DFID Department for International Development

plans

Addressing the Water Crisis

healthier and more productive lives for poor people

Strategies for achieving the international development targets

The international development targets

Economic well-being

- a reduction by one-half in the proportion of people living in extreme poverty by 2015.

Social and human development

- universal primary education in all countries by 2015;
- demonstrated progress towards gender equality and the empowerment of women by eliminating gender disparity in primary and secondary education by 2005;
- a reduction by two-thirds in the mortality rates for infants and children under age 5 by 2015;
- a reduction by three-fourths in maternal mortality by 2015;
- access through the primary health-care system to reproductive health services for all individuals of appropriate ages as soon as possible and no later than the year 2015.

Environmental sustainability and regeneration

- the implementation of national strategies for sustainable development in all countries by 2005, so as to ensure that current trends in the loss of environmental resources are effectively reversed at both global and national levels by 2015.

While not amenable to quantification, there is a range of qualitative elements of development that are essential to the attainment of the quantitative goals. These include democratic accountability, the protection of human rights and the rule of law.

Other Strategy Papers published in this series

Achieving sustainability, poverty elimination and the environment

Better health for poor people

The challenge of universal primary education

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Meeting the challenge of poverty in urban areas

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Addressing the Water Crisis

healthier and more productive lives for poor people

Strategies for achieving the international development targets

Department for International Development

The Department for International Development (DFID) is the UK government department responsible for promoting development and the reduction of poverty. The government elected in May 1997 increased its commitment to development by strengthening the department and increasing its budget.

The central focus of the Government's policy, set out in its first White Paper on International Development in 1997, is a commitment to the internationally agreed target to halve the proportion of people living in extreme poverty by 2015, together with the associated targets including basic health care provision and universal access to primary education by the same date. The government's second White Paper on International Development, published in December 2000, reaffirmed this commitment, while focusing specifically on how to manage the process of globalisation to benefit poor people.

DFID seeks to work in partnership with governments which are committed to the international targets, and seeks to work with business, civil society and the research community to encourage progress which will help reduce poverty. We also work with multilateral institutions including the World Bank, United Nations agencies and the European Commission. The bulk of our assistance is concentrated on the poorest countries in Asia and sub-Saharan Africa.

We are also contributing to poverty elimination and sustainable development in middle income countries, and helping the transition countries in Central and Eastern Europe to try to ensure that the widest number of people benefit from the process of change.

As well as its headquarters in London and East Kilbride, DFID has offices in New Delhi, Bangkok, Dhaka, Kathmandu, Nairobi, Dar-es-Salaam, Kampala, Harare, Abuja, Pretoria, Suva, Bridgetown and Montserrat. In other parts of the world, DFID works through staff based in British embassies and high commissions.

Department for International Development
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Acknowledgements

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List of Acronyms

CBO	Community-based Organisation
CCAI	Common Country Assessment Indicator
CGIAR	Consultative Group on International Agricultural Research
CSD	Commission on Sustainable Development
DAC	Development Assistance Committee
DFID	Department for International Development
GWP	Global Water Partnership
ICID	International Commission on Irrigation and Drainage
IDT	International Development Target
IHP	International Hydrology Programme
IMF	International Monetary Fund
IRRI	International Rice Research Institute
IWMI	International Water Management Institute
IWRM	Integrated Water Resource Management
JMP	Joint Monitoring Programme
KaR	Knowledge and Research
NBI	Nile Basin Initiative
NGO	Non-government Organisation
NSSD	National Strategies for Sustainable Development
OECD	Organisation for Economic Co-operation and Development
PPIAF	Public Private Infrastructure Advisory Facility
PPP	Public Private Partnership
PPPUE	Public Private Partnership in Urban Environment
PRSP	Poverty Reduction Strategy Paper
PSA	Public Service Agreement
SIDA	Swedish International Development Co-operation Agency
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UNICEF	United Nations Children's Fund
WELL	Water and Environmental Health at London and Loughborough
WHO	World Health Organisation
WMO	World Meteorological Organisation
WWC	World Water Council
WWDR	World Water Development Report
WSSCC	Water Supply and Sanitation Collaborative Council

Foreword by the Secretary of State

This paper is one of a set. Together, they spell out actions which could transform the lives of hundreds of millions of poor people and make the planet a better and safer place for our children and grandchildren. They say what needs to be done to achieve key targets for international development.

These international development targets have been agreed by the entire United Nations membership, following a series of summit meetings held by the UN and its Specialised Agencies over the past ten years or so. The meetings discussed progress in poverty reduction and sustainable development and set targets for measuring that progress.

In the past, targets have often been set and then disregarded. This time, however, the international community is giving them greater weight. In 1996, all the main Western donor countries, grouped together in the OECD, committed themselves to a partnership with developing countries and countries in transition from centrally planned economies. The success of this partnership would be measured against key targets from the UN Summits. In the following year, the new British Government made these targets the centrepiece of its 1997 White Paper on International Development. More recently the World Bank and IMF decided to co-ordinate their development efforts behind the targets. These targets are listed on the inside front cover.

Neither Britain nor any other individual donor country can achieve the targets alone. The targets are challenging, some particularly so. But if, by working together, we can increase the effectiveness of the international community, our assessment is that these targets are achievable for developing and transition countries as a group by the target date, or soon after in some cases, even though they may not be achieved in each region or country individually. It is clear that each developing country must lead the effort if the targets are to be achieved. If this commitment is lacking civil society institutions need to press their governments to take action as, without a local lead, progress cannot be achieved. The international community, in turn, must provide support for those governments committed to the reforms which are necessary to achieve the targets. Most countries should be able to register very considerable progress towards meeting the targets by the due dates.

Sustainable access to safe water for drinking, and water for agriculture and the environment, plays an important part in achieving a number of the key UN targets, and the availability of appropriate sanitation is closely aligned with a reduction in communicable disease. This paper is about water supply and sanitation and water for food in the context of broader water resources issues.

At the beginning of the UN Drinking Water Supply and Sanitation Decade (1981–1990), an ambitious target of universal access to safe water and affordable sanitation for all was set for the end of the decade. This target was subsequently extended to the year 2000. Now we have passed the latter date. Although progress has been achieved on improved access to safe water, there are still 1 billion people without this access, and the availability of appropriate sanitation has improved only very slowly with 2.4 billion living in unhealthy environments due to lack of sanitation. So new and credible targets were urgently needed, both for water supply and sanitation and for water resources management, in order to refocus the efforts of governments and the development community.

Significant efforts were made in preparation for the Second World Water Forum in The Hague to develop credible international targets for implementing comprehensive water strategies and for sustainable access to safe water and affordable sanitation. The Millennium Summit's ministerial declaration (September 2000) includes a target for water supply and refers to the need for improved water resources management. It is silent on sanitation. Our task is to support processes that will lead to international agreement on a sanitation target, and further embed water supply and water resources targets. The paper suggests how governments, the donor community in general and others can meet these targets and goes on to discuss the specific role that DFID might play.

Targets need to be used intelligently. They cannot capture the full richness and complexity of individual and collective transformation that makes for sustainable development. Individual countries should select and debate in normal democratic ways their own measures of achievement. But regular public assessment of how countries as a group and by region are performing against a simple standard is essential, in order to focus development assistance on achieving real outputs. Doing so will show what works and what does not, will provide accountability for the efforts being made in the name of development, and will give impetus to extending basic life opportunities that should be available to all.

Targets also need to be grounded in reality. For this, we should not underestimate the value of good statistics. The political debate in Britain was strongly influenced by 19th and early 20th century surveys documenting the reality of grinding poverty in our own society. A similar effort of political will is needed in many developing and transition countries if they are to give sufficient emphasis to the needs of their own poor people. Better quality and more accessible information on people's standards of living is one essential element in creating that will. Much work is needed to improve the collection of reliable and comparable data, and to strengthen local statistical capacity.

These papers do not attempt to provide detailed plans; they will follow, country by country and institution by institution, from discussions with developing countries and the relevant institutions. Many detailed proposals for action in pursuit of the targets are published, or soon will be, as Country and Institutional Strategy Papers. Our bilateral programmes are being reshaped. We are also encouraging the multilateral development institutions in the same direction. One example of this is the policy of the International Development Association – the concessional lending arm of the World Bank – which following its Twelfth Replenishment now focuses on poverty elimination in the context of the International Development Targets. Another example is the enhanced Heavily Indebted Poor Countries Debt Initiative, agreed at the IMF and World Bank in September 1999, which has started to deliver faster, deeper and broader debt relief to countries committed to eradicating poverty. The G8 Summit in Okinawa endorsed the targets and asked for annual reports on progress.

We must also take advantage of the increased wealth being generated by "globalisation", to help achieve the international development targets. The UK Government's second White Paper on International Development, focuses on managing the process of globalisation to the benefit of poor people.

This paper and the others in the collection assess the challenge and set out an overall approach and strategy for our involvement in achieving the development targets in a clear, focused and realistic way. Each reflects a process of consultation in the United Kingdom and overseas.

I hope that you will find them a valuable statement of what the British Government will do and how the United Kingdom seeks to use its influence to make a reality of the targets, to which we and the rest of the United Nations membership are committed. We stand ready to be judged against our delivery of this strategy. And the whole development community – governments, international agencies, civil society organisations – should be judged collectively against delivery of the targets.

CLARE SHORT
Secretary of State for
International Development

Executive summary

This paper is about water and its links to poverty elimination and to the achievement of the International Development Targets (IDTs). Those links form the basis of all DFID's work in water.

Section 1 of the paper describes the impending water crisis in the world. Six billion people now depend on the world's finite supply of freshwater – to drink every day, to grow our food and, in many cases, to dispose of our excreta, to bathe, and for many other purposes. One billion of us have only unsafe water to drink, and over two billion lack sanitation. Hundreds of millions live in places where water is very scarce and, therefore, a contested resource. Vast numbers are crowding into large, ill-served cities. In a generation's time, not six but eight billion of us will depend on the same amount of water for all the same purposes. That is the nature of the impending crisis, a crisis that is particularly serious for the health and livelihoods of the world's poor people. Section 1 continues by presenting the challenges that face us in resolving the crisis. We will have to improve our management of water resources and avoid conflicts over them. We must allocate water equitably between different uses and ensure sustainable access to different types of water services. We will have to improve co-ordination among the many organisations active in the water sector.

The goal underlying DFID's activities in water is to enable poor people to lead healthier and more productive lives through improved management of water resources and increased and sustainable access to water supply and sanitation. That goal is presented in Section 2 of this paper, which describes how water contributes to the three main elements of the International Development Targets, that is, economic well-being; human development; and environmental sustainability and regeneration. In pursuit of the goal, this section of the paper goes on to promote the adoption of the following three high-priority targets:

- to have comprehensive policies and strategies for integrated water resources management adopted and in process of active implementation in all countries by 2005
- to reduce by half the proportion of people who are unable to reach, or to afford, safe drinking water by 2015
- to reduce by half the proportion of people not having access to hygienic sanitation facilities by 2015.

Some of the lessons that we, and others, have learned are described in Section 3. To serve people we must put them at the centre, with the authority and confidence to determine their own development, and we must be ready to respond to their demands. To share water equitably between different uses we must both measure it and recognise its economic value. To provide the means to look after water properly we must pay a fair rate for using it and, for wastewater disposal and treatment, pay a realistic penalty for polluting it. To resolve conflicts we must work together in trust and openness.

Most of the big problems in water, and poverty, are in developing countries. Section 4 sets out proposals for the range of activities involved in order to achieve the targets. First, it addresses the people themselves, whose engagement is vital both directly and through civil society organisations. Next, it considers the governments of those countries, which are the most important agencies in the water sector – they remain the largest, if not the sole, suppliers of water services and they decide who will supply and use water, where and under what conditions. Then it deals with the private sector, whose role in water service delivery is increasingly significant. Finally, it addresses the international development community, whose help will remain invaluable and which needs to work with other organisations more than ever before.

DFID is a member of that international development community, and Section 5 describes DFID's own contribution, first by presenting our overall strategy for water, which is:

- to focus international policy making in water resources, irrigation, water supply and sanitation on the elimination of poverty
- to concentrate our efforts in improving the management and allocation of water resources and access to water and sanitation on achieving improved health and sustainable livelihoods for the poor
- to obtain agreement through the UN system for an appropriate interim sanitation target, and support action to achieve water supply and water resources targets
- to encourage strong leadership at all levels to address the water crisis
- to support a range of activities from field-level projects and programmes through to knowledge dissemination, advocacy and research and

- to ensure that our activities in water contribute to, and are guided by, Poverty Reduction Strategies (PRSPs).

Section 5 then describes a range of responses that provides a basis for DFID's water related activities, grouped under the strategic headings of transforming institutions, promoting best practice, and generating and sharing knowledge. While the range of activities is kept deliberately wide in order to reflect the complexity of water as an issue, DFID's special priorities, which derive from its goal in water described above, are clearly indicated.

The paper concludes, in Section 6, by discussing how progress in the water sector as a whole, and by DFID in particular, will be monitored.

1. The challenges

1.1 Introduction

This section of the strategy paper begins by setting out the current situation in the water and sanitation sector. The analysis indicates the nature of the potential crisis facing us arising from an increasing imbalance between the availability and demand for fresh water, a situation that is already affecting poor people most heavily. We then examine the key challenges that we all need to address if we are to be able to meet the growing demands within the limits of available resources. We must improve the management of the water resources and the environment, take urgent action to avoid conflicts over water resources, improve the allocation of water between different uses, deliver sustainable water and sanitation services to meet needs, and improve coordination among the international players.

1.2 The current situation in water resources

1.2.1 Freshwater is a finite and precious resource that is essential for sustaining life, as are the natural systems that provide and maintain its supply. As demand increases, this resource is becoming increasingly scarce. Global freshwater consumption rose sixfold between 1900 and 2000 – more than twice the rate of population growth – and the rate of increase of consumption is still accelerating. Demand for water resources is increasing both because of population growth (particularly in developing countries) and because of rising demand per person due to such causes as irrigation development, industrialisation, and increasing use by individuals as incomes rise. A potential crisis is looming where available resources can no longer meet needs.

1.2.2 Table 1 presents recent data on annual withdrawals within continents, and across sectors. The table illustrates the continental-scale variations that exist. The uneven distribution of the world's population exacerbates variations in the amount of water potentially available per person. In Asia, for example, water availability per person is half the global average. Although annual withdrawals currently represent an apparently small proportion of the available freshwater resources – some 9% in 2000 – this is deceptive. In addition, the annual withdrawals are also forecast to increase globally to 12% by 2025.

1.2.3 There is no set maximum limit on withdrawal, but at a national level a figure of 10% of the available freshwater resources is conventionally used to define a threshold of water stress. This is because a significant proportion of water resources occurs as seasonal floods that pass rapidly down rivers to the sea or are remote from human habitation. Table 2 illustrates the future predicted decline in availability of freshwater by region.

Table 1: Estimated annual water resources and withdrawals, by region, 1995

Continent	Annual renewable water resources (m^3 per person)	Annual Withdrawals in m^3 per person	Annual Withdrawals as % of average renewable water resources	Sectoral Withdrawals (as % of Annual Withdrawals) Agriculture	Industry	Municipal	Evaporation losses from reservoirs
Asia	4,000	680	17	80	9	8	3
Europe	4,200	760	18	38	45	14	3
Africa	5,700	325	6	61	4	9	26
North America	17,000	1530	9	47	38	10	5
South America	38,000	1140	3	57	12	21	10
Australia/Oceania	84,000	840	1	50	24	11	15
The World	7,600	680	9	66	19	10	5

Source: *Comprehensive Assessment of the Freshwater Resources of the World*, Stockholm Environment Institute 1997.

Table 2: Predicted decline in per capita availability of water resources, by region, 1995–2025

Region	Annual renewable water resources (m^3 per person)		
	1995	2000	2025
Asia	4,000	3,400	2,300
Europe	4,200	3,900	3,900
Africa	5,700	4,500	2,500
North America	17,000	15,400	12,500
South America	38,000	33,400	24,100
Australia & Oceania	84,000	75,900	61,400

Source: *Comprehensive Assessment of the Freshwater Resources of the World*, Stockholm Environment Institute 1997.

1.2.4 The Stockholm Environment Institute has estimated that, allowing for predicted population growth and assuming moderate projections of development and climate change, the proportion of the world's population living in countries of significant water stress[1] will increase from approximately 34% in 1995 to 63% in 2025. Those living in poorer countries in Asia and Africa, with low and unreliable rainfall and high levels of utilisation of the total water resource, will be most at risk of water stress impacting severely on their lives and livelihoods.

1.2.5 Freshwater is also a mobile resource. It is present as atmospheric moisture, rainfall, soil moisture, surface water (including rivers and lakes) and groundwater, and there are complex relationships between these different parts of the hydrological cycle. All of these forms of water vary over place and time, both seasonally and from year to year. Their distribution is affected by climate and landscape. Water use, and with it the value that people give that water, also varies with place and time according to the people's capacity to modify or capture the resource. The sustainability of the quality and quantity of water resources depends on the balance of agricultural, industrial and domestic uses against the prevailing hydrological conditions. At the same time, people are increasingly recognising that the environment is both the fundamental provider of freshwater and a legitimate user of that water, and that the maintenance of ecosystems demands a range of seasonal water requirements.

1.2.6 Users of water need dependable sources. Throughout the world reservoirs are used both to mitigate floods and to store surface water from periods of excess to periods of deficit (either within years or between years), and thereby to provide a reliable supply. As withdrawal amounts increase, particularly in places with sporadic rainfall, so the need for storage increases. However, while dams undoubtedly have benefits, some of which accrue to poor people, they also have complex social and environmental consequences for poor people. This subject was explored by the World Commission on Dams (1997–2000). The commission comprised twelve individuals of international standing, each representing different interests in the dams debate. They achieved a remarkable consensus, reflected in the World Commission on Dams report (November 2000) which sets out a very constructive protocol for future planning of dams.

1.2.7 Desalination has often been promoted as the supply side solution to the anticipated levels of rising demand. It is true that the cost of desalination has fallen dramatically in recent years as a result of technological advances, reducing energy prices and better management. However, although it now seems likely that desalination may well play a significant role in providing water to coastal cities and industries, it is unlikely that this technology could be used more generally to provide water to inland communities.

1.2.8 National boundaries and river catchments are not coincident, and many countries rely to some degree on river flows from countries upstream. Indeed, approximately 15% of all countries receive more than half their available water from upstream countries. Consequently, access to water often depends not only on national policies, but also on international relations and agreements with other nation states.

1.2.9 The absence of effective planning and management of these scarce water resources is a major impediment to the elimination of poverty. Poorer states, poorer regions of countries, and poorer communities and households have the greatest difficulty in establishing their claims to water. Few countries have specifically designed their water policies with an orientation towards poor communities. Where legislation exists, it is not always aligned with stated water policy and the institutions required for its implementation are frequently ineffective. On the other hand, where customary institutions and traditional water laws do exist, they are frequently overlooked or ignored.

