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World Water  
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# Water – the blue web that unites us

A concept paper for the 2009 G8 Summit in L'Aquila, Italy

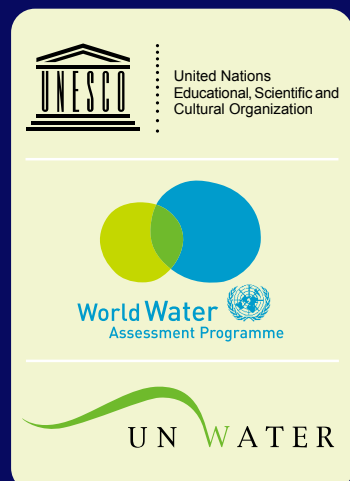
Prepared by the United Nations World Water Assessment Programme



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**Prepared by the United Nations World Water Assessment Programme,  
Perugia, Italy**



# Preface

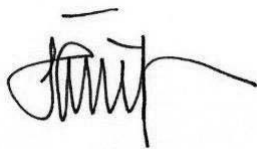
The 2009 meeting of the G8 in Italy comes a few months after the launch of the third edition of the United Nations World Water Development Report on 16 March 2009 during the 5th World Water Forum in Istanbul.

This third edition signifies an important transition in the World Water Development Report series; a transition from a status report on the world's water-related challenges to a report that paints a holistic picture of our global water resources, with water sub-sectors and challenge areas understood within the broader context of socioeconomics. It acknowledges that most decisions that have an impact on water resources (on their state and on how we use and manage them) come from outside the 'water box' of the traditional water sector. The report establishes its conceptual framework by examining the drivers of pressures that affect our planet's water systems: demographics, consumption patterns, climate change, social and technological change, governance and finance. It considers the impact of externalities, identifies pressures on the resource and examines ways different water uses interact. The final chapter discusses possible responses to sustainably address the global water needs of life, livelihoods and human aspirations.

Because the drivers of pressures that affect water resources are also drivers in many other sectors, the third edition of the United Nations World Water Development Report stresses the need for leaders in government, the private sector, and civil society to act in partnership to incorporate water in their decision-making processes.

This concept paper has been prepared as a contribution to the preparatory process for the G8 summit in L'Aquila, Italy, held from 8 to 10 July, 2009. We believe that the out-of-the box approach of the 2009 United Nations World Water Development Report and the explicit and implicit links between water and the agenda items of the G8 Summit make the messages of this paper particularly relevant.

We would like to thank James Winpenny, of Wychwood Economic Consulting, UK, for his contribution to the production of this paper.



Olcay Ünver

World Water Assessment Programme Coordinator  
United Nations Educational, Scientific and Cultural  
Organization



William Cosgrove

*United Nations World Water  
Development Report 3*  
Content Coordinator

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# Key points and messages

This paper is in two parts. The first part presents a brief review of progress made since the Water Action Plan was agreed at the 2003 G8 Summit in Evian, France. It includes an introduction to some of the key themes of the United Nations World Water Development Report 3: Water in a Changing World. The second, and main, part of the paper then proposes some priority areas for discussion at the 2009 G8 Summit in Abruzzo, Italy.

The priority areas proposed for consideration by the G8 are grouped under the following seven broad headings.

## I. Making water policies more coherent

Water is a web linking some of our biggest challenges: food, energy, climate change, economic growth and human security. Making policy decisions about such interrelated issues in isolated 'boxes' can be damaging. For example, efforts to reduce carbon emissions through the growth of biofuels can have negative impacts on water and food security.

Similarly, many drivers of change affecting water are external to the sector as it is narrowly viewed, and these drivers too are interlinked. Future outcomes need to be explored using scenario analysis.

G8 governments can show leadership on the nexus of today's most critical global issues – energy, food, climate change and environmental stewardship – by setting objectives in these areas that are mutually consistent, especially in their impact on water resources.

## II. Adapting water to climate change

Water is on the front line of our efforts to adjust to climate change, because it is the key medium through which climate change makes its impact. Although mitigating climate change has dominated the policy agenda to date, to safeguard the integrity of our water resources, G8 governments must commit far more support to adaptation measures, including increased funding. Specifically, global funding for adaptation, part of which is currently derived as a share of the proceeds of the Clean Development Mechanism, should be greatly supplemented and made available for all water-related sectors where adaptation is called for. In short, adaptation should be mainstreamed and adequately funded.

## III. Recognising water as an international and a global issue

Water is becoming an international issue through transboundary water sharing and the ramifications of trade and international business holdings. Production and consumption choices in all countries have water *footprints*, which, through the medium of *virtual water*, affect the use of water everywhere.

G8 governments and the responsible international agencies should reverse the relative neglect of international and regional institutions dealing with transboundary and regional water sharing. Their development partners should avoid beggar-my-neighbour tactics and promote exchanges of information and mutual support.

G8 governments should take the lead in examining the impact of international trade on water resources and the implications for governance in this area.

## IV. Putting water onto a sound financial footing

Water is under-financed everywhere, and in all its parts, leading to declining levels of service and deteriorating infrastructure. Making up for past neglect and adjusting to climate change and other future demands will greatly add to the financial needs the sector will face.

Among other proposals, it is recommended that donor agencies and international financial institutions make increased commitments to the full range of water needs – providing assistance for water resources development and conservation, as well as for water services in all areas: household, agricultural, industrial, energy and others – in return for mutual commitments to greater budgetary support from their development partners.

## V. Information, evidence and image

Much water policy-making takes place in an information vacuum. Meeting the demands placed on this most important resource and adapting to future challenges will require much better information about water, and better capacity to use this knowledge.

The international donor community should support their development partners in establishing national water assessment processes. Through the medium of UN-Water, the World Water Assessment Programme (WWAP) and other agencies, these assessments should produce a concise account of the status of each country's water resources, water use and water services, and indicate the main problems and flashpoints so as to guide national priorities and international cooperation efforts. Indicators relevant to water policy-making should be developed, alongside the creation of capacity to use these data.

G8 governments and their development partners also need to recognise the damage that corruption does to the image and performance of the water sector, and take action accordingly.

## VI. Conclusions: implications for Africa

The final section highlights action points particularly relevant to Africa.

Promoting sustainable and self-reliant development in Africa will require a much more intensive and coherent development of its water resources. All of the messages highlighted in this paper, and the actions suggested, are highly relevant to Africa. Supranational institutions such as the African Ministerial Council on Water (AMCOW) need to have their status, capacity and resources enhanced to give them the necessary stature relative to their peers in other parts of government. Bodies such as the New Partnership for Africa's Development (NEPAD) should do the maximum possible to ensure that water policy making is coherent and integrated with policy making in other domains.

To achieve sustainable development and eradicate poverty in Africa, the G8 should take all necessary actions to promote cooperation among African nations and joint development of their water resources.

## VII. A potential role for UN-Water and the World Water Assessment Programme

UN-Water and the World Water Assessment Programme can further the agenda outlined above in several important areas: national assessments, data collection, the development and use of indicators and monitoring tools, case studies, scenario development, capacity-building, and country-level coordination in all these areas.

# Introduction

## Progress since Evian and the new water agenda

The G8 Summit at Evian in 2003 produced the G8 Action Plan for Water, in which the proposed measures were divided into five categories: promoting good governance; utilizing all financial resources; building infrastructure by empowering local authorities and communities; strengthening monitoring, assessment and research; and reinforcing the engagement of international organisations.

Progress has been recorded in each of these areas, though it has been uneven. The clearest progress has been made in financing water investments, where the following examples can be cited:

- ◆ The World Bank coordinated a major study into the potential of lending directly to sub-sovereign bodies and creating guarantees and insurance schemes to mitigate risk. This led to the Bank and other international financial institutions (IFIs) reviewing their own products and policies in these areas and making appropriate changes. The most visible result was the creation of a World Bank/International Finance Corporation (IFC) Municipal Department to undertake lending at a sub-sovereign level. Most IFIs now also offer risk-mitigation products.
- ◆ Local capital markets have evolved as a source of local-currency funding for water investments in a number of emerging economies. Utilities and municipalities are drawing on these pools of local savings in countries as diverse as South Africa, India, Thailand, the Philippines and Uganda. In many of these cases, risk mitigation and other forms of credit enhancement have made local institutions creditworthy borrowers. In several countries (including India and the Philippines) revolving funds have been created to stimulate water investments, with external risk-sharing.
- ◆ The device of output-based aid (OBA) has continued to spread as a means of catalysing commercial finance for local water investments (in Kenya, for example).
- ◆ There has been a significant shift in the nature of private sector participation (PSP) in water supply and sanitation since the 1990s. The last decade has seen the emergence of a new kind of private water operator in South-East and East Asia, Russia, Latin America, and the Middle East, based nationally and often operating at a regional scale, frequently in joint ventures with European or North American multinationals. This new breed of operator is typically well connected politically, with local business experience and with its own or access to other local sources of finance. This shows signs of being a sustainable model of PSP in such cases.
- ◆ The donor community has taken steps to harmonise and streamline its aid, an action also promoted by the 2005 Paris Declaration on Aid Effectiveness. A number of donors are seeking to align their assistance with national procedures (through sector-wide approaches, for example, including the use of common pools of finance). All donors are fully committed to supporting the achievement of the MDGs, which has become the key organising principle and criterion for improving water supply and sanitation.
- ◆ Several new funds and programmes are dedicated to improving water supply and sanitation. The African Development Bank is administering the African Water Facility and the Rural Water Supply and Sanitation Initiative. The EU Water Facility provides funding through a challenge fund structure. The Asian Development Bank and the Inter-American Development Bank have also announced new lending programmes for water projects.

