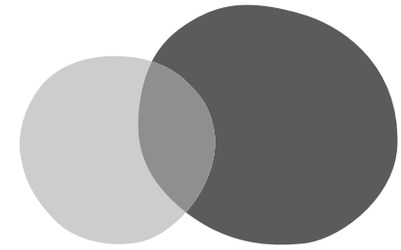

World Water Assessment Programme

WATER SECURITY:

A Preliminary Assessment of Policy Progress since Rio

Prepared by the
World Water Assessment Programme
as a contribution to the
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and the
World Water Development Report

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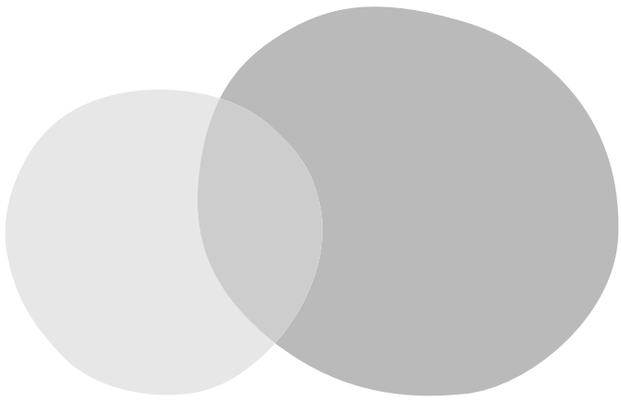
PREFATORY NOTE

This paper has been prepared by the World Water Assessment Programme (WWAP). It draws heavily on materials from discussion papers written by a number of authors within the WWAP framework. While it has also benefited from detailed comments made by experts from different United Nations organizations, it does not necessarily reflect the official views of those agencies. Given the broad range of issues discussed and their sometimes contentious nature, we are aware that this brief review might provoke disagreement with respect to some of the points raised. This paper is but a preliminary assessment of these issues, and we hope that it will provoke a strong response and stimulate further debate and consensus building. These responses will be important contributions to the preparation of the first edition of the *World Water Development Report* to be published in March 2003.



PREFACE

Today, the movement towards a more people-oriented and integrated approach to water management and development is well underway. This paper aims to contribute to this movement by discussing, defining and taking stock of the many challenges associated with the dynamics of policy processes for water resources. It has been produced in anticipation of the United Nations *World Water Development Report* (WWDR), which will be a periodic review designed to give an authoritative picture of the state, and our stewardship, of the world's freshwater resources. It will monitor progress in the resolution of challenges and in the attainment of targets, and contain indicators and analysis that will help to identify, diagnose and assess:

- the effectiveness of societal stewardship of global freshwater resources, including the broad institutional and socio-economic context of water resource utilization;
- the supply, demand and uses for water and the challenges of extreme events;
- current critical problems and emerging threats to freshwater ecosystems and their management.

As the principal component of the UN World Water Assessment Programme (WWAP), the WWDR is both part of the dynamic water assessment process and an outcome of it. WWAP, hosted by UNESCO in Paris, is a collective UN system-wide effort – set up upon the request of governments – to pool the talents and concerns of the UN family regarding the world's water resources and their management. WWAP will assist countries as requested in strengthening their capacities to assess their own water situation. The WWDR will be targeted to all those involved in the formulation and implementation of water-related policies and investments. It will aim to influence strategies and practices at the local, national and international levels. While a broad, global picture will be given, particular emphasis will be placed on developing countries, where management capacities are likely to be weaker, with the goal of identifying areas in particular need of attention. The WWDR will help lay the foundations for efficient and effective capacity-building in areas where stewardship challenges are greatest.

This paper's focus on policy challenges should be seen within this context. In defining these challenges, we wish to draw attention to policy options and their implications, without being prescriptive. There is a wide range of other issues associated with the assessment and management of water resources that will be considered in subsequent documents prepared within the WWDR framework.

Towards a Global Policy Framework

The United Nations Millennium Declaration called upon all member states

> *to stop the unsustainable exploitation of water resources by developing water management strategies at the regional, national and local levels which promote both equitable access and adequate supplies.*

While progress has been made over the decade since the Rio Earth Summit, it has been very uneven. Formidable challenges still remain for policy-makers everywhere in all areas of water management. The overall policy goal is to ensure that national and international water resource policies prioritize the attainment of real-world outcomes that reduce and eventually eradicate poverty. Through the sustainable use of water resources, basic needs can be met, vulnerabilities reduced, improved and secure access to water can be created, and poor people can be empowered to control the water upon which they depend. To achieve this goal, water policies need to:

- build new capacities and an enabling environment that change the **governance** of water resources in ways that are fairer and more sustainable,
- improve the **management** of water resources to meet the needs of all water users in a more integrated, equitable system that maintains the integrity of the environment.

This can be achieved through a process that considers all aspects of policy, from the initial advocacy of policy change through to the implementation and assessment of impacts on the ground. All too often this does not happen: policies do not reflect all needs and opportunities, and innovations are not followed through to effective implementation.

Improving Governance

Improving governance conditions is the most important but challenging of all the policy issues raised here. The key is to create a framework of decision-making and authority whereby the needs and interests of all water users are represented in a fair and transparent manner. This will mean challenging powerful interests, and a sustained political will for change is essential. Improving governance will result in better integration of the fragmented government institutions that are responsible for water. It means greater participation by local government, the private sector, civil society and, above all, local communities, which should be empowered to have greater control over their local resource base.

It is essential to develop a global policy framework for water that takes account of all related sectors and policies: agriculture, health and environment, *and* the macroeconomics, privatization and decentralization that affect water. This all-inclusive foundation can then inform and guide the institutional reform and capacity-building that is essential in most parts of the world if policy intentions are to be translated into effective actions.

Four key issues need specific attention if governance conditions are to be improved to provide the basis for a more effective policy framework:

- Negotiation and collaboration are essential for **sharing water** between countries where there are transboundary waters. The Nile Basin Initiative is a case in point where these matters are part of a formal process of policy-making.
- Awareness of the many **values of water** is a key to good policy. Value is not the same as price; at present, the economics of water do not reflect the resource's multiple values.
- **Managing disasters** such as floods and droughts is a key issue, and water policies need to integrate water-related hazards management and development.
- Wise decisions depend on good **knowledge,** and the complexity of water issues creates a need for policies that maintain and extend the knowledge base.

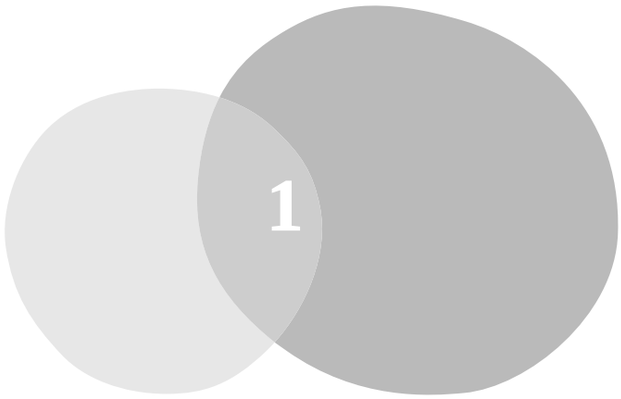
Improving Water Management

The urgency of many water problems means that effective actions are needed *now*. While it is of utmost importance to create an enabling environment, less-than-perfect conditions should not prevent policy change from taking place. An enabling environment is a long-term process and should indeed be a long-term goal, but it is not a prerequisite to taking action. Most water management will clearly continue to be based on sectoral divisions for some time to come. The key is to look for 'win-win' solutions: policies that create the basis for action now and that contribute to structural change within the sector as a whole. Where possible, this means creating an Integrated Water Resources Management (IWRM) framework in which:

- Policies for **basic needs** are and will remain a top priority around the world. These need to extend beyond traditional water supply and sanitation for health to include a far wider range of opportunities that improved domestic water can bring. The key is the empowerment of the community at all stages, based on secure rights and sustainable access to enough good-quality water resources.
- Water for **food security** will remain the dominant use of water around the world. However, there needs to be a shift in emphasis from traditional irrigation for national food self-sufficiency to a stronger focus on the specific needs of the poor (the 'food insecure'). Policies that develop sustainable irrigation and also harness the wider potentials of rainfed farming, on-farm water management, home gardens and foods from common property resources are needed.
- The effective implementation of policies to **maintain ecosystem integrity** will continue to be reinforced. Policies to protect threatened aquatic ecosystems such as wetlands and mangroves need to focus on sustainable management and on water flows through the wider river basin system. These need to be accompanied by strong measures to develop and implement a regulatory regime to assess and mitigate environmental impacts from development, pollution and land use changes.

- The competing demands (domestic, agricultural, commercial and industrial) on the use and allocation of **water resources in cities** will be attended to. With the majority of people now living in urban areas, water for cities requires urgent attention. The challenge today entails far more than the provision of water and sanitation for those whose basic needs are still not being met. It also involves a whole series of legislative, pricing and investment measures to encourage greater efficiency, productivity, conservation and quality control of the resource.

- **Water for industry and energy**, including industrial water uses and waste disposal and large-scale hydropower, will be better controlled. These present real policy dilemmas: they can provide great benefits to national development, but often at huge social and environmental costs. The key is a policy framework that maximizes sustainable benefits, but minimizes negative impacts and provides for fair compensation if these do occur.