1.2.10 In some countries, those responsible for managing and allocating water are vulnerable to conscious or unconscious bias towards the rich and powerful. Political patronage and corruption frequently override

[1]Significant water stress defined as withdrawals greater than 20% of the available freshwater resources in a country.

considerations of efficiency or equity. In the increasingly tense competition over the use of water resources, the poor have the least influence.

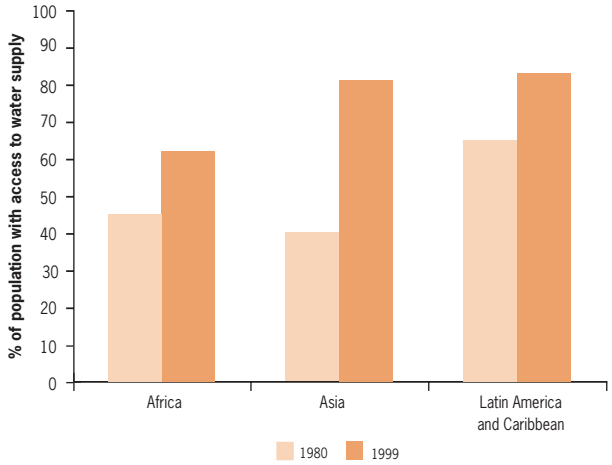
1.3 The current situation in water supply and sanitation[2]

1.3.1 In common with other agencies, DFID uses statistics produced by the WHO/UNICEF Joint Monitoring Programme (JMP) based on data collected within the countries concerned. Table 3 and Table 4 summarise current water supply and sanitation coverage using the JMP's "Global Assessment 2000 – Status of the water supply and sanitation sector" (N.B. 1999 figures)[3] (See Annex 2).

1.3.2 Table 3 presents the data subdivided by geographical regions. It shows that over 1 billion people around the world lack access to a safe water supply and over 2.4 billion lack adequate sanitation. A substantial majority of these people live in Asia.

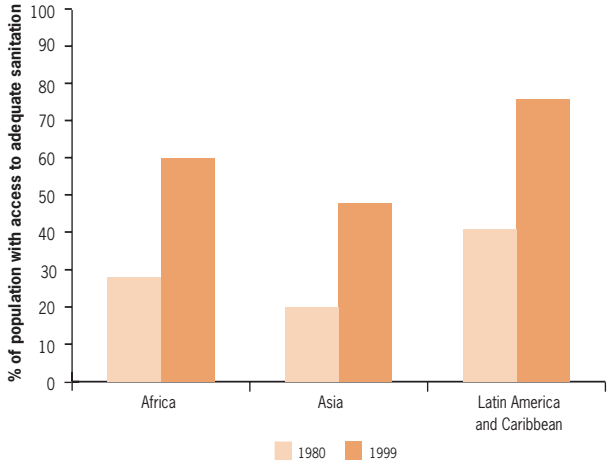
1.3.3 Figures 1 (a) and (b) present the water supply and sanitation figures from Table 3 for the three regions with the most people without access to water and sanitation, compared with figures for 1980. Subject to the cautions on interpreting the figures as explained in 1.3.5 below, good progress has been made in water supply, notably in Asia where the population with access to water has increased rapidly over the past 15 years. Indeed, some of the greatest achievements of the last 20 years have been made in India, where the population with access to water is reported to have increased from 41% to 88%. In Africa, by contrast, over one third of the population remains without access to water.

Fig 1a: Improvements in water supply coverage by region, 1980–1999



Source: JMP

Fig 1b: Improvements in sanitation coverage by region, 1980–1999



Source: JMP

Table 3: Water supply and sanitation coverage by region, 1999

Region	Population (millions)	Percentage with Access		Number Unserved (millions)	
		Water	Sanitation	Water	Sanitation
Africa	784	62	60	302	318
Asia	3,682	81	48	692	1,916
Latin America and Caribbean	519	83	76	89	127
Oceania	30	87	93	4	2
Europe	728	96	92	25	55
North America	309	100	100	0	0
Total	6,054	82	60	1,113	2,418

Source: JMP

[2]DFID uses the term 'sanitation' in its broadest sense, encompassing all aspects of personal, household and public excreta and waste disposal (on site and waterborne) and cleanliness. This sense applies throughout this paper.
[3]These figures differ slightly from those given for water supply in Annex 1, mainly due to the different methods of grouping countries into regions.

1.3.4 The figures for sanitation are worse than those for water in all regions, with Asia, despite apparent progress, containing 1.9 billion of the 2.4 billion people lacking adequate sanitation. The pace of improvement in sanitation has been slower than in water, and the numbers remaining unserved are much larger.

1.3.5 Table 4 disaggregates the figures for urban and rural areas (as defined by the JMP) for the same three regions, and shows the current figures alongside those from previous decades. It appears to show a pattern of steady progress over the last three decades in both water supply and sanitation; for sanitation in particular it shows more encouraging progress than most agencies had previously presumed. However, in studying this table to discern trends over the last 30 years, there are difficulties. First, the data collection methods have changed from supply data, estimated by officials of the agencies responsible, to consumption data obtained through household surveys from the people themselves, triangulated with the conventional supply data. Secondly, the definitions of safe water and adequate sanitation in specific countries have changed[4]. Thirdly, many countries failed to report in the earlier years, and many developing countries, such as the central Asian republics, were previously considered part of a developed country – for example, the Soviet Union.

Table 4: Percentage water supply and sanitation coverage (for Africa, Asia and Latin America combined), subdivided into urban and rural, 1970–1999

	1970	1980	1990	1999
Urban water	65	74	82	91
Rural water	13	33	50	69
Urban sanitation	54	50	67	80
Rural sanitation	9	13	20	32

Source: JMP

1.3.6 As to the comparisons between urban and rural areas, urban coverage appears higher for both water and sanitation. But over the next few decades almost all the world's population growth will be in urban areas in developing countries. Provision of urban water and sanitation will, therefore, become increasingly difficult and urgent. The problems are complex and involve many issues beyond the traditional aspects of water supply and basic sanitation. For example, some of the most vulnerable people lack legal title to the land they occupy and have little or no political voice or community organisation. Most poor urban dwellers, unlike most poor rural dwellers, must pay cash for their water and sanitation services. So, millions of poor urban dwellers are suffering from wholly inadequate water supply and sanitation facilities. Although in many places water vendors have responded to the demand for water and fill a vital role, they operate with minimal regulation on either price or quality and often charge exorbitant unit prices for what may be untreated water[5]. As to sanitation, very few agencies have responded to the needs of the urban poor.

1.3.7 Small towns need particular mention as they are often neglected because they fall between the definitions of rural and urban programmes. Technically, the water supply and sanitation needs of small towns are often not amenable to simple solutions such as drawing water from a spring or borehole, or digging a simple pit-latrine. Managerially, the water and sanitation services may exceed the capacity of community-based organisations, but the towns may come under the authority of district or provincial agencies that are not always efficient or responsive to local needs. Others may have municipal government structures whose technical and managerial capacity is often limited. Thus in small towns, neither formal municipal nor community-based agencies may be currently able to meet needs. So we must either build their capacity to do so or find other forms of service provision, such as the local private sector.

1.4 Improving the management of water resources

1.4.1 Human consumption of freshwater threatens to push to the limits the capacity of nature to supply benefits to mankind. Increasing demands for water jeopardise flows in rivers and wetland ecosystems. In many areas, a failure or unwillingness to manage resources effectively has led to over-abstraction of surface waters; some rivers are reduced to a mere trickle by the time they reach the sea; and lakes have dried out or significantly reduced in size, for example the Aral Sea in Central Asia. This in turn disrupts aquatic and other terrestrial ecosystems, the quantity and quality of

[4]Sanitation in China is a good example of this change. Whereas 81% of the rural population were reportedly served in 1990, the corresponding figure for 1999 is only 24%. The change reflects a substantial tightening of the definition of adequate sanitation by the Chinese Government.

[5]The DFID document 'Public Private Partnership – the Way Ahead' presents the comparison of water prices charged by vendors to prices charged by public utilities. In the 10 sample cities the cost of a unit of water from vendors was always much higher–from 4 to 100 times, with a median of about 12 – than the cost of a unit of water from a piped city supply.

water supplies, and the wider natural environment. Problems include vegetation loss and siltation, which lead to reduced capacity of rivers and increased risk of flooding. Poor land-use practices (farming, deforestation and land drainage) have a major detrimental effect on the environment, and hence on its capacity to support and maintain hydrological processes.

1.4.2 Groundwater provides drinking water to more than 1.5 billion people daily and to many more in times of surface water scarcity. Increasing demand for water is causing rates of abstraction of groundwater that exceed the capacity of nature to replenish it and lead to serious declines in water tables. Groundwater mining is damaging both agricultural productivity and wetlands ecosystems, and causing subsidence and salt-water intrusion in coastal aquifers. In some countries the groundwater itself may even be contaminated with dangerous natural minerals, such as arsenic in Bangladesh.

1.4.3 Both groundwater and surface waters are being polluted by industrial wastewater discharges and agricultural runoff. This is increasingly leading to degradation of river and lake ecosystems, creating or exacerbating health problems. The poor are often the first people to suffer the ill-effects of pollution because they frequently have to abstract water downstream of pollution sources. In many places, poor sanitation is also a major problem, both in contributing to disease transmission, and in causing wider pollution, especially in urban environments. Wastewater disposal in these contexts becomes a major environmental and health issue that communities alone cannot afford to tackle. The challenge to protect water quality needs a major change of behaviour by industrial, agricultural and municipal polluters.

1.4.4 Global climate change and variability may also affect the management of water resources, as has been amply demonstrated in the last few years. The poor – whose livelihoods (often based on access to natural resources) are at risk from both the short-term natural disasters and the longer-term trends associated with climate change – are the most vulnerable. They are also least able to respond, for example by changing their economic activities or moving home.

1.4.5 The majority of natural disasters involve either excess or scarcity of water. Of all natural disasters, floods cause the greatest number of deaths and the most damage. Death tolls from floods are particularly high in developing countries, and floods affect poor people disproportionately as they tend to inhabit the most risk-prone, low-lying regions. Flood related deaths are not simply caused by drowning and direct injury, but also by associated water-related diseases or crop losses leading to famine. Both floods and droughts can adversely affect the survivors' livelihoods for many years.

1.4.6 Environmental issues are often poorly integrated into national water policies and plans. Institutions with responsibilities for environmental management seldom have political influence, and are frequently under-resourced, too centralised and inexperienced. Policy makers may not understand the links between effective environmental management and poverty elimination.[6]

1.4.7 All these factors present a considerable challenge to manage water resources and the environment well, on behalf of poor people in particular. The challenge is a combined one of eliminating poverty and achieving environmental sustainability. Attitudes that view people and the environment in competition for freshwater will only serve to exacerbate the crisis in the long term. Healthier and more productive lives for poor people go hand in hand with a healthier environment and vice versa.

1.5 Avoiding conflicts over water resources

1.5.1 Throughout human history, water resources have been a source of conflict. As demand for water rises, the potential for conflicts may increase. Many international commentators argue that water will be an increasing cause of dispute (some suggest even war) in the years ahead[7].

1.5.2 Increasing demand for water may establish conditions for conflict over access at a range of levels: from the international river basin or aquifer level, through the sub-national level between regions of a country, down to local-level conflict between communities. Trans-boundary water resources disputes have become particularly significant in recent years, although there are some encouraging examples of countries discussing trans-boundary water issues with increased openness (see Box 1 for an example). Despite such examples, the challenge is increasingly urgent for coherent international frameworks

[6]Environmental issues are further dealt with in DFID Strategy Paper "Achieving Sustainability: Poverty Elimination and the Environment."
[7]See, for example, Chapter 4 of Gleick, *The World's Water*, Island Press, 1998.

to help resolve conflicts over shared water resources. Such legal frameworks as do exist to deal with water conflicts are in their infancy.

BOX 1: The Nile Basin Initiative

The Nile basin provides a current example of an international initiative to manage competition for water equitably and sustainably within a contested resource environment.

The Nile Basin Initiative (NBI) is a regional partnership under which the countries of the Nile basin are engaging in co-operation on the sustainable development and management of the waters of the Nile. Launched in Dar-es-Salaam in February 1999, the NBI expressed concerns about the need for a joint discourse on the Nile to go beyond the previous 1959 Nile Waters Agreement. The NBI is a transitional arrangement until a permanent legal framework is established. Member countries of the NBI are Burundi, Democratic Republic of Congo, Egypt, Ethiopia, Kenya, Rwanda, Sudan, Tanzania and Uganda.

The NBI has established a Strategic Action Programme to promote the shared vision 'to achieve sustainable socio-economic development through the equitable utilisation of, and benefit from, the common Nile Basin water resources'.

Source: Nile Secretariat, Entebbe

1.5.3 Water resources themselves have a long history as weapons of war. Attempts to flood or drain strategic areas for military advantage were documented over 4000 years ago[8]. Protocol 1 of the 1949 Geneva Convention prohibits attacks on dams and dykes when this would result in severe civilian losses. Man-made emergencies can also cause water problems; large movements of people put enormous pressure on the water supplies and sanitation facilities both of refugee camps and of host communities. Risks from poor sanitation in such situations can jeopardise the health of refugees and displaced people, who are already vulnerable. Once again it is the poor who are most at risk.

1.6 Allocating water between different users

1.6.1 As populations grow and demand for water leads to increasing competition between different sectoral uses – for example, between major urban centres and the surrounding agricultural lands and wetland ecosystems – tensions between different uses can arise. More effective systems for deciding the value of water are necessary, for balancing market efficiency against social equity, and, thus, for allocating water between sectors. We also recognise the religious significance of water in many societies, and the implications that this has for financial and legal instruments for water allocation. Allocation is a key element of water resources management which many governments lack the capacity to plan and implement.

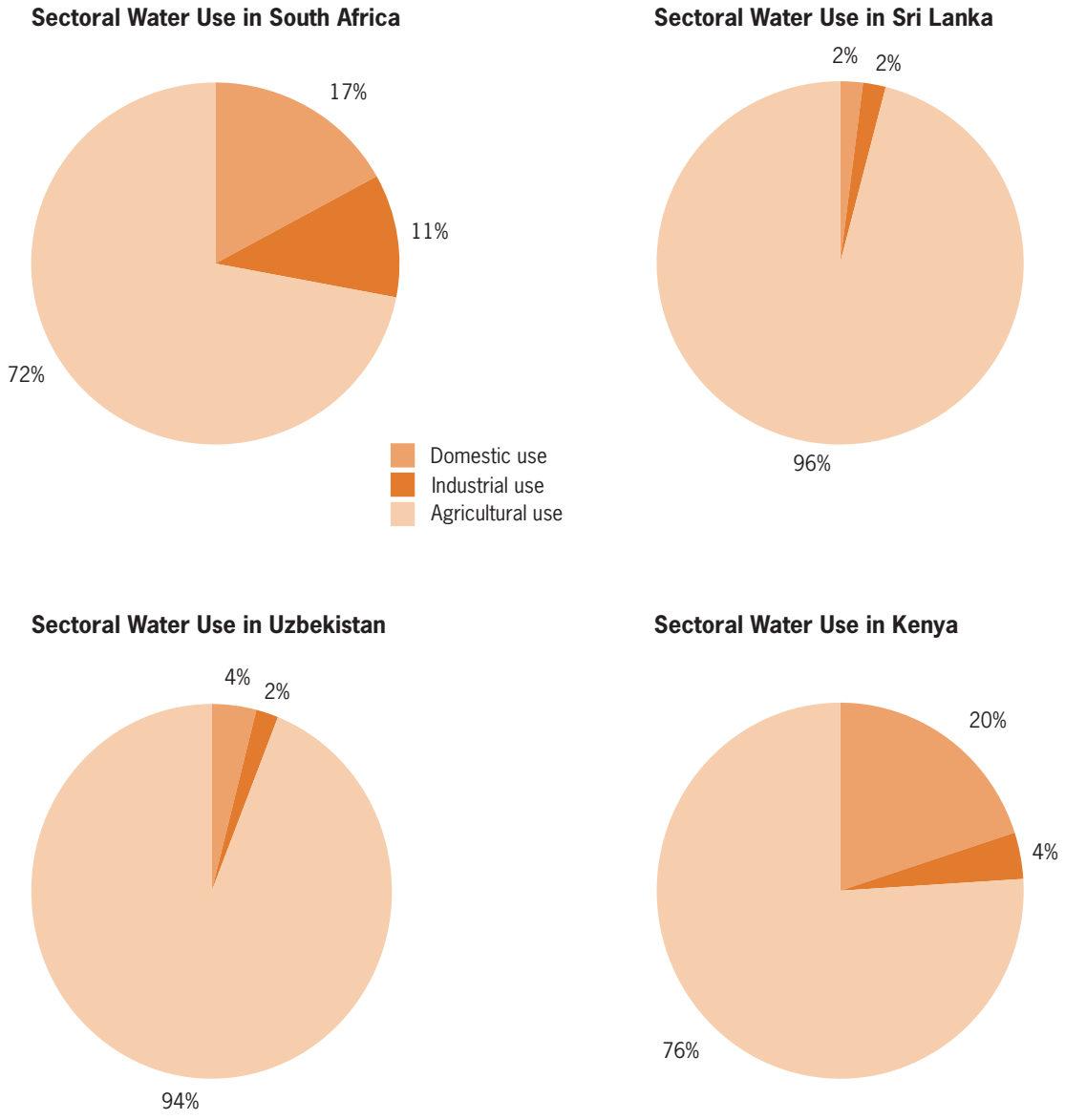
1.6.2 In countries where there is a significant level of irrigation, agricultural water consumption far outweighs domestic and industrial use (see Figure 2 for some examples). Irrigated agriculture frequently provides a very important part of national food security strategies, as well as individuals' and communities' livelihoods at the local level.

1.6.3 To date, the world has been generally successful in increasing food supply in response to its growing population. Over the past 30 years, food grain production has more than doubled through increases in irrigated land and improved crop varieties, although in some areas increased irrigation has led to salinisation of the land. But most population growth is now taking place where freshwater is in short supply, and by the year 2025, the world's population will have grown by another 2 billion. In many areas (especially in Asia, though less so in Africa) water, rather than land availability, is likely to be the main constraint to agricultural production in the 21st century. Irrigated agriculture currently produces some 40% of the world's food; some research suggests that by 2025 it may have to provide 60%. Even if both irrigated and rainfed agriculture improve their efficiency of water use, agriculture will still need significantly more water than is presently available. So improving agricultural water efficiency, important though it is, does not alone provide a simple solution to the problems of inter-sectoral allocation.