In the field of national and international water governance and institution-building, the following are notable:

- ◆ The creation of UN-Water and its progress in becoming a central coordinating and monitoring point for UN efforts in this sector.
- ◆ The formation, through the advocacy of UNSGAB<sup>1</sup>, of the Water Operators Partnership as a means of South–South or North–South cooperation among water authorities and utilities.
- ◆ The production of national Integrated Water Resource Management plans, many with donor support.

This sketch of recent progress responding to water needs indicates the improvements seen in the supply side of water finance in response to the Camdessus Panel, and the shift of attention in the Gurria Task Force and UNSGAB to the need for finance and improved institutional capacity to handle it.

The publication by the World Water Assessment Programme in March this year of the landmark United Nations World Water Development Report 3: *Water in a Changing World* (WWDR3) launched a new agenda around a series of Key Messages. The WWDR3 documents the growing problems and challenges posed by water in most regions, which are likely to reach critical proportions in many countries. These have arisen due to many causes, natural and human in

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<sup>1</sup> The United Nations Secretary-General's Advisory Board on Water and Sanitation

origin, and are not being tackled with sufficient focus and urgency by national leaders. The ignorance and neglect surrounding this topic needs to be dispelled by promoting awareness among influential stakeholders, education, and much heavier investment in data collection and research. The ramifications that water has on every part of our lives should be recognised, and the impact that decisions taken in other sectors have on water resources should be systematically factored into those decisions. In short, the water challenges we face over the next few decades will call for radical new policies and institutions (*governance*) that will affect the behaviour of us all.

The WWDR3 sets out an ambitious and detailed agenda. This paper does not aim to duplicate this, but instead [selects a number of specific actions that would advance the overall agenda, appropriate for high-level decision-makers](#). The actions are grouped under the following five themes:

- ◆ [Making water policies more coherent](#)
- ◆ [Adapting water to climate change](#)
- ◆ [Recognising water as an international and global issue](#)
- ◆ [Putting water onto a sound financial footing](#)
- ◆ [Information, evidence and image](#)

The final two sections reiterate these messages with specific reference to Africa, and indicate how UN-Water and the World Water Assessment Programme can support the actions required.



## I. Making water policies more coherent

A recent article in *The Economist* accuses governments of being ‘peculiarly bad at water policy’.<sup>2</sup>

Water does pose difficulties for governments. The United Nations World Water Development Report 3: *Water in a Changing World* (WWDR3) explains how water affects all parts of social and economic life, and how decisions taken about water have wide repercussions. Conversely, decisions taken outside the ‘water sector’ as it is narrowly understood can have a big impact on the water domain. The report’s first key message is that decisions about water must be taken ‘out of the box’ – a wider perspective is required than purely that of the water domain, and interactions with other parts of social and economic life must be recognized (Figure 1).

This is an argument for ‘joined-up thinking’ about water, both from those in the water community and from those in other walks of social and economic life. People who are most concerned about water and most knowledgeable about its importance are not usually the ones taking big decisions that affect its future. The water community needs to engage with the full range of national decision-makers: for their part, all of these decision-makers need to factor water into their deliberations. The theme of the Fifth World Water Forum, ‘Bridging divides for water’, is an apt description of what needs to happen.

The interrelatedness of water with other major global concerns has been likened to a web:

‘Water security is the gossamer that links together the web of food, energy, climate, economic growth and human security challenges

that the world economy faces over the next two decades ... . We simply cannot manage water in the future as we have in the past or the economic web will collapse.’

(World Economic Forum, Water Initiative paper for Davos, 2009)

Decisions taken in *separate policy boxes* can be very costly, and even self-defeating:

- ◆ the drive for food security can reduce water security where water use is unsustainable (for example, Saudi Arabia’s policy of self-sufficiency in wheat has led to serious depletion of its aquifers);
- ◆ choosing desalination as the ‘default option’ to achieve water security is very energy-intensive (and the energy itself requires water in its production), hence energy security is reduced;
- ◆ the pursuit of greater energy security through cultivation of biomass is very water-intensive and can seriously deplete water resources (examples are found in certain regions of the United States);
- ◆ the production of large volumes of untreated wastewater from rapid urban and industrial growth is a source of serious water contamination in many countries, which causes economic losses and higher costs of treatment for other downstream water users (as in China, for example).

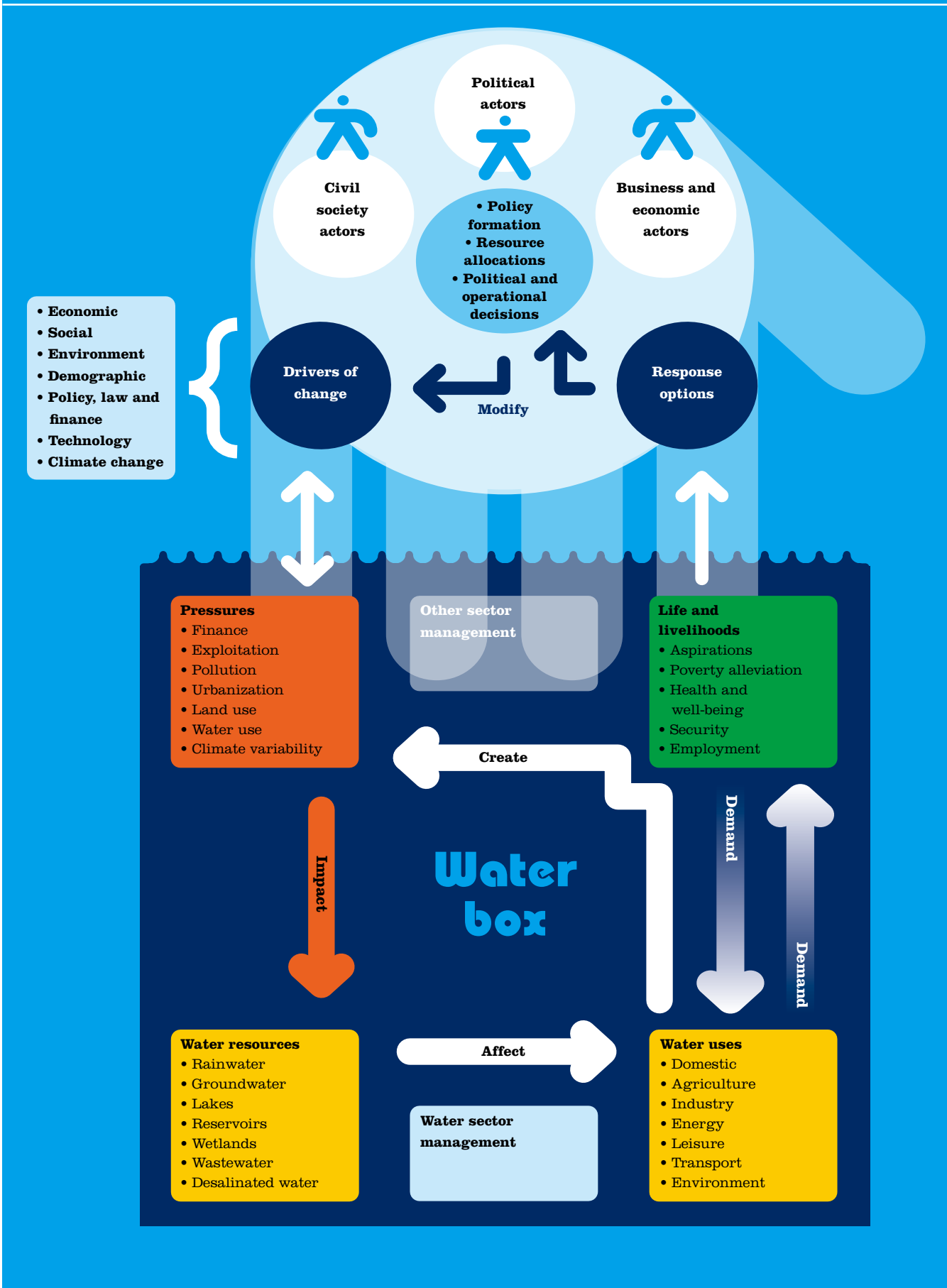
Where water is scarce, it is all the more important to coordinate decisions about its use, which are too often taken in isolation. In practice there is growing com-

<sup>2</sup> *The Economist*, ‘Water: sin aqua non’, 11 April, 2009.

Figure 1

Decision-making affecting water

(World Water Development Report 3, page 5)



petition for water in many countries<sup>3</sup>. The negative results of uncoordinated decisions, each having serious impacts on water, is nowhere better illustrated than in the transboundary Rio Grande/Rio Bravo river separating the USA and Mexico (WWDR3, p. 243). Allocating water among the needs of agriculture, industry, tourism, hydropower and municipal use is inevitably a big decision, which in the last resort is political.

Such political decisions need to be well informed through hydrological, economic and social data about the state of the resources and its value in use. Institutions and policies (markets, prices, directives, information, etc.) should provide the continuous flexibility needed for water use to adjust to its availability. Such in-built flexibility will help to avoid, postpone, or alleviate Big Decisions at the political level.

Making national water policies more coherent is the basic aim of Integrated Water Resources Management (IWRM), a leading paradigm used by those involved in determining water policy. IWRM is set of principles and tools, backed up by networks and case material. Many countries have adopted this approach in one form or another, but it is not a blueprint, and water is so context-specific that different countries apply IWRM in their own ways (WWDR3, page 245).

G8 governments can show leadership on the nexus of critical global issues – energy, food, climate change, environmental stewardship – by setting aims that are mutually consistent, especially through their impact on water.

Three specific actions are proposed to promote greater policy integration.