WATER TODAY

Setting the Scene

The fact that the world faces a water crisis has become increasingly clear in recent years. What does this mean? If we acknowledge this crisis, what form does it take and whom does it affect? Above all, what can be done to avert its effects? This paper will attempt to answer these and other key questions and provide some insights into the types of water (and other) policies that can contribute to achieving the stated goal of Chapter 18 of Agenda 21, prepared at the Earth Summit in Rio de Janeiro:

> *Water is needed for all aspects of life. The general objective is to make certain that adequate supplies of water of good quality are maintained for the entire population of this planet, while preserving the hydrological, biological and chemical functions of ecosystems, adapting human activities within the capacity limits of nature and combating vectors of water-related diseases.*

When phrased in this manner, of course, the task for water policy-makers becomes a part of the wider challenge of achieving sustainable development. This will be an underlying theme throughout this discussion – that the set goals and implemented mechanisms in water policy development should be an integral part of wider development and environmental goals. These challenges are formidable. While talk of crises is emotive, challenges remain nonetheless widespread and reflect severe problems in the management of water resources in many parts of the world. These problems will intensify unless effective and concerted actions are taken. As pointed out in the *World Water Vision*:

> *This increase in water withdrawals implies that water stress will increase significantly in 60% of the world, including large parts of Africa, Asia and Latin America. Will this lead to more frequent and more serious water crises? Assuming business as usual, yes.*

The 'business as usual' qualification is important. We cannot carry on as we do, and many aspects of water resources management must change. This is recognized in the United Nations Millennium Declaration, which again called upon all members of the United Nations

> *to stop the unsustainable exploitation of water resources by developing water management strategies at the regional, national and local levels which promote both equitable access and adequate supplies.*

Meeting this challenge will involve, for most countries, significant changes at all levels. It will require institutional reforms to improve the efficiency and change the governance of organizations involved in water resources and the actual management of these resources on the ground. It will also entail, in most cases, changes to the national framework of laws and policies that determine who gets access to which water resources for what purposes. The main focus of this paper is to help spell out the policy process (both the making and implementing of policies) so that we can move away from water crises and towards the goal of The Hague 2000 Ministerial Declaration, which seeks to achieve water security in the twenty-first century.

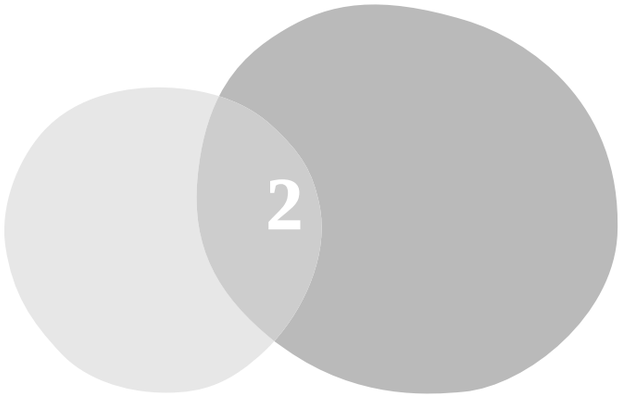
Achieving Water Security in the Twenty-First Century

This needs to be done in a rapidly changing world. Populations are growing and economies and lifestyles are developing, all adding to the stresses on water resources. Exactly which drivers are most important varies from place to place, but it is worth noting that while global population increased threefold in the twentieth century, our use of water increased sixfold!

Changes in social aspirations and consumption patterns are all part of the development success that has seen billions of people living more secure and prosperous lives than was ever thought possible by preceding generations. But these achievements are not evenly spread, and billions still live in relative or absolute poverty. The latest estimates are that 1.2 billion people live on less than US$1 a day, and over 2.8 billion live on the equivalent of US$2 or less. These people, the millions of the world's poor, use less water, directly and indirectly, but depend upon its resources for their livelihoods far more than the rest of us. Yet it is the poor who are hit first and hardest when water crises do come. One of the changes that we must aspire to in the future is a fairer, more equal world. This defines one of the key goals of water policy developments: to ensure and secure more equitable access to water resources.

Incremental changes can create tremendous opportunities for finding longer-term solutions to world problems. The information and communication revolutions, technological progress, great improvements in our understanding of how societies work and how people relate to ecosystems all create a position from which it is possible to envisage policy changes that were not conceivable a decade ago, at the time of the Earth Summit in Rio when Agenda 21 was prepared. Also, progress has been made towards finding common solutions by stakeholders initially holding conflicting views and positions. Our challenge is to take these potentials and turn them into effective and workable policies, while keeping a focus on the first principle of the Rio Declaration:

> *Human beings are at the centre of concerns for sustainable development. They are entitled to a healthy and productive life in harmony with nature.*



WATER ON AN INTERNATIONAL SCALE: ELEVEN GLOBAL CHALLENGES

The 1992 Dublin Conference

The antecedents of this paper lie in the international debates on water policies and management issues that have taken place over the last decade. The history could even go back further, to the Mar del Plata Action Plan of 1977, but perhaps the best starting point is the Dublin Conference of 1992, from which emerged the Dublin Statement on Water and Sustainable Development that was a contribution to the preparation of the Earth Summit in Rio de Janeiro. This statement contains much of merit, including the four Dublin Principles:

1. Freshwater is a finite and vulnerable resource, essential to sustain life, development and the environment.
2. Water development and management should be based on a participatory approach, involving users, planners and policy-makers at all levels.
3. Women play a central part in the provision, management and safeguarding of water.
4. Water has an economic value in all its competing uses and should be recognized as an economic good.

The focus of these principles, and of the action plan, on issues of environment, gender, governance and sustainability are still relevant today. They are taken up in Chapter 18 of Agenda 21, prepared at Rio, which states that:

> *The holistic management of freshwater as a finite and vulnerable resource, and the integration of sectoral water plans and programmes within the framework of national economic and social policy, are of paramount importance for action in the 1990's and beyond.*

Despite these important remarks, water resources were not, however, a particularly prominent issue at Rio, with issues such as deforestation and biodiversity having a far higher profile. The balance has, to a great extent, been redressed since then through the importance given to freshwater issues by the Commission for Sustainable Development (CSD) in their second (1994) and sixth (1998) sessions and in the 1997 UN General Assembly Special Session. All contained a call for a concerted effort to

develop more integrated approaches to water management and for a stronger focus on the needs of poor people and poor nations. Actions to protect ecosystems and to ensure better participation by women, the poor and other marginalized groups in the governance of water were identified as specific priorities. The importance of policies that create an enabling environment, protect the weak and create better governance conditions were particularly recognized.

The UN Millennium Declaration specifically states in the targets set for 2015 (paragraph 19):

> *We resolve further to halve, by the year 2015, the proportion of the world's people whose income is less than one dollar a day and the proportion of people who suffer from hunger and, by the same date, to halve the proportion of people who are unable to reach or to afford safe drinking water.*

This resolution is quoted in full because it demonstrates the link, in one paragraph, between poverty, hunger and water security. This link is significant in policy terms, as it defines, for the global community, the overriding policy priority for water resources management. In the previous section we asked what form the global water crisis takes. The answer is clear. The principal crisis is one of the governance barriers that prevent the poor from having sustainable access to water resources. Ultimately, it is a matter of asserting that access to water for a sustainable livelihood is a basic human right. This means that the **key policy priority** for the global community is to ensure that national and international water resources policies give priority to the reduction and eventual eradication of poverty. Through the sustainable use of water resources we can begin to meet basic needs, reduce vulnerabilities, improve access and empower poor people to control the water resources upon which they depend.

The 2nd World Water Forum, The Hague 2000

There has, in consequence, been active development toward refining the approach to water resources within the CSD in the years since Rio. There have also been parallel developments of great significance, perhaps the most important of which was the preparation of the World Water Vision, launched at the World Water Forum in The Hague in March 2000, and the Ministerial Declaration on Water Security in the 21st Century, affirmed by the representatives at the parallel Ministerial Conference in The Hague. The Ministerial Declaration identified seven challenges for the global community, challenges that provide the basis for the policy issues discussed below:

1. **Meeting basic needs:** to recognize that access to safe and sufficient water and sanitation are basic human needs and are essential to health and well-being, and to empower people, especially women, through a participatory process of water management.
2. **Securing the food supply:** to enhance food security, particularly of the poor and vulnerable, through the more efficient mobilization and use of water and the more equitable allocation of water for food production.
3. **Protecting ecosystems:** to ensure the integrity of ecosystems through sustainable water resources management.
4. **Sharing water resources:** to promote peaceful cooperation and develop synergies between different uses of water at all levels, whenever possible, within and – in the case of boundary and transboundary water resources – between states concerned, through sustainable river basin management or other appropriate approaches.

5. **Managing risks:** to provide security from floods, droughts**,** pollution and other water-related hazards.

6. **Valuing water:** to manage water in a way that reflects its economic, social, environmental and cultural values in all its uses, and to move towards pricing water services to reflect the cost of their provision. This approach should take account of the need for equity and the basic needs of the poor and the vulnerable.