1.6.4 As their populations grow, many countries in water-scarce areas face a difficult choice between allocating water first to meet domestic food production needs, or acknowledging that they will no longer be self-sufficient in food because of demands for industrial and domestic use. Countries not self-sufficient in food have to import, and face the vagaries of international markets. In order to reduce this dependency, many aim for a degree of national food self-sufficiency, especially in staple foods, even though this may restrict domestic or industrial water use. At the local level, that policy may promote security in rural

[8]For example, Abi-Eshuh of Sumeria dammed the Tigris in order to prevent the retreat of rivals from the southern marshes of Mesopotamia (17th century BC); the Serb forces besieging Sarajevo cut off the water supply from the surrounding hills (20th Century AD). Gleick, op cit. 125.

Fig 2 – Examples of inter-sectoral water allocations



Source: World Resources Institute, 1994.

people's livelihoods (which can be considerably boosted by the availability of irrigation water) and provides food for the towns and cities, but it may also reduce urban peoples' access to water.

1.6.5 Use of water for agriculture already threatens both the quantity and quality of water resources, particularly ground water, used for domestic purposes. The Ganges delta provides a good example: increased drawdown of the water table through over-pumping for irrigation has made it difficult to use the simple shallow well pumps commonly used to draw drinking water from the thousands of tubewells in the countryside.

1.6.6 As for the energy sector, there is frequently a clash between the timing of agricultural water needs and the timing of releases of flows for hydropower generation. Moreover, many irrigation systems are very heavy users of electricity for pumping, which is often provided at subsidised prices. This subsidy (estimated at £2.5 billion in India annually, for example) causes substantial losses to the power utilities and fails to send any meaningful signal to the agricultural sector to use the water more efficiently.

1.7 Delivering water services sustainably

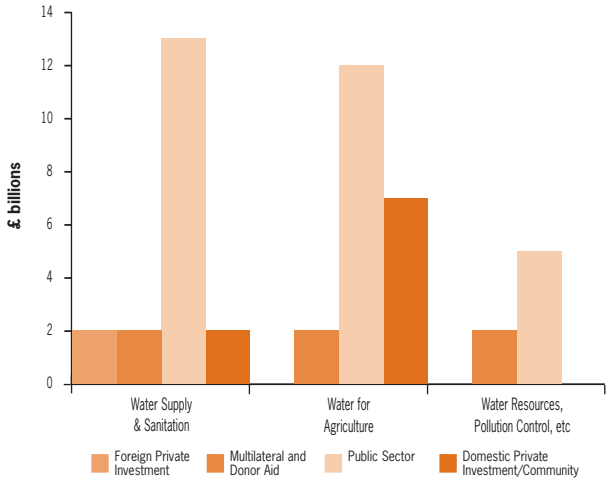
Financial sustainability

1.7.1 On a global level, there is a substantial financing shortfall across the whole water sector of both capital investment and investment for the operation and maintenance of existing infrastructure. So the challenge of

financial sustainability has two aspects: how to find enough money for capital investment to reach all the currently unserved people, and how to raise enough money to cover operation and maintenance, and eventual replacement.

1.7.2 Looking first at the issue of capital investment, a recent estimate of financial inputs to water infrastructure in developing countries is set out in Figure 3. Although the figure does not show the subdivision, much of this capital investment has been used to increase levels of service to those who already receive a water, sanitation or irrigation supply, rather than to extend services to the unserved poor. The table does, however, show that the contribution of the public sector of the countries themselves is far larger than that of external donor agencies or of the international private sector, although the latter is increasing. The figures for domestic and community inputs, both of which are substantial, are probably under-estimated due to the difficulty of collecting this data.

Fig 3 – Estimated annual investment in water in developing countries (1996)



Source: *Global Water Partnership Framework for Action*, March 2000

1.7.3 Estimates of the capital investment that will be needed to provide universal water and sanitation services vary in the region of £200–400 billion, depending on assumed levels of service. Taking as an example the values for water and sanitation in Figure 3, if all the present capital expenditure for water supply and sanitation was spent on the people currently unserved, universal coverage would be possible within, say, 20 years. But, given rich people's power and ability to attract funds to satisfy their higher water demands, either more money will be needed, or the time horizon will be much longer. This will make the achievement of the targets suggested in section 2 of this paper more difficult.

1.7.4 Turning to the issue of funding for operation and maintenance, recent studies[9] indicate that the amounts allocated for the operation and maintenance of irrigation schemes are typically less than 50% of the requirements; a similar level of under-funding exists with water and sanitation services. But the shortfall is not being made up from revenues from the users. This is because of the widely held view that water services, especially water supply and sanitation, must be provided free of charge by governments due to their importance for people's health and livelihood security. So water agencies have not been charging their users the true cost of supplying water and sanitation services. This situation often benefits the better off, who tend to use large quantities of water at little or no cost, while failing to ensure service delivery to the poor, who are rarely connected to the services. There is, therefore, a strong case for charging realistic tariffs and for collecting revenues properly in order to finance operation and maintenance.

1.7.5 In recent years, the importance of the private sector to mobilise new finance has been vigorously promoted by some agencies, and criticised by others. Given the private sector's need for return on investment, well-designed contracts and enforced regulation will be needed to ensure that part of improved service delivery goes to improving the level of coverage for poor people.

Institutional sustainability

1.7.6 For many years, the provision of irrigation systems, water supply and sanitation services was seen as a government responsibility to its citizens. Yet the competing priorities between sectors, and the financial and human resource constraints to which public sector agencies were subjected, often resulted in poor levels of service. Consequently, and largely at the prompting of external support agencies, many governments are encouraging other agencies to provide services in certain areas while continuing public provision in others. This requires the presence of agencies that are competent and willing to provide these services. It also implies that service users, and particularly poor people, need to become active consumers, willing to demand that the new institutional arrangements do indeed serve them better, rather than simply being passive beneficiaries of the work of others.

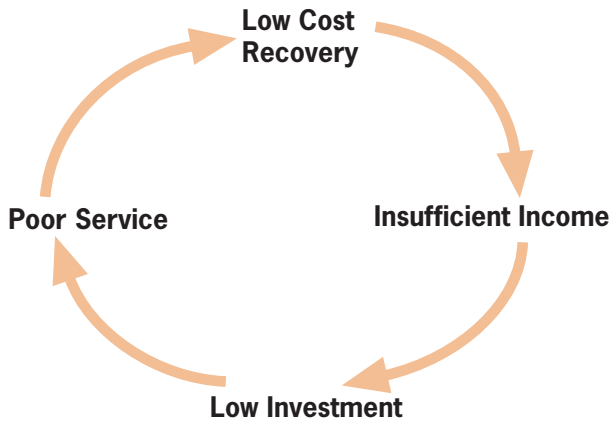
[9]International Programmes for Technology and Research in Irrigation and Drainage, 1998.

1.7.7 The main challenge in institutional sustainability is, therefore, to build good relationships between public authorities, the private sector and civil society. The success of these relationships depends on the relative strengths and interests of the institutions involved. Frequently, their ability or willingness to adapt has been limited. In many developing countries, the public water sector remains vulnerable to corruption and patronage and serves the wider interests of the political and business elite, while the poorest people remain without services or face a high-cost, poor-quality service. It would be wrong to assume that involving other agencies, including non-governmental ones, will root out corruption, but transparency in these contracts is an important issue. Empowering civil society can challenge vested political interests. But the governments also need institutional support because, even with increased service delivery by the private sector and civil society, they will continue to be the largest providers of services for the foreseeable future. Both institutional reform and affirmative action are necessary to achieve benefits to the poor.

Operational sustainability

1.7.8 Often, people are unwilling or unable to pay for irrigation or for water and sanitation because their levels of service are so poor, or because the payment systems are not appropriate or do not function. That in turn means that the income of the water agencies is too low to maintain or improve the system, leading to a downward spiral of decline (see Figure 4).

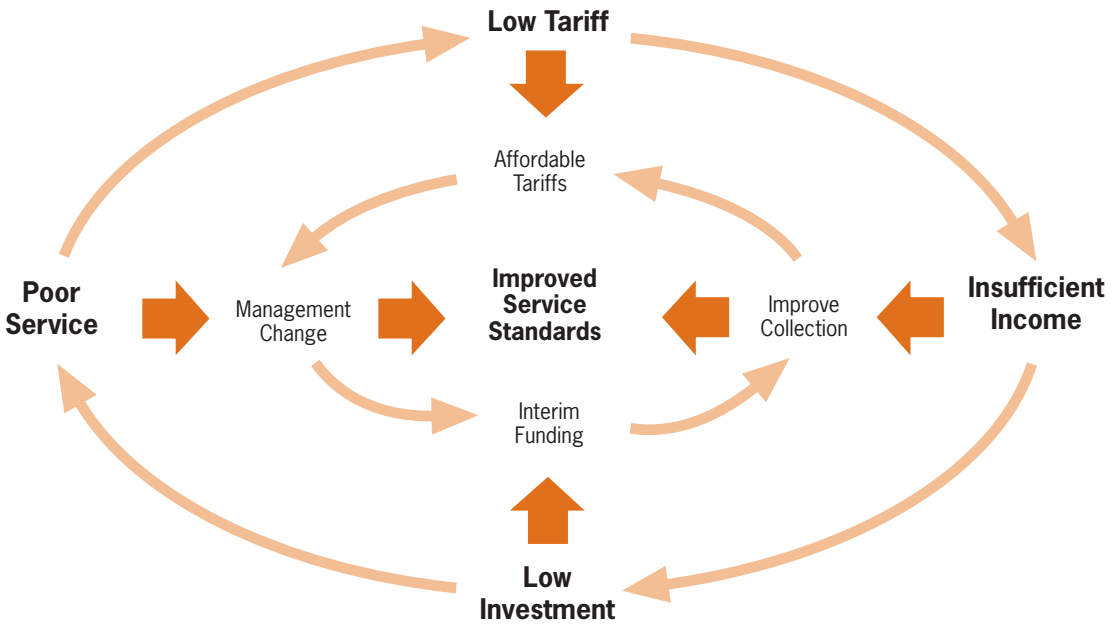
Fig 4 – A downward spiral



1.7.9 The challenge is to reverse the downward spiral by pricing the services to recover full costs and investing the money raised in operation and maintenance to provide better service standards (see Figure 5). This would ensure the operational sustainability of the service. Under such a system, poor people can be given either an external cash subsidy in order to help pay their full bills, or an internal cross-subsidy from other users in order to reduce the cost of an appropriate level of supply.

1.7.10 This operational sustainability will be achieved if the service agencies assess the demand properly, communicate better and become accountable. They can then hear the views of the users and provide the level of infrastructure and services for which people would be willing to pay.

Fig 5 – Breaking the spiral



1.7.11 While there have been attempts to use rules of thumb for assessing capacity to pay for water and basic sanitation – typically some 3 to 5% of household expenditure – we now recognise that the demand for water and sanitation services is much more complicated. In rural and peri-urban areas, for instance, people frequently use a variety of water sources for different purposes and at different times of the year. People's willingness to pay for water, therefore, depends on a complex range of factors, such as the perceived health and economic benefits of a good supply, the availability and cost of other water sources, convenience and time savings. A new supply may be only one among a range of options. Similar considerations apply to sanitation: people's demand for services may be strongly influenced by their perceptions of personal health benefits (as opposed to public benefits). The irrigation sector faces similar differences in perception due to decades of free provision with minimal inputs by the users into the operational decisions. Yet, while farmers often want better irrigation and households want improved water and sanitation services, and both are willing to pay for them, the existing service agencies may lack the understanding or the institutional means to meet their demands.

Technical sustainability

1.7.12 Historically, decision makers have favoured complex, high-cost piped systems for water supply, sewerage, and drainage. This is due partly to the tendency for direct transfer of technologies from developed to developing countries, and partly to the view that customers should have the same high levels of service provided to customers in developed countries. Service levels may be appropriate to developed countries, with economies strong enough to bear the enormous capital and recurrent costs are, however, rarely appropriate in developing countries. The challenge is, therefore, to explore a range of alternative options and adapt solutions to be more appropriate to the strength of the economy and to the needs of the people and also more amenable to affordable management and maintenance, which will generally need to be by users themselves. Such options already exist and are well-proven: in water these may involve more varied local sources and accessible technologies such as protected springs and handpumps; in sanitation they generally involve on-site systems potentially including composting or re-use of excreta.

1.7.13 However, water agencies are frequently unaccountable to the public, and vested interests – including on occasions the donor community itself – continue to favour major infrastructure schemes. Problems are frequently conceptualised in purely technical terms. Rational decision-making can be distorted by the opportunities for personal gain of government officials and contractors. Also, operation and maintenance is often seen as less prestigious than new capital work, and so it does not attract the higher-calibre staff. Challenging these mindsets, and broadening decision-making to consider a wider range of technical options, will be critical to improving the sustainability of services.

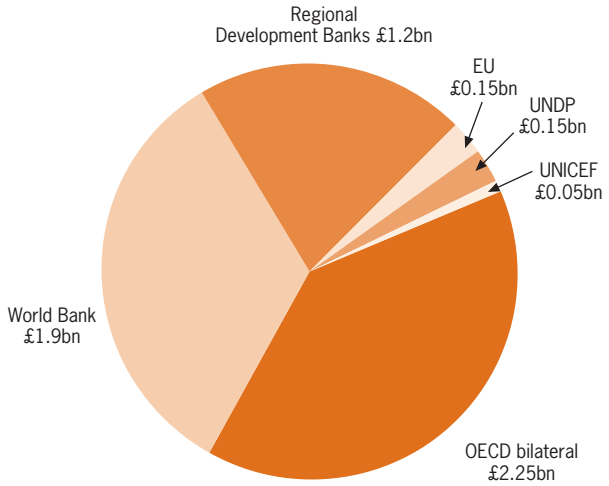
1.8 Improving coordination among the international players

1.8.1 There are a large number of international organisations and networks working in water. This creates a big challenge to improve co-ordination.

External Financing Agencies

1.8.2 Many bilateral and multilateral support agencies are active in water. Figure 6 shows the typical annual funding for water and sanitation programmes over the past four years for those agencies that contribute most to work in this sector.

Fig 6 – Typical annual financial contributions in the past four years from major funders to water supply, sanitation, irrigation and water resources



1.8.3 The largest proportion of the funding support comes by the way of grants and loans from bilateral donors. Of these, Japan and Germany have over recent years been the largest funders, with the Scandinavian and other European countries also being particularly active in water supply and sanitation. (DFID is itself one of this

group; in 1999/00 its bilateral funding to the sector was £82 million and this figure is set to increase substantially.)

1.8.4 The main multilateral agencies providing loan funding for water are the World Bank, and the regional development banks in Asia, America and Africa. The World Bank is the single largest funder, and is active across all aspects of the water sector. It is currently reviewing its water resources strategy. Among multilateral agencies providing grant funding, the European Union, UNDP and UNICEF are prominent, while numerous other UN agencies provide smaller amounts. All these agencies have different financial rules and regulations, and often have differing priorities regarding water.

1.8.5 The European Commission is an increasingly important donor to water programmes. Its main work is with the governments of African, Caribbean and Pacific developing countries, whom it helps both to define and to implement water policies. It has a particular focus on the sustainable management of water resources.

Organisations concerned with water resources management

1.8.6 The UN Administrative Co-ordination Committee's Sub-Committee on Water Resources is responsible for implementing recommendations from the Rio Earth Summit's Agenda 21 Chapter 18 (Freshwater) and from the UN Commission for Sustainable Development's Sixth Session of May 1998. This implies responsibility for co-ordinating UN activities to meet that end, and the Sub- Committee is now trying to improve its ability to undertake this task. The Sub- Committee is also strengthening its capacity to monitor global and national compliance with its policy frameworks: at a global level by creating the World Water Development Report; and at a national level by setting standards for collection of water resource data.

1.8.7 UNESCO, through its International Hydrology Programme (IHP) and WMO have mandates to ensure the availability of reliable hydrological and meteorological information to support water resource planning and trans-boundary initiatives. A current priority for IHP is to relate its work to the needs of poor people, having previously tended to focus on the science of hydrology.

1.8.8 The UN Environment Programme developed a water policy in 1999, and has established a new Advisory Board on water. It is the lead executing body of the Global Environment Facility funded Global International Waters Assessment.

Organisations concerned with water supply and sanitation

1.8.9 This sub-sector is comparatively well co-ordinated, with long-established agencies that generally work together effectively.

1.8.10 The Water and Sanitation Program (formerly the UNDP/World Bank Water and Sanitation Program) aims to help poor people gain sustained access to water and sanitation services. It works with governments, particularly bridging the gap between small-scale innovation and large-scale implementation and developing national policies. The Program is funded mainly by bilateral organisations (including DFID) but hosted by the World Bank: the Bank's mainstream development agenda has recently moved closer to the Program's, prompting an examination of the relationship between them that should ensure the Program's continued ability to influence the Bank on policy issues.

1.8.11 UNICEF has had a large and well-regarded water, sanitation and hygiene programme for many years. It now relates that work more directly to child survival, protection and development and to the rights of the child, in line with the goals of the World Summit on Children. UNICEF's work linking the provision of school sanitation with education is particularly strong and is supported by DFID in a number of countries.

1.8.12 The Water Supply and Sanitation Collaborative Council is in effect a professional association for people from governments and civil society. Its purpose is professional collaboration, specifically to accelerate water, sanitation and hygiene promotion for poor people. To date, its poverty focus has made it reluctant to participate in broader water related work or to engage with the private sector. It has quasi-UN status through being hosted by WHO.

Organisations concerned with water for agriculture

1.8.13 External support agencies, such as the World Bank and the Asian Development Bank have major funding programmes in irrigated agriculture, although the extent of the support has declined markedly over the last decade. The Food and Agricultural Organisation of the UN has an important programme focused on water and food issues. Bodies such as the International Water Management

Institute (IWMI) and the International Rice Research Institute (IRRI), both under the Consultative Group on International Agricultural Research (CGIAR), carry out strategic research in irrigated agriculture. The International Commission on Irrigation and Drainage (ICID) is the professional association for engineers and managers.

New global institutions

1.8.14 With the increasing sense of priority for water issues, new global institutions and networks have emerged in the form of the World Water Council (WWC) and the Global Water Partnership (GWP). Their creation was, in part, a response to the recognition that agencies were viewing water at the sub-sectoral level and failing to address broader water resources issues.

1.8.15 The WWC is a global policy think tank formed in 1996. Many of its members have close links with existing professional groups in water resources management. The WWC convened the World Water Forum in The Hague in March 2000 and is currently working with the Japanese government to convene a Third World Water Forum in 2003.