### THE CREATION OF EFFECTIVE WATER POLICY PROCESSES WITHIN NATIONAL GOVERNMENTS.

Integrated Water Resource Management does not necessarily imply a single unified administrative structure for dealing with water affairs. ‘Integration’ in this literal sense is rarely feasible or desirable. Water is a cross-cutting issue entering many different realms of public

3 A vivid recent example was the decision to withhold water from farmers in the vicinity of Beijing for six months in order to provide sufficient water for the needs of the Beijing Olympics.

life. *Managing water, and avoiding the sort of policy inconsistencies illustrated above, calls for the creation of effective mechanisms for consultation, the exchange of information, and joint decision-making across different government departments and official institutions.* These mechanisms and processes need to be flexible but tough, so that all interested parties become aware of the implications of each others’ decisions on the water resource. The precise institutional form needs to be determined by each country, and national leaders should urgently review what is needed for their specific circumstances.

### WATER IMPACTS SHOULD BE PART OF PLANNING AND MANAGEMENT DECISIONS

The WWDR3 devotes some space to ‘making water an integral part of all planning and management decisions’ (p. 292). Decisions, whether on projects or policy changes, should take into account impacts due to water. The impacts could be expressed in physical, qualitative or economic terms, as appropriate and as methodologies allow. If major decisions were subject to checks of this type some of the worst cases of disjunctive decisions could be avoided. This proposal draws encouragement from the effect of introducing Environmental Impact Assessments (EIAs) in recent decades, which has placed the treatment of environmental impacts onto a much more solid and systematic footing.<sup>4</sup> A similar and separate process is needed for water.

### PEER GROUP EXCHANGES SHOULD BE ENCOURAGED

Water policy making and management is highly country-specific, but all countries potentially have much to learn from what has happened elsewhere. There are already many international networks offering information, training<sup>5</sup>, and exchanges of know-how and a large number of conferences being staged, both general and specific. This process could be boosted by the creation of funding and institutional support for

4 Water is one of the environmental impacts to be considered in an EIA, but, until water has a much higher level of recognition, it is desirable to have its own assessment – the WIA – even if there is some duplication.

5 E.g. Cap-Net (see p. 257 of WWDR3) which could be one of the institutional anchors of the expanded programme of peer-group exchanges proposed here.

international water missions, – inward missions of international specialists – and outgoing study tours of national water officials and professionals.

**International Water Missions could be undertaken**, comprising a number of specialists in relevant disciplines, with the aim of reviewing the national water situation in a comprehensive way and making recommendations on policies, institutions and measures to place water policies onto a more sustainable basis.<sup>6</sup>

The benefits of these missions would be partly to expose national policies and practices to a wider, international, peer-group scrutiny, and partly to involve national stakeholders from outside the narrow ‘water box’. The missions would be specifically charged to make water a national issue, and to reach beyond the national water community to all relevant decision-makers. An analogy would be the series of Employment Missions organized in the 1970s by the International Labour Organisation, aimed at focussing the attention of national policy-makers on labour, employment and unemployment issues and the wider factors with a bearing on these.<sup>7</sup>

Study tours could also be arranged for national officials and water specialists to enable them to sample relevant experiences of other countries. An example was the recent study visit to Senegal organized by the Water and Sanitation Program of the World Bank (WSP) for officials from the Democratic Republic of Congo<sup>8</sup>. A more narrowly focussed programme of peer-group exchanges already exists in the form of the Water Operators Partnership, hosted by UN Habitat.

6 A precursor at a more modest scale, the UNDP supported rapid water sector assessments in Bolivia, China, Ghana, Mali, Mexico and Peru in the 1990s.

7 To Colombia, Kenya, Sri Lanka, the Philippines, and a few other countries. These included specialists from other international agencies and independent experts.

8 Reported in the WSP’s on-line bulletin ‘Access’ of March 2009.

## II. Adapting water management to climatic change

Global warming is likely to have its crucial impact on society through its impact on the water medium. Climate change will alter the world’s hydrological cycle in various ways. Changes in weather systems will affect rainfall patterns and evapotranspiration over time and space, with implications for runoff, storage and river flow regimes. There will be a greater likelihood of extreme events – droughts and floods – in different parts of the world and potential shifts of climatic zones. Millions of people will, for instance, become at risk from flooding in the Ganges, Brahmaputra and Meghna Rivers, as well as in Bangladesh due to the rise in sea levels (Nicol and Kaur, 2009).

Public policy in response to global warming has so far been dominated by mitigation. The WWDR3 argues for a more judicious balance between mitigation and adaptation to a process of global warming that appears already well underway.

So far, mitigation has dominated the policy agenda. To safeguard the integrity of our water resources, G8 governments should commit to much more support for adaptation measures, and to increases in funding for them. Specifically, funding for adaptation should be decoupled from the proceeds of the Clean Development Mechanism and finance should be increased for all water related sectors where adaptation is called for. In short, adaptation and its financing should be mainstreamed.

### SUPPLY-SIDE INVESTMENT

Measures on both the supply side and demand management will be necessary, depending on circumstances. Supply-side management will be relatively more important where populations are vulnerable to multi-year variability. These measures could include, for example, creating more storage, increased abstraction, groundwater recharge and development measures, or rainwater harvesting.

### THE NEED FOR DEMAND MANAGEMENT

Where scarcity is growing and competition for water is increasing, demand management will come into its own in the form of promoting sustainable use, pricing mechanisms, water saving techniques, water conservation,

etc. So far in the National Adaptation Programmes of Actions prepared by the Least Developing Countries, there is a heavy bias towards supply-side interventions. It will be important for adaptation strategies to strike the right balance between demand- and supply- side measures. Although the latter have greater political attraction and can attract aid funding, demand management is vital to promote long-term sustainability.

### AGRICULTURE IS ON THE CRITICAL PATH

Much of the adaptation will fall on agriculture – both irrigated and rainfed – adding to the challenges it faces in meeting the expected growth in demand for food and agricultural commodities and in coping with increased competition for scarce water from other sectors. The recent Comprehensive Assessment<sup>9</sup> set out the formidable challenges facing farming systems – improving equity, reducing environmental damage, increasing ecosystem services, and above all increasing water and land productivity (*more crop per drop*).

There is some scope to expand irrigated areas, especially in Sub-Saharan Africa, but elsewhere the main adjustment will have to come from upgrading and managerial improvements in existing irrigated systems. This will call for better information, improved water control, and a shift to a service-oriented culture from irrigation authorities, among other key changes. There will be an important role for groundwater management, both on its supply and demand side, for greater re-use of water, and use of marginal quality supplies.

Upgrading rain-fed farming systems will form a major part of the response to the growth in demand for food and the reduction of hunger as part of the MDGs.<sup>10</sup> There needs to be better management of rainwater, soil moisture & supplemental irrigation. This agenda will

have strong impacts on poverty, since the farmers concerned are typically among the poorest, and are highly vulnerable to climatic variability.

### MAINSTREAMING ADAPTATION AND ITS FINANCIAL IMPLICATIONS

Much adaptation will involve policy changes and institutional reforms that do not have major financial implications. Some of the necessary investment will be ‘soft’ (such as improving information systems, monitoring, regulation and public awareness), entailing recurrent rather than capital spending. Some costs will also be borne by water users, in effect financing their own adaptation (using different farming methods, for example). Some adaptation will, however, entail major costs, requiring serious financing. Estimates of this vary (the United Nations Development Programme suggests \$86 billion, while the World Bank has put this figure at \$9 billion to \$41 billion).<sup>11</sup>

The global cost estimates of adaptation in terms of water resources are extremely rough, and include items that ‘tick several boxes’ on the global agenda (food, energy, water scarcity, environment) as well as climate change. Hence the proliferation of new funding mechanisms for climatic adaptation (14 new environmental funds in the last 18 months<sup>12</sup>) is a matter of concern. The fragmentation of donor support for adaptation is unlikely to be an efficient way of addressing what are essentially multi-purpose projects. A better response would be to mainstream climatic adaptation as a cross-cutting criterion in all development programmes involving water, and to provide adequate funding for this.

9 *Water for Food: Water for Life: a Comprehensive Assessment of Water Management in Agriculture*. Edited by David Molden for the International Water Management Institute, 2007

10 According to one estimate, 85% of the freshwater required to meet the MDG Hunger Goal will originate from rainfed agriculture. (Sustainable pathways to attain the Millennium Development Goals: assessing the key role of water, energy and sanitation. Stockholm Environment Institute, Aug 2005.)

11 Simon Maxwell, A triple call on climate change, and Neil Bird and Leo Peskett, Recent bilateral initiatives for climate financing: are they moving in the right direction? Respectively, Opinions 112 and 122 from the Overseas Development Institute, London, 2008 and 2009.

12 Simon Maxwell, *loc.cit.*

### III. Recognising water as an international and global issue

Unlike global warming or the loss of biodiversity, which have global consequences, water is seen as an issue of mainly local or national importance. Water becomes of *international* concern where it involves transboundary and regional shared waters, and where international trade and the international location of economic activities have an impact on local water use. By these processes, decisions on consumption, production and trade can affect water stresses in countries thousands of miles apart.

#### INTERNATIONAL TRADE AND VIRTUAL WATER

In a shrinking, interdependent world, people even in water-secure regions may have a potential impact, through their consumption patterns, on people in regions of water stress. Trade in goods and services that embody water in their production (*virtual water*) may increase water stress in the exporting countries. Companies with holdings in water-stressed areas affect the local situation

through their *water footprint*. Consumers in more privileged societies may intensify water stresses elsewhere through these processes (Box 1).

The heart of the problem is that water embodied in traded goods and services is not properly priced – at its full opportunity cost, reflecting costs of supply, depletion and environmental impact. If water were priced in this way, countries would be adequately compensated for their ‘exported’ water, and would pay fully for their ‘imported’ water. But this does not happen, least of all for the production and processing of agricultural products. Increased international trade in water-intensive goods and services, where water is a hidden or distorted cost, risks aggravating the water status of exporting countries where these are short of water and where it has a high opportunity cost.<sup>13</sup> The picture is complicated because alongside this ‘hydraulic distortion’ are other economic distortions caused by subsidized exports.