7. **Governing water wisely:** to ensure good governance, so that the involvement of the public and the interests of all stakeholders are included in the management of water resources.

The seven challenges from The Hague represent a major turning point in the development of water policies, but they are not the final word. Indeed, work has continued since The Hague in further defining the key challenges that face water policymakers, and will continue over the coming years. Work undertaken within the preparation of the WWDR has identified a further four challenges for the future:

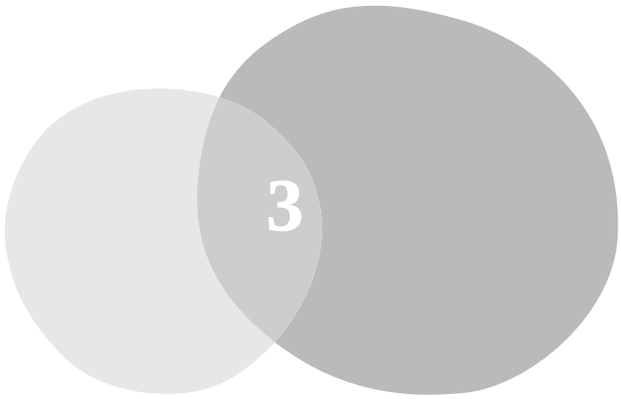
8. **Water and industry:** focuses on industry needs and the responsibility to respect water quality and take account of the needs of competing sectors.

9. **Energy and water:** recognizes that water is vital for all forms of energy production, and that there is a need to ensure that energy requirements are met in a sustainable manner.

10. **Ensuring the knowledge base:** reflects that good water policies and management depend upon the quality of knowledge available to decision-makers.

11. **Water and cities:** acknowledges that urban areas are increasingly the focus of human settlements and economic activities, and that they present distinctive challenges to water managers.

Taken together, these eleven challenges highlight the elements essential to defining a compelling policy agenda. Now it is up to the international community and individual governments to turn these elements into specific policies and actions that reflect their differing needs and priorities, and the potentials available to them in different places at different times. The following section sets out to contribute to this process by providing an overview of policy progress made since Rio in relation to the eleven global challenges just enumerated.



POLICY PROGRESS FROM RIO TO BONN

Governance Conditions

Here we briefly discuss progress since Rio in relation to the eleven global challenges listed in the previous section. This gives a sense of what has been achieved within the wide range of possibilities, and of where priorities have been seen to lie over the last decade.

There have been major achievements in our understanding of the types of changes needed regarding governance and approaches to the management of water resources. This is particularly reflected in the widespread recognition of Integrated Water Resources Management (IWRM) as, in principle, the basis for sustainable water management. And within IWRM, emphasis is increasingly placed on the issue of institutional reform and capacity development. However, this understanding has less frequently been followed through to the implementation of effective reforms and the adoption of real integration. This may be a reflection of lack of time, since many reform programmes are in their infancy.

There are, nevertheless, formidable barriers to putting IWRM into practice: fragmented and overlapping legal and institutional mandates, resistance to reform by many government agencies, the need to develop effective structures for widespread stakeholder participation and concerns that the emphasis on reforms will be at the expense of service delivery. There are also likely to be considerable, and largely unknown, costs associated with achieving integration. These costs have rarely been properly assessed, but can be important and would need to be justified in a setting where resources for direct investments in water services are limited. A full understanding of how much IWRM will cost is consequently essential if it is to be achieved in any particular setting.

Despite these gaps, there have been many initiatives since Rio, ranging from relatively simple changes (such as the creation of interagency coordination groups) to fundamental reforms (such as new water laws, changes to basic rights over water, comprehensive institutional reforms to devolve power and major policy changes that reallocate national priorities and expenditure patterns). What is clear is that the development of IWRM is by necessity a gradual process that may take many years, and that there is no one model of how to do it. The approach depends on very different starting points, and needs to reflect national traditions and societal structures and different potentials

and priorities for water resource management. In all cases, however, one ingredient is essential: political will, based on a strong societal consensus. Creating the understanding that underpins political engagement is a key policy priority.

Valuing Water

Rio set the challenge of managing water resources in ways that reflect their economic, social, environmental and cultural values. This issue of the value of water resources is also reflected in the Dublin Principles and the Hague Declaration. Progress here has been extremely limited. This is in part because understanding these values and then setting conditions whereby they are reflected in water management is extremely complex. And it is a task for which the basic tools are limited. It is also a reflection of the fact that emphasis has tended to be placed on economic values alone, which is in turn interpreted as meaning cost recovery. There is no doubt that there needs to be fundamental change in the ways in which water uses are paid for: the mere scale of investments needed dictates such a change. But the technical, social and political difficulties of doing this have consistently been underestimated, and little progress has been made in major use areas such as irrigation.

There has been much discussion about the scope for private sector involvement in water management, but again concerted experience outside of Europe and North America is generally limited to private sector participation in water supply provision in some major cities (for example, in parts of Latin America and Asia). The principle of treating water as an economic good is still valid: it is the practice of doing so that is problematic, and is likely to remain problematic for the foreseeable future.

Meeting Basic Needs

The issue of meeting basic needs for water resources tends, perhaps too narrowly, to be equated with the provision of adequate drinking water supplies. The provisions for this in Agenda 21 were the most specific for any water issue and followed on from a period of concerted international action in the 1980s. Traditional approaches have been very supply-oriented, and success or the lack thereof has tended to be measured in terms of numbers of people 'covered' by water supply schemes. Agenda 21 changed this somewhat, identifying seven clusters of action to improve service delivery: political will, financial investment, strengthening policies and participation, capacity development, improved public health, improved infrastructure and sustainability.

The WHO/UNICEF/WSSCC global water supply and sanitation assessment in 2000 showed that there has been steady progress made since 1990 in water supply and sanitation coverage, but much still remains to be done. Coverage has increased, but 1.1 billion people still do not have improved water supplies, and more than twice that number have no adequate sanitation. Many countries face major problems with the maintenance of the facilities that are in place, and the scourge of ill health from inadequate water is still the lot of many hundreds of millions of people.

More recently, WHO has further structured its water, sanitation and health activities to reflect an integration of broader water/health linkages. In the context of water resources development and management, this considers the traditional waterborne diseases related to the lack of safe drinking water supply and adequate sanitation, as well as the water-based and water-related vector-borne diseases in relation to the hydrological changes incurred by water resources development projects such as irrigation schemes and dams. New

tools to measure the health status of affected communities, using the Burden of Disease concept measured in Disability Adjusted Life Years (DALYs) allows for an assessment of relative burdens and their attributable fraction to environmental determinants modified by water resources development. Health impact assessment and health risk management are key activities in this broader context. WHO subscribes to the best practice procedures formulated by the World Commission on Dams in this respect and advocates their application in the planning and development of all water resources.

In terms of policies, there have been significant changes. These relate particularly to the increasing move towards empowering local government and / or local communities to manage water supplies and away from centralized government agencies. For example, new national guidelines implemented in 2000 in India mandate *panchayats* (village councils) to manage water supplies within the village, and contain provisions for building community capacities and allocation resources to local communities. Parallel policies can be found elsewhere, particularly in urban areas where municipal authorities are seen as the natural agency for water supply. The role of civil society, and especially NGOs, in assisting local communities has also been emphasized. In some cases, emphasis has been placed, with mixed success, on reforming government agencies to become facilitators to their involvement.

In many cases (Bangladesh, India, Lao PDR, Mozambique and South Africa, to name but a few), meeting basic needs has been accepted as the first priority in new water policies and laws. Meeting this challenge is increasingly linked to the development of greater participation and the types of institutional reforms mentioned above. In cases such as Yemen, it is linked to the development of a wider vision for water management, with the priority worked through into a process of institutional reform that is relevant to the water sector as a whole.

Defining what these needs are can prove problematic in terms of establishing norms (the WHO / UNICEF Joint Monitoring Programme for water supply and sanitation considers 20 to 50 liters per person per day a minimum, depending on local climate and hygiene needs). For water supply, water quality is also a critical, though sometimes neglected, issue. In urban areas, in particular, the role of the private sector has been emphasized, often in partnership with municipalities. There have been successful partnerships in countries like Mozambique.

Ensuring Food Security

The importance of water for food security is self-evident, but the extent to which this equates simply to irrigation provision remains a contentious issue. Recent decades have shown the importance of water in increasing food production in the battle to keep up with increasing global food requirements. After steady increases, peaking at more than 2% per annum in the 1970s, irrigation development slowed down as development costs increased, suitable areas for development were scarcer and declining food prices affected the feasibility of new developments.

During the last decade, there has been a growing awareness among governments and their financial partners that traditional models of irrigated agriculture are not well-adapted to major changes such as the opening up of markets, globalization, the increasing role of civil society and of the private sector, and increased consciousness of the values of environmental services. This has led to major policy changes in terms of the participatory design and management of irrigation services, changes to financial regimes and a move to a more service-oriented approach to irrigation development.

In particular, the process of transferring irrigation management from government departments towards farmers is now widely accepted. Despite this, the pressure of water scarcity in many places means that irrigation is slowly moving towards high-return agriculture, and national policy objectives of food self-sufficiency in many countries mean that irrigation departments still concentrate on grain production.