1.8.16 The GWP was established in 1996 by the World Bank and UNDP, together with a number of bilateral donors and non-governmental organisations (NGOs). Although positioned outside the UN system, its aim is to bring developing countries and external support agencies together, encourage a coherent conceptual framework for integrated water resources planning, and promote consistent strategies. GWP developed the Framework for Action for Water in the 21st Century, which was presented at the Hague Forum.

1.8.17 These two organisations do not have universal acceptance, and there are calls to make them more representative, accountable and transparent. But they do aim to bring together the many organisations concerned with water, a remit that is recognised by most of those organisations. The GWP, in particular, provides a promising opportunity to bring coherence and collaboration between public and private organisations, civil society and the UN system.

1.8.18 In addition to all the above networks and organisations, civil society organisations from both developing and developed nations also have an important role to play. One such, that specialises in water and sanitation issues, is WaterAid. Founded in 1981, it has established a reputation based on the strength of its project implementation, a clear poverty focus and an emphasis on capacity-building of Southern NGOs. More recently, it has broadened its strategy to include a particular emphasis on advocacy and policy influence. WaterAid has strong international credibility, both with donors and with civil society organisations in developing countries through which it works.

2. Target statements

2.1 Introduction

2.1.1 Water is life. It is essential for health and necessary for the production of food, economic growth and the support of the environment. The fulfilment of poor people's water-related needs is fundamental to the elimination of poverty. This section of the strategy paper describes the connections between water and poverty and concentrates on the links to the International Development Targets (IDTs). It then discusses specific water targets necessary to meet the broader IDTs, and the dates by which they must be achieved.

2.1.2 DFID's overall goal is the elimination of poverty and, therefore, our work in water will prioritise those activities that contribute most directly to that goal. This concentration on the link between water and poverty characterises our particular contribution to the water sector and, hence, underlies this strategy paper. Our goal in the water sector (see Box 2) ties in with the targets described in this section of the paper, and gives the clarity of purpose on which to plan practical and realistic actions.

Box 2: DFID'S goal in the water sector

To enable poor people to lead healthier and more productive lives through improved management of water resources and increased and sustainable access to safe drinking water supply and appropriate sanitation.

2.2 Water and the elimination of poverty

2.2.1 The following paragraphs examine the links between water and poverty elimination, using the three main headings of the IDTs, that is, Economic Well-Being, Human Development, and Environmental Sustainability and Regeneration. Our analysis is intended to emphasise the broad range of strategic issues that relate to water.

Water's contribution to economic well-being

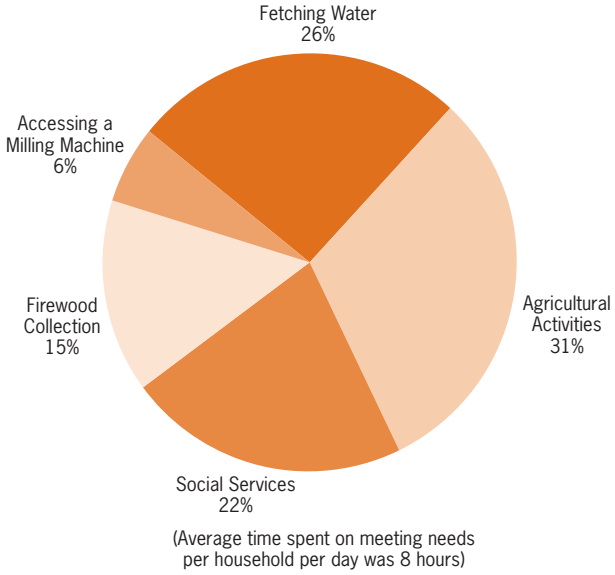
2.2.2 Water's main contribution to economic well-being is through its use for agriculture in order to improve food security. The relationship between water, food security and economic well-being at the national scale is complex since it involves other determinants such as access to infrastructure, information and markets. Overall, however, it is clear that control of water for agriculture can boost the yield of the main wet-season crop, secure extra dry-season crops, and enable the timing of production to match market demands. At the household and community level also, water for food production can improve poor people's livelihoods and economic well-being. The vast majority of farmers in developing countries, and hence the main users of water for agriculture, are smallholders, typically growing a few hectares of cereals. Water for crop irrigation can be vital for their livelihoods. For example, a study in West Bengal villages found that employment in irrigated areas was almost constant throughout the year with no 'dead' season, but in non-irrigated areas there were two severe gaps each year with almost no work.[10]

2.2.3 Water also has important economic benefits through industrial use, power generation and transport. These benefits are generally analysed at the national level, but can have a profound impact on economic opportunities for poor people, and, hence, the elimination of poverty.

2.2.4 Improved access to safe water supply and appropriate sanitation can also increase economic well-being at the household level, mainly through saving large amounts of people's time and energy. For example, fetching even a family's basic water requirement can be both time-consuming (taking 26% of the household's time in the typical example shown in Figure 7) and physically exhausting, a burden that falls disproportionately on women and children.[11] Seeking privacy for open defecation can also be very time-consuming, typically causing many women to wake an hour early every day of their lives. Being ill with a water-related disease, or caring for an ill family member, also consumes a lot of time and money for medical attention and medicines. The time and energy saved by improved water supply and sanitation can be used in many economically productive or educational activities.

[10] Ghosh M G, cited in Chambers, Saxena, Shah, 1989, "To the Hands of the Poor", Oxford and IBH.
[11] White: Drawers of Water, University of Chicago Press. 1972

Fig 7 – Typical proportion of household time spent on meeting needs in rural Africa



Source: *Chalinze-Tanga Road Socio-economic Study*, IT Transport 1998

2.2.5 Improved water supplies, particularly in urban areas, can be much cheaper than existing supplies. In many cities in developing countries, poor people have no access to piped water supplies and so they must buy water from vendors. While it can be argued that the vendors provide a valuable service, their water charge is typically ten times the unit price of the piped supply. Even using as little water as possible, the cost of water from vendors can amount to over one-fifth of the income of a typical poor urban household. Reducing the cost of vended water, or removing the need to buy it by providing acceptable improved services, is an intervention which can improve the economic well-being of the poorest people. However, there is evidence that provision of cheaper water does not always result in people adopting the cheaper supply. It is essential first to identify the priorities of the poor by an inclusive stakeholder analysis.

2.2.6 There are substantial externalities in water and sanitation. For example, a household benefits not only from its own latrine, but also from those of its neighbours that help to prevent pollution of the environment around their home; and a water-borne epidemic of cholera can cost a country millions in lost agricultural exports. Because of these economic factors that contribute to the public good, there is a strong case for governments to intervene in water, either by regulation or investment.

Water's contribution to human development

2.2.7 Human development entails people taking their own decisions about their lives, rather than being the passive objects of choices made by others about them. Water contributes strongly, either overtly or by implication, to a number of declarations and conventions on human rights. For example, the Convention on the Rights of the Child (1989) obliges states party to the convention to take measures to combat disease and malnutrition amongst children 'through inter alia …the provision of adequate nutritious foods and clean drinking water, taking into consideration the dangers and risks of environmental pollution'[12]. This demonstrates the centrality of water supply and sanitation to the exercise of people's human rights.[13]

2.2.8 The main contribution of water and sanitation to human development is by improving health. Firstly, water-related diseases (see Box 3) are the single largest cause of human sickness and death in the world, and disproportionately affect poor people.[14] Studies have shown that provision of safe water and basic sanitation, accompanied by hygiene promotion, can reduce the incidence of diarrhoeal disease by as much as 25%.[15,16] Sanitation can also dramatically reduce the spread of worm infections, while the use of increased quantities of water for personal hygiene can reduce faeco-oral transmission and prevent diseases such as scabies and trachoma. Good water resources management and drainage can prevent malaria carrying mosquitoes from breeding. Water used for food production also improves health, mainly by improving nutrition, and hence people's ability to recover from these and other diseases. All these contributions of water to improving health, while chiefly relevant today in developing countries, can also be witnessed in British public health history in the 19th and early 20th centuries.

[12]Article 24, paragraph 2b.
[13]Human Rights issues are further dealt with in DFID Strategy Paper "Human Rights for Poor People."
[14]Health issues are further dealt with in DFID Strategy Paper "Better Health for Poor People."
[15]WELL Technical Brief 10: *Measuring the Health Impact of Water and Sanitation*, Cairncross, S., 1999
[16]WASH Technical Report No 66, Esrey et al, *Improvements in Water Supply and Sanitation*.

Box 3: Water-related diseases

The water-related diseases that affect poor people are mainly infectious and parasitic diseases. There are four types:

- Faeco-oral infections that cause diarrhoea and include cholera, typhoid and dysentery. They can be spread by contaminated water or, more often, by poor hygiene.
- Skin and eye infections, including trachoma which is a major cause of blindness. These are also associated with poor hygiene.
- Various worm infections, including guinea worm and schistosomiasis (bilharzia), many of which are caught by wading in contaminated water.
- Diseases spread by insects such as mosquitoes that breed in water.

2.2.9 There are also some significant non-infectious diseases related to water. For example, global attention is currently focused on poisoning due to the high concentrations of arsenic in groundwater in the Ganges delta. This affects large numbers of people of the surrounding area, with between 10 and 60 million people estimated to be at risk in Bangladesh alone[17]. Water resources management, in the form of the development of alternative sources, may play an important role in reducing the incidence of such diseases.

2.2.10 Water and sanitation also contribute to human development in other ways. For example, better sanitation provides real personal benefits in the form of greater privacy, convenience, safety and dignity. These aspects are particularly important for women. The use of a latrine at home saves women's and girls' time and reduces their vulnerability, while the availability of a latrine at school can be a strong factor in encouraging girls to attend[18,19].

2.2.11 In most societies, domestic water and sanitation are the everyday responsibilities of women, and yet major decisions in communities are normally taken by men. The same gender demarcation applies, albeit to a lesser extent, to water for agriculture. Well-planned water and sanitation programmes, therefore, offer a real opportunity for women to exercise authority and leadership within a community, and to extend their influence beyond community level to address the strategic needs of women in the water sector.

2.2.12 Water, sanitation and hygiene promotion programmes that focus on children are one of the most effective ways to address long-term poverty within communities, for two main reasons. Firstly, children suffer disproportionately from poor water supplies and lack of adequate basic sanitation[20]; most of the ill-health, impaired development and death that is preventable through water and sanitation, is of children. Secondly, children can be important agents for change; their minds are more flexible and they have different, and often clearer, perceptions than adults. International organisations, such as UNICEF and Save the Children Fund (UK), for example, have found that including children's views in decision-making can positively benefit project development.

2.2.13 People's wish to manage their local water resources, or to improve their water supply and sanitation, can give an excellent opportunity for communities to work together equitably for their own development. Because the subjects are so well-known to them and so central to their lives, people respond to them by forming their own groups and taking their own initiatives. This is a positive and welcome contrast to conventional decision-making processes that are hierarchical and forced upon communities by external authorities such as local government or traditional elites. The water sector contains many examples of innovative and successful community management (see Box 4 for an example based on sanitation).

[17]BGS 1999, *Arsenic Study Bangladesh*.
[18]For example, a schools' sanitation programme in Bangladesh reported increased female attendance rates of 11% (see the DFID Strategy Paper, "Education for All: the Challenge of Universal Primary Education").
[19]Gender issues are further dealt with in DFID Strategy Paper "Poverty Elimination and the Empowerment of Women."
[20]Nicol, 1998 'Carrying the Can: Children and their water environments', Working Paper 18, Save the Children Fund (UK)

Box 4: Orangi Pilot Project – Karachi

Akhtar Hameed Khan, a community organiser, began working in Orangi, the largest squatter settlement in Karachi, in the early 1980s. He found that water supply was adequate, but the disposal of human and other waste was a major concern to the people living there, with a high rate of related disease. The population aspired to a traditional sewarage system. Once it became clear that the Karachi Development Authority would not provide this, Dr Khan worked with the community to find affordable alternatives. He describes his most important first step being to liberate people from the demobilising myth of government promises. The results in terms of service coverage and organisational achievement are impressive. The system is based on community contributions coupled with a high level of technical competence from the Orangi Pilot Project team, and is based on the establishment of neighbourhood Community-based Organisations (CBOs). It has led to the provision of appropriate sewarage sanitation services to 600,000 poor people in Karachi, and provides a powerful model of internal development by residents. The CBOs continue to operate and maintain the system.

Source: Briscoe 1998

Water's contribution to environmental sustainability and regeneration

2.2.14 Water's contribution in this area is twofold. First, good water resources management promotes environmental sustainability. Water resources are integral to the dynamics of many ecological processes, and wetlands and flood plains in particular play a strong role in maintaining the biodiversity and functioning of the environment as a whole. Secondly, good sanitation and solid waste management reduce water pollution, although complete protection of water quality also needs major improvement in industrial and agricultural pollution control.

2.2.15 Both of these links between water and the environment are recognised in the concept of Integrated Water Resources Management. This promotes the coordinated development of water, land and related resources in order to maximise equitable economic and social welfare, while maintaining environmental sustainability. It is not an abstract concept: people around the world instinctively follow it in generating their livelihoods in harmony with their local water resources and with a view to maintaining both livelihoods and resources into the future.

2.2.16 Environmental sustainability and regeneration in turn benefit everybody, but frequently the most direct beneficiaries are poor people. They are often forced by circumstance to live in marginal areas within flood plains, so they stand to gain most from reduced flood risk. In addition, many of them rely on the natural environment for their livelihoods to a far greater extent than rich people do, so they benefit from the sustained availability of natural resources of all sorts. Maintenance of fish stocks, for example, affects the lives of poor people by improving both their employment opportunities and their nutritional intake. So attention to environmental sustainability and regeneration can affect poor people both directly and indirectly. Decline in stocks of natural resources needs to be monitored to identify where the natural functioning of aquatic ecosystems is being disrupted.[21]

2.3 Water targets

2.3.1 As the Foreword to this paper explains, DFID places great importance on appropriately defined targets as a means of energising and measuring progress and exercising accountability. We have, therefore, actively encouraged the UN system to establish realistic indicators and targets for the water sector. We have prioritised three specific areas.

Box 5: DFID'S priorities

DFID's priorities in water are:

- implementation of integrated water resources management policies
- substantial improvement in people's access to clean water
- substantial improvement in people's access to appropriate sanitation.

2.3.2 The lack of a coherent set of targets for water resources, water supply and sanitation through the 1990s resulted at times in a lack of focus. The UN Secretary General's report to the Millennium Assembly (September 2000) was particularly welcome in that this highlighted water as an important issue and recommended the

[21]Environmental issues are further dealt with in DFID Strategy Paper "Achieving Sustainability: Poverty Alleviation and the Environment."

adoption of targets for water. The Ministerial Declaration agreed at the close of the Millennium Summit includes two targets for water:

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

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

The declaration is silent on sanitation.

The target for water resources management

2.3.3 Drawing on the decisions of the Sixth Session of the Commission for Sustainable Development in 1998, we agree that progress in integrated water resources management should be indicated by the adoption of comprehensive national water resources policies. The indicators for the International Development Targets include National Strategies for Sustainable Development. The definition incorporates a footnote that every National Strategy will need to include reference to sustainable use of water resources. This avoids the need for a separate new process for adopting integrated water resources management policies. It will, however, be important to ensure that these water resource policies are specified as a requirement of the national strategies for sustainable development, and the Millennium Summit declaration adds impetus to this.

2.3.4 As to the date, the International Development Target states that "there should be a current National Strategy for Sustainable Development in the process of implementation in every country by 2005, so as to ensure that current trends in the losses of environmental resources are effectively reversed at both global and national levels by 2015"; that is, it has both an intermediate target and a further goal. So the logic of including integrated water resource management plans into each national strategy would suggest those same dates. A resulting target statement for water resources is given below.

To have comprehensive policies and strategies for integrated water resources management in the process of implementation in all countries by 2005.

2.3.5 Building on the Millennium Summit Declaration, we will seek all opportunities to promote the adoption of this target within the UN system.

The target for water supply

2.3.6 The target adopted at the UN Millennium Summit is:

To reduce by half the proportion of people who are unable to reach, or to afford, safe drinking water by 2015.

The WHO/UNICEF Joint Monitoring Programme (JMP) is in the best position to assess progress and analyse definitional issues of accessibility, affordability and safe supply.

The target for sanitation

2.3.7 Regrettably, there remains no internationally agreed target for sanitation. This is disappointing given that the challenges remaining in sanitation are even greater than in water. The work to achieve a target of reduction in people unserved even by half by the general IDT target date of 2015 will be challenging, because it will require a change from past policies and practice rather than incremental improvements based on current practice, as is the case for water supply. (This is discussed further in section 4 of this paper.)

2.3.8 The indicators for sanitation are under discussion. Although we would prefer to see the monitoring of actual usage of sanitation facilities, rather than simply construction of latrines, we propose to follow the judgement of the JMP regarding indicators which, for pragmatic reasons, currently look at access.

2.3.9 The thematic group on Meeting Basic Needs at the second World Water Forum in The Hague (March 2000) agreed the following target statement. We will seek opportunities to promote its adoption within the UN system:

To reduce by half the proportion of people not having access to hygienic sanitation facilities by 2015.

Other targets

2.3.10 The GWP's Framework For Action proposes three other water-sector targets: to increase water productivity for food production from rainfed and irrigated farming by 30% by 2015; to reduce the risk from floods for 50% of the people living in floodplains by 2015; and to establish national standards to ensure the health of freshwater ecosystems in all countries by 2005 and programmes to improve the health of freshwater ecosystems implemented by 2015. DFID considers the three targets expressed in previous paragraphs to have highest priority, but recognises that the other targets proposed in the GWP's Framework For Action are potentially useful indicators and is prepared to engage with other actors concerning their future development.

2.3.11 We have a significant challenge before us if all (or even most) of the above mentioned targets are to be achieved. Some commentators are pessimistic about the prospects for water in the 21st Century. Others are sceptical about setting fresh targets for water. We do not share their views. We believe that, if all agencies concerned with water focus their efforts, the targets are achievable.

3. Experience to date

3.1 Introduction

3.1.1 The past 25 years have witnessed positive and exciting progress in both practice and policy in the water sector. We now have a good understanding of the social development aspects of water. Technically, we can cope with most of the present and foreseen problems. The key to progress is political will, particularly on the part of government leaders, to acknowledge lessons, change policies and take actions. Strong leadership can overcome the potential crisis in water and inspire people to improve their own lives. DFID is keen to do all it can to promote that political will and to encourage that leadership.

3.1.2 To identify the relevant lessons and new ideas, this section of the strategy paper starts with a short overview of recent progress in the water sector. It then indicates how the challenges described earlier in this document have been approached, by drawing out three particularly important lessons that organisations working in water have learned:

- to put people at the centre of work in water;
- to respond to demand, rather than be driven by supply; and
- to recognise water as an economic good with an inherent value, and with costs attached to its provision.