13 Whether trade should take place, and in which goods, will depend on broader considerations of comparative advantage. Water is only one aspect of resource endowment, and technology and opportunity costs of all factors will influence trade.

#### Box 1 Virtual water

(World Water Development Report 3, page 35)

Water-intensive products are heavily traded over large distances, as countries import and export water in virtual form as agricultural and industrial commodities. The global volume of virtual water flows in commodities is 1,625 billion cubic metres (m<sup>3</sup>) a year, accounting for about 40% of total water consumption. About 80% of these virtual water flows relate to agricultural products trade, and the remainder to industrial products trade.

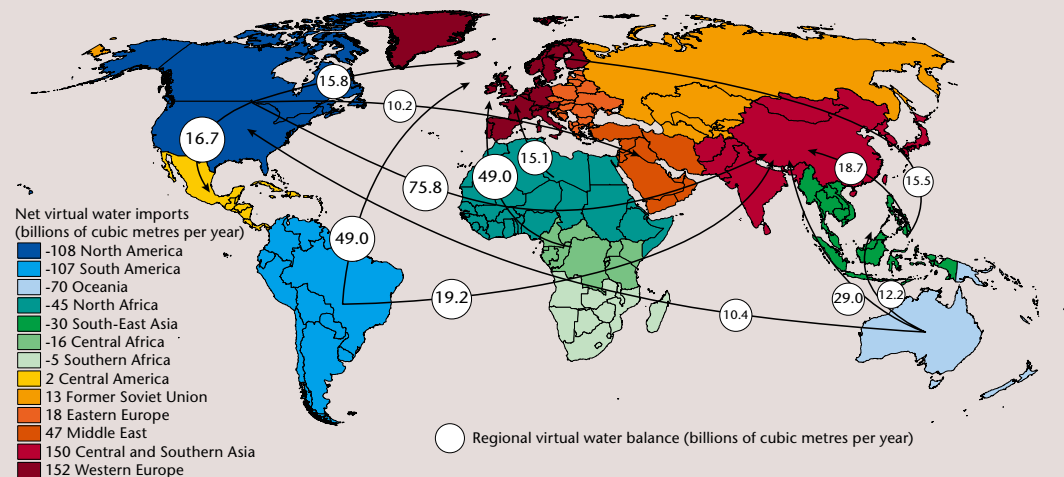
Global virtual water trade can save water if products are traded from countries with high water productivity to countries with low productivity. For example, Mexico imports wheat, maize and sorghum from the United States, which requires 7.1 billion m<sup>3</sup> of water a year in the United States to produce. If Mexico produced the imported crops domestically, it

would require 15.6 billion m<sup>3</sup> a year. From a global perspective this trade in cereals saves 8.5 billion m<sup>3</sup> of water a year. Despite some trade from countries with low water productivity to countries with high productivity, global water savings through international trade of agricultural products has been estimated at about 350 billion m<sup>3</sup> a year, equivalent to 6% of the global

volume of water used for agricultural production.

Many countries, including Japan, Mexico and most countries in Europe, the Middle East and North Africa, have net virtual water imports (see map). Water security in many countries thus strongly depends on external water resources (chapter 7).

**Regional virtual water balances and net interregional virtual water flows related to trade in agricultural products, 1997-2001**



Source: Based on Hoekstra and Chapagain 2008.



An appropriate international agency should commission a study on the implications on water resources of international trade in goods and services, with recommendations on ways of reducing the distortions and stresses this causes. This agency should be led by an individual or institution with sufficient standing to carry weight among governments, agencies and other key stakeholders. Its aim would be to provide greater clarity to governments, farmers, businesses and other consumers of the water implications of trading patterns, and the significance this has for public policy and the governance of international trade.

### WATER AS AN INTERNATIONAL AND REGIONAL PUBLIC GOOD

Official development assistance (ODA) is vital to sustain *international and regional 'public goods'* (products or services that benefit the international community rather than specific countries or individuals). The benefits of such public goods are enjoyed collectively: it is impossible to exclude anyone from them and one person's use of them has no effect on their availability for others. Because of these features, private funding is not feasible, and the cost of public goods falls on the state or the international community. Examples of public goods in the water sector include data collection and monitoring.

There is also a strong case for the development community to support international river basin management and other forms of transboundary water cooperation. Individual countries tend to be sparing with their contributions to such cooperative endeavours, perhaps in the hope that others will make up the deficit (the *free rider* problem). Also, where waters are shared, hydrological information becomes a sensitive political matter, and data may be withheld or manipulated for political advantage. External donors can usefully compensate for what has aptly been termed 'under-funded regionalism'.<sup>14</sup>

The problem is aggravated where neighbouring countries are at war.<sup>15</sup> Often, the attribution of benefits

to the different partner countries is difficult, making the sharing of costs problematic. Such confusion hampers the setting of realistic budgets and funding modalities. The architecture of international aid, with its emphasis on national programmes and country 'ownership', has also been blamed for the neglect of regional programmes. On one estimate, only 3%–4% of ODA goes to regional public goods, though such programmes can give high returns (Birdsall, 2006).<sup>16</sup>

The relative neglect of regional public goods has in turn affected the supply of information about them. This has fed back to further neglect, in a cumulative process. However, ensuring water security in Africa will require the construction of regional and shared infrastructure on a large scale, which will necessitate a greatly strengthened information base. **International action is needed to overcome the 'market failure' in the supply of relevant information. This should include the strengthening of international observatory functions.**

### SHARING WATERS

Where water resources are shared through rivers, lakes, inland seas and underground aquifers, growing water stresses in one country are likely soon to spill over into neighbouring areas. Pollution of shared waters by some countries is also a concern to all other riparian and bordering countries. So far, despite alarmist predications, 'water wars' have been rare, and joint water problems have been the occasion for cooperation rather than conflict. A number of successful agreements have been based on sharing the *benefits* of the water rather than merely dividing the physical water resources (WWDR3, Chapter 9). Even so, **transboundary and regional tensions are likely to grow and governments and international organisations should give high priority to supporting organisations dealing with shared waters and brokering agreements between the parties involved.** The international support for the sustainable management and protection of the Guarani Aquifer, shared by Argentina, Brazil, Paraguay and Uruguay, is an encouraging model (WWDR3, page 221).

<sup>14</sup> Birdsall (2006) and the WWDR3 Side Paper on *Investing in Information, Knowledge and Monitoring*

<sup>15</sup> The control of the Desert Locust in Sahelian countries has been severely hampered by the decline in regional information and monitoring systems, due in part to civil unrest and armed conflict endemic in the border regions at risk in these countries.

<sup>16</sup> Birdsall cites the Southern Africa Power Pool, the Baltic Sea clean up, the control of onchocerciasis in the Sahel, and the control of Chagas disease in Latin America.

## WATER FOOTPRINTS

Businesses operating on an international scale are becoming more aware of the impact of their trading on water environments. Following the growing acceptance of the concept of *virtual water*, there is now academic and business engagement with the idea of *water footprints* to trace and if possible measure the impact economic activities have on the water cycle. The sum of individual footprints is the aggregate water footprint of whole countries, which is also starting to be estimated.<sup>17</sup> There is now a Water Footprint Network and Working Group with academic, business and NGO membership. The World Business Council on Sustainable Development has also produced a Water Footprint Tool for use by businesses.

‘Water footprint’ is a much more complex concept than ‘carbon footprint’ and cannot be used as a crude and undifferentiated criterion or policy tool. The whole product cycle should be considered: much of the impact of a product occurs beyond the factory wall; upstream in raw material or energy suppliers, or downstream in the way the product is used by consumers, or disposed of. A firm’s footprint also depends very much on the environment in which various parts of its product cycle occur – on factors such as the availability of water, whether it is returned to the

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<sup>17</sup> E.g. Chapagain and Hoekstra, 2004. The national water footprint should also take into account the footprints of goods and services imported and exported.

catchment area in usable quality and volume, whether its use is consumptive or non-consumptive. With these reservations in mind, the water footprint is a powerful concept and a potential policy tool.

Businesses of all kinds – private and public, from all economic sectors and at all scales – need to be conscious of their impact on water, and aware of how to promote good business practice in this area. Governments and agencies should offer all necessary moral, physical and financial support to research on the development and application of water footprint data. As an application of this concept, poor, water-scarce countries should be helped to develop productive sectors with a low water requirement or footprint. This would also have implications for trade and tariff negotiations.

The two overriding messages from this section are:

- ◆ G8 governments and the responsible international agencies should reverse their relative neglect of international and regional institutions dealing with transboundary and regional water sharing, and their development partners should avoid ‘beggar my neighbour’ tactics on information exchange and other matters.
- ◆ G8 governments should take the lead in examining the impact of international trade on water resources and the implications for governance in this area.



## IV. Putting water onto a sounder financial footing

The water sector as a whole, and particularly certain parts of it, is seriously under-funded, and there is a mismatch between the type of money available and what is really needed.<sup>18</sup>

- There is an imbalance between funding for capital investment – which is more attractive to external financiers – and funding for routine operation and maintenance (O&M), which tends to be deficient. To fund O&M, tariff revenues need to be enhanced and budgetary transfers placed onto a more solid and predictable basis.
- Little provision is made for the high cost of rehabilitating and modernizing existing ageing systems. A forward-looking financing strategy is essential in this situation.
- It is much easier to obtain finance for hardware than for the many kinds of software involved in the water sector – these include watershed management, research, policymaking, monitoring, environmental and pollution control, training, public awareness. A number of these are overhead services or integrative functions, which might not seem as essential as infrastructure and frontline services, but which if neglected will soon affect all water users.
- The distribution of ODA provided for water strongly favours ‘donor darlings’ at the expense of ‘aid orphans’.<sup>19</sup> Although this pattern of allocation is understandable in terms of administrative effectiveness and response to effective local demands, ODA is a valuable and scarce resource and it is desirable to set priorities on its use that correspond to real need.

