into a full 'situation analysis' covering all of the topics identified in Chapter 12. Whatever the scale and depth of the investigations, there will be a need to encompass both the collection and analysis of hard data and the involvement of stakeholders on the more qualitative aspects. A major challenge is to strike a balance between the analytic tasks which need to be performed and the stakeholder inputs. Box 36 gives some suggestions about how this can be done.

Box 36: Knowledge collection principles

- Multi-stakeholder groups need to design the information gathering, analysis and research process themselves, to ensure **ownership** of the strategy and its results.
- All the 'analysis' tasks are best implemented by bringing together, and supporting, existing centres of technical expertise, learning and research.

⁴ Typology based on GWP Technical Brief (2006) (Ref R12)

Box 36: Ctd...

- Since analysis is central to strategy development, it should be **commissioned, agreed and endorsed at the highest level** (i.e. by key government ministries or by the planning steering committee). This will increase the chance that analysis will be well focused and timely in relation to the plan's evolution and timetable, and that it will be implemented.
- In the same way, analysis needs **good coordination**. It is logical for the Management Team to coordinate the analysis but it should not undertake all the analyses itself and, indeed, not necessarily any of it. Many players need to be involved. Through their active involvement in reflection and analysis, the strategy will help in building learning institutions.

Source: Cap-Net (2005) pg 44 (Refs R30)

Specialist expertise will be needed when highly technical skills are required, large baseline surveys need to be done or where an independent viewpoint would be particularly valuable. What is important is to have that expertise complement and feed into processes which stakeholders control. In a shared river basin context, the balancing also has to take into account the technical and the participatory capacity of different states involved. Formal approaches to monitoring with agreed procedures are likely to provide the best outcomes, even if they involve longer times and more resources than corresponding activities in a purely national context. Shared monitoring activities are likely to help consolidate systems of transboundary information exchange.

35 Developing Policies, Strategies and Plans

In designing water policies, strategies and plans, possible conflicts and the consequent need to make trade-offs needs to be anticipated and planned for. As pressure on water resources grows, there will increasingly be situations of winners and losers. There may be need for established, powerful economic interests to give up water in order for others to gain access to basic levels of service, or to allow more water to be allocated to the environment.

To maintain confidence and trust in the process, the trade-offs (as well as ways of avoiding them, like water demand management) need to be made transparent and the need for compromise openly discussed. The aim must be to arrive at a consensus – a solution that is acceptable to all parties without it necessarily being the preferred solution of any one party.

Water sector initiatives cannot and should not be designed in isolation. Water policies, strategies and action plans need to be dovetailed with national and sectoral development goals and plans, including poverty reduction strategy papers (PRSPs). A practical approach is the 'continuous improvement' framework, which has been developed by international agencies and widely adopted for all forms of policy and strategy formulation aiming at sustainable development (SD), including poverty and environmental strategies.

The philosophy is one of integrating research and policy actors in a step-by-step, learning and adaptation process of change driven by multi-stakeholder groups, as illustrated in Figure 5. As can be seen from the differences listed in Table 5, the continuous improvement approach stands in stark contrast to the older 'masterplan' approach.

Table 5: Changing approaches to developing policies and strategies

From 'Masterplan' Concepts	To Continuous Improvement
Develops and implements a single 'master plan' for SD (that gets increasingly out of date)	Builds a system of coordinated mechanisms & processes dealing with SD priorities step-by-step
Fixed ideas and solutions	An adaptive, learning system offering coherence between activities
One-off initiative	A continuous process
Management based on precedent or evidence only	Also experimentation and managing uncertainty
State alone is responsible	Society as a whole is responsible
Narrow participation	Multi-stakeholder approach
Focus on outputs (projects, laws, etc.)	Focus on outcomes (impacts) and the quality of participation and management processes
Sector-based research and planning	Partnerships and integrated research and planning
Focus on costly 'projects' (and a consequent dependence on external assistance)	Focus on cost savings and domestically-driven and financed investment and development

Source: Dalal-Clayton et al, 2002, (Refs R5)

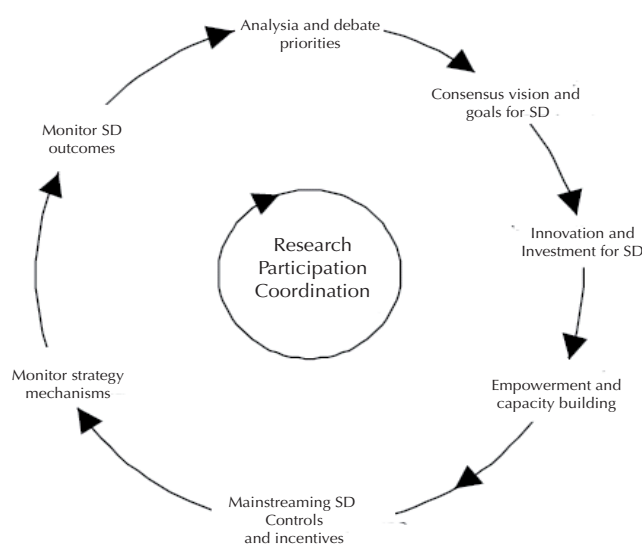


Figure 5: A 'continuous improvement' approach to sustainable development strategies
Source: Dalal-Clayton et al (2002), pg 22 (Refs R5)

36 National Legislative and Institutional Frameworks

While in some countries, legislation is drawn up first and water policy is prepared afterwards, the more usual pattern is for water legislation to convert policy into law. As laws are more difficult and cumbersome to change than policies, it is thus very important that the policies be carefully specified before becoming entrenched in law. An attractive alternative would be for a new water law to be developed in parallel with a major revision in water policy. The discipline of turning a principle or an intention as commonly expressed in a policy statement into the unambiguous wording of a law would often require a sharpening of ideas so as to clarify precisely what is intended.

In broad outline, a water law, together with its associated regulations, has to fulfil the following functions:

- stipulate the roles of the state in relation to other stakeholders;
- clarify the entitlement and responsibilities of users and water providers;
- provide legal status for water management institutions of government and water user groups;
- lay out the mechanisms for the allocation of water;
- stipulate the manner and extent of use of economic incentives and penalties;

- provide for the financing of the water sector;
- make provisions to ensure sustainable use of the resource.

There is growing international pressure, from the United Nations and elsewhere, to treat water as a basic human right. If it is considered desirable to codify this in national law, this could be done in the constitution (as in South Africa, for example) or in the main water law.

The primary geographical unit for the implementation of IWRM is the river basin. A modern water law will thus make provision for an institutional structure which encourages water resources management to be based on hydrological boundaries. The law needs to establish organisational structures at basin and sub-basin levels to enable decision making at the lowest appropriate level. The role of central government is one of coordination and regulation, rather than direct resource management.

As is suggested in Part II, given the unique nature of water it is desirable for water sector regulation to be institutionally divided between environmental regulation and service provision regulation. Given resource and capacity limitations, it may be beneficial to have water resource regulation as a component of an environmental regulator with a much broader mandate than water, and similarly for the service provision regulation to be part of an infrastructural regulator which might include electricity, telecommunications and transport services in addition to water supply.

37 Legal Framework in a Shared Basin

At the regional level, it is desirable to have a regional legal framework in place, as this will give the basis for cooperative development of the shared basin as well as a coherent and consistent basis for resolving contentious issues, such as abstractions and quality control. Establishing such a framework is not a straightforward matter. The experience of Europe in this regard spans over 200 years.

The relatively recent phase of international law-making in respect of the management of shared water resources may be said to have begun with a resolution in the United Nations General Assembly in 1959. A professional body of lawyers, the International Law Association set about devising rules for international rivers. This resulted in the publication in 1966 of the so-called **Helsinki Rules** for international watercourses. These were not adopted by the United Nations, which instead tasked the International Law Commission (an agency of the UN) with formulating a comprehensive law on the use of international water resources. This proved far more difficult and contentious than had originally been anticipated. It was only in May 1997 that the **Convention on the Law of the Non-Navigational Uses of International Watercourses** was finally adopted by the UN General Assembly⁵. It is worth mentioning here that the Nile Basin Countries have different stands with respect to this UN Convention.

In addition to the Helsinki Rules and the UN Convention on the Law of the Non-Navigational Uses of International Watercourses, European countries through the UN Economic Commission for Europe (ECE) have the **UN/ECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes**. This was signed in 1992 and came into force in 1996, the clear bias being towards environmental concerns. Member states of the European Union have also to implement the EU Water Framework Directive, published in the year 2000. The intention of the EU Directive is to modernise and standardize European water law and require comprehensive transboundary management of waters in river basin districts. The target is to achieve clean, ecologically intact standards in all European Rivers by 2015. The implementation of the Directive will require even closer cooperation in river management and water protection than has been the case in the past.

⁵ The definitions and main articles of the UN Convention are explained in detail by Stephen McCaffrey in Chapter 2 of Salman et al (1998) (Refs R28). Annex 1 contains the full text of the Convention.

The UN Convention on the Law of the Non-Navigational Uses of International Watercourses has been very influential outside of Europe. In the case of SADC, a Protocol on Shared Watercourses in the Southern African Development Community was negotiated over a two year period and signed by 10 member states in 1995. After the passing of the UN Convention, revisions to bring the SADC Protocol in line with the Convention were proposed, leading to the signing of a Revised Protocol in the year 2000. It embodies a number of key principles that inform its implementation – see Box 37.