We recognise that many other lessons have been learned, and indeed are implicit within the text of this paper. But the three lessons presented here are those that DFID regards as most relevant to its own emphasis on the links between water and poverty elimination.

3.2 Historical overview

3.2.1 In 1977, the World Water Conference in Mar del Plata, Argentina designated the 1980s as the International Drinking Water Supply and Sanitation Decade. The Decade gave the water sector an international boost. Its creation gave water supply and sanitation a higher profile among politicians and decision-makers around the world, while the universal coverage targets set for the Decade concentrated people's minds even though they were over-ambitious. During the Decade, many agencies and governments overhauled their supply-led approaches to water and sanitation, which focused almost exclusively on the construction of new infrastructure. They introduced more appropriate technologies and started to integrate hygiene promotion, sanitation and water supply. Experience in community management grew rapidly. The need for consistent data to monitor progress on service provision prompted WHO and UNICEF to establish their Joint Monitoring Programme in 1986 to collect data in a standard form.

3.2.2 The New Delhi Conference in 1990 highlighted the lessons of the Decade and the changing working methods of governments, civil society and the private sector. Building on these conclusions, and on other lessons learned in water resources management, a new framework for developing water resources and sanitation was articulated at the International Conference on Water and the Environment in Dublin in 1992. This recognised that to increase services required involving a wider set of stakeholders, with governments increasingly standing back from providing services to create environments that would facilitate public-private partnership in service provision.

3.2.3 As a result of the Earth Summit in Rio de Janeiro, also in 1992, the emphasis on water supply and basic sanitation for public health widened to recognise that the management and use of water is part of broader environmental protection and sustainable development. This was complemented by global concern over water scarcity and water pollution. The Earth Summit endorsed the need for action to improve water supply and sanitation, emphasising the particular challenge of ensuring sustainable water supply for cities. It also called for integrated management of water resources, protection of water quality and management of water for food production. Box 6 summarises the international consensus reached through the Dublin and Rio conferences.

Box 6: International consensus on water principles

Dublin Principles:

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

Rio, Agenda 21:

- ensure the integrated management and development of water resources,
- assess water quality, supply and demand,
- protect water resource quality and aquatic ecosystems,
- improve water supply and sanitation,
- ensure sustainable water supply and use for cities,
- manage water resources for sustainable food production and development,
- assess the impact of climate change on water resources.

Source: ECSC-EEC-EAEC, Brussels 1998

3.2.4 Since the Dublin and Rio conferences, most governments and agencies have started to implement these principles. To turn the principles into practice we suggest a particular focus on the three lessons discussed in paragraph 3.1.2 as set out below.

3.3 Lesson 1: Put people at the centre

3.3.1 This is one of the most important lessons learned in international development during the last 25 years, and applies strongly in relation to water. Putting people at the centre involves recognising their right to enjoy healthier and more productive lives through access to safe water supply and sanitation and to water for agriculture, and also their right to participate in decision-making. People belong to communities and the wider civil society, so governments and other agencies need to engage with the institutions of civil society.

3.3.2 In the particular case of water supply and sanitation, many sector activists realised early in the 1980s that appropriate hardware solutions, such as locally manufactured hand pumps, low cost gravity piped systems, rainwater harvesting and low cost on-site sanitation options, were a first step to greater sustainability. Yet even the availability of this appropriate hardware did not necessarily lead to its endorsement by the concerned authorities. In many cases, strong resistance came from the water services agencies, many of whose staff had benefited from the lucrative contracts for large-scale infrastructure development.

3.3.3 In the case of water for agriculture and economic activity, a focus on people's livelihoods can usefully address their vulnerability to variations in the water resources. It can also explain the links between better water resources management, the use of water for food production, water's role in economic activity and diversity, water supply and sanitation, and poverty reduction. Adopting a livelihoods approach is an example of putting the people at the centre of our thinking.

3.3.4 Water infrastructure has often been provided as a public good in the name of public health, and, as a result, the community was not responsible for maintenance and management. When the infrastructure broke down the people suffered from poor operation and maintenance by the government agencies. So they had the incentive to demand more authority. It soon became clear that when people actively participated in their own development, making decisions about the management and maintenance of their own services, those services were more sustainable. This role is broader than just irrigation or water supply and sanitation, and can include managing catchments and local water resources.

3.3.5 Around the world, there are many examples of successful community management. It has mainly been demonstrated in rural areas, and on a small scale. Two major needs therefore exist: to scale up demand-responsive and community management approaches into national policies and programmes in countries where pilot projects have been successful; and to assimilate the lessons and pilot these approaches elsewhere. These may involve significant changes in the way the existing water sector institutions work.

3.3.6 In recent years, women have become more involved in these processes. Experience showed that community-based management achieved more when women's voices were heard and responded to. More broadly, a range of social, economic and political issues can inhibit participation by both women and men, so water

agencies have to understand and deal with these wider development issues, not only with technical subjects. As to the professional staff in the sector, the large majority of water policy-makers and practitioners in most countries are men. On a positive note, in some countries initiatives have been taken to popularise the water profession among girl students and to ensure that educational institutes are equipped for both women and men.

3.4 Lesson 2: Respond to demand

3.4.1 Putting the users at the centre of water services leads to the second important lesson: the need to respond to demand. Historically, water supply and sanitation and irrigation programmes were supply driven, centrally planned according to set standards and available resources. It is now recognised, at least in the case of water supply and sanitation, that programmes have more chance of succeeding if their costs and service levels are tailored to local conditions and the users' demands. As a result, community choice of service level has become a central feature of demand-responsive approaches.

3.4.2 While evidence of the link between demand-responsive approaches and sustainability is increasing, research shows that there are few projects that fully meet demand-responsive criteria. Implementing this approach needs more work on both policy and practical levels. For example, poor people may not always be able to express their demands, so project staff need skills in social mediation and communication.

3.4.3 Integrated approaches to handling demand are necessary in two respects. First, poor people are more likely to attain better health from water supply, sanitation and hygiene promotion together than from water alone. Secondly, they are more likely to attain more productive lives if all their water-related needs are considered together rather than separately. At the national level this involves: linking demand forecasts for water supply and irrigation into plans for allocating water resources; ensuring that proposals for water supply, sanitation and irrigation improvements are consistent with national strategies for water conservation and pollution prevention; ensuring compliance with river water quality objectives and other environmental standards; and integrating catchment management with water supply strategies. These activities in turn require special, and potentially unfamiliar, skills on the part of the people responsible for them.

3.4.4 Responding to demand will stretch the institutional and financial resources of most countries. The preferred form of service provision will depend on the local context and the capacity of the public and private sectors. Experience shows that management autonomy, adequate financial resources, and tariffs that provide an acceptable return, are all important for success. These attributes are commonly ascribed to the private sector, but can also be achieved in the public sector. Nevertheless, achieving the overall targets will require the mobilisation of as many types of agencies as possible, including the private sector. This in turn will require governments to develop their roles in making policy, monitoring service standards and regulating the private sector.

3.5 Lesson 3: Recognise water as a scarce resource

3.5.1 Historically, water has been viewed primarily as a social good. While this is a valid view, it has often led to water services being provided free by governments to the people, with no acknowledgement of the cost associated with the provision of that service or the increasing scarcity of water. We have now learned from world wide experience that water services provided freely, or at very low cost, are not respected or conserved. These concerns, together with concerns over efficiency of allocation and over water's ecological importance, led the international community to recommend that water be recognised as an economic good[22] – in other words, as a finite and often scarce resource, with a value in its own right.

3.5.2 Ironically, many poor people in developing countries are already forced to treat water as an economic good, because they pay high prices to water vendors or incur heavy time costs to fetch water from a distance. Meanwhile, the better-off continue to enjoy water and wastewater services as socially provided, almost free, goods, supplied by a utility company. In contrast, appropriate community-managed supplies can substantially reduce the cost to poor users while providing a better service. In many cases, people are willing to pay for a more reliable service, thus providing the opportunity for reducing or eliminating subsidies to existing users.

3.5.3 Considered as a scarce resource, a unit of water used in one sector has the opportunity cost of being unavailable for use in another sector, or by another producer or consumer in the same sector. Different sectors

[22]Fourth Principle from the 1992 Dublin conference, echoed in Chapter 18 *of Agenda 21*, in the World Bank's 1993 policy paper, and in the CSD's ongoing Freshwater Initiative.

need water of different quality – potable water often has higher treatment costs than water for agriculture or industry – and different uses of water require different wastewater treatment. The costs of transporting water are significant, so the location of demand is important in addition to the seasonal variation of that demand. A starting point for the full pricing of water is to consider the long run marginal costs of supply: long run because both discounted capital and operating costs are included; marginal because they are based on the costs of expanding supply. Impacts of water use that are outside the water users' main concern (such as watershed conservation or maintaining biodiversity) need also to be factored into the economic decisions.

3.5.4 Water pricing along the above lines is already being employed in some countries, both to encourage users to conserve scarce resources and to generate the money needed to maintain the services. Prices that accurately reflect water's economic or scarcity value enable consumers' choices regarding water consumption and use to be more socially efficient, from the point of view of society as a whole. But consumption of at least a minimum quantity of safe water by all is essential for health and economic well-being (as discussed in section 2.2). Tariffs which enable access to a minimum quantity of safe water for poor people are therefore needed. Water pricing may also be designed to discriminate between different categories of users and levels of service. One practical problem is that, while water can be given a monetary value fairly easily, this is less easy for sanitation provision, and hence cost recovery is more difficult. Hygiene promotion and social marketing are essential to help people appreciate the value of sanitation services for convenience, health and quality of life.

3.5.5 However, many governments remain sensitive to the political costs involved with water pricing. There remains strong resistance from some countries to the idea that water should be regarded as an economic good. The Agenda 21 principles on water resources (presented at the post-Rio Ministerial meeting on water and sanitation held at Noordwijk in the Netherlands in 1994) did not receive universal endorsement. This disagreement reflects concern that economic considerations will be elevated over concern for water's life-support functions and its deep social, cultural and religious values. It is, therefore, important to continue to acknowledge water as a social and ecological good as well as an economic good. Indeed, the Dublin Conference also recognised that access to clean water and sanitation at an affordable price is a right for all human beings.

3.5.6 In the early 1990s, positions were polarised, with some arguing that water tariffs should be based on full cost, irrespective of social status, while others remained opposed to charging the poor at all. After intense debate, there is wide agreement on the need for equity of access to water. This means that users should pay for the level of service provided, but with scope for cross-subsidy from higher volume to very low volume consumers. This idea is compatible with the economic argument in 3.5.4 enabling access for all to a minimum quantity of safe water.

3.5.7 Increased involvement of the private sector during the 1990s has contributed to an increased understanding of the true cost of water and wastewater provision. Costs indirectly subsidised during public provision are usually passed on to producers by private operators and included in the tariff. The cost of borrowing money, and commercial and political risk, can in many situations lead to very high, and in some cases unaffordable, tariffs and this is a dilemma with which many governments and agencies are grappling.

4. Meeting the challenge

4.1 Introduction

4.1.1 This section of the strategy paper outlines how we all – the people themselves, civil society, governments, the private sector and the international development community – can meet the challenges presented in section 1 and achieve the targets set out in section 2. In doing so, we will be applying the lessons described in section 3. (All of these are repeated here in Box 7 for convenience.) This section is structured according to the different actors, rather than the different subjects.

Box 7: Challenges, targets and lessons

The challenges are:

- to improve the management of water resources and the environment,
- to avoid conflicts over water resources,
- to improve the allocation of water between different uses,
- to deliver sustainable water services and sanitation services to meet needs,
- to improve coordination among the international players.

The targets are:

- to have comprehensive policies and strategies for integrated water resources management in process of implementation in all countries by 2005,
- To reduce by half the proportion of people who are unable to reach, or to afford, safe drinking water by 2015,
- to reduce the proportion of people not having access to hygienic sanitation facilities by half by 2015.

The lessons are:

- to put people at the centre,
- to respond to demand,
- to recognise water as an economic good.

4.2 How people and communities can respond

4.2.1 The International Development Targets are all concerned with helping poor people. None of the targets is achievable without the engagement of the people themselves in the development processes. First, they can play a strong role in articulating their needs in relation to their livelihood priorities. In water resources, these may relate to improving water security and reducing risks and uncertainties, increasing the range of productive uses of water, or coping with natural disasters. In water supply and sanitation, the priorities may relate to protecting existing sources or finding new ones, reducing costs, improving sanitation facilities and drainage. The priorities will vary from place to place: the important point is that the people themselves should decide them, or be involved in the decision making process.

4.2.2 The people can also play a leading role in putting their ideas and wishes into practice. The previous sections of this paper have referred to community management, which has now become well understood, especially in water supply and sanitation, and is increasingly being applied to irrigation systems. Through community management, the people can work with local governments, civil society and/or the private sector to achieve the results they wish. Box 8 gives one such example of a community managed project combining social development with water and sanitation.

Box 8: Community-based management for service delivery

The Dodota Rural Water Supply Project, Ethiopia, had its origins in a study on women in development by SIDA in Ethiopia in 1980. Peasant women in Dodota sub-district, who spent between two and six hours a day fetching water, identified lack of easy access to clean water as their main problem. The aim of this demand-led project was both to meet the women's immediate needs and to address the wider issue of their status in rural Ethiopian society. From the beginning there was greater emphasis on the project process rather than on a blueprint and on following a strict project schedule. This allowed many people to influence the shape and content of the project, thereby increasing the sense of ownership. Women were trained to operate and maintain the communal water points, and to manage the overall scheme (i.e. to keep the books and collect the fees). There was continuous dialogue between the women and the technical designer of the project that led to some innovative adaptations to the standard design, including the development of a planned preventative maintenance programme. This dialogue also contributed to the strong sense of ownership of the project. The project took six years from identification to operation by the community-based organisation.

Source: Evaluation Synthesis of Rural Water and Sanitation Projects, DFID 1997

4.2.3 Yet, if current inequalities of influence and power over decision-making persist, it is unlikely that poor people will be able to access the services, or pursue the livelihoods, that they want. We need to change power relations within societies and give voices to the weak and excluded. This work can be complemented by initiatives such as improving national governance systems, national poverty reduction strategies, more focused urban development plans, and longer term national strategies for sustainable development. At the same time, the people and their community organisations should not be subject to unrealistic or unduly onerous responsibilities.

4.3 How civil society can respond

4.3.1 Earlier sections of this paper have emphasised the important role of civil society organisations in helping poor people to express their demands and in advocacy on their behalf. This work extends to monitoring the responses of the government and of the private sector to those demands and that advocacy. This is the most familiar role for civil society in many countries. In future it could be extended still further to include involvement in regulation of water sector organisations and contracts.

4.3.2 In many countries, civil society groups (especially NGOs) are themselves also valuable service providers, enabling poor and excluded people to determine their livelihoods, improve sustainable water resources, and gain access to essential and appropriate services. When social development activities are coupled with service provision (as in Box 8 above) the impact on poverty is enhanced. Under the Dublin and Rio principles, civil society will be encouraged to expand its work as a service provider with government regulation and support. In some countries, civil society and the commercial private sector work together, or in competition, as service providers.

4.3.3 If communities continue to expect the government to provide water services freely, it will be very difficult to achieve change. Civil society organisations can, therefore, form a communication channel from the government to the people about choices of service level and the roles of the different players, including the private sector and the government itself. Indeed, civil society groups have a key role to play in disseminating information and knowledge about new approaches within communities.

4.3.4 Civil society groups can also channel information back to the government, for example about practical difficulties arising from particular policies. Hence, they need good relationships with both the central and the lower tiers of government and their administrations, such as rural councils and local offices of line ministries. Civil society groups must emphasise the need for open, accessible and accountable government. This is an example of civil society's role in ensuring healthy democratic systems.[23]

4.4 How governments can respond

4.4.1 National governments are the most important players in the water sector. Their principal task is to establish national water policies and laws (the first target in section 2.3 of this paper). Water policies should not be imposed by donors but developed internally by the governments.

[23] Governance issues are further dealt with in DFID Strategy Paper "Making Government Work for Poor People."

4.4.2 Within the framework of these national legal and policy frameworks, government agencies are responsible for allocating water between uses – such as domestic water supply, agriculture, fisheries, forestry, environmental services, industrial, transport, power and recreation. They must utilise appropriate legal and financial instruments to balance economic development priorities with impacts on social structures, livelihoods and the environment. In doing so, they should protect the rights of the public (especially the poor) and ensure their access to water services, while being aware that allocating water to one section of society may reduce the water security of another section. They should also allocate sufficient base flows of water to support ecosystem functions. Such an assessment requires good supply and demand data.

4.4.3 Ranking priorities of use, and setting water prices, are politically sensitive and economically important processes in which governments should involve stakeholders at all levels of water resources management. Demand management, including water pricing, is a particularly important concept, and should complement demand-responsive approaches. It can play an important role in reducing wasteful consumption of water, in allocating water efficiently between sectors, and in ensuring that water can be reallocated to the uses to which higher value is attached by the governments and the other stakeholders.

4.4.4 With increasing involvement by civil society and the private sector, governments may lose some, or all, of their direct responsibility for providing water services. Their task of leadership, coordination and regulation within the sector will then become more significant. This covers many subjects, from water testing and tariff structures to public education and capacity-building. Government agencies will also be responsible for providing incentives to ensure equity between regions and communities. These may include an element of cross-subsidy, while avoiding misdirected subsidies.

4.4.5 Governments will need to introduce financial incentives for water users and polluters to change their behaviour: users should pay for the water they abstract and polluters should pay according to the pollution they cause. The costs of removing pollution, in particular, are enormous. The demand for water quality rises with increasing income. Yet, in countries in which many people do not even have access to basic water and sanitation, sewage treatment is unlikely to be a priority and improving the quality of water in rivers and lakes may seem to be a luxury. Improvements should be incremental and affordable, and set in the context of a long-term strategy. In due course, preventing water pollution will play a major role in reducing required expenditure on water treatment.

4.4.6 Effective public sector institutions, with established accountability, representation and transparent decision-making, are essential to fulfil all these roles for governments. They will need to address new and unfamiliar problems. They must be capable of planning the protection of water resources and the mechanisms to regulate a demand-responsive working environment including private sector organisations, and applying legal instruments. These government institutions will also encourage market-based incentives, innovative actions, and participation and commitment by all sectors of society. All this work will place a real strain on these institutions. Governments may want the international community to help build their capacity to cope with that strain.

4.4.7 Public servants responsible for licensing and service provision can be pressured by illegal payments to give faster or preferential treatment to particular users. Public procurement can also be subverted by bribery and illegal payments by contractors to secure contracts. Governments are now more aware of the costs of corruption and more willing to address the problem through legislation, preventative measures and prosecution. The international community can help governments to make more progress in eliminating corruption by building appropriate systems of financial management and accountability, while civil society organisations can help to expose and investigate it.