18 Finance is covered in several parts of WWDR3, e.g. chapters 1, 4 and 14. It is covered at greater length in several new reports from the OECD, especially *Strategic financial planning for water supply and sanitation*. (2009b) and *Managing water for all: an OECD perspective on pricing and financing* (2009a)

19 From the Creditor Reporting System of the Development Assistance Committee of the OECD. [www.oecd.org/dac/stats/crs/water](http://www.oecd.org/dac/stats/crs/water).

- All parts of the water sector – including water resources and all water-using services – deserve more funding, reversing years of stagnation (see Table 1 and Figure 2, below).

Donor agencies and international financial institutions should make increased commitments for the full range of water needs – resources as well as services – in return for mutual commitments to greater budgetary support from their development partners. However, the extra finance will not be fully effective without a number of actions to counter these financial biases and deficiencies.

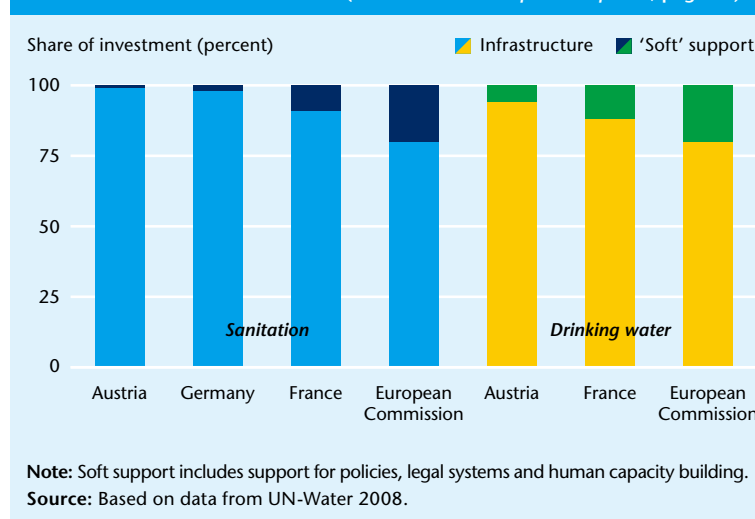
**Table 1 Commitments of official development assistance from bilateral and multilateral agencies, 2004-06**  
(World Water Development Report 3, page 64)

(US\$ millions)

Sector	2004	2005	2006
Water transport	416	503	304
Hydropower plants	755	480	652
Agricultural water resources	608	830	790
Water supply and sanitation	3,127	4,405	3,879
Total water sector	4,951	6,218	5,625
Total all sectors	79,431	107,078	104,369
Water sector as share of all sectors (%)	6.2	5.8	5.4

Source: OECD, DCD/DAC 2007.

**Figure 2 New infrastructure seems to dominate donor investments in drinking water and sanitation**  
(World Water Development Report 3, page 58)



## COST RECOVERY AND SUSTAINABLE FINANCING

The ultimate sources of finance for water are tariffs, taxes, and transfers from aid or other external grants. This combination is known as the ‘3Ts’ (OECD, 2009b). Sustainable financing aims to ensure an adequate, reliable and predictable cash flow from these sources to support future operations and as the basis of a financing plan that includes repayable sources such as loans, bond issue and equity. Tariff revenue is at the heart of sustainable financing, though this does not imply that tariffs should always recover the full costs of supply including capital investment. Full cost recovery through tariffs is rare in practice, and most countries take a pragmatic approach – captured in the term *sustainable cost recovery* – through the three sources mentioned above.

A more active use of tariffs will, however, require more careful thought about *affordability* and how to deal with it. Many poorer people are not connected to networked water and sanitation systems, and have to make their own arrangements, usually at a multiple of the cost of those connected. For many such people, connection is more important than the tariff rate (though the connection charge may be a hurdle, for which special provisions have to be made). For connected customers, *affordability benchmarks* (for example, allowing for 3% or 5% of household income to be spent on WSS) are frequently used as a guide for tariff setting, however this measure is of greatest value when applied to the poorest segments of the population. *Affordability can be tackled either through the tariff structure (for example, offering free or cheap basic quotas, followed by full tariffs for subsequent increments and/or cross subsidies from other user categories) or through social security payments targeting deserving groups.*

## MINIMISE DEMANDS FOR FINANCE

Managing the demand for finance is as important as increasing its potential supply. *Although the financial input required to ensure adequate access to safe water will be large, this input should be kept within affordable bounds: by choosing more realistic investment programmes and service standards, introducing demand management approaches, maximising the efficiency of operations, and improving services in order to nurture the willingness-to-pay of users.* There is huge scope in each of these areas.

## FUNDING DEPENDS ON GREATER EFFICIENCY

In return for greater public financial support, it is reasonable (and desirable) for ministries of finance to require greater efficiency in the way water institutions operate. The WWDR3 documents the high level of wastage and losses in the distribution and use of water in household, industrial and agricultural end users. In many municipal distribution systems, Non-Revenue Water (NRW)<sup>20</sup> exceeds 50%. This comprises both physical losses through leakage and economic losses through unregistered and illegal connections, meter tampering, or bribery of collectors. The World Bank has estimated that NRW worldwide costs \$14 billion annually, and in developing countries the amounts lost through leakage are enough to serve an extra 200 million people annually (Kingdom, Liemberger and Marin, 2006). NRW is a waste both of the water and of the energy it takes to propel it around the network, while economic measures of NRW indicate the potential for improving the rate of collection of revenues due.

*Across all water sectors, there is ample scope for more critical and cost-effective investment targeting the reduction of waste and other ‘good housekeeping’ measures.* Such measures would improve the current reputation of the water sector in many countries as a financial Black Hole. Where there is inefficiency and unaccountability, corruption also flourishes (see section V below).

## MAKING WATER LESS RISKY

Financiers should exploit the full range of risk mitigation instruments available in order to manage the specific risks of the water sector. The main risk categories to be addressed are political, regulatory/contractual, credit, foreign exchange and sub-sovereign. The mechanisms available include guarantees, insurance, preferred creditor status, loan subsidies, output-based aid, convertible loans, debt-equity swaps, blended value models, challenge funds, shadow credit ratings, bond pooling, and project preparation facilities. The aims of these devices are, variously, to eliminate specific risks, to multiply the volume of finance, to make a more attractive financing package, to improve transparency, to strengthen balance sheets, to elicit better financial performance, to reduce transactions costs, to attract non-traditional sources, or to project potential earnings streams. However,

<sup>20</sup> This is also referred to as ‘unaccounted-for-water’.

guarantees and other instruments work best when they support other favourable forces – they cannot compensate for the absence of fundamentals.

Although the financial problems of water undertakings are familiar and have been well publicised, shares and bonds of well-managed water institutions can be attractive elements of an investment portfolio, particularly if key risks can be mitigated. The supply of water and sanitation services has the potential for stable cash flows and, with its durable infrastructure, meets the needs of certain kinds of investors. This can appeal to savers and investors (such as pension funds, insurance companies and specialised water and infrastructure funds) with a long time horizon to match their liability profile. A number of emerging and developing countries are issuing municipal bonds to fund water development. Many of the securities issued by municipalities and utilities are backed by various kinds of credit enhancement to reach the investment grade status that makes them attractive to local institutional investors. [Governments and agencies should ensure they offer an adequate range of risk-sharing facilities to ensure that potentially good projects do not suffer in the current turbulent financial climate.](#)

### TARGETED USE OF OFFICIAL DEVELOPMENT ASSISTANCE (ODA)

The largest gaps in access to drinking water and sanitation are in sub-Saharan Africa, in the slums in Asia and Latin America, in countries recovering from conflict, and in other *fragile states*. It is recommended that development agencies of all types increasingly focus their efforts on these country categories in future (WWDR3, p. 296).

### INTERNATIONAL FINANCIAL INSTITUTIONS: NEW LENDERS OF FIRST RESORT

The current international financial crisis has made it more difficult to raise commercial and private finance for public sector projects, especially for PSPs. Where this is feasible, some projects are raising more funds from local banks, especially where these are publicly owned.<sup>21</sup> There is likely to be greater demand for financing from international financial institutions (IFIs) and

development banks whose products and terms are well suited to the needs of water-related sectors. Early indications from the IFIs are that the demand for both their loans and risk-sharing products revives after a period of years when they have been subject to strong market competition from their commercial counterparts. In the World Bank Group, for example, the International Bank for Reconstruction and Development (IBRD) is gearing up to triple its rate of lending, the International Development Agency (IDA) has a facility in place to alleviate the effects of the financial crisis in poorer countries, and the International Finance Corporation (IFC) now has facilities to recapitalise distressed banks and provide rollover finance and recapitalisation for existing PSP projects.<sup>22</sup> [Governments should support the IFIs in their current initiatives to alleviate the financial distress of sponsors of water investments \(including co-financing, where appropriate\).](#)

### WATER INVESTMENTS AND FISCAL POLICY

Many economies are suffering from the repercussions of the current international financial turmoil, which is damaging the real economy through effects on the volume of trade, commodity prices and the movement of capital. National budgets are affected on both sides of the equation – with, on the one hand, reduced fiscal revenues due to recession, and on the other hand, increasing pressures to alleviate distress through subsidies, bail-outs, and other anti-cyclical spending measures.