The role of water in contributing to food security is difficult to assess when it extends beyond simple irrigation provision. Agenda 21 clearly defined a more comprehensive framework for this issue that included rainfed farming and issues such as inland fisheries and livestock. These perspectives have developed in many cases since Rio, but perhaps not as far as would be desirable, and there is still a strong focus on irrigation in many places. Evidence shows that irrigation does contribute to poverty alleviation, both for farmers and landless labourers, but that this is contingent upon a wider framework of pro-poor policies and is only true where suitable conditions for irrigation development prevail.

The direct consequences are that the unsustainable use of water and other resources, and pollution and equity issues in agricultural development have been marginalized. The same is true for policies and strategies that support food production from rainfed lands as well as livestock, fishing, tree crops and other sectors. In particular, approaches to water and food security are not rooted in the specific problems faced by the poor, who are the food insecure. A focus on national policy objectives has led to neglect of very real opportunities to address malnutrition and reduce poverty among the many poor people who are not engaged in irrigated agriculture. There are signs that this balance is being redressed in some areas (discussed below), but this seems to be an issue in which the parameters of water resources management have been dictated by policies from other sectors, rather than set by water sector policies.

Protecting the Environment

Protecting the environment was, by definition, a key focus of Agenda 21 and has since been at the heart of measures to directly implement its provisions. The specific approach to water resources in this regard has focused on sustainable use and on ensuring water quality that is environmentally benign. Specific proposals to protect aquatic ecosystems and freshwater living resources were also included in Agenda 21, reflecting the extreme threats that exist to many wetlands, mangroves, river and lake ecosystems, deltas and other areas. In these areas, the poor progress since Rio is extremely depressing: with a few exceptions (mostly in more prosperous countries), environmental degradation, disappearing wetlands and deteriorating water quality are all a universal experience.

The impacts of these problems are widely documented and very widely publicized; again, their visibility is a reflection of the prominence given to environmental issues through the Rio process. This has led to a far higher awareness of the importance of environmental issues in water policies and management. This is in turn reflected in systematic changes to policy approaches in many parts of the world, away from a traditional supply-side technical focus to one in which environmental issues (along with improved participation) are seen as integral to water policies and practice. Policy goals and priorities have been reordered, and there is widespread adoption of Environmental Impact Assessments (EIA) as determinants of decisions on water investments. While EIA policies, procedures and institutional frameworks are in place in a majority of countries, many

still lack adequate human resources to make the procedure work smoothly. There is a trend towards more strategic impact assessments (at the policy level) and towards giving certain aspects (such as health impact assessment) a separate and higher profile within the EIA framework. These changes are difficult to enforce and will take time to impact, but there can be little doubt that the approach to environmental protection in water policies has evolved in a widespread and systematic manner over the last decade. For this issue, the key is not new policies, but rather the implementation of the policies that already exist.

Water for Industry and Energy

The use of water for industry and energy is perhaps not sufficiently recognized in Agenda 21 and many similar declarations over the last decade. These uses are of great importance in many countries in terms of the amounts of water used, the cost of investments to provide the water, the economic significance of the resultant production and, on the negative side, the environmental impacts of this use. Environmental and economic issues need to be addressed in a water policy framework. In both areas there have been significant changes since Rio, but formidable challenges still remain.

For industry, the key issues are the regulatory environment established by government and the adoption of effective environmental standards by the predominantly private-sector water users. There has been great progress in the formulation of standards and of integrated environmental management systems that trace water and other impacts through the whole chain of production. Their adoption is patchy, from the strictest environmental standards in many developed countries to more limited capabilities in many developing countries. Particular problems characterize the countries of the former Soviet bloc. There are also real problems with pollution from small-scale industry in many developing countries, where regulatory regimes are weaker.

The topic of energy and water has been dominated by the big dams debate, to the neglect of important issues such as small-scale hydropower and water use for cooling in thermal power plants. Although most of this water re-enters the water system, the significant change in temperature and, in some cases, quality that it undergoes has serious environmental and resource implications that have not been widely acknowledged and that are an important policy issue in many countries.

Hydropower is an important contributor to the world's energy balance, providing about 20% of total electricity production. In some developing countries, such as in Mozambique and Sri Lanka, hydropower is dominant in electricity generation. It brings notable economic and environmental benefits, and for poor, mountainous countries such as Laos and Nepal, hydropower offers one of the few avenues for economic growth (including through electricity exports). In the past, these developments have too often been accompanied by devastating environmental, social and health costs. These costs have been the source of widely publicized controversies in cases such as the Three Gorges Scheme in China, the Narmada Programme in Gujarat, India, and the dams constructed in the Senegal River Basin. Practices have changed over the last twenty years, and there are now many cases of good practice in getting economic benefits, including for poor people, while mitigating the most serious environmental and social impacts.

These improvements notwithstanding, dams remain one of the most contentious development issues, and in recent decades there has been a major decline in external support for such projects in developing

countries. This controversy was the source of the most overt moments of discord at The Hague in 2000 and is a debate that will rage for some time to come. On the one hand, there is justifiable and appropriate attention on actions to ensure the sharing of economic benefits while mitigating environmental and social impacts. On the other hand, there is resentment in many developing countries which note the disparity with respect to the high levels of development of hydropower in many developed countries.

The World Commission on Dams (WCD) report, published in late 2000, stimulated an unprecedented and highly productive debate among all stakeholders. While there is some disagreement on details, there is a broad consensus on the core values and strategic priorities articulated by the report, which provides clear guidelines based around five core principles: equity, efficiency, participatory decision-making, sustainability and accountability. The scale, impact and potential costs and benefits of big dams mean that their construction will inevitably continue to be controversial. Extrapolation of the WCD principles to all water resources development planning is an important subject for further debate.

Water and Cities

With over 60% (nearly 5 billion) of the world's population expected to be living in urban areas by 2030, cities are rising to the top of the policy agenda. New ways of responding to rapid change and making the urban environment sustainable are being explored, especially through better management, better service pricing, greater participation of community groups and women, and creative partnerships between public and private sector enterprises. As centres of economic and social activity, cities provide a unique critical mass of highly productive skills and opportunities that drive development forward. But at a cost. Meeting competing demands from commercial, domestic and industrial users puts great pressures on freshwater resources. Cities are going ever deeper into ground water sources and ever farther to distant surface water sources, at costs that are ultimately unsustainable in both economic and environmental terms. They are increasingly in competition with the rising demands for water of peri-urban agriculture and rural regions.

City planners are also facing the challenge of securing safe and affordable access to water for the urban poor, the vast majority of whom live in shanty towns well beyond the reach of any municipal services. And they must learn to cut down on wasteful practices that deprive many cities of more than half of their rightful revenue. Unless better urban water governance is instituted, the degradation and depletion of freshwater resources will threaten the very livelihood of cities and the sustainability of economic and social development.

Managing Risks

The importance of managing risks has been gaining far greater prominence in recent years as the impact of water-related disasters grows and is more widely publicized. The effects of severe floods (such as those in Mozambique in 2000), ongoing droughts (such as those in Central Asia) and major storms (such as the Orissa cyclone in 1999) cannot be overestimated. The spectre of climate change, with sea level rises and more extreme weather events, means that these problems are certain to grow in the coming decades.

The need to plan for and mitigate these disasters within the overall water management process is now widely recognized, and there have been significant improvements in disaster-preparedness and management systems. For example, the 1998 floods in

Bangladesh were the worst on record, but their impact was less than earlier, smaller floods thanks to the effective disaster-preparedness and management system. This preparedness is increasingly seen within the context of integrated catchment management, including where river basins cross national boundaries – a perspective that should be integral to the development of water policies. Recent initiatives in southern Africa and elsewhere give cause for optimism in this matter.

Sharing Water Resources

This issue is one of many that has led to an ever-greater pressure to develop more effective policies and systems for sharing water resources. It is an issue that is important at all levels, from local communities to the international stage, but the fact that 60% of the world's freshwater flows is in systems that cross national boundaries, along with the potential for conflict that this brings, means that attention has tended to focus on the international level. Transboundary water issues are poorly covered in Agenda 21 but now are considered more urgent. The development of the UN Convention of Non-Navigational Uses of International Waters in 1997 provides a legal framework for these issues and has raised their profile in many regions.

Negotiations on these matters are inevitably slow, complex and politically perilous, but there are examples of success such as in the Rhine Basin, and new initiatives such as the Nile Basin Initiative also present considerable cause for optimism for the future. There are also examples of bilateral agreements that do not cover a whole basin, but remain nonetheless important. The basis for collaboration ranges from simple data-sharing through to sharing regional economic development priorities (as in the Southern African Development Community), with many stages in between. The appropriate starting point is contingent upon local conditions.

Ensuring the Knowledge Base

An issue that runs across all of those identified above is the importance of a good knowledge base to inform policy development, management decisions and negotiations at all levels. Knowledge comes in many forms, but the significance of national databases that provide minimum levels of hydrological and resource use information cannot be overestimated. These are vital to the development of a consensus on contentious issues at national and international levels. Actions to ensure that these databases develop and survive require a clear policy base and the allocation of resources to operate the system. The record over the last decade is patchy. Technological developments in data management, remote sensing, climate data and related fields mean that far better data in far greater quantities are available relatively cheaply. Some countries have improved their systems significantly. Web-based systems have also led to major improvements in the accessibility of data. These advances must be offset against the decline of many national hydrological monitoring systems.

