



postnote

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ACCESS TO WATER IN DEVELOPING COUNTRIES

Sufficient clean water is essential to everyone's wellbeing. Yet nearly 20% of the world's population does not have ready access to drinking water and 40% lack sanitation facilities. The vast majority of these people are in developing countries and the United Nations has identified water use as a priority for international aid. Access to water is now recognised as a key issue in development and therefore will be high on the agenda in August 2002, when world leaders meet in Johannesburg¹ to address key issues affecting 'sustainable development'. This briefing outlines the technological, social, economic and political issues influencing sustainable water use and examines the UK's role in helping to increase developing countries' capacity in this area.

The global 'water crisis'

At the beginning of the 21st century many people face formidable challenges to meet increasing demand for water. However, there are significant pressures that make it difficult to meet these demands including inefficient agriculture, expanding urban areas, water pollution, and international conflict. The situation has led many in the international development community to point to a 'global water crisis' (see box opposite).

Since the 1960s widespread acute water shortages have attracted increasing attention. For example, 1981–90 was declared the International Drinking Water Supply and Sanitation Decade. Following this, in 1992 the Earth Summit in Rio de Janeiro set goals for sustainable development, including guaranteeing every individual access to clean water and sanitation. Significant progress has been made since then, but an enormous challenge remains. Sound management of water resources and access to water and sanitation services are now regarded as key components of sustainable development,

The global water crisis

One billion people do not have an access to safe and affordable drinking water, and 2.4 billion people live in conditions lacking adequate sanitation. Each year about 4 million people die of waterborne diseases, including 2 million children who die of diarrhoea. More than 800 million people, 15% of the world population is malnourished, due in part to insufficient water for crops.

Based on assumptions of population growth, projections of development and climate change, the Stockholm Environment Institute has estimated that the proportion of the world's population living in countries with significant water stress will increase from approximately 34% in 1994 to 63% in 2025, including large areas of Africa, Asia, and Latin America. This will impact their lives and livelihood.

Source : Department for International Development. (2001) *Addressing the Water Crisis*

particularly as a precondition for the steady improvement in living standards in developing countries².

The UN Secretary General's report to the Millennium Assembly in September 2000, highlighted water as an important issue and recommended that targets be adopted for access to water. The Ministerial Declaration at the close of the Millennium Summit included the following targets:

- "To halve, by the year 2015, 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 supply."

Global supply and demand for water

Total water supply

Water supply depends on several factors in the water cycle, including the rates of rainfall, evaporation, the use of water by plants (transpiration), and river and groundwater flows. It is estimated³ that less than 1% of all fresh water is available for people to use (the remainder is locked up in ice sheets and glaciers). Globally, around 12,500 cubic kilometres (km³) of water are considered available for human use on an annual basis. This amounts to about 6,600 m³ per person/year⁴.

Total water demand

Today, the quantity of water used for all purposes exceeds 3,700 km³ per year. Agriculture is the largest user, consuming almost two-thirds of all water drawn from rivers, lakes and groundwater. While irrigation has undoubtedly contributed significantly to world agricultural production, it is extremely water intensive. Since 1960, water use for crop irrigation has risen by 60-70%.

Industry uses about 20% of available water, and the municipal sector uses about 10%. Population growth, urbanisation and industrialisation have increased the use of water in these sectors.

Access to water

The previous section examined the gross supply of and demand for water on a global basis. However, the world's available freshwater supply is not distributed evenly around the globe, throughout the seasons, or from year to year.

About three-quarters of annual rainfall occurs in areas containing less than one-third of the world's population, whereas two-thirds of the world's population live in the areas receiving only one-quarter of the world's annual rainfall. For instance, about 20% of the global average runoff each year is accounted for by the Amazon Basin, a vast region with fewer than 10 million people. Similarly, the Congo River and its tributaries account for about 30% of the entire African continent's annual runoff, but the basin contains only 10% of Africa's population.

Throughout much of the developing world freshwater supply comes in the form of seasonal rains, such as the monsoons in Asia. Such rains often run off too quickly for efficient use. India, for instance, gets 90% of its rainfall during the summer monsoon season – at other times rainfall over much of the country is very low. Because of the seasonal nature of the water supply (without storage), many developing countries can use no more than 20% of their potentially available freshwater resources.

Water supplies can also vary from year to year, depending on variations in the weather. For example, monsoons may fail in some years. Also natural phenomena such as the El Niño Southern Oscillation can lead to significant differences in rainfall in the southern Pacific Ocean, affecting south-east Asia and south and central America.