Box 37: Summary of principles embodied in SADC Revised Protocol on Shared Watercourses

- 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

It is important to highlight that the legal framework in the water sector benefits from its being formulated within the umbrella of a regional body committed to the deepening of regional integration across all spheres of activity. This is reflected, for example, in the provisions in the Revised Protocol on Shared Watercourses for dispute settlement. These follow the general guidelines laid down in the SADC founding treaty, which encourage amicable settlement, failing which arbitration can be pursued. Disputes which cannot be amicably settled can be referred to the SADC Council for an advisory opinion or to the SADC Tribunal for a final and binding adjudication.

38 Human Resources and Capacity-building

The biggest challenge in establishing a new institutional structure is to ensure that the posts can be filled with adequately trained and motivated staff. In most countries, a crucial element of the success of water sector reform initiatives is continuous capacity-building of the staff and of people in governance structures.

Equally important in IWRM is identifying and meeting the capacity-building needs of the various stakeholders who have been recruited to have a role in the management of water and the policy-making and planning process, but may not have the awareness and skills to contribute as fully as they could do. Pertinent questions to address in this regard are given in Box 38.

Box 38: Questions to determine capacity building needs

- To what extent is IWRM new?
- Are stakeholders aware of the importance of the proposed water reforms?
- Are ministers and other politicians adequately informed to be able to make the right political choices?
- Are there important gender differences in access to and use of water?
- Does the Management Team understand all of the issues and have the skills to facilitate a stakeholder process?
- What are the water management strategic options and how do we decide what is best for us?
- Why should we charge for water?
- Do we have enough knowledge to be able to implement the IWRM plan?

Source: Cap-Net (2005) pg 36 (Refs R30)

The capacity building needs of stakeholders may not be clear until a water initiative is taken and new skills are found to be needed. The example of women in Patan District, India, launching an ambitious 10 year programme is illustrates the point (see Box 39).

Box 39: Gender and watershed management, Patan District, India

Patan District is arid. Average annual rainfall is seven inches. Frequent droughts, severe salinity in land and water, high temperatures and sandstorms reduce communities to survival level. When crops fail due to drought, there is no option except migration. Two-thirds of water users in this region are women.

In 1995, the Self-Employed Women's Association, a trade union of 215,000 poor self-employed women, launched a ten-year water campaign in nine districts of Gujarat, India. Watershed Committees were set up at meetings where every villager from user groups and self-help groups was present. Out of a total of 11 members, at least seven were women. The chairperson was unanimously elected from among the women members.

The Watershed Committees first collected detailed information on the resources of each village - natural resources as well as human resources. They then prepared an action plan for every four years. Treatment works were implemented on the basis of annual micro plans.

Results

Over the period of the program, the committees constructed 15 farm ponds, recharging 120 tube wells. They also repaired 20 village ponds, and recharged three check dams and 15 open wells in eight projects. Through soil and moisture conservation work, the salinity of the land decreased.

With more productive land, the women began getting higher and more sustainable incomes. About 3,662 hectares were thus treated. Now they grow cash crops using organic farming. Using panchayat wasteland, community pasture land and private land, about 5,000 trees have been grown and grass cover created on 3,500 sq. metres of field bunding for better retention of water. This has created a green belt in the area and generated employment opportunities for about 240 women. Nearly 2,500 hectares of land, which formerly had only rain-fed agriculture, have an irrigation facility, and drinking water is now assured.

Source: UNDP (2003): Mainstreaming Gender in Water Management, Refs R6

39 Political Commitment and Resource Mobilisation

When policies fail to get implemented, the reason usually given is 'lack of political commitment'. This is clearly true, but not very useful *ex post*. Box 40 makes a number of suggestions about how water sector people can try *ex ante* to ensure that a political commitment to IWRM is built. It is not just water policy itself which is at stake. What is needed is to infuse national policies in different sectors with IWRM principles and to ensure that the cross-agency support is there to achieve integrated water resource management in different catchments.

Box 40: Suggestions on Building Political Commitment to IWRM

- Identify opportunities for drawing attention to the broad issues of IWRM
- Build on international commitments, e.g. most governments, including yours, have signed up to the international goal to develop plans for the sustainable management and efficient use of water resources.
- An early step may be to start with key individuals, champions, and gradually build support.
- Use a problem based approach and appeal through parliamentarians to address the water problems of their constituents;
- Use publicity to raise water issues on the national agenda and therefore the relevance to politicians;
- Provide information or make a presentation to the parliamentary committee or other suitable government body with responsibilities for water, land or environment.
- Promotional material, summaries of long reports and other targeted information material in an appropriately short and readable format;
- Take a 'process approach' and build commitment along the way – but don't leave it too late.

Source: Cap-Net (2005) pg 31 (Refs R30)

Political commitment is also essential for effective mobilisation of resources. Armed with well prepared and carefully justified financing requests, politicians still have to fight for a share of national budget resources and for allocations for water development from donor agencies. Co-operating partners are keenly aware of the importance of political commitment and are far more likely to release resources if there is the political will to ensure they will be effectively used within the water sector.

40 Roadmap for Policy Implementation in Shared Basins

The vision of the Nile Basin Initiative emphasizes equitable and sustainable socio-economic development through improved usage of water resources. How is this to be achieved in practice? What lessons can be learnt from experience in other shared river basins?

The Rhine Basin provides an appropriate case study. The Round Table held at Petersberg, Bonn in 1998, produced a set of influential recommendations⁶:

- Water should be seen as a catalyst for co-operation. Water alone is not the cause of conflicts. Potential conflicts arise only in conjunction with other causes.
- Critical factors for successful co-operation are:
 - a shared vision
 - sustained political commitment and broad-based public support
 - broad-based partnerships and
 - environmental management.
- Integrated approaches are required, which should focus on co-operation at the regional level. International river basin commissions are to be supported as facilitators of communications, as a forum for establishing shared goals and for proposing steps to achieve these goals.

⁶ As quoted in article by Robert Hollaender in Abernathy (ed) (2000) (Refs R27)

- It is important to strengthen institutional frameworks by
 - enhancing confidence-building measures,
 - strengthening legal instruments both regionally and globally
 - strengthening the capacity of government, in particular in transition and developing countries and
 - using economic instruments.

The experience on the Rhine highlights the need for complex processes to be broken down into stages and small steps, allowing confidence to be progressively developed over time. The successful carrying out of joint projects is similarly described as “essential for further co-operation”. The examples given are joint projects for water protection (e.g. wastewater treatment), traditional water uses (e.g. fishing, transport) or regional development of new uses (e.g. dams for generating energy or developing new irrigation projects) ⁷.

The modus operandi of the International Commission for the Protection of the Rhine is to draw up action plans with specific sub-activities involving monitorable goals and targets. The Rhine Action Programme 1987-2000 has as a symbol of its success the re-emergence of salmon as a fish species in the river. The successor Rhine 2020 embraces the EU Directive’s ‘good status by 2015’ and the Action Plan on Floods. Cooperation is supported by a number of technical agencies which provide data and professional back-up, the Water Information System for Europe (WISE) being a case in point.

In southern Africa, the SADC Water Division similarly has a work programme, albeit with targets that are at a more strategic and policy level than those appropriate for a river basin organisation. Over the period 1999-2004, the objective has been to implement the Regional Strategic Action Plan for Integrated Water Resource Management (RSAP), this being a component of SADC’s overall Regional Indicative Strategic Development Plan (RISDP). The main issues identified in RSAP related to:

- Water demand and water security
- Poverty and water
- Food security and water and
- Industrial development and water.

Seven key objectives were identified:

- Improve the legal and regulatory framework at the national and regional levels.
- Improve national and transboundary river basin management, planning and coordination.
- Strengthen linkages between macro-economic, social and environmental policies.
- Improve information acquisition, management and dissemination.
- Support awareness building, education and training.
- Promote public participation.
- Invest in infrastructure.

Not all of these objectives were achieved to the same extent, but some of the major achievements were the conclusion of the Revised Protocol on Shared Watercourses, the formulation of a Regional Water Policy and Regional Water Strategy and the establishment of regional flood and drought management arrangements for SADC countries.

The Nile Basin Initiative as a collaborative structure is comparatively recent, but effective cooperation between sub-sets of the Nile countries has a long history. A good example of such cooperation is provided in Box 41.

⁷ Op cit, page 326.

Box 41: Cooperation between Egypt and Uganda – the Aquatic Weed Control Project in The Equatorial Lake, Uganda

Problem description

In the period between October 1997 and the beginning of 1998, many climatic changes occurred in East Africa, causing heavy rainfall on the Equatorial Lakes where water levels increased in Lake Victoria up to 1.5 m, equivalent to more than 100 billion m³ of runoff.

This additional water volume led to high discharges in Nile Victoria and consequently high water levels in Lake Kyoga, upon which large quantities of water hyacinth and floating mats of Papyrus caused huge blockage at the lake outlet. The blockage extended 16 km along the Lake Kyoga outlet. Water levels increased in the lake, inundating all villages and communities along the shores of Lake Kyoga. The problems for the communities were compounded by diffusion of epidemic diseases like Typhoid and Cholera.

Uganda-Egypt Aquatic Weed Control Project

In 1998, the Uganda Government invited all countries and donors to offer their help in order to find solutions for the problem that was directly affecting fisheries, health, economics, and social lives of local people. Accordingly, the Government of Egypt allocated the sum of 13.9 million US\$ as a grant to Uganda, of which US\$ 8.3 million was for the supply of project equipment and 5.6 million US\$ for machine operations by specialized Egyptian companies, training of Uganda personnel and covering the running costs of the project offices in Uganda and Egypt. The project contract was signed between the two Governments on 22 March 1999. Bilateral technical and steering committees were formed in order to purchase project equipment, manage and operate the project.