There has thus been significant, albeit uneven, movement in these different areas of water-related policy over the decade since Rio, but considerable challenges lie ahead. The first step is to define a coherent and effective policy framework for water resources that reflects local conditions, needs and priorities. There is no easy prescription for this, but there are positive experiences, basic principles and key questions that can be identified in each of the different policy areas discussed above. These are considered in the remaining sections of this paper.

WHAT ARE THE KEY POLICY CHALLENGES? A SERIES OF QUESTIONS

This section provides an overview of the global picture in relation to patterns of water resources availability and use, and draws out key policy issues from these patterns. Of course, what is said here reflects the 'state of the art' of our understanding of these issues. Water resources, their uses and their relation to wider environmental and development processes are extremely complex and variable. We have imperfect, if improving, knowledge. This in itself is important in policy terms and defines the first policy question:

What knowledge is needed to define policies for water resources and manage water supplies, and what needs to be done to maintain and develop the knowledge base?

Taken globally, we use only a small proportion of the world's potential water resources. Estimates vary (not least because much water use is 'non-consumptive' and about 45% of all water used re-enters the water cycle, albeit in an altered state), but most lie in the range of 4–5,000 km^3 per year out of a total annual runoff of about 42,000 km^3, or some 10% of the total. But this water is unevenly distributed in time and space. Some areas, such as the Amazon Basin and Canada, have huge quantities of water and low demands. Other areas, such as the Middle East and many parts of South Asia, have demand that represents a very high proportion of the water available. What is available, and where, is dependent upon precipitation and how the water moves – on the surface and below the ground – within that hydrological unit. Water managers increasingly aspire to working through these hydrological units, something reflected in approaches such as Integrated Water Resources Management (IWRM) and integrated catchment management. But hydrological units cut across administrative and, in many cases, national boundaries. This reality not only affects our planning and management procedures, but also the analysis of datasets whose boundaries may not be compatible. This sets the second major policy question:

What mechanisms are needed to coordinate water resources planning, development and management across political and administrative boundaries?

Understanding water resources goes beyond hydrological processes to include ecological processes. Rivers, watersheds and aquatic ecosystems need adequate flows of water to maintain their values and functions. Any alteration of water flows has ecological consequences. And any changes to ecosystems affect water flows. For example, diverting water for irrigation can jeopardize aquatic ecosystems. In some cases, such as with the Aral Sea and Yellow River, this can take place on a massive scale. Similarly, major changes such as deforestation significantly alter the quantities and timing of water flows within a river basin. This means that the allocation and reservation of water for the maintenance of ecosystems and environmental flows should be an integral part of water resources policies and strategies:

> ***What policies and actions are needed to maintain the integrity of the ecosystems through which water resources move and are made available to humankind?***

The range and patterns of uses of water resources are as complex and varied as the resources themselves. Globally and in most countries, agriculture is the largest direct user of water, accounting for about 70% of total global withdrawals and considerably more than this in many developing countries. Using a different indicator, it takes 4–5,000 litres of water to produce the average daily diet of someone from a developed country (the global average is 2,500 litres) – a stark comparison to the 40 litres needed for safe drinking water and sanitation. Industry, including energy, accounts for another 20% but, like industry itself, this is very unevenly distributed. Where they are found, industry and energy are very significant in terms of the quantities of water used, the cost of the investments made and their impact upon ecological processes. Domestic water use is typically small in terms of quantities, at most 10% of the total, but of profound importance in terms of basic human needs, dignity and health. There are many other important uses, including fishing and other resources gathered from aquatic ecosystems, as well as aesthetic and recreational. Whatever the specifics of local patterns of water attribution, there needs to be a means through which scarce resources can be allocated differently. This is, inevitably, a policy issue:

> ***What policies are needed to ensure an efficient and fair allocation of water resources to different uses? What criteria should apply and which procedures should be followed in the process of priority setting and allocation where there are scarcities in water availability?***

When defining these allocation mechanisms, wider development goals should be at the fore. The needs and potentials of the least powerful in society – the poor and women in particular – need to be set as a specific priority. They often face formidable barriers to accessing these resources in order to meet their needs, and this is an integral part of their poverty and powerlessness. Specific and concerted policy actions are needed to overcome these barriers:

> ***What policies and actions are needed to target the specific needs and problems of the most needy and vulnerable, and especially the poor and women?***

Where there are pressures upon water resources (and this can be in terms of water quality as much as the quantity of water available), then policies should set basic minimum standards that reflect priorities in allocations and realistic aspirations in terms of what can be achieved. These should not be set in stone and should develop as capabilities improve, but a key responsibility of government is to set the regulatory framework within which water resources are managed:

What are appropriate minimum standards in terms of the quantities of water available for defined uses and the quality of water resources? What is the most appropriate system to ensure compliance with these standards?

Of course, meeting needs, setting allocation mechanisms and ensuring minimum standards do not come for free. They will all entail significant costs in terms of investments in water management systems (infrastructure and organizations) and in the costs of operating and maintaining these systems. Estimates of the levels of investments needed are staggering: the World Water Vision calculated that a figure of US$180 billion a year for thirty years was needed to meet minimum investments for global water security. The costs of keeping these investments going and operating fair and efficient systems are equally daunting for many governments. But the rewards are equally staggering: the direct and indirect costs of *not* investing to maintain and improve water resource flows are huge, if difficult in some cases to calculate. Some hard choices need to be made in terms of how much to invest, how much to spend on a recurrent basis and how these costs should be recovered:

How should the cost of investment in and the provision of water resources be met? What values do different water resources have and what levels of cost recovery for different uses should be set?

Governments cannot, and should not in principle, try to do everything. They should set the regulatory framework that defines the rights and responsibilities of different users of water resources and ecosystems. Even where this happens, however, there are basic incompatibilities between different water uses (waste effluents from a factory can poison ecosystems and drinking water; irrigation can drain rivers and lakes used for fishing and other uses). There can also be disputes within one use (for example, irrigators up and downstream) where scarcities exist. These disputes can be serious – on rare occasions even violent. Where this happens, governments must ensure the means through which such conflicts can be resolved:

What are the most effective, fair and transparent means to mitigate conflicts over water resources?

The development of a strategy to deal with this issue is a daunting challenge, and its effectiveness will be determined by the nature of the system that decides who does what, and where power and authority lie in managing water resources. In other words, governance conditions hold the key to implementing successful water resources policies and strategies.

* * * *

Governments have a key role and primary responsibility in defining these conditions, which is not the same as saying that they should have all power in governance. Indeed, the opposite is true, as in too many cases far too much power has been centralized in government agencies. One of the most important challenges for many national governments is what and how much power they should devolve to local communities, civil society, the private sector and local government. Decentralization is a core policy issue for addressing the water crisis. The concept of subsidiarity looms large in these questions:

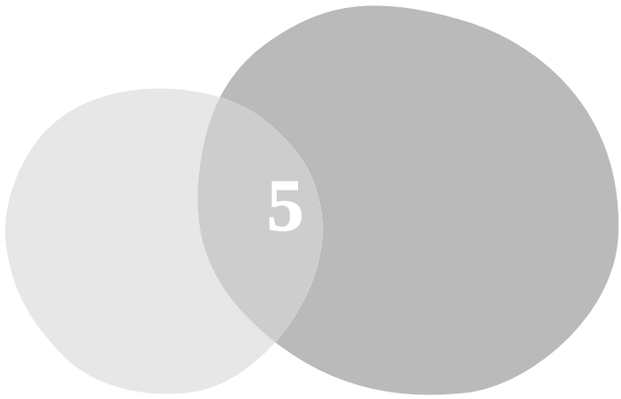
What roles should different actors take in water resources management, including government agencies (central and local), the private sector, civil society and local communities? What policies are needed to ensure that these different actors are capable of taking up their role?

Once this governance framework is clear, it is also essential that the institutions involved in water resources management work in an effective, transparent and fair manner. Whether they can or not depends on the internal characteristics of the institutions involved: Are they efficient? Do they have the right skills and sufficient resources? Are they representative of all stakeholders? It also includes the relationships between different institutions (including between central government agencies, where fragmentation is often a major problem). As such, a critical dimension of both policy and strategy issues is:

> ***What capabilities do different institutions need, and what policies and actions are needed to ensure that these capabilities exist?***

Taken together, these issues make up a compelling set of challenges for policy-makers. Of course, both the starting point and the specific patterns of needs and resources available vary from country to country, so that the emphasis will be on different issues within the set in different places and at different times. All need to be considered. In the past, this was often not the case. Water policies have too often been driven by simplistic assumptions about the need to increase supplies through physical investments.

When we discuss policy reform, we should recognize the progress already made in the last decade or so. Recent years have seen the development of sophisticated and nuanced policies in many parts of the world, examples of which are considered in the next section of this report. Such reforms have often been assisted by the international community and have frequently been motivated, at least in part, by the active international debate on these issues. As we have seen in the previous section, these achievements also need to be balanced, however, by a recognition that policy changes at the national level have often only been imperfectly followed through to effective implementation. This is an issue that we take up again in the final section.