4.5 How the private sector can respond

4.5.1 The private sector has been involved in various aspects of water provision and management for a long time. Recently a new role has been developed, aiming to use the private sector to manage and/or expand existing services provided by the public sector, particularly in an urban context. The term Public Private Partnership (PPP) is used to describe this new approach.

4.5.2 Actively encouraged by international institutions, governments are turning to PPPs to improve operational efficiency, bring in extra investment and increase service coverage to those people previously excluded. They are involving a range of private organisations, from the major international utility companies to the formal and informal

local private sector. Various models of PPP are being tried around the world, with different levels of responsibility for management of the service, capital investment and ownership of the infrastructure.

4.5.3 Private sector involvement needs a legal and policy environment defining roles and responsibilities and transparent processes for award of contracts to service providers. This environment is designed by the government and enforced by the regulator (which may be part of, or independent from, the government itself). Strong leadership by the public sector client, and good regulation, also benefit the private sector companies by providing a more stable operating environment, as well as benefiting the poor by helping to ensure that the increased investments and efficiencies actually reach them. In many places, however, regulation is not well developed. New model contracts and strengthened regulatory functions will be needed to ensure that the private sector participation does benefit the poor rather than resulting only in improved services for the better off.

4.5.4 A number of networks exist to share knowledge on poverty reduction and propose new policies (see Box 9 for examples). These help to improve mutual understanding with governments and civil society and even to exert influence on them. The large international utilities companies, in particular, are already playing an increasingly significant role in such networks. We appreciate the fundamental need for commercial returns, but in the new collaborative working atmosphere of the water sector this is not enough: companies should also demonstrate their global citizenship and corporate responsibility in the way that they conduct their business and their approach to service provision for the poor.

4.5.5 At the medium and small scale, there are many private sector organisations and individuals involved in local water and sanitation provision (e.g. water vendors and latrine pit emptiers). A large number of poor people already depend on this small-scale service industry, and it will be essential in responding to future demand. More work is needed to understand this contribution and to explore how such local level private sector activities should be properly recognised, encouraged and regulated.

Box 9: Some knowledge networks involving the private sector

Business Partners for Development is a World Bank initiative – in which DFID is participating – to investigate the impact of tripartite partnerships between the public sector, private sector and civil society on services for the urban poor. In the water sector eight focus projects around the world are being studied. Experiences and ideas are being openly shared among the partners and disseminated widely. Most of the project work is currently in drinking water supply rather than sanitation or water for food, although opportunities are being sought to broaden the agenda.

In association with the World Bank, DFID and the Government of Japan launched an initiative to help developing countries to establish appropriate enabling environments for public-private partnerships. The Public Private Infrastructure Advisory Facility (PPIAF) is now operational and is advising governments throughout the developing world. It is attracting widespread support from both bilateral and multilateral funding institutions. DFID is placing particular emphasis on ensuring that PPIAF's advice results in benefits for poor people, and tackles difficult sectors of infrastructure provision such as water supply, sanitation, and solid waste management.

For some years the UNDP has been operating the Private Public Participation in Urban Environment programme to support private-public partnerships in smaller-scale urban work in water, sanitation and solid waste disposal. DFID has recently joined the UNDP in this initiative.

4.6 How the international development community can respond

4.6.1 International concern for water resources and the environment has now reached an unprecedented level, as demonstrated by the recent spate of major conferences. Now we must put the talk into practice. The international community must support people, civil society, the private sector and, most of all, the governments in their work. That work has been described in some detail in sections 4.2 to 4.5 above, and this should provide the basic agenda for support by the international community. Out of all that work, there are certain areas in which international

involvement has particular advantages, and these are highlighted in the following paragraphs.

4.6.2 International political processes can be especially helpful in mediating between competing country interests for water resources, for example agreeing the allocation of water between upstream and downstream countries. The World Bank and the regional development banks are well placed, by virtue of their political access and financial influence, to play active roles in dispute resolution. Other international agencies can work alongside them to provide technical expertise and financial support so as to achieve long-term solutions to water sharing problems. It is essential that the international community develops a coherent and mutually supportive approach.

4.6.3 In private sector participation, the international community should support good practice and provide guidance on efficient and sustainable service provision for all. This will include supporting the development of appropriate agreements that neither government nor the private sector, will come to regret in the longer term. Regulation and bench-marking the performance of both public and private service providers can also appropriately be supported by the international community.

4.6.4 The national governments, in their work to set policies and allocate water, will need comprehensive, accurate information about water to be compiled and made widely available. The international community, with its expertise and resources, can help with this work. Often the collection, storage and retrieval of such information is the responsibility of different organisations; they must work together better to share the data and information they have and to ensure that other people can access it easily.

4.6.5 As a more general issue, the international community should share more effectively the existing knowledge that can contribute to meeting the various water challenges. We also need to generate, evaluate and share new knowledge about diverse subjects such as population growth, allocating water resources between different uses, potential areas of conflict over water resources, demand for food, environmental resources, pollution levels, environmental change, and the linkages between water and people's livelihoods. The international research agenda should respond to demand for knowledge on particular subjects, and should address the problems and issues of poor people, not the interests of researchers in the rich countries.

4.6.6 The current information technology revolution has enormous implications and potential in many areas. In water, as in all areas, we need to ensure that knowledge is available in a form accessible to all those who need it. Electronic media can provide an opportunity for some catching up, but they can further marginalise the people who lack access to them. The international community should work to achieve equity in people's access to information on water globally, nationally and at local levels.

4.6.7 To generate knowledge more effectively, we must support the institutions that generate and share that knowledge, particularly those in developing countries. We must also be aware of the types of people who will use that knowledge to develop policy and implement work programmes. For example, if local communities will be taking increasing responsibility for their own water services, training and education initiatives must reflect this change, balancing new community-based approaches with more traditional professional networks. In the latter, enhanced education and training curricula can create a new generation of stakeholders with a stronger understanding of interdisciplinary issues and water resources management concepts and options.

4.6.8 The global water problems are too big and complex for individual countries or international agencies to tackle alone. The international community should foster new alliances between groups around the world and with local and national governments, within which policy-making and implementation can be more transparent and consensus can be built. This will be particularly important for implementing policies that require significant behavioural and financial changes. As the users make an increasing contribution to the cost of water services, the international community should support groups that give a voice to those users, particularly the poor.

4.6.9 To be consistent with their own advice to other people, the large number of international organisations and networks must also coordinate their own work better and reduce duplication. In this regard, the UN's Development Assistance Framework, the World Bank's Comprehensive Development Framework and the increasing importance of Poverty Reduction Strategy Plans (PRSPs) being developed by the countries themselves, are of particular note. Bilateral donors, such as DFID, that fund the various international networks have a strong role to play in this work.

5. Priorities for DFID

5.1 Introduction

5.1.1 This section describes what DFID will do to meet the challenges, stating firstly DFID's overall strategy in water, then indicating DFID's likely range of activities in the coming years.

5.2 DFID'S overall strategy in water

5.2.1 The 1997 White Paper on International Development[24] committed DFID to seeking the elimination of world poverty. Leading directly from that commitment, DFID's goal in the water sector is: to enable poor people to lead healthier and more productive lives by helping to increase and sustain their access to adequate water resources and to safe drinking water supply and appropriate sanitation (see Box 2 in section 2).

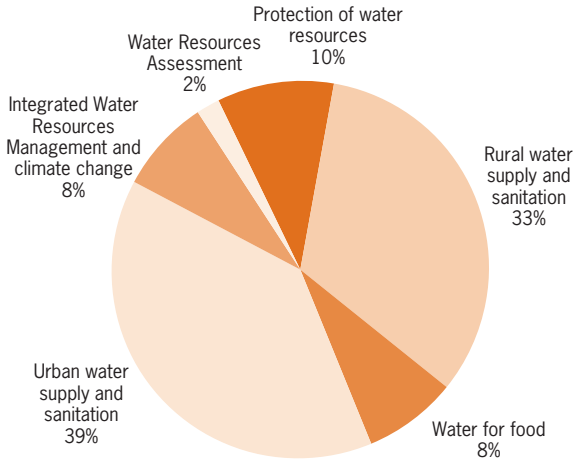
5.2.2 To achieve that goal, DFID's overall strategy in water has progressed in recent years to reflect the lessons described in section 3, and in particular to concentrate on the links between water and poverty. Box 10 indicates the main features of our future work.

Box 10: DFID'S overall strategy in water

- we will seek to focus international policy making in water resources, irrigation, water supply and sanitation on the elimination of poverty
- as a means to eliminate poverty we will concentrate our efforts in improving the management and allocation of water resources and access to water and sanitation on achieving improved health and sustainable livelihoods for the poor
- we will endeavour to obtain agreement through the UN system to an appropriate interim sanitation target, and support action to achieve agreed water supply and water resources targets
- we will encourage strong leadership at all levels to address the water crisis
- we will support a range of activities from field-level project and programmes through to knowledge dissemination, advocacy and research
- we will ensure that our activities in water contribute to, and are guided by, Poverty Reduction Strategies (PRSPs).

5.2.3 DFID's bilateral expenditure in the water sector in 1999-2000 was approximately £82million, a figure that is budgeted to increase substantially in the years ahead. Figure 8 indicates how that expenditure sub-divided between the various subsectors in 1999-2000.

Fig 8 – DFID expenditure on water-related projects 1999–2000



(Total expenditure was £82 million)

5.2.4 The proportions shown in figure 8 are not immutable; DFID will allocate its future spending between the different sub-sectors in line with the priorities developed through this paper and described in detail in section 5.3 below. As to the type of work, DFID's emphasis has already changed from the direct funding of infrastructure construction to strategic and policy-level work. The majority of our work will, therefore, be in institutional development, capacity building of governments and others, research and dissemination, and advocacy. We may also support selected national or local infrastructure projects that promote or demonstrate best practice, especially if we can use results to inform policy debates. The processes, projects and institutions supported may be formal or informal, local or international. By supporting activities across the spectrum of research, advocacy and projects, we intend to link best knowledge and best practice.

5.2.5 DFID does not intend to act alone – working closely with other organisations is itself an important part of our development philosophy. All our work will be

[24] *Eliminating World Poverty: A Challenge for the 21st Century*, White Paper on International Development, 1997.

undertaken, to the maximum extent possible, in partnership with recipient governments, the UN agencies, civil society organisations, the private sector and other like-minded donors, both multilateral and bilateral. Of these different groups, the governments of developing countries are our principal partners. We will encourage them to play the lead role in water, and will help them to develop their capacity to do so if needed.

5.3 DFID'S range of activities in water

5.3.1 Our proposed activities are described below, grouped under three headings that indicate DFID's emphasis on strategic and policy-level work and are framed to address the challenges stated in section 1 of this paper. This method of grouping DFID's activities places them in the logical flow of this paper: from identifying challenges, through setting targets and lessons learned, to the responses of all the various actors and specifically to DFID's contributions. We have deliberately avoided narrowing down the scope of DFID's work, preferring instead to reflect the complexity of water as a subject in the breadth of possible responses. The actual work to be carried out in any particular Department or Country Programme within DFID will also be informed by other policy documents such as DFID's Country Strategy Papers and Institutional Strategy Papers.

Response 1 activities to transform institutions

Improved capacity and co-ordination

5.3.2 This paper emphasises the need to build the capacity of institutions that work in water (see section 4). To achieve this we will undertake to address institutional development at all levels.

5.3.3 We will support reform and decentralisation of agencies responsible for allocating and managing water resources. Skills available in UK-based institutions and internationally will be used to assist in training, new skills development, and capacity-building to governments and other organisations working in water and poverty elimination at an international level. Recognising that collaboration is essential to achieving international development targets, we will seek improved co-ordination of international organisations (see Section 1.8) and of institutions within individual countries.

5.3.4 We will continue to support a range of strategic international initiatives that inform and influence the broader policy environment. We will encourage improved collaboration between the international organisations and networks, in order to reduce duplication, and to improve the transparency and accountability. We will also support work to improve co-ordination between government, civil society, trade unions and the private sector organisations within countries.

5.3.5 Central to our work with governments will be to ensure that poor people's interests, and particularly those of women and children, are reflected in national and regional legal and regulatory frameworks. We will also help governments to set water targets and to make financial plans that show how those targets can be achieved. We will support decision makers to develop and explore a range of possible options to ensure that the most appropriate solution, or set of solutions, is adopted. The solution will be based on the full range of policy, institutional and technical options. The assessment will include social, environmental, economic and financial factors.

5.3.6 Recognising in particular the significance of decentralised government to improving the management of water and the lives of the poor, we will support the relevant parts of national and local governments in adapting their working cultures from supply driven to demand responsive approaches. As an important part of this process, we will support and build governments' understanding of how to involve the private sector. We will also build capacity to manage effectively the public-private partnership process, to design, tender and award contracts, and to establish appropriate systems of regulation.

5.3.7 At a local level, we will encourage the growth of the indigenous private sector and facilitate involvement of local, small scale, providers. We will also support and enable the active involvement of civil society at this level in communication, advocacy and service provision in the water sector, particularly in sanitation. This will include explicit attention to gender issues, including improving women's capacity to formulate their needs and to express these within local and national civil society processes.

5.3.8 We will seek opportunities to work with other bilateral and multilateral agencies, in particular the World Bank, European Commission and the Asian Development Bank, on strategic country level and international initiatives.

Increased political commitment

5.3.9 To achieve institutional change, a high level of political commitment is required (see section 3). Future prospects of improving services to the poor depend largely on mobilising this commitment. DFID will actively promote processes that help to mobilise international commitment by raising water issues on the agenda at all appropriate UN meetings including Rio +10. Issues will include securing international agreement on a sanitation target, and further embedding water supply and water resources targets.

5.3.10 Mobilising increased financial resources will also be a priority. We will also promote initiatives external to the water sector itself (e.g. in world trade, food security, economic development, the power sector) that help to resolve financing and sustainability problems within the water sector.

5.3.11 Avoiding the translation of dispute into conflict over shared water (see Section 1.5) will be a key aspect of both institutional development and mobilising political commitment. The increasingly contested nature of water at all levels requires that appropriate preventive responses are undertaken. We will support international processes that help to prevent and resolve conflicts between countries over shared water resources and that promote co-operation in trans-boundary water management. In addition, we will look for opportunities to use water supply and sanitation to assist the re-establishment of effective institutions during and following conflict. At a national level we will assist governments in managing systems of water rights and allocations which can provide a suitable legislative framework for dispute resolution.

Box 11: Summary of activities to transform institutions

- Improve the capacity and co-ordination of governments and other organisations working in water.
- Help governments set realistic water targets and work to achieve them.
- Support governments to effectively involve the private sector.
- Mobilise international commitment for setting a sanitation target and achieving existing water targets.

Response 2 activities to promote best practice

Addressing poverty

5.3.12 Our support to individual water projects and programmes will be contingent on their contribution to promoting best practice and informing current policy debates. To address best practice in meeting the needs of the poor, we will support users, individually and collectively, in their articulation of demands and in determining the service levels most appropriate to their livelihood strategies. An important element of this process will be acknowledging and supporting the idea that access to an adequate water supply and appropriate sanitation is fundamental to the exercise of their broader human rights.

5.3.13 Within a decentralised resource management environment, we recognise the importance of community financing and management of water supply, sanitation and irrigation systems in order to achieve sustainable access to resources. We will support initiatives that pay particular attention to gender-focused development at the community level. This requires a better understanding of gender roles and the division of labour surrounding water management at the household level. Accordingly, we will support measures to improve this understanding and to integrate it within appropriate gender-focused initiatives. Recognising that the challenge increasingly lies in assisting the unserved poor in urban and peri-urban areas, including small towns, we will seek new ideas to reduce costs and improve services.

5.3.14 Sanitation provision world-wide currently lags behind water supply. We intend to give a high priority to sanitation, hygiene promotion and environmental health, recognising the need for innovative approaches to promote best practice. We will encourage leaders and decision-makers to promote sanitation and prioritise support to all types of organisation to accelerate work in sanitation and hygiene promotion. At a policy level, we will encourage the switch from supply-driven, subsidy-led, sanitation projects to creating demand for improved sanitation through hygiene promotion and social marketing.

5.3.15 At a project level, we will support the integration of hygiene promotion into all appropriate interventions and support household-centred approaches to sanitation. Recognising the importance of gender issues, we will support the provision of segregated sanitation facilities at schools to ensure that sanitation does not constitute a constraint to female school enrolment and attendance. In environmental health, we will support initiatives to

address the broader needs of poor people, including drainage, waste management, mosquito control and pollution prevention.

Achieving sustainability

5.3.16 To achieve sustainable development of water resources, we will support a range of innovative financing mechanisms and institutional frameworks that can bring more funding for water provision and sanitation services (see especially sections 1.7 and 3.5). This will include encouraging understanding of the full costs (capital and recurrent) of irrigation, water supply and sanitation services, whilst emphasising the income-generating capacity of water being used for productive purposes. We will promote systems for charging users of those services to cover at least the recurrent costs (ensuring that everyone is able to obtain a minimum quantity of water), recognising that billing and payment arrangements can affect sustainability, and ensuring that those revenues are spent on maintaining and improving the services.

5.3.17 We will support clear institutional responsibilities for operation and maintenance of systems which can improve the quality of service and the utilisation of existing assets. Recognising the important link between demand, willingness to pay and sustainability, we will support investment decisions based on the users' willingness and ability to pay and encourage a wider choice of options for technology and levels of service in irrigation, water supply and sanitation.

A holistic approach

5.3.18 At the level of water resources management, DFID's approach will emphasise the importance of Integrated Water Resources Management as a principle to be adopted at a national scale, but also at a local scale, putting poor people and their livelihoods at the centre of water resources management (see section 1.4).

5.3.19 To promote best practice in managing and allocating water resources, we will help governments to adopt, and implement, comprehensive national policies and strategies for integrated water resources management that link water to national development goals, and respond to the needs of poor people. In addition, we will encourage the use of appropriate financial and legal instruments for implementing the water resources policies and for preventing pollution. Integral to the success of new policies and strategies will be well-informed, strategic, participatory decision-making processes for allocating water resources rationally and equitably between different and competing uses. We will also suggest policies that ensure that water is used optimally and that the resource base is conserved rather than exploited and degraded. This includes recognition of the need for base flows of water to serve environmental functions and of the role wetland ecosystems play in supporting the livelihoods of many poor rural communities. Recognising the importance of user-level decision making, we will promote local-level water resources management by communities.