In this financial climate, finance ministries are coming under great pressure to curb their discretionary spending. It will be more important than ever for them to set priorities in spending programmes that protect vulnerable social groups but also shield key infrastructure projects essential for long-term growth. These include investments in water infrastructure. It will also be important to resist the temptation to skimp on recurrent budgets and delay vital maintenance, which greatly adds to the cost of restitution in the longer term, as many countries are now discovering.

The WWDR3 contains ample evidence of the large expenditures urgently needed in all parts of the water sector. Water resources management needs to adapt to

<sup>21</sup> Latest news bulletins from PPIAF (Public-Private Partnerships in Infrastructure) ([www.ppiaf.org](http://www.ppiaf.org))

<sup>22</sup> Presentation by Jamal Saghir, Director of Energy, Transport and Water at the World Bank, to MEDEF International, Paris, Jan 23, 2009.

climatic change through investments in storage, flood control and more efficient irrigation systems. Water and sanitation services need to be provided to the several billion people lacking them. In more developed countries, ageing infrastructure needs upgrading to meet current expectations, and systems need optimising to make them more efficient. Many existing water infrastructure projects began as anti-recessionary schemes, and there are influential calls to use fiscal stimuli to promote 'green' development. In the midst of current problems of the world economy, however, finance ministers are rediscovering the value of infrastructure projects, including water, as anti-recessionary measures.<sup>23</sup>

Governments should keep a longer perspective on the current global financial uncertainty and see the opportunities, as well as the obvious difficulties, it contains for water finance.

### WATER SHOULD BE A PART OF ECONOMIC STIMULUS PACKAGES

A number of countries have announced economic stimulus packages to counter the impact of potential global recession on their domestic economies. Most of these packages include spending on water infrastructure, which if they are effective, can provide the *double dividend* of economic stimulus and specific benefits in the water domain. Since they are implemented in periods of surplus productive capacity, they are also likely to represent value for money for taxpayers. To have the intended counter-cyclical effect, they need to be in a state of readiness for implementation (*shovel-ready*).

In this context, the President of the World Bank has appealed for developed countries to earmark 0.7% of their stimulus packages for allocation to developing countries, in order to spread the international *multiplier effect* to these countries. IFIs are also gearing up to increase their lending to offset the current dearth of commercial credit and investment capital. The

World Bank has also created several new facilities: the Vulnerable Finance Facility, the Infrastructure Recovery Assets Platform, and (through IFC) the Private Sector Platform. These funds aim to stabilise the flow of investment into infrastructure, rescue sound but 'at risk' projects, support projects involving private sector participation, and sustain the pipeline of future projects.<sup>24</sup> These various initiatives propel the IFIs into the role of *lender of first resort* for infrastructure in many countries.

The need for such extraordinary fiscal measures does not diminish the importance of protecting public spending on essential operations and maintenance in the water sector. At a time of severe pressure on national budgets (lower revenues, more competing claimants), finance ministers should recognise the importance of safeguarding basic water infrastructure and services. At times of economic and financial austerity, it should be recalled that much of the investment required in water is to adapt existing infrastructure to changing demands, and to make it more efficient in delivering its services. Resizing elderly infrastructure, reducing leakage and losses, reducing high energy bills with state-of-the-art technology, encouraging recycling, conservation and water re-use, are all examples of investments with potentially good pay-offs, which will reduce recurrent spending in the future.

Many at the Fifth World Water Forum in Istanbul urged the water community to treat the current global financial crisis as an opportunity for bringing forward the reforms and investments that will sooner or later be essential. The UN Secretary-General has added his voice to encourage political leaders to 'seize the opportunity to shift the world economy towards sustainable growth, "green" jobs and "green" technologies' as part of any global stimulus plan.<sup>25</sup> The water sectors have a large agenda of actions of this kind.

<sup>23</sup> To date, water investments feature prominently in the economic stimulus programmes announced by the USA, China and Korea.

<sup>24</sup> Information from World Bank presentations at the 5<sup>th</sup> World Water Forum, March 2009.

<sup>25</sup> *Financial Times*, March 26, 2009. p. 8.

## V. Information, evidence and image

### INCREASE INFORMATION AND THE CAPACITY TO USE IT

Information about water is as essential to life as water itself. It aids decision-making by converting uncertainty into risk, which is more manageable.

Information reduces ignorance and uncertainty, which are important ingredients of market failures. It enables a better choice of infrastructure to be made. It is also the basis of water democracy, giving citizens and users more control over their lives and making public institutions more accountable for their actions.

Despite this, the WWDR3 demonstrates that not enough information on the world's water resources is being produced (Chapter 13). From a social viewpoint, insufficient resources are invested in the supply and dissemination of water information. From an economic perspective, water information is under-supplied, because much of it is a public good that private agents have no incentive to supply. This points to the important role of public agencies (and philanthropists) in rectifying this market failure. Globally, there is an important role for international action to supply water information in its role as an international public good.

The WWDR3 describes the main drivers and pressures governing water, but emphasises that they interact in a dynamic fashion and give rise to adjustment and feedback mechanisms. These forces create a complex dynamic, which makes prediction difficult. [Against this background there are potentially high returns to global society from further investment in data gathering and scenario modelling.](#) There would, for example, be great benefits from creating an empirical store of evidence-based adaptation measures (Nicol and Kaur, 2009).

More generally, national governments should commit to restoring and nourishing the information base on which the health of our water depends and resist the temptation to postpone or trim budgets for data collection and analysis. International agencies and other bodies should recognise the need to support the provision of water information. Governments can: encourage

the sharing of water knowledge; lower the barriers to the free spread of information; promote learning networks and peer-group interaction; and develop water education among children – who are the consumers and decision-makers of the future.

The information agenda also includes spreading 'water literacy' among users, decision-makers and others not normally found in the 'water compartment', and sponsoring the research and development of new concepts (such as 'virtual water' or 'water footprints'). Local knowledge should be fostered, marrying grassroots wisdom with 'top down' know-how. Local workers should be enabled to feed their data into national networks and models. Scientific and technological innovation should be promoted in all branches of the water domain, and human resources trained and equipped to absorb, process and apply this information for the benefit of society. This will be a challenge for education and capacity-building.

### WATER DATA TO INFORM DEVELOPMENT POLICY AND MANAGEMENT

At the World Water Forum in Istanbul there was a repeated message: that while the challenges faced in the water sector are growing, the data available to support water management and decision-making is not. Indeed, in many regions, data availability is decreasing. This has resulted in a series of inverted information pyramids, with a great deal of global policy and analysis activity at the top, supported by a very narrow data base. This data is often insufficient to allow robust conclusions to be drawn or to allow critical trends in water resource availability and use to be identified.

Data collection, integration and dissemination must be elevated on the agenda at the next World Water Forum. There is a need for strong leadership to achieve this, and for clear goals and timelines to support data for all. These will need to be established through an ongoing process that should bring together hydrologists, economists, social scientists and statisticians to strengthen coordination and cooperation among countries and international agencies.

Climate change is considered to be one of the major challenges facing the water sector, as water is the



**Figure 3 Water – a cross-cutting tool for the Millenium Development Goals (MDGs)**

MDG Target	Example of benefit
<b>1. Eradicate extreme poverty</b>	<ul style="list-style-type: none"> <li>• Water is a factor of production in agriculture and industry.</li> <li>• Improved health and convenience from better water services releases time and increases productive capacity.</li> </ul>
<b>2. Reduce hunger</b>	<ul style="list-style-type: none"> <li>• Water is a direct input to irrigated agriculture, subsistence food production and raising livestock.</li> <li>• Lower food prices benefit consumers.</li> <li>• Healthy people are better able to absorb nutrients.</li> </ul>
<b>3. Ensure universal primary education</b>	<ul style="list-style-type: none"> <li>• Better school attendance through improved health and fewer water-carrying duties.</li> <li>• Separate sanitation facilities for girls increases their school attendance.</li> </ul>
<b>4. Ensure gender equality and the empowerment of women</b>	<ul style="list-style-type: none"> <li>• Reduced healthcare burdens.</li> <li>• Lower child mortality eventually leads to less childbearing.</li> <li>• More convenient water and sanitation services saves time, effort, loss of dignity.</li> </ul>
<b>5. Reduce child mortality</b>	<ul style="list-style-type: none"> <li>• Better water and sanitation reduces diseases affecting children.</li> </ul>
<b>6. Improve maternal health</b>	<ul style="list-style-type: none"> <li>• Less water-carrying, improved nutrition, greater quantities of clean water and higher rates of child survival have health benefits for women.</li> </ul>
<b>7 &amp; 8. Combat HIV/AIDS, malaria and other major diseases</b>	<ul style="list-style-type: none"> <li>• Better water management reduces mosquito habitats and risks of other water-related diseases.</li> <li>• Better health and nutrition lowers susceptibility to many diseases and improves survival rates.</li> </ul>
<b>9 &amp; 10. Ensure environmental sustainability</b>	<ul style="list-style-type: none"> <li>• Water management, pollution control and water conservation help preserve habitats and ecosystems.</li> <li>• Water management helps combat desertification and water stress.</li> </ul>
<b>11. Improve the lives of slum dwellers</b>	<ul style="list-style-type: none"> <li>• Water supply, safe sanitation and excreta disposal are among the most pressing needs of slum dwellers.</li> </ul>

Source: *Investing in the Future: Water's Role in Achieving the Millennium Development Goals*, Swedish Water House, (2005)

medium through which many of its impacts will be felt – whether in relation to availability of water for agriculture, to creating conditions detrimental to health, to greater vulnerability of human settlements to natural disasters, or to increased costs for the supply of water and the disposal of waste water. It is thus relevant that the Nairobi Declaration<sup>26</sup>, the product of an initiative of the Danish Government to identify key issues in land and water management in preparation for COP15, adopted ‘information’ as one of its five guiding principles, stating in part that:

‘Information and knowledge for local adaptation must be improved, and must be considered a public good to be shared at all levels: The information currently available through global climate impact models and vulnerability assessment methods need to be refined to better support national and local actions to adapt to climate change within land and water management. We know enough to act; but we need to reduce uncertainties by improving and sharing data, scientific and local context specific knowledge and good practices on climate change impacts, in a form that can be widely disseminated and used by decision-makers at all levels. This includes real-time data for early warning and monitoring.’