In April 2000, an emergency program with a total cost of 2 million US\$ was initiated and lasted for three and half years until the full purchase of project equipments was accomplished. The emergency program helped to release the excess water from the flooded villages and roads surrounding Lake Kyoga in central Uganda, which brought people back to their villages and removed of the accumulated mass of aquatic weeds upstream of Pakwach bridge in Albert Nile in Northern Uganda, thus rescuing the possible collapse of the bridge due to weed impact as well as opening the water passage.

The project during the course of operation has proven a sound management and successful achievements in controlling aquatic weeds in Lakes Victoria, Kyoga, and Albert and River Kagera. In addition, more than 15 villages along the lakes have been developed and at least 90 Ugandan technician and engineers have been trained. The project activities enhanced the environmental, socio-economic, and health aspects of a wide range of beneficiaries within the project areas.

Source: Egypt National Working Group

41 Next Steps

At the time of preparing the Guidelines and Compendium, all NBI countries except the DRC have written national water policies in place, and these all to a significant extent reflect IWRM principles. These observations are drawn from the studies of the status of water policy in each country (see references R1), which are comprehensively synthesized in the Regional Nile Policy Paper (Nicol, 2006, Refs R1). The latter report contains many detailed tables itemising the status of different aspects of water policy for each country – see in particular Table 3.1.4 (Policy content matrix and gap analysis).

On the shared water aspect, the report finds that “on the whole most policies do not refer to transboundary issues in any detail, barring reference to international (bi- and multilateral) agreements to which the countries are already party. None make explicit mention of benefit-sharing issues”.

The fact that the transboundary issues are not comprehensively covered in the policy statements does not imply that they are not taken seriously by the participating countries. As noted in Chapter 1, in terms of its effects on the ground, implemented policy may well be of more importance than codified policy. The evidence is that the formation of the NBI has served to intensify the commitment of participating countries to cooperation in respect of transboundary water. In the period before formal changes to policy statements are made, what is important is that transboundary issues are handled in the best way possible by riparian countries.

Nonetheless, it is desirable that the de facto position in due course be regularised so that the written policies of the Nile countries fully reflect and make explicit commitments on transboundary cooperation. However, there is no element of prescription here: enhancing the transboundary aspects of national water policy statements is to be done entirely at the discretion of the country concerned and at a pace and in manner that is appropriate for its own particular circumstances. Countries are at different points in the policy cycle and are also in different situations as regards the significance of transboundary issues. As these Guidelines have tried to make clear, there are transboundary aspects to be considered in virtually all aspects of water policy, but the extent to which these can or should be reflected in national policy statements will vary significantly over different countries.

What the NBI Water Resources Planning and Management Project can usefully attempt to provide is various complementary forms of capacity-building for officials from NBI countries. The aim of the capacity-building will be first and foremost to assist the countries to do as well as possible in the management of transboundary water issues, and secondarily to amend policy documents to reflect more fully transboundary issues. The management aspect embraces being effective both on issues that are already familiar and anticipating and being well prepared for new transboundary issues which are bound to emerge as pressure on resources grows and as cooperation within the Nile Basin intensifies. In particular, it is important for countries to be ready to make the most of opportunities to maximise their share of the benefits of water use, rather than just focussing on the water resource itself. The benefits to be negotiated are primarily economic in character, but broader benefits (social and environmental) need also to be considered.

The different forms of capacity-building which would have a role in the context of transboundary water management and policy-making are:

- training courses, both general courses (e.g. formal university courses) and purpose-designed and delivered short courses and seminars (e.g. to meet specific requirements in a sub-set or all of the NBI countries);
- study tours to allow NBI water sector professionals to interact with their counterparts elsewhere and to appreciate at first hand the strengths and weaknesses of approaches that have been taken on various transboundary issues;
- country-to-country attachments, which would have many of the advantages of the study tours, but would be of longer duration, and would thus allow for a more in-depth experience. Such attachments could be between NBI countries or could involve countries in other regions or both. In all cases, attachments would require considerable commitment both from the participants and from the host institutions.

The extent to which individual countries would wish to participate in such capacity-building is again a matter for each country to decide. General and specific needs have been identified in the *Regional Nile*

Policy Paper, but this does not provide any basis for prescribing what should happen at the national level. It is for each country to propose the degree to which it wishes to avail any capacity-building opportunities that can be provided.

IV. Additional Compendium Materials

As noted in the Preface, it has been found useful and accessible to make examples of ‘good practice’ quite brief and to include these in the various chapters of the Guidelines. There is still a need, though, for some additional, longer materials to complete the Compendium of Good Practice. In Part IV, examples are given of a water policy document (Sudan) and of a water action plan (Burkina Faso). To prevent this document becoming too voluminous, what is provided here is an outline in the case of Sudan and the Preface and Contents page of the Burkina Faso document. The full versions of these documents, as well as many other Compendium materials can be accessed via the References section which follows Chapter 43.

Even as extracts, the Sudan and Burkina documents are interesting as examples of the sort of way in which the topics raised in the Guidelines may be covered in a very different order and with an emphasis and set of priorities which clearly reflect particular national conditions and circumstances at a particular point in time. It is also interesting to note the high degree of political commitment in the Burkina document – besides the Preface signed by the Minister, the document includes an enabling legal Decree that is signed by the President, the Prime Minister and 5 other Ministers who have identified roles in its implementation.

42 Outline of Sudan National Water Policy Draft 2000

The Sudan National Water Policy (SNWP) draft of 2000 brought together for the first time many aspects of water resources management, utilization and protection in a single integrated policy document. The objectives of the SNWP are as follows:

- To bring together and clarify existing policy;
- To review and adapt water policy to meet changing circumstances within the country;
- To ensure that the water resources of Sudan are properly managed, protected and efficiently utilized for the benefit of all;
- To provide the basis for the ongoing development of water related regulations and legislations;
- To strengthen and rationalize water related institutions in both the public and private sectors in The Sudan.

The development of SNWP involved a wide range of stakeholders and a large number of people from the government, academic institutions and the private sector. In addition, State governments, farmers, communities and NGOs are also involved in the Policy preparation process.

The main Water Policy principles and statements of the SNWP are summarized below:

1. Overarching Policy Principles and Objectives to provide a framework for more detailed specific policy:
 - a. Water is a scarce and valuable commodity which has to be equitably, economically and efficiently used.
 - b. Access to water for basic human needs is the highest priority in the development of water resources.
 - c. Development of water resources must be demand driven and management should be undertaken at the lowest possible level.
 - d. Development and management of water resources, and the operation and maintenance of water services must be economically sustainable through the recovery of costs from those who benefit.
 - e. All water, including surface and groundwater, form part of the hydrological cycle and should be managed in an integrated manner.

- f. Water resources management affects everybody and should be undertaken with the participation of relevant stakeholders.
- g. People are stakeholders for water use and the national government is the custodian of all water in the Sudan for the equitable benefit of all in the public interest.
- h. The gathering and management of accurate information for recording and ongoing monitoring of water resources is essential for the proper development, management and protection of water resources.
- i. The environment needs to be protected in order to ensure sustainable utilization for present and future generations.
- j. The development of water resources will be undertaken in order to maximize its benefits in the public interest whilst ensuring minimum adverse impact on the environment.
- k. Public institutional arrangements at federal and state levels will be integrated, accessible, efficient and transparent whilst avoiding duplication of functions and responsibilities.
- l. Water and water related issues are an integral part of the wider economy and have direct effects on many other sectors which require inter-departmental and inter-sectoral communication and cooperation.

2. Water Resources

a. Surface Water

The Policy addressed a number of issues and problems associated with the development and protection of surface water resources in the country such as: floods and droughts, storage means for the highly variable flow, upkeep of irrigation infrastructure, supply and demand management, surface water quality management, monitoring and assessment of the resources and human resources. Policy principles and objectives for the above issues are addressed below:

- i. Surface water planning and development must be integrated at all levels.
- ii. It is the obligation of all to protect surface water resources.
- iii. Surface water development policy should be clear and accessible to communities.
- iv. A reliable data base and information system is a pre-requisite for sound assessment, planning management and development of surface water resources.
- v. The operation and maintenance of surface water systems should be based on cost recovery—the user pays principle.
- vi. The storage capacity has to be increased to meet the increasing demand of water.
- vii. Optimum and equitable use of surface water should be promoted through cooperation between the national water users.
- viii. The Government has a regulatory function to ensure that the appropriate standards of service quality, sustainability and environment friendliness are met by the water suppliers and users.

b. Ground Water

The key issues and problems addressed by the Policy pertaining to groundwater resources cover: groundwater monitoring and information base, groundwater quality and pollution, environmental degradation, development and utilization of groundwater resources and institutional arrangements. Policy principles and objectives associated with the above issues:

- i. Groundwater resources are an indivisible part of the hydrological system, the national water balance and the natural resources base.
- ii. Groundwater resources are a national property, the equitable use of which is common to all subject to national authority and control.
- iii. Proper planning assessment, development and management of water resources cannot be achieved without strengthening the information base at the national and the states level.
- iv. Present and future water users have a right of access to clean and unpolluted groundwater resources and un-degraded environment.