Water scarcity

Where water supplies are inadequate, two types of water scarcity can be identified that particularly affect developing countries:

Physical water scarcity where water consumption exceeds 60% of the usable supply. This means that there is limited spare capacity, and so even with the highest feasible efficiency and productivity, water supply is not sufficient to meet the demand of agriculture, domestic and industrial sectors while satisfying environmental needs. Countries in this category include those in the Middle East. To help meet water needs some countries such as Saudi Arabia and Kuwait import much of their food and invest in desalination plants increase the cost of water to around twice the cost in the UK.

Economic water scarcity where a country physically has sufficient water resources to meet its needs, but additional storage and transport facilities are required. This will mean embarking on large and expensive water-development projects. For many countries, specifically in sub-Saharan Africa, it will be difficult to mobilise the necessary financial and other resources to increase water supply to adequate levels.

In addition, in developing countries, access to adequate water supplies is most affected by the exhaustion of traditional sources, such as wells and seasonal rivers. Access may be worsened by cyclical shortages in times of drought, inefficient irrigation practices, lack of resources to invest to meet demand and to increase the efficiency of irrigation system.

The International Water Management Institute⁵ estimates that 26 countries, including 11 in Africa, can be described as water scarce (see box above), and that over 230 million people are affected.

Issues

Population growth and urbanisation

As world population and industrial output have increased, the use of water has accelerated, and this is projected to continue. Indeed, it is projected that by 2025 global availability of fresh water will drop to an estimated 5,100m³ per person per year as the world's population increases by 2 billion⁶.

One of the main problems facing the developing countries is rapid urbanisation. This results in increasing numbers of people living in urban fringe areas of shanty towns where it is extremely difficult to provide an adequate supply of clean water or sanitation.

Water quality

As well as the need for an adequate quantity of water for consumption, it also needs to be of an adequate quality that minimises health impacts, such as water-borne diseases. However, the World Health Organisation (WHO) estimates that around 4 million deaths each year can be attributed to water related disease, particularly cholera, hepatitis, dengue fever, malaria and other parasitic diseases.

Tackling water pollution

There are three general ways to deal with water pollution:

- reduce releases from pollution sources
- transport pollutants to a place where they will do no harm
- treat the water to remove or convert the pollutants to harmless forms.

There is a wide range of technological options available to treat polluted water. These range from simple sand filters, through to sophisticated water treatment works that can remove a large number of potential contaminants, using technologies such as reverse osmosis and ion exchange. Which of the options is used depends on the specific circumstances of the pollution problem. Reduction at source is the more environmentally preferable way of dealing with pollutants. In some locations natural ecosystems, such as wetlands and soils, are used as part of the treatment process. However, cleanup and treatment of water pollution for both surface water and groundwater resources is expensive and are not always completely successful.

Source: United Nation Commission on Sustainable Development, *Comprehensive Assessment of the Freshwater Resources of the World*

Again, the incidence and effects of these diseases is most pronounced in developing countries, where 66% of people have no toilets or latrines. The illnesses that result from water contaminated by sewage not only kill millions of people, but also disable many millions more, thus further hampering economic development in those countries.

Water pollution can also occur from the release of harmful substances, the use of agricultural chemicals, urban drainage, industrial effluents and the ingress of salty water as a result of over-pumping groundwater resources. To return contaminated water to standards fit for human consumption costs money (a typical small treatment works can cost around \$3-5 million), and this exacerbates the difficulties facing developing countries. Today, 90% of waste-water in the developing countries is discharged without having undergone any treatment⁷ (see box above).

Water use in agriculture

In many developing countries farmers use, on average, twice as much as water per hectare as in industrialised countries, yet their yields can be three times lower – a six-fold difference in the efficiency of irrigation (see box opposite). On top of this, only one-third of all the water withdrawn for agriculture actually contributes to making crops grow – of the remainder some is returned to the system and reused but much is polluted or unusable. Added to this inefficiency in use, aquifers are being depleted faster than they are being replenished.

This is particularly the case in China, India, Mexico, Thailand, North Africa and the Middle East. Also intensive pumping can deteriorate the quality of groundwater by attracting salt water either from the sea or from naturally saline groundwater.