REAL-WORLD WATER POLICIES AND PRINCIPLES

Successful Governance Practices and Reforms

The first group of policy experiences and principles discussed here relate to five of the different global challenges: improving governance conditions, sharing water, valuing water, managing disasters and enhancing the knowledge base. These are all of critical importance in creating an enabling environment in which different water uses can be developed to maximize the potential and ensure the sustainability of these key resources. If one thing has been learnt in recent years, it is that actions to improve one particular dimension of water management in isolation will not work or be sustainable unless this wider framework of water management is effective. The discussion in these pages is limited by space. We can, however, identify basic principles and illustrate them with examples of good practice from around the world.

Improving governance is perhaps the most important and challenging of all of the policy issues considered here. There are many dimensions, but all relate to defining a framework of decision-making and authority within water management where the needs and interests of all water users (including the environment) are represented in a fair and transparent manner. This may seem self-evident, but realizing this goal often entails substantial changes regarding where power lies and who benefits from decisions, which can mean challenging powerful alliances of vested interests. The first feature of improving governance conditions is to ensure that there is a strong *political will*, based on as broad a consensus across society as possible to make the needed changes.

Creating this will and building a societal consensus are both contingent upon the *wider governance conditions* in society, as are all aspects of improvements to water governance. In other words, water management cannot be seen in isolation from wider social and development trends. Water management institutions are unlikely to be fair, transparent and legitimate if other aspects of governance in society do not have these characteristics.

The specific governance context for water determines the *policy framework* for water resources and all related sectors (health, agriculture and the environment, and wider policies such as decentralization and macroeconomics). Changes to the governance of water resources need to be rooted in the attainment of real-world outcomes, as these

will both justify and give direction to these changes. The goal of prioritizing water management in such a way that it will reduce poverty and the vulnerabilities faced by the poor in an environmentally sustainable manner was identified above. This needs to be given more precise form and clear targets in individual countries through an inclusive process in which all stakeholders are represented.

In addition, the *institutional framework* of responsibilities in water management often needs to change. Three key issues arise here: reducing fragmentation caused by responsibilities being split between different government agencies, improving the effectiveness of water management institutions and increasing participation of local communities, civil society, local government and the private sector. Such institutional reforms are invariably fraught with difficulty and take a long time, but they are essential to the development of improved governance in the water sector. Their implementation can be hindered by many of the vested societal interests that have developed in public sectors.

The intersectoral collaboration needed to overcome the fragmentation in water resources planning, development and management goes against the grain of the system. To surmount this hurdle, there needs to be recognition at the highest level of government that the intersectoral divide can be overcome only if resources are specifically allocated to do so. This requires clearly defined criteria of what can and what cannot be labeled as intersectoral, to avoid a watering down of the principles and a return to the status quo.

There are a number of examples of countries that have introduced reforms to enhance governance conditions. South Africa has made sustained efforts to develop an integrated institutional framework based on the implementation of a new law and policies surrounding river basins (see box 1). Here reform includes all aspects of governance with the goal of improving local control of and access to water for all sections of the community.

The multiplicity of water users within river basins means that there needs to be a policy framework for **sharing water** between these different users. This brings up issues that are relevant at all different scales, but most pressing are those related to where water needs to be allocated across administrative boundaries, whether within countries, or between states in large nations (such as India). But many of the most important challenges relate to transboundary waters. There are 261 international river basins, accounting for 60% of the world's freshwater flows and 45% of the earth's surface across 145 countries. Indeed, most continental countries do in fact share part of a river basin.

The potential for conflicts over transboundary waters is something about which many people are critically aware, and recent years have seen many negotiations develop structured frameworks for managing these waters. These can be bilateral agreements that cover only part of a river basin; a number of initiatives also exist that cover a whole basin (see box 2 on the Nile Basin Initiative). Such initiatives need to be based on a high degree of trust; where successful, they have the potential to act as a catalyst for confidence-building that is significant far beyond the immediate river basin issues.

Many complex issues of resource allocation for the multiple uses of water resources need to be based on a stronger understanding of **water values**. This raises complex policy issues. All resource values (including non-consumptive uses such as recreation and fishing) need to be taken into account. The economic value of many of these water uses is subjective and often reflects cultural

Box 1: Reforming Water Governance in South Africa

South Africa's water policy framework was completely reformed between 1994 and 1997, leading to a new water policy and the Water Services Act in 1997, and the National Water Act in 1998. The policy and laws aim to develop greater sustainability, equity and public trust over what is an extremely scarce resource in many parts of South Africa, encapsulated in the slogan 'some for all forever'. The provisions are linked to related policies for rural and urban development (including agriculture and industry) and the environment. The goals are to be achieved through an integrated approach based on the principle of cooperative governance whereby government and non-government agencies at all levels should communicate and work towards common plans.

All aspects of the use of water are included, with uses based on limited period authorizations that have replaced riparian and ownership rights. The 1998 Act allows the provisions to be implemented in a 'phased and progressive manner' as new institutional structures are formed and their capacities developed. A completely new institutional framework has been created, based on the devolution of responsibility to the lowest possible level, and organized around hydrological units (through a series of catchment management agencies). It is recognized that the process will take many years, and South Africa provides an excellent example of where new laws and policies are recognized as the beginning, not the end, of the challenge. For the challenge to be met, it needs to be followed up by determined and concerted actions and capacity-building that will permit policy implementation.

Based on MacKay, H. *Water Policy Implementation in South Africa.* Living Water Foundation, 2001.

Box 2: The Nile Basin Initiative

The Nile, one of the great rivers of the world, has been the basis of the economy and civilization of countries for millennia. The river basin is immense, stretching over ten countries from Central Africa to the Mediterranean. The Nile Basin Initiative has been launched to bring together this disparate region to achieve a shared vision of 'sustainable economic development through the equitable utilization of, and benefits from, the common Nile Basin water resources'. The range of potential conflicts in the region means that any success is a noteworthy achievement. The Nile Basin Initiative is developing a momentum that promises to develop cooperation in ways that start with water resources but could go further.

The Initiative combines water management and allocation objectives with the larger issues of poverty eradication, economic integration and coordination between riparian countries. The initial phase of developing a policy framework and the modalities for collaboration have led to the launch of a strategic action programme that is based on 'win-win' actions on the ground. A wide range of discussions, confidence-building measures and analyses have led to greater understanding and trust across the region and to the agreement of principles for allocating the precious water resources of the Nile. Although much remains to be done, progress to date has been remarkable and bodes well for the future of this important initiative.

assumptions. Water resources are variable between seasons and years, and between places. The cost of investments as well as operating costs must be included, as must the value of water resources in maintaining the functioning and integrity of ecosystems. Water values reflect the quality as well as the quantity of water resources. Above all, policy-makers must consider ability to pay, by the poor in particular (for whom water resources are a basic need and fundamental to their livelihoods).

There are techniques for establishing these values, but all are based on different sets of assumptions. What is critical is the recognition that understanding values is *not* the same as setting prices, and that any pricing or cost recovery regime needs to be based on consent by the water users. Ultimately, this will in turn depend upon a transparent and legitimate institutional framework through which values can be established and negotiations with and between different users can be developed.

Managing risk from water-related hazards has justifiably emerged as a key policy issue. This is particularly true for many poor people from developing countries, who live in environments that make them more vulnerable to these risks and less resilient to their impacts, but it affects even the most prosperous parts of the world.

Notwithstanding loss of life, global economic losses to floods alone average US$3 billion per year, equivalent to 20% of new investment in the water sector in developing countries. Coherent policies that assess risks and develop appropriate responses are an essential part of water resources policies. They can include both structural (such as coastal protection) and non-structural (such as early warning systems) mitigation measures to reduce the risk, as well as prevention measures such as changes to land management practices or flood-proofing schemes. There are good examples of disaster management and relief systems in even poorer and risk-prone parts of the world (see box 3 on Bangladesh). An area of policy that continues to need developing is the integration of disaster management into the overall water resources management process. In the context of irrigation development and its human health impact, there is considerable evidence which indicates that solutions can be found that favour both improved health and increased agricultural production. International initiatives to develop these systems are an urgent policy priority, and in support of these activities and the recognition of the clear need for cooperation between different sectors of society and between nations, the United Nations General Assembly has established the International Strategy for Disaster Reduction (ISDR).

These different examples highlight some of the various component parts of a global policy framework. All require innovations in policy development in most parts of the world. The failure to do so will severely limit, if not fatally compromise, any attempts to improve the management of water resources. These policy changes will create a framework within which the problems and potentials of different water uses can be balanced.

However, the quality of the decision-making process within this framework will only be as good as the information upon which the decisions are made. This means that there is one final area of policy that needs to be considered: the need to maintain and enhance the **knowledge base** for water resources management. This involves many different components, and of course the potential for information-gathering is almost infinite. Policy development in this area needs to be realistic, given the starting point and levels of capacity that can be feasibly developed.