- v. Groundwater is to be recognized as having a social and economic value; its value is based on the cost of the development, operation and maintenance of groundwater resources.
- vi. Groundwater abstraction, particularly from alluvial and shallow aquifers, shall be based on recharge and safe yield concept.
- vii. Sustainability of groundwater development and supply services shall be planned for and considered as part of development and management policy of the water resources systems.

3. Unconventional Water Resources

This type of water resources is rarely used in the Sudan at present, but is expected to be used in the near future when water stress arises acutely. Examples of unconventional water resources in the Sudan are: drainage water, desalinated water, etc. The Policy principle and objective of this type of water is that:

Research planning and development of unconventional water resources will be undertaken in order to use unconventional alternative water resources for the Sudan.

4. Utilization

a. Water Supply and Sanitation

Main key issues and problems addressed by the Policy covered: supply demand imbalance, sustainability of water supply system, unsafe surface water supplies, sanitation and waste water disposal and water supply and sanitation sector institutional reform. Policy principles and objectives associated with water supply and sanitation are:

- i. Access to adequate water supply and sanitation is a basic necessity.
- ii. The achievement of sustainable and financially viable water supply and sanitation service must be the objective of service providers.

b. Agriculture and Land Use

The key issues and problems addressed by the Policy in this regard comprise: wind and water erosion, declining yields from crops, animal loss and migration of rural people to towns, excessive removal of vegetation, concentration of agricultural activities in the central Sudan, wildlife degradation, soil degradation and poor traditional land use practices. Policy principles and objectives covering the above issues and problems are:

- i. The improvement of water use efficiency in agriculture shall be a priority.
- ii. The licensing of water use must include a rigorous assessment of water resources to be utilized.
- iii. Water pricing must promote equitable and efficient water use.
- iv. The use of water in irrigation projects should be monitored and evaluated using appropriate monitoring and evaluation (M&E) systems.

c. Hydropower

Issues addressed by the Policy pertaining to hydropower generation are: competition with other water uses and system needs, supply and demand imbalances and financing. Policy principles and objectives include:

- i. As hydropower is a clean energy form which is relatively cheap to operate, it forms an integral part in the design and operation of multi-purpose dams.
- ii. Thermal backup shall be secured to fill the gap when hydropower generation drops during the flood season.
- iii. In order to optimize the use of the water stored for different purposes, dam operation should be coordinated at all levels through appropriate institutional arrangements.
- iv. Stakeholder participation in management of hydropower must be institutionalized.
- v. Public awareness, clarity and transparency of energy policy are needed to gain acceptance by customers.

- vi. Involvement of the private sector has to be encouraged in the development of small scale hydropower generation, phased large scale developments and the rehabilitation of existing thermal units.
- vii. The government must oversee the quality of service provided to the customers.

d. Industry

Key issues addressed by the Policy contain: treatment, disposal, reuse and cost of the industrial effluent, quantity and quality of available water and industrial waste disposal in the Nile. Policy principles and objectives to address these issues are:

- i. The use of water to transport and dilute waste and to act as a coolant has to be linked with treatment.
- ii. The precautionary principle of pollution control should be adopted with financial penalties for polluters.

e. Navigation

Policy principles and objectives pertaining to navigation on the domestic and international waters are:

- i. River navigation constitutes an important form of transportation in The Sudan and will continue to be promoted and adequately regulated.
- ii. Keep our rivers clean.

f. Fisheries

The policy principle and objective pertaining to fisheries is:

The water resources management measures which are required to promote and protect both small scale and commercial fisheries, including water quality and quantity issues, will be identified and implemented.

5. Water and the Environment

The National Water Policy, in this regard, addressed issues related to the environment such as: the environment as the resource base, pollution control, catchments degradation, biodiversity and wildlife and come up with the following principles and objectives:

- i. It is necessary to sustain aquatic environments which are the water resource base on which human development and wellbeing are dependent.
- ii. People and the consequences of their development are part of the environment.
- iii. The impact of the development and use of water resources should not compromise the long-term sustainability of aquatic environments.
- iv. A balance should be maintained between water resources development and utilization on the one hand and their protection on the other.

6. The International Dimension

Policy principles and objectives pertaining to the international waters are:

- i. The Sudan will seek to cooperate with other countries for the development, optimum use and protection of international waters wherever possible in its national interest and without compromising its sovereignty.
- ii. Watershed management inside the country and in the neighbouring countries is a prerequisite for efficient water use and for strengthening political relations.

7. Disaster Management and Public Safety

a. Natural Disaster Management

The NWP has covered the disaster management in relation to water e.g.. floods and droughts which threaten the public safety and major structures such as dams and reservoirs. The adopted policy principles and objects contain:

- i. A national Disaster Management Plan will be developed to enable both avoidance of disasters and effective response to disasters.
- ii. International cooperation is critical for proper and adequate response to natural and other disasters. The Sudan will seek to participate in and contribute to international efforts such as the Program to Combat Desertification.

b. Public Safety

The policy principle and objective pertaining to public safety is:

In order to ensure adequate public protection, regulatory and administrative instruments which balance the cost of safety measures with an acceptable level of risk to public safety will be developed and implemented at national and federal level as appropriate.

8. Institutional Arrangements

The Policy discussed the issue of linking program development in water sector with community goals, the institutional functions and responsibilities, and the institutional development. It also highlights the key issues and problems related to the institutional arrangements in the field of: balanced management, information management, and research. Policy principles and objectives pertaining to the institutional issues are:

- i. There will be a clear distinction and differentiation of roles and functions of water related institutions at federal, state and local level.
- ii. Government institutions will function in a transparent and accountable manner and will be service oriented towards the public.
- iii. There will be a high level of cooperation and interaction between water related institutions at all levels of federal, state and local government and between these levels.
- iv. The collection, management and analysis of water related information will be accorded high priority and resources will be allocated accordingly.
- v. Water sector research will be encouraged and directed by the government to meet the development needs of the country and to maintain high applied research and academic standards.
- vi. Cooperation will be sought with regional and international academic and applied research institutions and agencies to ensure interchange of knowledge and experience.

9. Human resources, capacity building and technical assistance

a. Human Resources

Due to the importance of human resources and capacity building, the Policy addressed the issue in a separate section. Policy issues pertaining to human resources are:

- i. Modern human resources management techniques and practices will be introduced in public institutions in the water sector in the Sudan.
- ii. Attention will be given to the service conditions of all ranks of civil servants ensuring, wherever possible, a productive and amenable working environment.
- iii. Senior and professional staff should have a clear career advancement path which is geared towards retaining highly motivated and qualified staff in the civil service.

b. Capacity Building

Key issues addressed by the policy comprise adoption of a modular approach to large capacity building programs, the types of training and the importance of adopting an Action Plan for the Sudan that will involve issues aimed at water resources conservation, managing and monitoring, with relevant capacity building dimensions. Recommended policy principle and objective in this field is:

- i. The building of capacity of the water sector, at government, private and community level is a high priority.

c. Technical Assistance

The policy reiterated the importance of external donor assistance in supporting capacity building programs. The policy principle and objective in that regard is:

Partnerships will be sought to engage external assistance in supporting capacity building programs

10. Socio-economic Issues

Accommodating social and economic issues in water development project is essential.

11. Implementation and Conclusion

In implementation, the policy document covered the establishment of an implementation plan, phasing implementation, public awareness, review of legislation, institutional review, budget review and implementation monitoring and ongoing policy review. The last section concluded the document.

43 Contents of Burkina Faso IWRM Plan

Action Plan for Water Resources Integrated Management in Burkina Faso (March 2003)

BURKINA FASO



MINISTRY OF AGRICULTURE, HYDRAULICS AND FISHING RESOURCES

Preface

It is an imperative for humankind to take up many challenges related to soft water, affecting food security, human health, economic and social development and the ecosystems sustainability in several places in the world and mainly in the sahelian region.

The importance of *Integrated Water Resources Management (IWRM)* as a way to meet these issues linked to water is subject to a consensus at the international level. The pending matter relies on the following question *“How to implement IWRM ?”*.

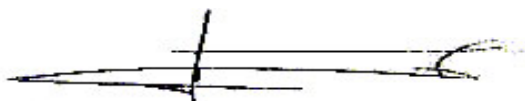
In September 2002, this main concern has been subject to a call of the world summit on the sustainable development in Johannesburg towards all the countries in the world to work out and implement the “action plan of the integrated water resources management” in the year 2005. The working out and adoption of this Action Plan in the early 2003 sets Burkina Faso in the leading bunch of countries in this area.

The Action Plan for the Integrated Water Resources Management (PAGIRE) is in keeping with the prospect of the water sector in depth re-structuring. The stakes concerned are considerable and in the proportion of the huge number of actors and interests sometimes diverging, but able to coexist when dealing with the water supply issue which is of a vital interest for our country.

The Action Plan for the Integrated Water Resources Management (PAGIRE) appears without any doubt as a widespread work of institutional innovations whose specific action structure for the thirteen (13) next years an in-depth reform planner of the water resources management framework in the country. Its implementation will constitute the base allowing to set up at term a true sustainable management of the country water resources.

Institutional innovations are as much a source of development as technical and technological ones. Under these circumstances, it is hoped that this approach will provide to the country the means to tackle in a sustainable way the challenges related to drinking water supply and sanitation of the various urban centres and rural communities, water economic valorisation, self-funding capacity building in the water area and the knowledge building, the management and protection of water resources and milieus which depend on them.