UN-Water and the UN World Water Assessment Programme are taking action in response to this and other calls for more information, and are well placed to do more (see section VII).

Political support is needed to reallocate some of the resources currently focused on generating climate system information for mitigation efforts towards generating water resource data to underpin the more complex ongoing task of supporting adaptation.

### EVIDENCE: WATER IS THE KEYSTONE OF DEVELOPMENT

The economic and social benefits of developing water infrastructure and capacity have been well documented. Yet this evidence often seems to fall on deaf ears.

<sup>26</sup> The Nairobi Declaration is a direct response to the Bali Action Plan adopted at the 13th Conference of the Parties (COP13) to the United Nations Framework Convention on Climate Change (UNFCCC) and its call for long-term cooperative action on adaptation, now, up to and beyond 2012.

Water underpins economic growth. The direct financial returns from investment in water infrastructure tend to under-estimate its true economic worth: financial rates of return on such projects are often less than their economic returns. The provision of household water supply and sanitation to those currently lacking access has high net economic benefits through its impact on public health, labour productivity and time savings. Likewise, water storage can have major macroeconomic benefits that may not appear on the balance sheets of the institutions directly involved (see below). The returns of water investments partly accrue to other parts of the economy and to overall welfare and growth. *Investment in the development of water infrastructure and services has throughout history been an integral part of economic growth and development. This message needs to be stated more convincingly and in the right quarters.*

### WATER IS INTEGRAL TO ALL OF THE MILLENNIUM DEVELOPMENT GOALS

Improved management of water resources and better access to water supply and sanitation can benefit each of the MDG targets (Figure 2)

The benefits of water for all the MDGs need to be more widely and convincingly demonstrated, especially to key decision-makers.

### IMAGE: BRINGING CINDERELLA OUT OF THE SHADOWS

Despite its evident importance, as a topic for the attention of the world’s leaders, water is unfashionable, neglected, taken for granted, and only noticed when its services fail to materialise. Its assets are often invisible or unnoticed. Few politicians bother to turn up at the opening of new water or wastewater facilities, and – though happy to commemorate a new dam, reservoir or irrigation scheme – none has so far offered his/her name for a new sewage works. Water deserves better than this.

Water is affected by all the major global challenges that we now confront, and the degree to which it adapts will determine the success of humankind’s response to these challenges. Policies, institutions, behaviour and infrastructure will all need radical changes in the coming decades. The different parts of the water spectrum need

**Box 2 Economic impacts of water events in Africa**

Studies have documented the severe economic impact of flood and drought on East African countries. In Ethiopia and Tanzania there was a high correlation between rainfall variability and the growth of GDP over the period 1989–99. In Kenya the impact of the El Nino flooding in 1997–98 on transport, health and water infrastructure reduced GDP by 11%, while the impact of the drought of 1998–2000 on industry, hydropower, agriculture and livestock reduced GDP by 16%.

(*World Water Development Report 3*, page 70).

to attract the best people and resources, and engage the full attention of politicians and their public.

Water has had a staid and unfashionable image – ‘out of sight, out of mind’ – and has changed less than most other public services. However water represents a huge global market for goods and services (\$400 billion annually, by some estimates) that will need to change massively to keep up with environmental challenges, provide more food for growing populations, and become more efficient in its use of the resource in view of growing water scarcity in many regions. Innovation is needed, and will probably be rapid. Much of this will be driven by commercial interest, but much will also come from public institutions. It will need public and philanthropic support.

Water is not generally seen as the most exciting, glamorous and challenging sector in which to work. Many public sector workers have been criticised, often unfairly, for their low skills and resistance to change, though there are also inspiring examples of reform and innovation in public organisations. The image of water needs to change, and institutions in the water sector need to evolve into high-performance workplaces, in which workers have access to all the skills required in their new roles. Water could – and should – be a challenging and exciting sector in which to work.

Political leaders can help to bring this about through the prominence they give to the agenda of water change and their personal engagement in it. National water champions should be chosen from well-known and charismatic members of society to raise the profile of water among the public, to publicise the reforms to be made and the challenges to be met.

There is a darker aspect to the image of water – the corruption that it contains, the scale of which was recently exposed in the *Global Corruption Report 2008*, produced by Transparency International. Corruption occurs at all levels, in public and private institutions, individuals and companies and its impact varies. In one telling example, the report estimates that the inflation in the cost of equipment and works through inflating invoices, illegal commissions and backhand payments could raise the cost of achieving the MDGs by several billion dollars annually, or alternatively reduce annual programmes by this amount, or delay them. In any case, the poor unserved water users are the victims. A number of countries are taking steps to expose and manage this problem, and the Water Integrity Network is doing good work at the international scale. Governments are urged to recognise the damage done by corruption to the image and performance of the water sector, and to support all current initiatives to stamp it out.

The international donor community should support their development partners in the process of constructing national country water assessment. In collaboration with UN-Water and other agencies, these assessments should produce a concise account of the status of the country’s water resources, usage and services, indicating the main problems and flashpoints, to guide national priorities and international cooperation efforts. Indicators should be developed relevant to water policy-making, alongside the creation of capacity to use these data.



## VI. Implications for Africa

All of the issues and proposals discussed so far are of particular relevance to Africa. This section recaps the main points with specific reference to the African context.

Promoting more sustainable and self-reliant development in Africa will require more intensive and coherent development of the continent's water resources. All of the messages highlighted in this paper and the actions it suggests are highly relevant. Supranational institutions such as the African Ministerial Council on Water (AMCOW) need to have their status and resources enhanced to give them the necessary stature relative to their peers in other parts of government. Bodies such as the New Partnership for Africa's Development (NEPAD) should do the maximum possible to ensure that water policy-making is coherent and integrated with policy-making in other domains.

To achieve sustainable development and eradicate poverty in Africa, the G8 should take all necessary actions to promote cooperation among African nations and joint development of their water resources.

### POLICY COHERENCE

A coherent view of water is vital if Africa is to realise the potential of its resources for agriculture, mining, hydropower and industry. Only by understanding how these major sectors are interlinked and how water connects them all can we ensure that the necessary investments are made in infrastructure and capacity-building in areas from water storage to environmental protection, water supply and sanitation. Africa is widely regarded as having huge unrealised water potential, but this does not imply that water is a free resource, or that decisions can be taken irrespective of their impact on the water resource. Equally, failure to make necessary investments in water infrastructure can inflict major damage on growth and development (Box 1).

Raising the profile of water ministers among their national peers is an important step towards having water recognised as a factor in crucial decisions. The vital work of AMCOW, NEPAD and other African ministerial councils should be supported. Likewise for support

to the continued spread of Integrated Water Resource Management (IWRM) in African countries – IWRM is an approach dedicated to producing a holistic view of water among policy-makers. This is relevant both nationally and at river basin level (UNESCO, 2009).

For investment planning and project appraisal, water impact assessments will improve the quality of investments and avoid future costs and failures on this account. Peer group exchanges and international networking are also vital to spread good practice and new approaches to policy coherence: although water policy and institutions are highly country-specific, much can be learned from an awareness of what happens elsewhere.

### ADAPTING WATER TO CLIMATE CHANGE

Most of the discussion of the global response to climate change has been concerned with how these effects can be *mitigated*. From the point of view of water, the crucial medium through which climatic effects appear, *adaptation* is a more urgent perspective for African countries to take. It is widely accepted that Africa even now has much less storage, relative to its needs for flood and drought alleviation, than other regions. This need will increase if, as expected, climatic conditions become more unstable in future. Africa also has more scope than elsewhere to expand its irrigated area, though upgrading its rain-fed farming systems will also be vital to its adjustment.

Since 2001, countries have been encouraged to produce National Adaptation Programmes for Action (NAPAs), under the auspices of the UNFCCC. To date, thirty-eight NAPAs have been completed. Donor governments should support African countries in creating capacity to produce NAPAs, as well as exchanging experience in the development of this instrument so far. (Bjorklund *et al.* 2009).

### WATER AS AN INTERNATIONAL, REGIONAL AND TRANSBOUNDARY ISSUE

Consumption and investment decisions taken in one country can affect the water situation in another on the opposite side of the world. In 2008, a Korean conglomerate announced plans to lease half of Madagascar's arable land, with access to the water resources involved, to produce food for importing by

Korea.<sup>27</sup> The agreement has been rescinded following widespread opposition and political unrest. However, the concepts of *water footprints* and *virtual water* transform water from a local to an international and global issue. Many countries, including African, follow trading patterns that add to their water stress by exporting water-intensive goods and services.<sup>28</sup> A thorough study of the implications of virtual water for international trade policy and institutions is desirable, and governments should be prepared to help to adjust their own and their trading partners' policies accordingly.

Water is a regional or transboundary matter for more than forty African countries that share rivers or lakes. In developing their water resources, as well as adjusting to climate change, these countries need adequate data on these hydrological resources. They also need regional and transboundary institutions to negotiate and implement the agreements required. Unfortunately, with some notable exceptions<sup>29</sup> the development of these databases and institutions has suffered from a lack of funding. Urgent action is needed to restore international support to regional institutions and their information infrastructure.