Box 3: The Disaster Management System in Bangladesh

The threat of floods and devastating cyclones is ever-present in coastal areas of Bangladesh. Rural people have adopted coping and adaptation strategies to mitigate the effects of such natural disasters, but even so they disrupt livelihoods and even, in extreme cases, destroy many thousands of lives. These threats were a matter of policy concern for a long time, but the floods of 1987 and 1988, and the cyclone in 1991 that killed 138,000 people, created an imperative for rapid and effective action. Infrastructure construction (embankments, cyclone shelters, water supply and other facilities) was the dominant approach to disaster prevention, but the government also developed an effective disaster management and relief system. Standing Orders (which did not entail primary legislation) were prepared and enacted in 1997.

These orders identify three stages in disaster management: preparedness, relief (at the immediate time of the disaster) and recovery. The basis of the approach is to establish a series of interagency committees from the national level (the National Disaster Management Council, chaired by the Prime Minister) to the local level, where officials and volunteers have specific responsibilities to warn people of impending threats, to monitor the situation and to assist with relief and recovery efforts. Different agencies are involved at each level and the Standing Orders define their responsibilities in preparing for and coping with disasters.

Recent major disasters, such as the floods of 1998, have demonstrated the effectiveness of this system in dealing with the immediate warning and relief process. The scale and effectiveness of interagency collaboration and coordination has been particularly effective in a setting where this is identified as a major problem in so many aspects of life. The approach, based on committees, is effective where specific and time-bound actions are needed and where there is a strong imperative to bypass normal rules and procedures to take decisive actions. The process of disaster-preparedness and, especially, recovery is less effective, but the system is of great importance in reducing one of the most important vulnerabilities faced by coastal communities in Bangladesh.

Here, the idea of *optimal ignorance* (that is, the *minimum* level of information needed to make a good decision) has much of merit, as it helps define the 'bottom line' in terms of what specific information is needed, how often it is needed and what level of accuracy is acceptable. International collaboration is an essential part of this, as both water and climate know no national boundaries, and events in one country can be critical for decisions made in another. There are also great cost-sharing benefits in many cases. Initiatives in establishing international knowledge-sharing and capacity development are urgently needed. It is clear from the preceding analysis that the knowledge base for water needs to be set within a much wider economic, social and environmental context.

Successful Water Management Practices and Reforms

The second group of policy experiences and principles discussed here relates to the six remaining global challenges: basic needs, food security, ecosystems, industry, energy and cities. The development of the enabling environment for water management discussed above is essential for creating conditions in which long-term equity and sustainability in different aspects of water resources management is possible. There are many policies that can directly improve key aspects of water resources management, and this means that there is a need for action now. Indeed, there is a powerful argument that Integrated Water Resources Management (IWRM) can only be developed through working within traditional sectors and gradually developing capacities and mechanisms for integration: a twin-track approach. In consequence, some of the key policy issues in relation to these different aspects of water management are discussed here, as they offer considerable potentials to be the catalysts for a wider process of change within water resources policies and management.

Water for basic needs has been and will remain a top priority throughout the world. There are wide calls for policies that put people first and that focus on the unserved, notably the widely neglected need for improved sanitation. Experience has shown that supply-based infrastructure approaches need to be balanced by the creation of institutional capacities at the community level to develop and manage this infrastructure, along with effective links between communities and external service providers (including the private sector). Very different structures are typically needed for urban and rural areas. There is also, in many cases, a need for knowledge development in fields such as resource assessment (quantity and quality), health and hygiene, operation and maintenance, and service management. New, composite health indicators may facilitate the justification of these needs and will also help to promote the broader concept of water and health relationships. Research policies are urgently needed in support of the multidisciplinary investigations necessary to test innovative water management practices for the reduction of health risks.

Policies in this area often fail to develop sustainable financial and allocation mechanisms. Where basic needs in the household include water as an input into vital livelihood activities (such as livestock, vegetable gardens, handicrafts or services), as in many parts of the developing world, then allocations to these needs must be made. Box 4 shows the far wider range of benefits, beyond health, that improved domestic water supply can bring. This full range of benefits needs to be considered in the planning and detailed design of water supply interventions. Thus, a key policy issue here is the financial basis for meeting basic needs, including who should pay for which services and the levels of subsidy that are socially desirable for both investments and operational costs.

Water for food security reflects the policy dilemmas (identified above) that exist between irrigation for national food security and a far more comprehensive approach that includes rainfed farming and common property resources (which represent the food security of the poor, who are the most food insecure). The policy base for water resources needs to be based on a more coherent national food and agriculture policy. In particular, in many cases there is a need to move away from food self-sufficiency as the overriding policy goal, regardless of whether this reduces malnutrition or improves food security for the poorest sections of the population. This has many distorting

Box 4: The Benefits of Domestic Water: The WaterAid Impact Assessment

WaterAid*, a leading water supply NGO, undertook an impact assessment of older water supply and sanitation projects in Ethiopia, Ghana, India and Tanzania. The results were remarkable. Even though the projects were mostly straightforward supply-oriented, they were based on strong community mobilization and empowerment at all stages. This was a key to the success and sustainability of the projects. Women and children in particular were the main beneficiaries. Although the initial justification was usually based on health objectives, the assessment identified a wide range of positive impacts that affected many dimensions of life:

- The most important benefit was often the time saved and reduction in fatigue from not having to travel to collect water, on average, six kilometres away. This was often translated into an increased number of working days, with direct income benefits.
- Many health benefits, including reduced medical costs, were identified, resulting in obviously reduced diarrhoea and dysentery, but also in fewer worm infestations and less bilharzia, scabies and other conditions.
- A wide range of income opportunities around the house emerged, including vegetable production, brewing, brick- and pot-making, food stalls and others.
- There were multiplier effects throughout the local economy from the increased income, and new economic activities and benefits that came from establishing supply and service points for water supply.
- Many new skills were learnt, such as masonry and mechanics, management skills, negotiation skills and leadership skills (including among poor women in traditionally male preserves).
- The local organizations set up for the water supply programmes formed a basis for wider local mobilization, provided greater community coherence and developed far greater levels of confidence among women and poorer, marginalized households.
- Savings and credit groups provided a basis for the development of accessible credit facilities among the communities and assisted with the development of financial management skills.
- The new skills and confidence, better local organizations and increased economic momentum all had impacts on the wider political and governance systems, including on government policies.

**Looking Back: The Long-Term Impact of Water and Sanitation Projects.* WaterAid, 2001.

effects, of which the concentration on irrigation-based grain production is but one.

Once these policy objectives are established (including very specific poverty, nutrition and environmental goals) then the key policy issue is again the development of the institutional base and governance conditions (including key issues of rights and entitlements of access to resources) through which priorities are made and decisions on water allocations and cost recovery are based. The potential for more integrated approaches, and for measures to improve efficiency (including on-farm water management) are great. In the consideration of the various scenarios possible, their impacts on cross-cutting issues (poverty alleviation, reduction of

hunger, protection and promotion of human health) need effective assessment.

The dominant use of water for agriculture (in terms of the total use of water, future needs for increased food production and the need for more effective food security systems) means that there is an urgency to policy innovations in this area. Much has been achieved through the 'green revolution' approach that includes large-scale irrigation development, but the limitations (often not reaching the malnourished except to avoid famine) and frontiers (they do not work in many areas where the problems are most acute) are increasingly apparent. In contrast, new, often very simple ideas can have a tremendous impact where they reflect the specific needs and capabilities of the poor (see box 5 on South Asia's initiative). In many places, the recipes of the past are not the ones needed for the future. These should be carefully analysed in policy terms, and a coherent national strategy for food security developed accordingly.

Maintaining ecosystems integrity is a key policy challenge that has, as discussed, become increasingly recognized in many national policy developments. The extent to which these principles have been worked through into robust and sustainable practice is a concern in two key areas.

Specific measures are needed to protect the integrity of key *aquatic ecosystems* such as wetlands, deltas and mangroves. Traditional conservation approaches (based on preventing resource use within defined areas) are often ineffective, and it is now recognized that there needs to be a twin-track approach that works with local communities to develop sustainable management in these areas. At the same time, the need to maintain minimum flows of unpolluted water to these habitats by integrated management across the whole river basin is recognized. Improved human health through environmental management can be a key incentive for sustained involvement of the local communities. Developing strong policy frameworks for this is challenging but, as box 6

Box 5: Treadle Pump Irrigation in South Asia

The North-East India, Nepal Tarai and Bangladesh region contains one of the highest concentrations of extremely poor people in the world, and it is an area where resource pressures are acute and access to resources is constrained by a host of factors. Despite this, poor people in the region are innovative and quick to adopt new ideas that will work for them. One such idea is the treadle pump, a simple but ingenious foot-operated device that can draw water up from wells, shallow aquifers or surface water to irrigate small areas such as homestead gardens. Costing only US$12–15, it increases family income by an average of US$100. It is simple to install and operate and can be made from materials readily available in every village in the region. It makes possible small-scale production of vegetables, grains or other foodstuffs that bring income and provide vital nutrients in a region where the opportunities for these are limited. Although no panacea (in particular, the shallow groundwater of the region is a prerequisite), over 200,000 treadle pumps have been sold in less than a decade, and impact studies show tremendous benefits. Policies that switch from an exclusive focus on traditional, large-scale irrigation to support and disseminate this type of innovation can effectively target the livelihood and food security needs and opportunities of the very poor.