May this 1st Action Plan for the Integrated Water Resources Management go a long way towards the achievement of the changes required for the joint and several and sustainable development in Burkina Faso.

A handwritten signature in black ink, appearing to be 'Salif Diallo', written over a horizontal line.

Salif DIALLO
Minister of State
Minister of Agriculture, Hydraulics and Fishing Resources

References, Additional Readings and Useful Websites

R1: Nile Basin

- Abdalla, Seifeldin H. (2005): Sudan: *Baseline and national water policy needs assessment study*, Draft, June. Khartoum.
- Attia, Bayoumi B. (2005): *Egypt: Water Policy Formulation and Implementation Process Baseline and Need Assessment Study*, Final, September. Cairo.
- Kamugasha, Benjamin Nganwa (2005): *Uganda: Baseline and needs assessment*, June. Kampala.
- Lukanda, Mwamba Vincent (2005) : *DRC: Evaluation de base et de besoins pour la mise en œuvre de la politique nationale de l'eau dans une perspective de coopération regionale*, Draft, July. Kinshasa.
- Msuya, Meraji O. Y. and Luteganya, Kamugenyi P. (2005): *Tanzania: Baseline and needs assessment*, Final, September. Dar es-Salam.
- Nicol, Alan (2006): *Regional Nile Policy Paper*, NBI, Addis Ababa
- Nyaoro, John Rao (2005): *Kenya: Situation analyses on the national water policy, final*, October'. Nairobi.
- Onjala J, 2001: *Water Pricing Options in Kenya: Cases of Mwea and West Kano Irrigation Schemes*, CDR Working Paper 01.9, Centre for Development Research, Copenhagen.
- Onjala J, 2002: *Regulating Industrial Wastewater in Kenya: Towards an Appropriate Institutional Arrangement*, CDR Working Paper 02.8, Centre for Development Research, Copenhagen.
- Onjala, J, 2001: *Industrial Water Demand in Kenya: Industry behaviour when water tariffs are not binding*, Dept of Environment, Technology and Social Studies, Roskilde University
- Onjala, J, 2002: *Good Intentions, Structural Pitfalls: Early Lessons from Urban Water Commercialisation Attempts in Kenya*, CDR Working Paper.
- Ruberangeyo, Théophile S, 2005: *Rwanda: Etat des lieux du processus de formulation de la politique et evaluation des besoins pour son amélioration et sa mise en oeuvre*, Draft, August. Kigali.
- Said, R. (1999): *The River Nile - Geology, Hydrology and Utilization*, Pergamon Press
- Sinarinzi, Evariste (2005): *Burundi: Etude de base sur l'état actuel du processus de formulation de la politique de l'eau et evaluation des besoins pour son amelioration et sa mise en oeuvre*, Final, June. Bujumbura.
- Workie, Teshome (2005): *Ethiopia: A baseline and needs assessment study of Ethiopian water policy*, Final, September. Addis Ababa.
- Zimconsult and CMTS (2005): *Economics and Financing of the Water Sector in Kenya*, Water Sector Reforms Secretariat, Nairobi.

R2: Southern Africa

- African Water Issues Research Unit (AWIRU), Pretoria University www.up.ac.za
- Department of Water Affairs and Forestry, South Africa www.dwaf.gov.za
- Global Water Partnership, 2002. *Water for the 21st Century. Vision to Action – Southern Africa*. Stockholm, Sweden and Harare, Zimbabwe.
- 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
- 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, 2000. *Revised Protocol on Shared Water Courses in the Southern African Development Community*.
- 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*.
- SADC, 2003. *Review of National Water Policies – Synthesis Report and Water Policy Reviews* (available for each of the 14 SADC member states).
- SADC, 2004. *Consolidated SADC Position on the World Commission Dams and Development Report* (April draft).
- SADC, 2005. *Regional Water Policy*.
- SADC, 2006. *Regional Water Strategy*.
- Stein, R, 2000 *Reforming the water and sanitation sector in South Africa*. Pretoria

R3: 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>

United Nations Conference on Environment & Development, 1992. *Protection of the Quality and Supply of Freshwater Resources: Application of Integrated Approaches to the Development, Management and Use of Water Resources*, Agenda 21, Chapter 18

Earth Summit (Rio 1992, +5 in 1997)

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

<http://www.iisd.org/rio+5/agenda/default.htm>

<http://www.ecouncil.ac.cr/about/ftp/riodoc.htm>

<http://www.un.org/esa/earthsummit/>

Nile Basin Initiative www.nilebasin.org

World Water Vision

<http://www.worldwatercouncil.org/Vision/cce1f838f03d073dc125688c0063870f.htm>

<http://www.worldwatercouncil.org/Vision/Documents/CommissionReport.pdf>

Second World Water Forum (The Hague, 2000) <http://www.waternunc.com/gb/secWWF.htm>

Millennium Development Goals (2000)

<http://www.un.org/millennium/declaration/ares552e.pdf>

<http://www.un.org/millenniumgoals/>

http://www.unesco.org/water/wwap/facts_figures/mdgs.shtml

http://www.unesco.org/water/ihp/ihp_seven_plan_mdgs_water.doc

<http://www.irc.nl/content/view/full/10611>

<http://www.developmentgoals.org/>

<http://www.weforum.org/site/homepublic.nsf/Content/Independent+Report+Gives+Failing+Grades+to+Efforts+to+Improve+the+State+of+the+World>

Bonn Conference on Freshwater (2001)

http://www.water-2001.de/outcome/Ministerial_declaration.asp

http://www.water-2001.de/outcome/bonn_recommendations.asp

African Ministerial Conference on Water (AMCOW, Abuja, 2002) and Africa Water Facility (managed by the African Development Bank)

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

<http://www.afdb.org/water/awf.htm>

Accra Declaration on Water and Sustainable Development

http://www.africanwater.org/Documents/accra_statement_15-17_april_2002.pdf

<http://www.iwmi.cgiar.org/accra2002/>

NEPAD http://www.afdb.org/water/adb_nepad.htm

NEPAD, 2002. *Water and Sustainable Development in Africa: An African Position Paper*.

World Commission on Dams (2002)

<http://www.dams.org/>

<http://www.icold-cigb.org/>

World Summit on Sustainable Development (Johannesburg 2002)

http://www.johannesburgsummit.org/html/documents/summit_docs/131302_wssd_report_reissued.pdf

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

http://www.johannesburgsummit.org/html/documents/summit_docs/2309_planfinal.htm

World Water Forum 3 (Kyoto, 2003)

http://www.world.water-forum3.com/jp/mc/md_final.pdf

<http://www.unesco.org/water/wwap/wwdr>

R4: IWRM – general

African Development Bank, 2000. *Policy for Integrated Water Resources Management*. <http://www.afdb.org/water/>

CAP-NET: International Network for Capacity Building in IWRM, in particular the IWRM Tutorial and Cap-Net e-library
info@cap-net.org www.cap-net.org

Consultative Group on International Agricultural Research – water management research programme http://www.cgiar.org/research/res_whater.html

FAO document retrieval <http://www.fao.org/documents/>

Global Water Partnership, 2002. *Integrated water resources management. Technical advisory committee background paper number 4*. Stockholm.

Access via www.gwpforum.org/ > Library – Publications > Technical Papers (TEC Background Papers) > TEC Background Paper no.4

GLOBWINET (Information Network on IWRM focusing on transboundary river basin organisations, water legislation, and national water administration. SAWINET is regional node in Southern Africa).

www.globwinet.org

<http://www.gtz.de/gwpgtz> or

<http://www.waterweb.org/linksdb/view.ihtml?id=2310>

Robinson, Peter. 2003. *Water Economics*. Waternet, Harare.

Solanes, Miguel and Gonzalez-Villareal, Fernando, 1999. *The Dublin principles for water as reflected in a comparative assessment of institutional and legal arrangements for Integrated Water Resources Management*. TEC background paper No 3, Global Water Partnership, Sweden

Access via www.gwpforum.org/ > Library – Publications > Technical Papers (TEC Background Papers) > TEC Background Paper no.3

Stockholm International Water Institute www.siwi.org

UN Commission on Sustainable Development www.un.org/esa/sustdev/csd.htm

Water Page (incorporates the former African Water Page) and includes the Water Resources Information Database (Gives cross-references to various publications and other websites).www.thewaterpage.com/ and <http://www.thewaterpage.com/information/welcome.cfm>

World Water Council (WWC) www.worldwatercouncil.org

Water Issues Group, School of Oriental and African Studies www.soas.ac.uk/Geography/WaterIssues/

WELL Resource Centre Network For Water, Sanitation and Environmental Health. (resource centre network providing services and resources in water, sanitation and environmental health). www.lboro.ac.uk/well/

R5: Stakeholder Participation

Dayal, Rekha, Christine van Wijk, and Nilanjana Mukherjee, 2000. *Methodology for Participatory Assessment with communities, institutions and policy makers*. Water and Sanitation Program. www.wsp.org/pdfs/eap_mpa_helping.pdf

Dalal-Clayton B. Swiderska K, Bass S, 2002: *Stakeholder Dialogues on Sustainable Development Strategies*. Lessons, Opportunities and Developing Country Case Studies. Environmental Planning Issues No 26, November 2002. International Institute For Environment and Development. London, United Kingdom.