5.3.20 Agriculture currently accounts for a very high proportion of water use in many developing countries (see section 1.6). Increasing efficiency of water use in agriculture will involve substantial institutional, technical, social and economic changes. We will, therefore, encourage improvements in the efficiency of water use, including support for water re-use, prevention of water-logging and salinisation of irrigated land, and land reclamation for productive use. We will also promote water and soil conservation techniques, particularly involving farmers and their organisations in this work, and encourage the involvement of other stakeholders, including the private sector, in the research and management of water for agriculture. An important aspect of our approach will be to encourage stakeholder and gender analyses, in order to ensure that all actual and potential beneficiaries are correctly identified.

Improving emergency responses

5.3.21 Whilst the main focus of our support is to achieve sustainable developmental objectives, we also recognise the devastating impact of natural disasters on the lives and livelihoods of the poor. We recognise that in many conflict and emergency situations people are more vulnerable to water and sanitation related diseases and, therefore, water and sanitation should be priority interventions. We also recognise that it is often around entry point activities, such as water and sanitation provision, that institutional arrangements develop in these situations.

5.3.22 In order to promote best practice, we will support governments in planning for prevention and mitigation of disasters related to floods and droughts. Important to this support will be helping governments and civil society organisations to respond effectively to water supply and sanitation needs resulting from natural or man-made disasters and emergencies. Where appropriate, we will also directly support water supply and sanitation interventions in emergencies and conflicts.

Box 12: Summary of activities to promote best practice

- Support water projects and programmes which address poverty.
- Support a range of innovative financing mechanisms and institutional frameworks that can bring more funding for water provision and sanitation services.
- Support the integration of hygiene promotion into water and sanitation programmes.
- Improve sustainability of all initiatives by focusing on institutional, financial, operational environmental and technical aspects.
- Encourage improvements in the efficiency of water use, especially for agriculture.
- Support governments to plan prevention and mitigation of disasters from flooding and drought.

Response 3 activities to generate and share knowledge

Building better knowledge

5.3.23 The success of the above actions, and those described more broadly in section 4, will involve support work in generating and sharing knowledge. DFID, with its long-standing Knowledge and Research (KaR) programme and its strong links to a number of experienced UK institutions, is well-placed to provide such support.

5.3.24 DFID will focus both on sharing existing knowledge and on developing innovative and appropriate ideas relating to the water sector. The KaR programme promotes demand-driven research, with an emphasis on dissemination and uptake. Its approach recognises the multi-disciplinary nature of water and sanitation issues. The four related water sub-themes[25] will be supported by other DFID research programmes.

5.3.25 To generate better knowledge, we will work with poor people, service providers, national governments and international partners to identify and address their key requirements for knowledge related to water resources and sanitation issues and poverty elimination. We will also support a range of organisations to collect and share good quality information about water and sanitation. At a strategic level, we will support research in water resources management, water supply and sanitation, water for agriculture and water and the environment. Our support will also be given to areas such as gender aspects of water and sanitation, the effects of global climate change and variability, and household-level links between poverty elimination, demand for water and livelihood systems, and the allocation of water between competing demands.

Sharing knowledge more widely

5.3.26 To help bridge the gap between knowledge generation and the availability of knowledge, we will encourage a wide range of dissemination strategies to ensure that information is provided to those who need it, and in a form which can help to change how they actually work. This will include encouraging development education and awareness-raising within the UK about global water issues. At an international level, we will seek to build the capacities of research organisations and information networks that specialise in water and sanitation, especially those located in, or representing the interests of, developing countries. In addition, where there has been demonstrable innovation in knowledge generation and dissemination in developing countries, we will seek opportunities for the replication and scaling up of such approaches.

Box 13: Summary of activities to generate and share knowledge

- Encourage the development of innovative and appropriate ideas relating to the water sector.
- Identify and address key requirements for knowledge related to water resources and sanitation issues.
- Encourage a wide range of dissemination strategies to ensure that information is provided to those who need it.

[25] These are: W1, Water Resources Management; W3, Combating Degradation of Water Resources; W4, Water and Sanitation; W5, Water for Sustainable Food Production.

6. Monitoring progress

6.1 Indicators and monitoring systems

6.1.1 Indicators of progress must be practicable, measurable and, to the extent possible, incorporated into national and international monitoring programmes. We propose to use three main indicators to measure progress in water:

- the number of countries in which comprehensive policies and strategies for integrated water resources management have been adopted and are in process of active implementation;
- the proportion of people who are unable to reach, or to afford, safe drinking water;
- the proportion of people not having access to hygienic sanitation facilities.

Section 2.3 discussed targets for each of these indicators (respectively: all by 2005; reduce by half by 2015; reduce by half by 2015).

6.1.2 There is currently no regular programme to collect information on the number of countries that have adopted comprehensive national water policies. However, progress in water resources management will be monitored by the international community within its definition of national strategies for sustainable development.

6.1.3 Information on the numbers of people without access to both water and sanitation is collected on a 5-year cycle under the WHO/UNICEF Joint Monitoring Programme, whose work is described in section 1.3 of this paper. In the last year of collection (1999) data was recorded for 152 countries. Interest is growing and it is expected that subsequent surveys will record data for even more countries. DFID will continue to support the JMP, and in particular to emphasise the importance of community-managed monitoring and of household-level survey work.

6.1.4 The UN Administrative Co-ordination Committee's Sub Committee on Water Resources is responsible for monitoring national and international compliance with water resources policy frameworks. It has been mandated by the Commission for Sustainable Development to produce a biennial World Water Development Report to record progress in the sector. DFID broadly supports this initiative, and will encourage collaboration with related initiatives of the Global Water Partnership and the general adoption of agreed OECD-DAC/UN/World Bank indicators. We will expect this report to include monitoring of the three main indicators given in section 6.1.1 against the agreed targets. We recognise that organisations with which DFID works will also emphasise other indicators, such as: water productivity for food production; risk from floods for people living in flood plains; standards for the health of freshwater ecosystems; and potentially others. We will collaborate in refining and using those indicators and in encouraging their inclusion in the World Water Report, although our principal focus will be the three listed above. We will also continue to support other relevant data-collection initiatives related to the water sector.

6.1.5 Success or failure in meeting the objectives and targets set out in this strategy paper will also be reflected in indicators for health, the environment and the general improvement in economic growth, all of which will be tracked under the standard OECD-DAC/UN/World Bank indicators. We will check the correlation between the three main indicators specific to water and the indicators in these associated areas, in order to identify discrepancies that might warrant further investigation.

6.1.6 Where countries or regions are either failing to make progress against the main indicators, or lagging behind the general trend, we will seek to work with them to identify the causes of the problem and to discuss with decision makers there, and with other interested parties, how we might jointly act to address these problems. Thus, the activity of monitoring against the indicators will directly influence our work planning, specifically by prioritising support for the places that are making the least progress.

6.2 Assessing DFID'S performance

6.2.1 DFID is committed to assessing its own contribution to progress towards the IDTs. An important instrument for doing this is DFID's Public Service Agreement (PSA)[26] which sets out indicators for assessing

[26] All departments in the British Government are required by the Treasury to prepare Public Service Agreements, against which performance is reported quarterly. Linked to each PSA is a Service Delivery Agreement that sets out operational targets and indicators, again for quarterly reporting.

DFID's performance against key departmental objectives, including progress towards the IDTs. The linkages between DFID's inputs, our spending and activities, and 'real world' results in terms of progress towards the targets are complex and difficult to quantify. However, the PSA provides a coherent and logical basis for linking the performance of DFID programmes with the achievement of our overall objectives, and in consequence with the contribution we are making towards reaching the IDTs.

6.2.2 DFID has prepared strategies to guide its work at country level and in relation to other development institutions[27]. Developed through consultation, these strategies include appropriate and coherent sets of indicators for assessing progress of DFID assisted programmes sectorally, nationally and internationally. Regular review of country strategies and institutional strategies will encourage lesson learning and improved performance, particularly where such reviews are led by the appropriate agencies within developing countries themselves.

6.2.3 DFID also routinely monitors and evaluates its performance at both project and programme level, in order to guide the planning and implementation of its development work and to identify best practice for its future activities.

[27]See DFID's range of Country Strategy Papers and Institutional Strategy Papers.

Annex 1

Global and regional indicators of development progress for the international development targets

		World total	Developing country total[a]	East Asia & Pacific	Eastern Europe and Central Asia	Latin America and Caribbean	Middle East & North Africa	South Asia	Sub Saharan Africa
Population [millions]	1980	4,430	3,641	1,398	426	360	174	903	380
	1990	5,255	4,414	1,641	466	439	238	1,122	508
	1998	5,897	5,011	1,817	475	502	286	1,305	627
Reducing Extreme Poverty									
Population covered by at least one survey for poverty data [%]	1985–98[b]	,,	88.1	90.8	81.7	88.0	52.5	97.9	72.9
Population living on less than $1 a day [c] [millions]	1987	,,	1,183.2	417.5	1.1	63.7	9.3	474.4	217.2
	1990	,,	1,276.4	452.4	7.1	73.8	5.7	495.1	242.3
	1993	,,	1,304.3	431.9	18.3	70.8	5.0	505.1	273.3
	1996	,,	1,190.6	265.1	23.8	76.0	5.0	531.7	289.0
	estimates for 1998	,,	1,198.9	278.3	24.0	78.2	5.5	522.0	290.9
Population living on less than $1 a day [c] [%]	1987	,,	28.3	26.6	0.2	15.3	4.3	44.9	46.6
	1990	,,	29.0	27.6	1.6	16.8	2.4	44.0	47.7
	1993	,,	28.1	25.2	4.0	15.3	1.9	42.4	49.7
	1996	,,	24.5	14.9	5.1	15.6	1.8	42.3	48.5
	estimates for 1998	,,	24.0	15.3	5.1	15.6	1.9	40.0	46.3
Poverty Gap [c,d] [%]	1987	,,	8.6	6.8	0.1	5.2	1.0	13.0	20.0
	1990	,,	9.0	7.6	1.0	6.0	0.5	12.0	20.4
	1993	,,	8.9	7.5	1.3	5.8	0.4	11.2	21.7
	1996	,,	7.5	4.0	1.5	5.3	0.4	10.6	21.5
	estimates for 1998	,,	7.2	4.2	1.6	5.3	0.2	9.5	20.1
National income/ consumption by poorest 20% [share that accrues to the bottom 20% of the population]	1980s	,,	,,	6.3	9.8	3.7	6.6	7.9	5.7
	1990s	,,	,,	6.9	8.8	4.5	6.9	8.8	5.2
Prevalence of child malnutrition, weight for age [% of children under 5 years old] [% of children under 5 years old]	1992–98[b]	30	31	22	8	8	15	51	33

			World total	Developing country total[a]	East Asia & Pacific	Eastern Europe and Central Asia	Latin America and Caribbean	Middle East & North Africa	South Asia	Sub Saharan Africa
Universal Primary Education										
Net primary school enrolment [school age in school as % of all school age children]	Female	1980	77	72	82	91	85	64	52	49
		1990	86	83	96	95	88	82	65	52
		1997	88	86	99	99	93	84	70	54
	Male	1980	86	83	90	93	86	84	75	59
		1990	91	89	99	95	88	92	82	59
		1997	92	91	99	100	95	91	83	66
	Total	1980	81	78	86	92	85	74	64	54
		1990	88	86	97	95	88	87	74	56
		1997	90	88	99	100	94	87	77	,,
Persistence to grade 5 [% of children enrolled at Grade 1 who reach Grade 5]		1990–1995[b]	77	74	91	,,	76	90	56	67
Youth literacy rate [% of people 15–24]	Female	1980	70	69	85	96	89	47	38	44
		1990	77	77	92	97	92	63	50	60
		1998	81	81	95	98	94	75	58	72
	Male	1980	83	83	95	99	90	73	64	66
		1990	87	87	97	99	92	82	71	75
		1998	89	89	98	99	93	87	76	81
	Total	1980	77	76	90	97	89	60	52	55
		1990	82	82	94	98	92	73	61	68
		1998	85	85	97	99	94	81	67	76
Adult literacy rate [% of people 15+]	Female	1980	54	52	57	92	77	28	25	28
		1990	62	61	71	94	83	41	34	40
		1998	68	67	78	95	87	52	41	51
	Male	1980	72	71	80	97	82	56	52	49
		1990	78	78	87	98	86	67	59	60
		1998	82	82	91	98	89	74	65	68
	Total	1980	63	62	69	94	80	42	39	38
		1990	70	69	79	96	85	54	47	50
		1998	75	74	84	96	88	63	53	59
Gender Equality										
Gender equality in school [female gross enrolment ratio as a % of male gross enrolment ratio]	Primary	1980	87	84	87	99	97	74	67	76
		1990	90	88	94	99	100[f]	86	75	82
		1994–1998[b]	94	92	100	98	98[f]	86	82	84
	Primary & Secondary	1990	,,	,,	88	93	98	82	75	82
		1996	,,	,,	91	85	95	86	94	87
Gender equality in adult literacy [female literacy rate as a % of male literacy rate]		1980	75	73	71	95	94	50	48	57
		1990	79	78	82	96	97	61	58	67
		1998	83	82	86	97	98	70	63	75

			World total	Developing country total[a]	East Asia & Pacific	Eastern Europe and Central Asia	Latin America and Caribbean	Middle East & North Africa	South Asia	Sub Saharan Africa
Infant and Child Mortality										
Infant mortality rate		1980	80	87	55	41	61	95	119	115
[per 1,000 live births]		1990	60	65	40	28	41	60	87	101
		1998	54	59	35	22	31	45	75	92
Under-5 mortality rate		1980	123	135	82	,,	78	136	180	188
[per 1,000 live births]		1990	87	91	55	34	49	71	121	155
		1998	75	79	43	26	38	55	89	151
Maternal Mortality										
Maternal mortality ratio		1990	430	480	210	95	190	320	610	980
[per 100,000 live births]										
Births attended by health staff		1990	,,	49	58	,,	,,	58	39	,,
[% of total]		1996–1998[b]	52	47	,,	92	78	62	29	38
Reproductive Health										
Contraceptive prevalence		1997–1998[b]	49	48	52	67	59	55	49	21
[% of women 15–49]										
HIV prevalence [g]		1999	1.1	,,	0.07	0.14	,,	0.13	,,	8.0
[Percentage of adults (15–49 years) living with HIV/AIDS in 1999]										
Environment										
National strategies for sustainable development [countries with effective processes for sustainable development]		1998	,,	,,	,,	,,	,,	,,	,,	,,
Safe water [% of population with access]	Urban	1990–98[b]	90	89	95	,,	88	97	86	77
	Rural	1990–98[b]	62	62	58	,,	42	72	78	39
	Total	1990–98[b]	72	72	69	,,	78	85	80	50
Forest Area [% of		1990	30	29	25	36	49	4	14	23
National Surface Area]		1995[h]	25	26	24	36	45	1	16	17
Biodiversity: land area		1994[h]	6.7	5.1	6.2	3.6	6.5	3.0	4.4	5.8
protected [% of total land area]		1996[h]	6.6	5.3	6.9	3.2	7.3	2.2	4.5	6.2
Energy efficiency: GDP per		1990	,,	,,	,,	0.7	,,	1.5	,,	,,
unit of energy use		1997	,,	,,	,,	0.8	,,	1.3	,,	,,
Industrial Carbon Dioxide		1980	3.4	1.5	1.4	,,	2.4	3.0	0.4	0.9
emissions [tonnes per		1990	3.3	1.7	2.0	,,	2.2	3.3	0.7	0.9
capita]		1996	4.0	2.5	2.7	7.4	2.5	3.9	0.9	0.8

			World total	Developing country total[a]	East Asia & Pacific	Eastern Europe and Central Asia	Latin America and Caribbean	Middle East & North Africa	South Asia	Sub Saharan Africa
General Indicators										
Life Expectancy at Birth	Female	1980	64	60	67[e]	72	68	60	54	49
[in years]		1990	68	65	69	74	71	66	59	52
		1998	69	67	71	74	73	69	63	52
	Male	1980	59	56	64[e]	63	62	57	54	46
		1990	63	62	66	65	65	63	59	49
		1998	65	63	67	65	67	66	62	49
	Total	1980	61	58	66[e]	68	65	59	54	48
		1990	65	63	67	69	68	65	59	50
		1998	67	65	69	69	70	68	62	50
Fertility Rate		1980	3.7	4.1	3.0	2.5	4.1	6.2	5.3	6.6
[births per woman]		1990	3.1	3.4	2.4	2.3	3.1	4.8	4.1	6.0
		1998	2.7	2.9	2.1	1.6	2.7	3.5	3.4	5.4
GNP per capita		1980	2,530	790	330	,,	2,110	2,040	270	650
[Atlas method (current US$)]		1990	4,030	940	570	,,	2,250	1,720	380	550
		1998	4,890	1,250	990	2,200	3,860	2,030	430	510

[a] Combined figure for low and middle income countries used as a proxy for developing countries with the exception of the indicators for persistence to Grade 5, maternal mortality ratio and safe water where a true developing countries figure is used.
[b] Data refer to the most recent year available within the specified period.
[c] At 1993 purchasing power parities (PPPs) adjusted to current price terms
[d] The poverty gap is the mean shortfall below the poverty line (counting the non-poor as having zero shortfall), expressed as a percentage of the poverty line. The measure reflects the depth of poverty as well as its incidence.
[e] Data are for nearest available year.
[f] Figures are based on net enrolment ratios.
[g] The indicator actually relates to HIV prevalence in 15 to 24 year old pregnant women. However, until satisfactory data coverage is achieved on this indicator, the prevalence of HIV infection in all adults will be used.
[h] Data may refer to earlier years
,, = Not available