### IMPROVING WATER FINANCES

In financing, the essential distinction is between basic sources of revenues (tariffs, public budgets, ODA and other philanthropic transfers) and repayable funding (loans, bonds and equity). It is important to secure a future flow of revenues through the former in order to leverage the required amounts of the latter. Various forms of facilitation are available (guarantees, subsidies, co-finance, etc.) to achieve this leverage.

Funding is essential to cover the costs of operation and maintenance (O&M) replacement, rehabilitation, modernisation and extension of water infrastructure. The cost of maintaining and repairing systems is widely neglected, with the result that infrastructure is deteriorating and the quality of services is falling. This is just as true for basic rural services as for the more sophisticated urban networks: in recent surveys of the

Menaca region in Mali, 80% of the wells were found to be dysfunctional, and in northern Ghana, 58% of the water points needed repair. The International Institute for Environment and Development has estimated that across Africa as a whole there are 50,000 dysfunctional water infrastructure systems (IIED, 2009).

Different countries make different choices in the balance between tariff revenues, government budgets, ODA and other transfers. In general, tariffs fail to cover O&M for household WSS, though some African countries have instituted tariff reforms as part of efforts at commercialisation. The situation is even worse for irrigation charges, where pricing reforms need to be part of a comprehensive set of measures to improve productivity and governance.

African Governments have committed themselves to increasing their budgets for water. There are various channels through which public budgetary transfers can flow, depending on whether they are intended to cover administrative overheads, target specific categories of users, underwrite deficits of utilities, subsidise capital spending, etc.

ODA commitments for water supply and sanitation are starting to increase, though the trend is less clear for ODA for water resources in a wider sense. Donor agencies are taking steps to harmonise their programmes and modalities to ease the impact on recipients. Even so, the multiplicity of donors and NGOs can be a serious distraction for national administrations. The distribution of ODA for water is causing international concern – a number of needy countries have become *aid orphans*. Africa received 32% of all aid for water supply and sanitation in 2001–06, though this has fallen more recently. Part of the explanation of this relatively low share is the presence of a number of failed and fragile states. It is urgent for the donor community to pool its resources and experience to get effective aid to these deserving cases.

Commercial bank lending for municipal or agricultural water in Africa is normally short-term, unless there are guarantees or other kinds of credit enhancement. IFI loans, especially from the World Bank and AfDB, have become more important during the current international situation, and these agencies have just introduced new

27 *The Economist*, April 11, 2009.

28 Conversely, some relieve their stress by importing 'virtual water' in the form of goods and services with a high water content.

29 E.g. the Nile Basin Initiative and the Southern African institutions within SADCC

facilities to support existing projects and sustain the future project pipeline. The World Bank's Water and Sanitation Programme and the Water Operators Partnership are working with seven African water utilities to give them *shadow credit ratings* and benchmarking as steps towards giving them access to domestic financial markets. The Ugandan NWSCC is preparing for a national bond issue. Governments and agencies should support these efforts to strengthen the finances of water authorities and broaden their access to local sources of funds.

Private equity has had a chequered record in African water. There have been successful concessions and lease contracts in some francophone countries, but few solid success stories elsewhere. Likewise, PSPs in hydropower have been problematic. There is a trend in PSP for municipal water services to favour lower-risk variants such as management contracts or leasing, that do not expose the promoters' balance sheets. There are some interesting examples of PSP (of all types) in irrigation.

The current international financial climate has created great uncertainty for all kinds of commercial funding and private equity. National budgets in many countries are also coming under great strain and borrowing is more difficult. It is difficult to predict how these forces will resolve themselves, or what their final impact will be on water sector financing. Water agencies and service providers will need to exert themselves to take all

possible housekeeping measures to reinforce their basic revenues, improve their financial viability and minimise their need for external funding until the situation improves.

## INFORMATION AND AWARENESS

The importance of water and the demands being placed on it to meet future challenges call for a transformation in the way water is perceived by society. Political leaders can make a start by promoting the water agenda, engaging personally in it, and identifying local water 'champions' who can promote public interest and support in the changes required.

Governments, private businesses and members of civil society need to recognise the damage that corruption does to the image and performance of the water sector and commit to eradicating such practices.

Awareness depends ultimately on information, to overcome the familiar problem of 'out of sight, out of mind'. However, water databases have been depreciating in many countries – to bring water back into the limelight, the WWDR3 proposes measures to bridge this observational gap (Chapter 13). All governments and international agencies need to invest more in the information base for water, through data-gathering, scenario-modelling, improved water literacy, and scientific and technological innovation.

## VII. Potential role for UN-Water and the World Water Assessment Programme

UN-Water has established a Task Force on Indicators, Monitoring and Reporting to strengthen its effectiveness to monitor what is happening in the water sector (water resources management, sanitation and all sub sectoral uses), including situation changes, performance, and impacts of actions and investments. It also aims to report regularly and provide a simple picture of the complex water sector on its website.

For its part, the United Nations World Water Assessment Programme is undertaking a programme of work to address the data and monitoring challenge. It aims to produce proposals for actions at global, regional and national levels to strengthen both data production and the ability to generate information to improve policy and decision making at those levels. Key innovations have already been identified that, if implemented and

resourced, would enable water and development managers at all levels to take more effective action and to cope better with future challenges.

In short, UN Water and the World Water Assessment Programme can take the above agenda forward in a number of important ways:

- ◆ country assessment,
- ◆ data collection,
- ◆ development and use of indicators and monitoring,
- ◆ case studies,
- ◆ scenario development,
- ◆ capacity building,
- ◆ and country level coordination in all these areas.

## Key references

- Birdsall, Nancy. 2006. 'Overcoming coordination and attribution problems – meeting the challenge of under-funded regionalism'. In Kaul, Inge and Pedro Conceicao (eds.), *The New Public Finance: Responding to Global Challenges*. UNDP/ Oxford University Press.
- Bjorklund, G. et al. 2009. *Water Adaptation in National Adaptation Programmes for Action*. Dialogue Paper. Paris, UNESCO Publishing and WWAP.
- Chapagain, A.K. and Hoekstra, A.Y. 2004. *Water Footprints of Nations*. Paris, UNESCO-IHE,.
- G8 Sherpa Office, Italy. 2008. *The 2009 G8: Sharing Leadership for a Sustainable Future*.
- IIED. 2009. 'Where every drop counts: tackling rural Africa's water crisis'. March. (www.iied.org).
- Kaul, Inge and Pedro Conceicao (eds.). 2006. *The New Public Finance: Responding to Global Challenges*. UNDP/ Oxford University Press.
- Kingdom, Liemberger and Marin. 2006. 'The challenge of reducing Non Revenue Water in developing countries'. World Bank/PPIAF.
- Ministry of Foreign Affairs, Turkey. 2009. *Istanbul Water Strategy Guide*. Ministry of Foreign Affairs, World Water Council.
- Molden, David (ed). 2007. *Water for Food, Water for Life: A Comprehensive Assessment of Water Management in Agriculture*. IWMI/Earthscan.
- Nicol, Alan and Kaur, Nanki. 2009. 'Adapting to climate change in the water sector'. Background Note prepared for the World Water Day, 22 March 2009. Overseas Development Institute, London.
- OECD. 2009a. 'Managing water for all: an OECD perspective on pricing and financing'. March. Paris, OECD.
- OECD. 2009b. 'Strategic financial planning for water supply and sanitation'. March. Paris, OECD.
- UNESCO. 2009. *IWRM Guidelines at River Basin Level*. Paris, UNESCO.
- World Economic Forum Water Initiative. 2009. 'The bubble is close to bursting: a forecast of the main economic and geopolitical water issues likely to arise in the world during the next two decades'. Paper prepared for the World Economic Forum Annual Meeting, Davos, Jan.
- World Water Assessment Programme. 2009. 'Messages Series' (a series of briefing papers addressed to different target readers, produced to accompany the WWRD3, 2009). Perugia, Italy, WWAP.
- World Water Assessment Programme. 2009. *The World Water Development Report 3: Water in a Changing World*. Paris, UNESCO, and London, Earthscan.

## The United Nations World Water Development Report 3: Water in a Changing World

Water is vital to all aspects of human life. Using water wisely and managing our water resources is an essential component of growth, socioeconomic development and reducing poverty. Yet around the world we see water scarcity problems rising. And if we don't take action, they risk becoming even more severe.

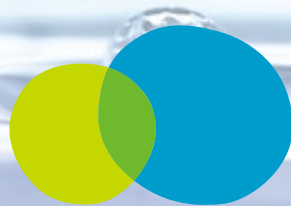
Coordinated by the World Water Assessment Programme, the United Nations World Water Development Report 3: *Water in a Changing World* is a joint effort of the 26 United Nations agencies and entities that make up UN-Water. The report brings together some of the world's leading experts to analyse the state of the world's freshwater resources: it monitors changes in our water supplies and in how we manage them, and tracks our progress towards achieving international development targets.

*Water in a Changing World* also provides decision makers with the tools to implement sustainable use of our water – offering best practices to help stimulate ideas and actions for better stewardship of this most essential resource.

The report is presented together with a case study volume: *Facing the Challenges*. Adopting the premise that local actions and on-the-ground insights are the starting point of a global strategy to improve management of the world's freshwater resources, these 20 case studies from around the world examine water challenges and the differing management approaches taken in response in Bangladesh, Cameroon, China, the Cholistan desert (Pakistan), Estonia, the Han River basin (Republic of Korea), Istanbul (Turkey), the Lake Merín basin (Brazil and Uruguay), La Plata River basin (Argentina, Bolivia, Brazil, Paraguay and Uruguay), the Netherlands, Pacific island states, the Po River basin (Italy), the Autonomous Community of the Basque Country (Spain), Sri Lanka, Sudan, Swaziland, Tunisia, Uzbekistan, the Vuoksi River basin (Finland and the Russian Federation) and Zambia.



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