Gorre-Dale, E. Jong, D. de, Ling, J., 1994. *Communication in Water Supply and Sanitation Resource Booklet*, IRC, The Hague. www.irc.nl/pdf/publ/resbook.pdf or www.irc.nl/products/publications/descr/come.html

International Water and Sanitation Centre (IRC), The Netherlands www.irc.nl

Ostrom, Elinor, 1990. *Governing the commons: The evolution of institutions for collective action*, Cambridge University Press, 1990.

Rietbergen-McCracken, J., and Narayan, D., 1998. *Participation and Social Assessment: Tools and Techniques*, World Bank, New York

Water Supply and Sanitation Collaborative Council (WSSCC), World Health Organisation (WHO) <http://www.wsscc.org/>

Water Voice Project www.worldwaterforum.org/eng/voice.html

R6: Gender Mainstreaming

Gender and Water Alliance, 2003. *Gender and Water Development Report 2003: Gender perspectives in policies in the water sector*

<http://www.genderandwateralliance.org/english/annual.asp>

<http://www.genderandwateralliance.org/english/advocacy.asp>

Hellum, Anne, 2001. *Towards a human rights based development approach: The case of women in the water reform process in Zimbabwe*. Institute of Women's Law, University of Oslo, Norway

UNDP, 2003: *Mainstreaming Gender in Water Management: A practical Journey to Sustainability - A Resource Guide*

R7: Capacity-building

CAP-NET: International Network for Capacity Building in IWRM, in particular the capacity-building sections of the Cap-Net e-library info@cap-net.org www.cap-net.org

Institute of Water and Sanitation Development (IWSD), Harare www.iwsd.co.zw

WaterNet www.waternetonline.org

R8: Institutional framework

Frederiksen, H D, 1992. *Water Resources Institutions: Some Principles and Practices*, World Bank Technical Paper No. 191

Livingston, M L, 1991. *Normative and Positive Aspects of Institutional Economics: The Implications for Water Policy*, Water Resources Research, Vol 29, No 4, pp 815-821

Singh J, Moffat D & Linden O, 1995. *The Niger Delta: A Stakeholder Approach to Environmental Development*, Findings, World Bank Africa Region, No 53, December 1995

R9: Water resources assessment

Batchelor, C., Cain, J., Farquharson, F., and Roberts, J., *Improving water utilisation from a catchment perspective*, IWMI SWIM Paper 4, Colombo, ISBN 92-9090-358, 1998.

www.cgiar.org/iwmi/pubs/swimpubs/Swim04.pdf or via www.cgiar.org/iwmi/ > Publications – Swim Papers > No.4

Calder, I. R., 1998. *Water-resource and land-use issues*, IWMI, SWIM Paper Colombo. Available on-line: <http://www.cgiar.org/iwmi/pubs/swimpubs/Swim03.pdf>

Fredra, K, 1996., *Decision Support Systems for Natural Resources Management: Models, GIS and Expert Systems* www.iiasa.ac.at/Research/ACA/papers/toronto.html

Hydrological Operational Multipurpose System (HOMS). (World Meteorological Organisation's system for technology transfer in hydrology and water resources). www.wmo.ch/web/homs/homshome.html

IWMI's Water Balance Framework: A Model for Project Level Analysis. www.cgiar.org/iwmi/pubs/pub005/Report05.pdf

McKinney, D. C., Cai, X., Rosegrant, M. W., Ringler, C., and Scott, C. A., *Modelling water resources management at basin level: review and future directions*, IWMI, SWIM Paper 6, Colombo, ISBN 92-9090-376-7, 1999.www.cgiar.org/iwmi/pubs/swimpubs/Swim06.pdf or www.cgiar.org/iwmi/ >Publications – Swim Papers > No.6

Wallingford, 2003. *Handbook for the Assessment of Catchment Water Demand and Use*, DFID, London. (SADC data and orientation).

World Hydrological Cycle Observing System (WHYCOS - provides a co-operation framework in water resources monitoring and assessment by increasing capacity of national hydrological services). Hyd@gateway.wmo.ch or 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) www.wmo.ch WMO

R10: Environmental assessment

Donnelly, A., Dalal-Clayton, B. and Hughes, R, 1998. *A Directory of Impact Assessment Guidelines*, 2nd Ed. International Institute for Environmental Development, London

Environmental Impact Assessment Centre (training activities and documents etc).<http://www.art.man.ac.uk/EIA/EIAC.htm>

See also <http://www.brad.ac.uk/staff/pghopkin/whatisea.html> and <http://www.gdrc.org/uem/eia/impactassess.html>

Gilpin, A, 1995. *Environmental impact assessment: Cutting edge for the twenty-first century*. Cambridge University Press, Cambridge.

International Association for Impact Assessment (resources, handbook etc) <http://www.iaia.org/>

Institute of Environmental Assessment (IEA) <http://www.greenchannel.com/iea/>

Petts, J. (Ed.), 1999. *Handbook of environmental impact assessment*. Blackwell Sciences, Oxford.

Vanclay, F, 1999. *Social impact assessment*. In J. Petts (Ed) *Handbook of environmental impact assessment. Volume I: Environmental impact assessment: Process, methods and potential*. London: Blackwell Science.

World Bank, (2001). *Environmental Assessment Sourcebook and Sourcebook Updates 1992-2001*. Environment Department, World Bank, Washington.

R11: Social assessment

Burdge, R.J., 1999. *A community guide to social impact assessment: Revised Edition*. Middleton, Wisconsin: Social Ecology Press.

Reser, J. & Bentrupperbäumer, J, 2000. *Reframing the nature and scope of social impact assessment: A modest proposal relating to psychological and social (psychosocial) impacts*. In A Dale, A, N. Taylor, and M. Lane (Eds) *Integrating social assessment in resource management institutions*.

Taylor, C.N., Bryan, C.H. & Goodrich, C.G., 1995. *Social assessment: Theory, process & techniques*. Second Edition. Christchurch, New Zealand: Taylor Baines & Associates.

R12: IWRM planning, sectoral linkages and benefit sharing

DANIDA, 1998. *Workshop on Water Action Plans - Experience with alternative implementing strategies*. (Case studies from Uganda, Ghana and Nicaragua). www.vandresource.dk/danida-uk.htm

Dialogue on Water, Food and Environment. www.cgiar.org/iwmi/dialogue

Global Water Partnership, 2006. *Technical Briefs for IWRM Plans and Strategies*. Stockholm www.gwpforum.org/

Gomukh, India, and Both ENDS, *The Netherlands River Basin Management: A Negotiated Approach* www.bothends.org/encycl/encycl.html/

Groundwater Management Team (GW-MATE) www.worldbank.org/gwmate

International Hydropower Association <http://www.hydropower-dams.com/iha/>

Interwies, Eduard (2006): *Economic Instruments for Policy Formulation and Implementation*, IWRM and Water Policy Course for NBI, World Bank Institute, Addis Ababa

Miller, B A & Reidinger, R B (eds) (1998): *Comprehensive River Basin Development - The Tennessee Valley Authority*, World Bank Technical Paper No 416

North, R M, 1993. *Application of multiple objective models to water resources planning and management*, Natural Resources Forum, August 1993

UCC-Water and GWP-DHI Resource Centre 2002. *Linking Freshwater Resources Management and Coastal Zone Management - General Issues Paper* [www.ucc-water.org/freshco/ Docs/Issuepapere.pdf](http://www.ucc-water.org/freshco/Docs/Issuepapere.pdf)

UNEP, 1999. *Conceptual Framework and Planning Guidelines for Integrated Coastal Area and River Basin Management* Developed through the UNEP Mediterranean Action Plan Priority Action Programme. www1.unep.org/icarm/guidee.doc

van der Zaag, Pieter, I.M. Seyam, Hubert H.G. Savenije, 2002. *Towards measurable criteria for the equitable sharing of international water resources*, Water Policy 4 pg 19–32

R13: Land use planning in relation to water

Dialogue on Water, Food and the Environment www.cgiar.org/iwmi/dialogue

Falkenmark, M., Andersson, L., Castensson, R., and Sundblad, K., 1999. *Water – a reflection of land use*, Swedish Natural Science Research Council, Stockholm.

International Commission on Irrigation and Drainage <http://www.ilri.nl/icidad/ciid.html>

Lundqvist, J. (Ed), 2000. *New dimensions in water scarcity*, Food and Agriculture Organisation, Land and Water Development Division (AGLW), Rome.

Wetlands International (NGO concerned with the conservation of wetlands and wetland species) www.wetlands.org/

R14: Dams and development

International Commission on Large Dams (ICOLD) <http://www.icold-cigb.org/> <http://www.icold-cigb.org/grenierDAMS.htm> (ICOLD response to WCD Report)

SADC. 2003. *Key Dam Issues in the SADC Region*. Gaborone.

World Commission on Dams, 2000. *Dams and Development : a New Framework for Decision-Making*; Earthscan Publications Ltd. London & Sterling, VA.

R15: Water resources allocation

Bauer, C. J., 1998. *Against the current: privatisation, water markets and the state in Chile*, Kluwer, Dordrecht.

Landry, C. J., 1998. *Saving our streams through water markets – A practical guide*, Political Economy Research Center. www.perc.org/sossum.htm

Rogers, P, 1992. *Comprehensive Water Resources Management: A Concept Paper*, Infrastructure and Urban Development Department, the World Bank, WPS 879

R16: Inter-basin transfers

Hirji, R., 1998. *Inter-Basin Water Transfers - Emerging Trends*, Environment Matters, Fall 1998

United Nations ECA. *Study on Large-scale Water Transfer in Africa*, ECA/NRD/WEMS/TPUB/91/2

R17: Economic and financial instruments

Arntzen, Jaap, 1999. *Economic instruments and the Southern African environment*, Dept of Environmental Science, University of Botswana, Gaborone

OECD, 1993. *Integrating environment and economics: the role of economic instruments*. Environment Directorate, OECD Paris.