Based on Shah, T., et al. *Pedalling out of Poverty*. IWMI, 2000.

Box 6: Policies for Ecosystems Integrity: The Wetlands Sector Strategic Plan in Uganda

The Wetland Sector Strategic Plan was launched in early 2001 to build on the experiences gained during twelve years of the National Wetlands Programme, a collaboration between the Government of Uganda and IUCN supported by the Netherlands. Wetlands cover 13% of Uganda's territory, and many are of international biodiversity significance. The programme is innovative in that wetlands management and poverty alleviation are integrated into the approach through the funding of local communities to develop sustainable management initiatives that improve their livelihoods and maintain the integrity of the wetlands. These are based on locally developed management plans that identify areas where all exploitation is prohibited and areas where specific types of management (such as cultivation, fishing, livestock and papyrus collection) are allowed.

The experiences of successful local pilots convinced the sometimes sceptical authorities that local communities were interested in and capable of sustainable management within agreed-upon boundaries. These pilots have formed the basis for 'scaling up' the approach to the national level and the integration of the principles of sustainable management into the national policy framework for these critical habitats. The Ugandan Constitution contains a clause stating that 'wetlands should be held on trust by the government for the benefit of all the people'. The introduction of the Wetlands Sector Strategic Plan shows that this constitutional aspiration can be turned into robust policy that includes effective means through which it can be implemented. The Uganda experience demonstrates the importance of a sustained effort, supported over many years – both financially and technically – by external development partners.

shows for Uganda, is possible with a sustained programme to support it.

Far more effective measures are needed to mitigate potential *environmental impacts* from different forms of water management such as agriculture, flood control measures, water supply and sanitation, dams development, industry and others. The principles for this are often already embedded in policy through measures such as environmental impact assessment requirements or water quality standards for waste emissions. Where this is not the case, this area of policy is an urgent priority. A more common challenge is to make sure that existing laws and policies are effectively enforced through an efficient and sustainable regulatory system. The development of capacities to create such a system should be prioritized.

With the majority of people now living in urban areas, **water for cities** requires urgent attention. Poor sanitation is one of the biggest problems in slums and squatter settlements all over the world, but examples of innovative approaches to solving these problems abound. For instance, the Orangi Pilot Project in a shanty town on the outskirts of Karachi, Pakistan, has been able to improve living conditions and health for many of the millions who live there. This has been done through a combination of government assistance, development of specially designed low-cost sanitation technology and the use of community participation to install and maintain the sewers and latrines.

The challenge entails far more than the provision of water and sanitation for those whose basic needs are not being met. A

whole package of legislative, pricing and investment measures must be developed to encourage greater efficiency, productivity, conservation and quality control of the resource. These are essentially management and policy decisions requiring an integrated approach that takes account of all of the competing demands from different users while setting priorities that will ensure long-term sustainability of water resources and the cities they support.

Water for industry and energy presents major policy challenges. Both are sectors central to the economic development aspirations of many countries, and meeting their needs can bring enormous benefits to the country as a whole. At the same time, however, these benefits often go disproportionately to the 'haves' and can bring major environmental and social disbenefits to the 'have nots' – the pollution, loss of homes and habitats, diversion of scarce water and other impacts that are so familiar and pernicious in their effect. The policy challenge has two dimensions to it.

At the very minimum, such developments must take place with acceptable standards of social and environmental protection, to make sure that negative impacts do not take place or, where they are unavoidable, that adequate compensation measures (such as the proper resettlement of and compensation for displaced people) are provided.

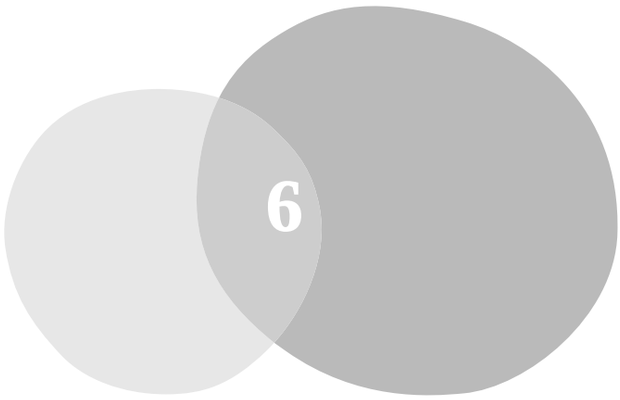
To what extent can the planning of these activities be targeted to bring benefit flows to the poor and/or the environment? This can be direct, through measures that are an integral part of the production process. Or it can be through 'planning gain' measures, where permission to develop is contingent upon social or environmental measures, such as providing water supply to low income neighbourhoods in the area or support to a conservation programme.

Whichever approach is used, the creation of legal, policy and institutional capacities to effectively regulate these water resource uses is essential and will involve a commitment of both resources and political will to ensure conformity among what can be extremely powerful lobbies.

Integrated Water Resources Management (IWRM)

All of these different aspects of water resources use have a wide range of institutional and management issues associated with their successful development that are not considered within the policy focus presented here. But ensuring that these different types of management systems develop with the highest practical levels of synergy and a minimum of conflict has, in itself, an important policy implication: the need for an integrated water resources management framework will require major policy reforms and a far higher level of policy coordination than is found in most countries. This is not a prerequisite for successful water management within and between sectors, but it will certainly advance it, as what can look extremely successful from a limited, sectoral perspective is far less appealing when the wider implications for water resources as a whole are taken into account.

Creating these levels of synergy is far from easy, and perhaps the most pragmatic approach is to develop them incrementally, with each step having a clear purpose and demonstrable benefits. But if there is a strong consensus on the need for such an approach, then the 'big bang' model where IWRM is developed in one move may be feasible. However it is effected, the case for IWRM is strong from a water resources perspective, and it can be seen as an aspiration to which, it is hoped, the different aspects of policy development discussed in this document have contributed.



RESTRUCTURING THE POLICY PROCESS: WHERE TO BEGIN

So while there has been significant progress in water policy development since Rio, we have seen that this progress is uneven and that considerable challenges remain in many areas. This in part reflects the limited approach to policy in many places: often the preparation of a national level policy statement is treated as an end in itself, and key aspects of the full policy process are not followed through. In other places, the policy formulation process has attained a level of comprehensiveness that makes its translation into strategies virtually impossible. It is often insufficiently clear that policies are about choices, not about finding the lowest common denominator that keeps everyone happy. In particular, there needs to be a more complete understanding of the forces that lead to policy development in the first place and, critically, a concerted drive to make sure that policies are followed through to implementation. There also needs to be effective 'feedback' mechanisms, so that the consequences of policy implementation can inform future policy development.

There are many different ways to view this process, and the structure set out here that has been developed within WWAP is but one of them. This structure is based on a series of key questions that trace policy development from its initial conceptualization through to the assessment of its impacts. It is an approach that can be used in each policy setting to ensure that the full implications of policy development are considered. Illustrative examples are given for each question, but just as important are the links between the different stages in the process and, as emphasized below, the wider governance and institutional context within which the policy process operates.

Why was the policy advocated?

In particular, what specific objectives and priorities was the policy intended to address? For example, was it a response to the impact of a flood or drought, or was it influenced by new approaches from the international stage?

Where and by whom was it advocated?

This is an elusive but important issue, as policy responds to many pressures and vested interests. One measure of 'good' policy is the transparency of this process, while

another is how inclusive it is. For example, did advocacy through the media and civil society, to represent the needs and interests of vulnerable groups and threatened ecosystems, influence the timing and content of decisions on policy changes?

Are different levels of government aware of the policy, and to what extent have they adopted it?

For example, have irrigation agencies internalized new policies on cost recovery and changed their procedures to reflect this?

What obstacles to adoption exist?

There can be many barriers, overt and hidden, to the effective implementation of policy: the lack of capabilities in or resources available to government departments; resistance by sceptical officials; pressure by interest groups, such as industrialists or farmers; problems with other aspects of law and policy, such as land acquisition for infrastructure development.

Has the policy change led to improved water management and access for target groups?

For example, has service delivery been extended to new groups or have environmental protection measures been adopted? These changes should, as far as possible, be measured in an objective and quantifiable manner and based on clear and agreed-upon targets that are integral to the policy.

Has changed management led to more effective and sustainable management of the resource base?

This can be measured by products: more crops per unit of land or unit of water used, flows of resources maintained without further environmental degradation or the same level of services provided at a lower cost.

Has the policy led to improvements in the health, welfare and livelihood of the people?

In particular, has the policy been successful in relation to the needs of the specific target groups that it was intended to reach? For example, do more urban poor now have access to safe water and sanitation? Have vulnerable people been protected from the risks of floods or droughts?

Has the policy improved or worsened the status of the natural environment?

For example, have increased abstractions of water or changes to water quality had consequences for the long-term sustainability of water resources and the integrity of the ecosystems through which they pass? A key measure of policy in many areas is that it should reverse degradation and stabilize or enhance water resources.

This or a similar sequence of questions should be followed through very consciously in any water policy process. The follow-up should be done through transparent and participatory structures so that all stakeholders are able to contribute to and influence the outcome. In this way, changes to water resources policies can begin to make an impact upon the challenges discussed above, and lead the way to water security for all.