World Bank & UN Sources
DFID Statistics Department

Annex 2

Water and Sanitation Coverage[1] by Country

Country	Year	Total population (x 1000)	Urban population (x 1000)	Rural population (x 1000)	% urban water coverage	% rural water coverage	% total water coverage	% urban sanitation coverage	% rural sanitation coverage	% total sanitation coverage
Afghanistan	1990	14,755	2,692	12,063				25	8	11
	2000	22,720	4,971	17,749	19	11	13	25	8	12
Angola	1990	9,231	2,546	6,685						
	2000	12,878	4,404	8,474	34	40	38	70	30	44
Antigua and Barbuda	1990	64	23	41						
	2000	68	25	43	95	88	93	98	94	97
Argentina	1990	32,527	28,141	4,386						
	2000	37,032	33,299	3,733	85	30	79	89	48	85
Bahamas	1990	255	213	42						
	2000	306	271	35	98	86	96	93	94	93
Bangladesh[2]	1990	109,466	21,090	88,376	98	89	91	78	27	31
	2000	129,155	31,665	97,490	99	96	97	82	44	53
Barbados	1990	257	115	142	100	100	100	100	100	100
	2000	270	135	135	100		100	100		100
Benin	1990	4,660	1,607	3,053				46	6	20
	2000	6,097	2,577	3,520	74	55	63	46	6	23
Bolivia	1990	6,573	3,653	2,920	92	52	74	77	32	57
	2000	8,329	5,203	3,126	93	55	79	82	35	63
Botswana	1990	1,276	530	746	100	85	91	86	33	55
	2000	1,622	815	807	100	85	92	87	33	58
Brazil	1990	147,940	110,524	37,416	91	58	83	76	23	63
	2000	170,115	138,269	31,846	89	58	83	81	32	72
Burkina Faso	1990	9,061	1,229	7,832	70	38	42	88	14	24
	2000	11,937	2,204	9,733	70	38	44	88	16	29
Burundi	1990	5,456	342	5,114	94	63	65	70	50	51
	2000	6,695	600	6,095	96	61	64	79	50	52
Cambodia	1990	8,652	1,090	7,562						
	2000	11,168	1,778	9,390	53	25	30	58	10	18
Cameroon	1990	11,472	4,622	6,850	76	36	52	99	79	87
	2000	15,085	7,379	7,706	82	42	62	99	85	92
Chile	1990	13,099	10,908	2,191	98	48	90	98		
	2000	15,212	13,031	2,181	99	66	94	93	12	81
China	1990	1,155,306	316,563	838,743	99	60	71	57	18	26
	2000	1,277,558	409,965	867,593	94	66	75	68	24	38
Colombia	1990	34,970	24,291	10,679	95	68	87	95	53	82
	2000	42,322	31,274	11,048	98	73	91	97	51	85
Congo - Dem. Rep.	1990	37,364	10,442	26,922						
	2000	51,655	15,641	36,014	89	26	45	53	6	20
Dominica	1990	71	48	23						
	2000	70	50	20	100	90	93	28		

Country	Year	Total population (x 1000)	Urban population (x 1000)	Rural population (x 1000)	% urban water coverage	% rural water coverage	% total water coverage	% urban sanitation coverage	% rural sanitation coverage	% total sanitation coverage
Egypt	1990	56,333	24,841	31,492	97	91	94	96	80	87
	2000	68,469	30,954	37,515	96	94	95	98	91	94
El Salvador	1990	5,110	2,242	2,868						
	2000	6,276	2,927	3,349	92	25	59	86	50	68
Eritrea	1990	2,888	456	2,432						
	2000	3,851	722	3,129	63	42	46	66	1	13
Ethiopia	1990	48,092	6,461	41,631	77	13	22	58	6	13
	2000	62,565	11,042	51,523	77	13	24	58	6	15
Gambia	1990	921	237	684						
	2000	1,306	424	882	80	53	63	41	35	37
Ghana	1990	15,128	5,124	10,004	83	43	56	59	61	60
	2000	20,213	7,753	12,460	87	49	63	62	64	63
Grenada	1990	91	31	60						
	2000	94	36	58	97	93	93	96	97	97
Guyana	1990	795	264	531						
	2000	861	329	532	98	91	93	97	81	85
Haiti	1990	6,916	2,038	4,878	55	42	46	48	15	25
	2000	8,222	2,935	5,287	49	45	46	50	16	28
Honduras	1990	4,879	2,040	2,839						
	2000	6,485	3,420	3,065	94	70	81	94	50	70
India	1990	850,785	217,254	633,531	92	73	78	58	8	17
	2000	1,013,662	288,283	725,379	92	86	88	73	14	31
Indonesia	1990	182,812	55,923	126,889	90	60	69	76	45	47
	2000	212,108	86,833	125,275	91	65	76	87	50	65
Iran	1990	56,309	31,720	24,589	95	75	86	86	74	67
	2000	67,702	41,709	25,993	99	89	95	86	74	81
Jamaica	1990	2,369	1,219	1,150						
	2000	2,583	1,449	1,134	81	59	71	98	66	84
Jordan	1990	4,619	3,140	1,479	99	92	97	100	95	68
	2000	6,669	4,948	1,721	100	84	96	100	98	99
Kazakhstan	1990	16,742	9,546	7,196						
	2000	16,223	9,157	7,066	98	82	91	100	98	99
Kenya	1990	23,552	5,671	17,881	89	25	40	94	81	84
	2000	30,080	9,957	20,123	87	31	50	96	81	86
Korea - Dem. Rep.	1990	20,461	11,946	8,515						
(North)	2000	24,039	14,481	9,558	100	100	100	100	50	80
Korea - Rep (South)	1990	42,870	31,658	11,212						
	2000	46,844	38,354	8,490	97	71	92	76	4	63
Kyrgyzstan	1990	4,395	1,645	2,750						
	2000	4,699	1,563	3,136	98	66	77	100	100	100
Laos	1990	4,152	750	3,402						
	2000	5,433	1,275	4,158	59	100	90	84	34	46
Lesotho	1990	1,722	346	1,376						
	2000	2,153	602	1,551	51			9		
Liberia	1990	2,579	1,083	1,496						
	2000	3,154	1,416	1,738				70		

Country	Year	Total population (x 1000)	Urban population (x 1000)	Rural population (x 1000)	% urban water coverage	% rural water coverage	% total water coverage	% urban sanitation coverage	% rural sanitation coverage	% total sanitation coverage
Madagascar	1990	11,632	2,735	8,897	85	31	44	70	25	36
	2000	15,942	4,721	11,221	85	31	47	70	30	42
Malawi	1990	9,335	1,242	8,093	90	43	49	96	70	73
	2000	10,925	2,723	8,202	72	68	72	97	96	97
Mexico	1990	83,226	60,305	22,921	92	61	83	85	28	69
	2000	98,881	73,553	25,328	94	63	86	87	32	73
Moldova	1990	4,364	2,047	2,317						
	2000	4,381	2,022	2,359	100	100	100	100		
Mozambique	1990	14,198	3,781	10,417				70	26	38
	2000	19,681	7,917	11,764	86	36	56	71	26	44
Namibia	1990	1,350	359	991	98	63	72	84	14	33
	2000	1,726	533	1,193	100	67	78	96	17	36
Nepal	1990	18,772	1,680	17,092	88	60	63	63	16	20
	2000	23,931	2,844	21,087	88	60	63	63	18	23
Nicaragua	1990	3,827	2,031	1,796				93		
	2000	5,074	2,848	2,226	95	34	67	93	56	77
Niger	1990	7,732	1,245	6,487	65	51	53	71	4	15
	2000	10,730	2,207	8,523	70	56	59	79	5	20
Nigeria	1990	87,030	30,470	56,560	78	33	49	77	51	60
	2000	111,506	49,050	62,456	81	39	57	85	45	63
Pakistan	1990	119,155	37,987	81,168	96	79	84	78	13	26
	2000	156,483	57,968	98,515	96	84	88	92	40	59
Peru	1990	21,570	14,862	6,708	84	47	72	81	26	64
	2000	25,662	18,674	6,988	87	51	77	90	40	76
Philippines	1990	60,687	29,612	31,075	94	81	87	85	64	59
	2000	75,967	44,530	31,437	92	79	87	92	71	83
Russian Federation	1990	148,291	109,733	38,558						
	2000	146,934	114,141	32,793	100	96	99			
Rwanda	1990	6,987	372	6,615						
	2000	7,733	476	7,257	60	40	41	12	8	8
Senegal	1990	7,327	2,933	4,394	90	60	72			
	2000	9,481	4,498	4,983	92	65	78	70	13	40
Sierra Leone	1990	3,994	1,198	2,796						
	2000	4,855	1,779	3,076	23	31	28	23	31	28
South Africa	1990	34,012	16,609	17,403						
	2000	40,377	20,330	20,047	92	80	86	99	73	86
Sri Lanka	1990	17,046	3,625	13,421	90	59	66	93	79	82
	2000	18,827	4,435	14,392	91	80	83	91	80	83
St Lucia	1990	134	50	84						
	2000	154	58	96	98		98			
St Vincent and	1990	106	43	63						
Grenadines	2000	114	62	52		93	93		96	96
Sudan	1990	24,062	6,405	17,657	84	60	66	87	48	58
	2000	29,490	10,652	18,838	84	69	74	87	48	62
Tanzania	1990	25,470	5,298	20,172	80	40	48	97	86	88
	2000	33,517	11,021	22,496	80	42	54	98	86	90

Country	Year	Total population (x 1000)	Urban population (x 1000)	Rural population (x 1000)	% urban water coverage	% rural water coverage	% total water coverage	% urban sanitation coverage	% rural sanitation coverage	% total sanitation coverage
Thailand	1990	55,595	10,410	45,185	83	68	71	97	83	78
	2000	61,399	13,252	48,147	89	77	80	97	96	96
Uganda	1990	16,457	1,837	14,620	80	40	44	96	82	85
	2000	21,778	3,083	18,695	72	46	50	96	72	75
Venezuela	1990	19,502	16,378	3,124						
	2000	24,170	21,010	3,160	88	58	84	75	69	74
Vietnam	1990	66,689	13,157	53,532	81	40	48	86	70	61
	2000	79,832	15,749	64,083	81	50	56	86	70	73
Yemen	1990	11,590	2,648	8,942	85	60	66	80	27	39
	2000	18,112	4,476	13,636	85	64	69	87	31	45
Zambia	1990	7,239	2,853	4,386	88	28	52	79	48	60
	2000	9,169	3,632	5,537	88	48	64	79	64	70
Zimbabwe	1990	9,863	2,799	7,064	99	68	77	98	51	64
	2000	11,669	4,121	7,548	100	77	85	79	51	68

1 Coverage is defined as access within one kilometre of the users dwelling of an 'improved' water point or sanitation facility. 'Improved' is defined as the use of certain technologies which are assumed to be 'safer' or 'more adequate' than others. The Joint Monitoring Programme did not measure water quality (see note 2 below). For water supply such technologies include household connections, public standpipes, boreholes, protected dug wells, protected springs and rainwater collection. For sanitation this includes connection to a public sewer, connection to a septic system, pour-flush latrines, simple pit latrines and ventilated improved pit latrines.

2 Water coverage figures for Bangladesh take no account of levels of arsenic in groundwater which in some cases are well in excess of WHO guide levels.

Source: The WHO and UNICEF Joint Monitoring Programme 'Global Water Supply and Sanitation Assessment 2000 Report'.

Annex 3

Water Resource and Water Abstraction Data

	Annual Renewable Water Resources (WR)				Annual Water Abstraction (WA)						
Country	1998 population (thousands) (Note 1)	Total WRT (million m^3) (Note 2)	WR per inhabitant in 1998 (m^3/year)	WR Dependency Ratio (Note 3)	Year WA data collated	Annual WA (million m^3)	% used for Agriculture	% used for Domestic	% used for Industry	WA as % of WR	Source (WR and WA) (Note 4)
Afghanistan	21,354	65,000	3,044	15.4	1987	26,110	99	1	0	40.2	(i)
Albania	3,119	21,300	6,829		1970	200	76	6	18	0.9	(iv)
Angola	12,092	184,000	15,217	0.0	1987	480	76	14	10	0.3	(ii)
Argentina	36,123	994,000	27,517		1976	27,600	73	9	18	2.8	(iv)
Bangladesh	124,774	1,210,644	9,703	91.3	1990	14,636	86	12	2	1.2	(iii)
Barbados	268	1,000	3,731		1960	30	7	52	41	3.0	(iv)
Bolivia	7,957	300,000	37,703		1987	1,240	85	10	5	0.4	(iv)
Brazil	165,851	6,950,000	41,905		1990	36,470	40	43	17	0.5	(iv)
Burkina Faso	11,305	17,500	1,548	0.0	1992	376	81	19	0	2.1	(ii)
Burundi	6,457	3,600	558	0.0	1987	100	64	36	0	2.8	(ii)
Cambodia	10,716	476,110	44,430	74.7	1987	520	94	5	1	0.1	(iii)
Cameroon	14,305	268,000	18,735	0.0	1987	400	35	46	19	0.1	(ii)
Chile	14,824	468,000	31,570		1975	16,800	89	6	5	3.6	(iv)
China	1,255,698	2,829,569	2,253	0.6	1993	525,489	78	5	18	18.6	(iii)
Colombia	40,803	1,070,000	26,224		1987	5,340	43	41	16	0.5	(iv)
Congo - Dem. Rep. of	49,139	1,019,000	365,889		1990	360	23	61	16	0.0	(iv)
Egypt	65,978	86,800	1,316	97.9	1993	55,100	86	6	8	63.5	(i)
El Salvador	6,032	18,900	3,133		1975	1,000	89	7	4	5.3	(iv)
Eritrea (Note 5)	3,577	8,800	2,460	68.2	1987	2,200	86	11	3	1.9	(ii)
Ethiopia (Note 5)	59,649	110,000	1,844	0.0							(ii)
Gambia	1,229	8,000	6,509	62.5	1982	20	91	7	2	0.3	(ii)
Ghana	19,162	53,200	2,776	43.0	1970	300	52	35	13	0.6	(ii)
Haiti	7,952	11,000	1,383		1987	40	68	24	8	0.4	(iv)
Honduras	6,147	8,304	1,351		1992	1,520	91	4	5	18.3	(iv)
India	982,223	1,907,760	1,942	33.9	1990	500,000	92	5	3	26.2	(iii)
Indonesia	206,338	2,838,000	13,754	0.0	1990	74,346	93	6	1	2.6	(iii)
Iran	65,758	137,510	666	6.6	1993	70,034	92	6	2	50.9	(i)
Iraq	21,800	96,420	4,423	63.5	1990	42,800	92	3	5	44.4	(i)
Jamaica	2,538	8,300	3,270		1990	320	86	7	7	3.9	(iv)
Jordan	6,304	880	140	22.7	1993	984	75	22	3	111.8	(i)
Kazakhstan	16,319	109,600	17,386		1993	33,670	81	2	17	30.7	(iv)
Kenya	29,008	30,200	1,041	33.1	1990	2,050	76	20	4	6.8	(ii)
Korea-Dem. Rep. (North)	23,348	67,000	827,160		1987	14,160	73	11	16	21.1	(iv)
Korea-Rep. (South)	46,109	66,000	814,815		1992	27,600	75	11	14	41.8	(iv)
Kyrgyzstan	4,643	47,230	10,172	0.0	1990	11,036	95	2	3	23.4	(i)
Laos	5,163	331,550	64,217	42.6	1987	990	82	8	10	0.3	(iii)
Latvia	2,424	35,400	14,604		1994	290	13	55	32	0.8	(iv)
Lesotho	2,062	5,200	2,522	0.0	1987	50	56	22	22	1.0	(ii)

	Annual Renewable Water Resources (WR)				Annual Water Abstraction (WA)						
Country	1998 population (thousands) (Note 1)	Total WRT (million m^3) (Note 2)	WR per inhabitant in 1998 (m^3/year)	WR Dependency Ratio (Note 3)	Year WA data collated	Annual WA (million m^3)	% used for Agriculture	% used for Domestic	% used for Industry	WA as % of WR	Source (WR and WA) (Note 4)
Liberia	2,666	232,000	87,022	13.8	1987	130	60	27	13	0.1	(ii)
Madagascar	15,057	337,000	22,382	0.0	1984	16,300	99	1	0	4.8	(ii)
Malawi	10,346	18,700	1,807	6.4	1994	936	86	10	3	5.0	(ii)
Mexico	95,831	357,400	3,729		1991	77,620	86	6	8	21.7	(iv)
Moldova	4,378	11,700	102,632		1992	2,960	26	9	65	25.3	(iv)
Mozambique	18,880	216,000	11,441	53.7	1992	605	89	9	2	0.3	(ii)
Namibia	1,660	45,500	27,410	86.4	1991	249	68	29	3	0.5	(ii)
Nepal	22,847	210,200	9,200	5.7	1994	28,953	99	1	0	13.8	(iii)
Nicaragua	4,807	175,000	36,405		1975	890	54	25	24	0.5	(iv)
Niger	10,078	32,500	3,225	89.2	1988	500	82	16	2	1.5	(ii)
Nigeria	106,409	280,000	2,631	21.1	1987	3,630	54	31	15	1.3	(ii)
Pakistan	148,166	429,370	2,898	42.2	1991	155,600	97	2	2	36.2	(i)
Peru	24,797	40,000	1,613		1987	6,100	72	19	9	15.3	(iv)
Philippines	72,944	479,000	19,317	0.0	1995	55,422	88	8	4	11.6	(iii)
Poland	38,718	56,200	1,452		1991	12,280	24	16	60	21.9	(iv)
Russian Federation	147,434	4,498,000	30,509		1994	77,100	20	19	62	1.7	(iv)
Rwanda	6,604	6,300	954	0.0	1993	768	94	5	2	12.2	(ii)
Senegal	9,003	39,400	4,376	33.0	1987	1,360	92	5	3	3.5	(ii)
Sierra Leone	4,568	160,000	35,026	0.0	1987	370	89	7	4	0.2	(ii)
South Africa	39,357	50,000	1,270	10.4	1990	13,309	72	17	11	26.6	(ii)
Sri Lanka	18,455	50,000	2,709	0.0	1990	9,770	96	2	2	19.5	(iii)
Sudan	28,292	154,000	5,443	77.3	1995	17,800	94	4	1	11.6	(i)
Swaziland	952	4,500	4,727	42.2	1980	656	96	2	2	14.6	(ii)
Tanzania	32,102	89,000	14,796	10.1	1994	1,165	89	9	2	1.3	(ii)
Thailand	60,300	409,944	6,798	48.8	1990	33,132	91	5	4	8.1	(iii)
Uganda	20,554	66,000	3,211	40.9	1970	200	60	32	8	0.3	(ii)
Ukraine	50,861	139,500	2,743		1992	25,990	30	18	52	18.6	(iv)
Venezuela	23,242	1,317,000	56,665		1970	4,100	46	43	11	0.3	(iv)
Vietnam	77,562	891,210	11,490	58.9	1990	54,330	87	4	10	6.1	(iii)
Yemen	16,887	4,100	243	0.0	1990	2,932	92	7	1	71.5	(i)
Zambia	8,781	116,000	13,210	30.9	1994	1,706	77	16	7	1.5	(ii)
Zimbabwe	11,377	20,000	1,758	29.5	1987	1,220	79	14	7	6.1	(ii)

Notes:

1. Source: United Nations Population Division, World Population Prospects: The 1998 Revision.
2. Average annual figures. Includes internal and cross boundary renewable water resources.
3. Indicates how reliant a country is on water from upstream countries (higher values indicating greater reliance on other countries). Where no value is entered renewable water resources data is not available in a disaggregated internal/external format.
4. (i) 'Aquastats – Near East', Food and Agriculture web site, www.fao.org
   (ii) 'Aquastats – Africa', Food and Agriculture web site, www.fao.org
   (iii) 'Aquastats – Asia', Food and Agriculture web site, www.fao.org
   (iv) Gleick, 1998, 'The Worlds Water – The Biennial Report on Freshwater Resources 1998–1999'.
5. Water abstraction figures refer to Eritrea and Ethiopia combined.

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