Rogers, P., Bhatia, R., and Huber, A., 1998. *Water as a Social and Economic Good: How to Put the Principle into Practice*, TEC Background Papers, no. 2: Global Water Partnership, Stockholm, Sweden www.gwpforum.org/ > Library – Publications > TEC Background papers no.2 www.gwpforum.org/servlet/PSP?iNodeID=215&itemId=28

Rogers, Peter, Radhika de Silva, Ramesh Bhatia, 2002. *Water is an economic good: How to use prices to promote equity, efficiency, and sustainability*, Water Policy 4, pg 1–17.

Sinha, B., and Bhatia, R., 1981. *Economic Appraisal of Irrigation Projects*, New Delhi, 1981.

Standard & Poor, *Project and Infrastructure Finance Review*, annual publication and periodic reports on water sector. www.standardandpoors.com

Winpenny, J., 1995. *Reforming water resources policy: a guide to methods, processes and practices*, FAO, Rome.

Zimconsult, 1996. *Water Pricing Options and Implications*. Report prepared for Steering Group of the Water Resources Management Strategy, GTZ

R18: Water resources pricing

Arntzen, Jaap; Sennye Masike and Letsholo Kgath, 2000. *Water values, prices and water management in Botswana*. Paper presented at first WARFSA/Waternet Symposium on Sustainable Use of Water Resources, Maputo.

Rural Focus (2005): *Operationalisation of the Water Act 2002 in Water Resources Management*, Final Draft Report

Waterpage Development of a charge system for discharging into water resources – An application of the polluter pays

principle. (South African case study) www.thewaterpage.com > Search "polluter pays principle" > The Water Page – SA Pollution

Zimbabwe National Water Authority (2000): Operational Guidelines for the Control of Water Pollution in Zimbabwe Harare, Government Printer

R19: Water service provision pricing

Bhatia R, Cestti R & Winpenny J, 1995. *Water Conservation and Reallocation: Best Practice Cases in Improving Economic Efficiency and Environmental Quality*, World Bank-ODI Joint Study, Water & Sanitation Currents, UNDP-World Bank Water & Sanitation Program

Eberhard, Rolfe. 2001. *Urban Water Pricing – a Critical-Realist Approach*. Unpublished PhD Thesis, School of Oriental and African Studies, University of London.

Hazelton, Derek, 2002. *Water tariffs & targeted subsidies*, IUCN Overcoming Constraints to WDM Study, Domestic Sector Note 4.

Schrecongost, A, J Staatz, B Diallo, M Yade, 2004: *Water Pricing as a Tool for Integrated Water Resource Management: A Synthesis of Key Issues for Rural West Africa*, Policy Synthesis for Cooperating USAID Offices and Country Missions, No 73.

R20: Subsidies in the water sector

Deverill, Paul, Simon Bibby, Alison Wedgwood and Ian Smout, 2002. *Designing water supply and sanitation projects to meet demand in rural and peri-urban communities – Book 3. Ensuring the Participation of the Poor*. WEDC.

Irwin, T, 2003: *Public Money for Private Infrastructure, Deciding when to offer Guarantees, Output-based Subsidies, and other Fiscal Support*, World Bank Working Paper No *, Washington DC

Kar, Kamal, 2003: *Subsidy or Self-Respect? Participatory total community sanitation in Bangladesh*, Institute of Development Studies Working Paper 184, Brighton, Sussex.

Mehta, M & A Knapp, 2004: *The Challenge of Financing Sanitation for Meeting the Millennium Development Goal*", Water & Sanitation Program

Mehta, M, 2003: *Meeting the Financing Challenge for Water Supply and Sanitation*, World Bank Water & Sanitation Programme.

Pricing and service differentiation of utility water and sanitation services for the poor: a strategic marketing approach www.lboro.ac.uk/wedc/projects/psd/index.htm

R21: Demand management and efficient water use

Artzen, Jaap. 2003. *Incorporation of WDM in National and Regional Water Policies and Strategies*. IUCN, Pretoria, June 2003.

Blumenthal, U. J., Peasey, A., Ruiz-Palacios, G., Mara, D. D., 2000. *Guidelines for Wastewater Reuse in Agriculture and Aquaculture: Recommended Revisions Based on New Research Evidence*, WELL Study Report Task No 68, Part 1. www.lboro.ac.uk/well/studies/t68i.pdf

Frederick, K D, 1993. *Balancing Water Demands with Supplies: The Role of Management in a World of Increasing Scarcity*, World Bank Technical Paper No. 189

Goldblatt, M, Ndamba, J, Van der Merwe, B, Gomes, F, Haasbroek, B and Arntzen, J. 1999. *Water Demand Management: Towards Developing Effective Strategies for Southern Africa*. IUCN. Harare.

Gumbo, Bekithemba and Pieter van der Zaag, 2001. *Water losses and the political constraints to demand management: the case of the City of Mutare, Zimbabwe*. 2nd WARFSA/WaterNet Symposium, Cape Town.

Gumbo, Bekithemba, 2003. *The status of water demand management in selected cities of Southern Africa*, Working Paper, University of Zimbabwe, Harare.

Haarhoff, J., and Van der Merwe, B., 1996. *Twenty-five years of wastewater reclamation in Windhoek, Namibia*. Water Science and Technology, Vol 33 No 10-11, pp 25–35, IWA Publishing 1996. Article: www.iwaponline.com/wst/03310/wst033100025.htm Homepage: www.iwapublishing.com/

IUCN *Water Demand Management Project for Southern Africa*, Phase 2 research and analytic papers (country studies also available from IUCN-ROSA website):

<http://www.iucn.org/places/rosa/wdm/outputs/research2.html>

<http://www.iucn.org/places/rosa/wdm/outputs/analytical2.html>

Norplan et al, 2001. *Bulawayo Water Conservation and Sector Services Up-Grading Project Final Report; Volume 1*, Bulawayo.

- Rand Water 2003: *Water Demand Management Cookbook*, Johannesburg
- Rothert, Steve, and Macy, Peter. 2002. *The Potential of Water Conservation and Demand Management in Southern Africa: An Untapped River*. Paper prepared for World Commission on Dams.
- UK Environment Agency's National Water Demand Management Centre (NWDMC) www.fwr.org/nwdmc.htm
See also: www.environment-agency.gov.uk > Water Resources > Search "National Water Demand Management Centre"
- UN-Habitat, 2002. *Water Demand Management in Practice*. Nairobi.
- United Nations Bureau of Reclamation (USBR) 1996. *Achieving Efficient Water Management: A Guidebook for Preparing Agricultural Water Conservation Plans*. Updated by Bureau of Reclamation, Prepared by Hydrosphere Resource Consultants, Second edition, September 2000. Home page: www.usbr.gov/main/index.html Publications page: www.pn.usbr.gov/project/wat/publications/index.html
- Water Association Specialist Group on Water Reuse, part of the International Water Association (IWA). www.iawq.org.uk
- Water for African Cities Programme, UNHSP (UN-Habitat), Nairobi, Kenya www.un-urbanwater.net
- Waterwiser, USA: The Water Efficiency Clearing House www.waterwiser.org/

R22: Demand management and equitable access to water

- Agarwal, A., Narain, S. 1997. *Dying Wisdom: rise, fall and potential of India's traditional water harvesting systems*, Centre for Science and Environment, New Delhi
- Department of Water Affairs & Forestry, 2000: *Water Supply Service Levels: A Guide for Local Authorities* Pretoria, South Africa
- Global Applied Research Network (GARNET) for the theme roofwater rainwater harvesting <http://info.lut.ac.uk/departments/cv/wedc/garnet/tncrain.html>
- Green Water Harvesting Network for creates a movement for rainwater harvesting. www.cseindia.org
- Moriarty, Patrick, and Butterworth, John. 2003. *Beyond Domestic: Case Studies on Poverty and Productive Uses of Water at the Household Level*. Published by IRC, NRI and IWMI.
- Poverty and Productive Uses of Water at the Household Level www.irc.nl/prodwat
- Robinson, Peter B, 2002. 'All for some': *water inequity in Zambia and Zimbabwe*. Physics and Chemistry of the Earth, 27, pages 851-857.
- Sen, Amartya, 1981. *Poverty and Famines: An Essay on Entitlement and Deprivation*. Oxford University Press, Oxford
- Sen, Amartya, 1984. *Resources, Values and Development*. Harvard University Press, Cambridge, Massachusetts.
- Water and Sanitation Program, 2004: *Self Supply: A Fresh Approach to Water for Rural Populations* WSP Field Note
- Wegelin-Schuringa, Madeleen, 2002. *Water demand management and the urban poor*. IRC International Water and Sanitation Centre. <http://www.irc.nl/themes/urban/demand.html>
- Werchota, Roland, 2001. *Sustainable service provision for the urban poor*. 27th WEDC Conference, Lusaka, Zambia.

R23: Environmental regulation

- Abeyungawaya, P, 1999. *Environmental Project Evaluation*, Asian Development Bank, Manilla.
- Association of Waterboards, The Netherlands www.urw.nl
- Burchi, S., 1994. *Preparing national regulations for water resources management; Principles and practice*, FAO, Rome.
- Environment Agency of the UK. www.environment-agency.gov.uk
- King, J.M., 1996. *Quantifying the amount of required for maintenance of aquatic ecosystems*: Water Law Review. Department of Water Affairs and Forestry, Pretoria.
- Rees, Y., and Zabel, T., 1998. *Regulation and enforcement of discharges to water, in: F. N. Correia, F. N. (ed.), Water Resources Management in Europe, Volume 1* Balkema, Rotterdam, 1998.

R24: Service provision regulation and public-private-civil partnerships

- Africa Forum for Utility Regulation
<http://www.reeep.org/index.cfm?articleid=810>
<http://www1.worldbank.org/afur/>

<http://www.nepad.org.ng/infrastructure.htm>

- Bayliss, Kate, 2002. *Water privatisation in SSA: Progress, problems and policy implications*, PSIRU, University of Greenwich
- Bayliss, Kate, 2002. *Privatisation and poverty: The distributional impact of utility privatisation*. Centre on Regulation and Competition, Manchester University, Working Paper No 16.
- Bayliss, Kate and David Hall, 2002. *Can risk really be transferred to the private sector? A review of experiences with utility privatization*. Public Services International Research Unit, University of Greenwich
- Brook Cowen, Penelope J, 1997. *The Private Sector in Water and Sanitation - How to Get Started*, World Bank Private Sector Note 126.
- Blokland, Maarten, Okke Braadbaart and Klaas Schwartz (eds). 1999. *Private Business, Public Owners. Government Shareholding in Water Enterprises*, Ministry of Housing, Spatial Planning and the Environment, The Hague. www.wsscc.org/test/activities/imo/index.html
- Hukka, J J and T S Katko, 2003. *Water privatisation revisited: Panacea or pancake?* IRC International Water and Sanitation Centre, Delft, the Netherlands
- Klein, Michael and Timothy Irwin, 1996. *Regulating Water Companies*, World Bank Private Sector Note 77.
- Merrey, D. J., 1996. *Institutional Design Principles for accountability in large irrigation systems*, IIMI Research Report No. 8, Colombo, Sri Lanka, International Irrigation Management Institute. www.cgiar.org/iwmi/pubs/ > Research Reports > No. 8
- Nyambe, Imasiku, Daniel C. W. Nkhuwa, Michael Kambole, Inyambo L. Nyumbu and Kamwenje Nyalungwe, 2004. *Guidelines on Public/Civil/Private Sector Participation and Partnership in Integrated Water Resources Management*. GWP-Southern Africa, Harare
- Onjala, Joseph, 2002. *Good Intentions, Structural Pitfalls: Early Lessons from Urban Water Commercialisation Attempts in Kenya*, CDR Working Paper.
- Public Private Partnerships for the Urban Environment (UNDP) www.undp.org/pppue
- Rees, J. A., 1998. *Regulation and Private Participation in the Water and Sanitation Sector*, TEC Background Papers No. 1, Global Water Partnership, Stockholm, Sweden. www.gwpforum.org/ > Library – Publications > TEC Background papers no.1.
- Robinson, Peter B (2005): *Trade in Services in Economic Partnership Agreements with the EU*, African Union, Addis Ababa
- Samarajiva, R, 2004: *Making Regulation Pro-Poor, Regulatory System Design: Lessons from Telecom*, PPIAF/ADB Conference on Infrastructure Development
- Water Utilities Partnership for Capacity Building in Africa (WUP-Africa) www.wup.org
- World Bank, 1997. *Toolkits for Private Sector Participation in Water and Sanitation*, Washington DC. www.worldbank.org/html/fpd/wstoolkits/

R25: Droughts and floods

International Decade for Natural Disaster Reduction Secretary, 1997. *Report on Early Warning for Hydrometeorological Hazards Including Drought*, Geneva. www.unisdr.org/unisdr/hydrofore.htm

R26: Information exchange

Geographic Information Systems in Sustainable Development <http://www.fao.org/sd/eidirect/gis/Elgis000.htm>

Integrated Systems for Knowledge Management (ISKM): - participatory approach to environmental research and development initiatives. www.landcareresearch.co.nz/research/social/iskm.asp

Nieuwkamer, R. L. J., Wolfert, H.P., Tol, A. C. van, and Appelman, K., 1996. *River management: framework for development of information and decision support systems for integrated river management*, CUR/LWI, Gouda, The Netherlands.

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

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.wcainfonet.org

R27: Transboundary water management

- Abernathy, Charles L, 2000: *Intersectoral Management of River Basins*, Proceedings of a Workshop, International Water Management Institute, Colombo, Sri Lanka.
- Aw D & Dejou C, 1995. *Recent Developments in the Office du Niger*, Mali, World Bank Water Seminar report
- Biswas, A K, 1993: *Management of International Waters: Problems and Perspective*, Water Resources Development, Vol. 9, No 2
- Blomquist W, Dinar A & Kemper K, 2005. *Comparison of Institutional Arrangements for River Basin Management in Eight Basins*, World Bank Policy Research Working Paper 3636
- Carmo Vaz, Álvaro and Van der Zaag, Pieter, 2003. *Sharing the Incomati Waters: Cooperation and Competition in the Balance*. UNESCO. February 2003.
- Neda, Netherlands Development Assistance, 1998: *The Management of Shared River Basins - Experiences from SADC and EU*
- Priscoli, Jerome Delli, 2000: *Foreword to Special Edition on Management of Shared River Basins*, Water Policy 2.
- Rangeley R, Thiam, B M, Andersen, R A and Lyle, C A, 1994: *International River Basin Organizations in sub-Saharan Africa*, World Bank, Technical Paper Number 250, Africa Technical Department Series
- Transboundary Freshwater Dispute Database.http://www.transboundarywaters.orst.edu/projects/spatial_database/
- Wouters, Patricia, 2004. *Sharing Transboundary Waters: An Integrated Assessment of Equitable Entitlement*, part of project on Transboundary Resources Management: Using the Law to Develop Effective National Water Strategy: "Poverty Eradication through Enforceable Rights to Water", DFID and International Water Law Research Institute, Dundee, UK

R28: Conflict resolution

- Just, R. E., Netanyahu, S., 1998. *Conflict and co-operation on trans-boundary water resources*. Kluwer Academic, Boston. www.undp.org/seed/water/region/nile.htm or www.nilebasin.org/
- Salman M. A., 1998: *International Watercourses: Enhancing Co-operation and Managing Conflict*, World Bank, Washington D.C., ISBN 0-8213-4298-3

R29: Policy implementation

- Dalal-Clayton B, Bass S, 2002: *Sustainable Development Strategies: A Resource Book*. 388pp. National Strategies For Sustainable Development (NSSD).
- DWAF, 2004. *National Water Resources Strategy, First Edition* Department of Water Affairs and Forestry, South Africa. <http://www.dwaf.gov.za/Documents/Policies/NWRS/Default.htm>
- Logical Framework Approach - NORAD. LFA Handbook. <http://www.baltichealth.org/getfile.php/11071.354/LFA%20handbook.pdf>
- National Strategies for Sustainable Development: A resource book http://www.nssd.net/res_book.html#contents
- Participation, Consensus building and Conflict management. UNESCO. <http://unesdoc.unesco.org/images/0013/001333/133308e.pdf>
- Practitioner's guide. Problem tree. http://www.methodfinder.net/pdfmethods/methodfinder/methodfinder_method1.pdf
- Stakeholder Methodologies in Natural Resource Management. DFID <http://www.dfid.gov.uk/pubs/files/BPG02.pdf>
- UNESCAP - Strategic Planning and Management of Water Resources <http://www.unescap.org/esd/water/spm/>
- Working on Teams. Articles and Tools. MIT. <http://web.mit.edu/hr/oed/learn/teams/articles.html>
- World Bank, 1998. *Pollution Charges: Lessons from Implementation extract from Pollution Prevention and Abatement Handbook*, Washington DC.

R30: Guidelines and Manuals

- Cap-Net, GWP and UNDP (2005). *Integrated Water Resources Management Plans Training Manual and Operational Guide*. This can be downloaded from http://www.cap-net.org/TMUuploadedFiles/FileFor67/IWRM_Plan.doc or requested on CD with copies of supporting references from info@cap-net.org.
- CAP-NET e-library info@cap-net.org www.cap-net.org
- FAO, World bank, UNDP, 1996. *Water sector policy review and strategy formulation. A general framework*. Published by FAO, Rome.
- FAO, 1995. *Reforming water resources policy. A guide to methods, processes and practices*. FAO, Rome.

- FAO, 1995. *Methodology for water policy review and reform*. FAO, Rome.
- Frederiksen, H D, Berkoff J & Barber W, 1994. *Principles and Practices for Dealing with Water Resources Issues*, World Bank Technical Paper Number 233 (Asia Technical Department Series)
- Global Water Partnership, 2002. *Integrated Water Resources Management Toolbox: Policy Guidance and Operational Tools*. <http://gwpforum.netmasters05.netmasters.nl/en/>
- Le Moigne, G, Subramanian, A, Xie, M & Giltner, S, 1994. *A guide to the Formulation of Water Resources Strategy*, World Bank Technical Paper No 263
- SADC, 2003. *Guidelines for the development of national water policies and strategies to support IWRM*.
- SADC, 2005. *Implementing the SADC Regional Strategic Action Plan for Integrated Water Resource Management (1999-2004): Lessons and Best Practice*, Gaborone.
- Waterpage policy guidelines http://www.thewaterpage.com/policy_doc_prep.htm