Managing water resources for agriculture

Improved agricultural irrigation could reduce water use by between 20% and 30%. Options include:

- pricing agricultural water to encourage conservation.
- using lined or covered canals that reduce seepage and evaporation.
- developing computer monitoring and scheduled release of water for maximum efficiency.
- integrating the use of surface water and groundwater to more effectively use the total resource.
- irrigating at times when evaporation is minimal, such as at night or in the early morning..
- using improved irrigation systems, such as sprinklers or drip irrigation that more effectively apply water to crops.
- improving land preparation for water application.
- encouraging the development of crops that require less water or are more salt tolerant.

Water and war

Shortage of water could lead to major political conflicts around the world. Over 20 countries depend on the flow of water from other nations for much of their water supply. For instance, the Nile flows through Ethiopia, Sudan and Egypt. If population rises as expected in these countries from 150 million today to 340 million in 2050, the UN has suggested that competition for increasingly scarce water resources may lead to regional conflict⁸. Investment in international diplomacy alongside aid is thus seen by many as essential.

In modern conflicts, water supply systems have proven to be vulnerable to the effects of conflict, for example:

- deliberate destruction of water supply infrastructure such as pumping stations, water mains and treatment facilities. Similarly, power stations and power lines, indispensable for most major water stations can be hit.
- deliberate cut-off of water supply facilities such as springs, wells and water treatment facilities. Water supply has itself been used as a bargaining tool.
- disruption of operation and maintenance – conflict makes it difficult to operate facilities and to obtain chemicals for water treatment and spare parts to run pumps and to repair the leaks.
- deliberate or inadvertent displacement of large numbers of people during conflicts can strain water supplies and sanitation facilities in refugee camps and host communities. Risks from poor sanitation in such situations can affect the health of displaced people.

International development and aid

Global and regional institutions

There are many international organisations involved in water-related aid programmes, including the World Bank, Asian, American and African regional development banks, the European Union, and UN agencies. The largest proportion of the funding support comes through grants and loans. In addition, there are many bilateral arrangements between developed and developing world countries.

Over the last few years, the average total annual aid budget for water-related projects has been around £3.5 billion, with bilateral arrangements contributing the lion's

share (£2.25 billion), with the World Bank as the largest single donor (£1.9 billion). The European Commission's role is becoming increasingly important in water programmes. It mainly works with African, Caribbean and Pacific developing countries, and helps to define and to implement water policies focusing on sustainable water management. These institutions:

- provide grant aid or loans for development projects
- support bilateral programmes
- transfer knowledge and technology.

In terms of the costs for ensuring adequate water supplies in developing countries, the Global Water Partnership (GWP) has estimated that some \$180 billion per annum would be needed for water treatment, supply infrastructure and irrigation⁹. This would represent a doubling of the present level of investment. Many developing countries clearly do not have the resources to cover these costs, as their financial burdens are already large. Since no single aid agency or government is able to provide all funds, international co-operation is necessary.

The UK's role

The Department for International Development (DFID) has lead policy responsibility for promoting development and reducing poverty overseas. Water projects are a central element of DFID's strategy to improve the quality of the life for people in developing countries. Water has increased in importance, with the budget for water-related activities expanding by 7% since 2001 to the current figure of £90.6 million. This represents 6.7% of DFID's total bilateral funding for developing countries.

DFID's water related activities also involve work with multilateral institutions such as the World Bank and the United Nations. Also, DFID supports several non-governmental organisations (NGOs) active in water related projects, including trade bodies such as British Water (e.g. through trade missions) and charities such as WaterAid and Oxfam. It also supports a Knowledge and Research programme that has approximately 40 water-related projects with a total value of around £10 million.

In 1970, the UK Government had committed itself to giving 0.7% of UK GDP to development in overseas aid. Successive governments have not met this target, but the current Government has recently re-stated its intention to meet the target. DFID intends to increase expenditure but it is shifting its support to more general programmes, and thus has acknowledged that it will be more difficult to identify spending on specific themes such as water. However, DFID has adopted a high priority target to promote access to water supply and sanitation integrated water resources management. A question arises whether the proposed new budgetary systems in DFID will allow simple monitoring of achievement of this target.

NGO-led projects mainly focus on enabling local people to manage their own water resources sustainably. Such projects concentrate on the poorest countries, aiming to ensure safe water supplies and better hygiene. These organisations focus on smaller scale projects than those

supported by UK bilateral or international aid programmes. NGO projects often involve communities participating directly to ensure the most effective delivery of aid, and contributing to meeting the equity requirements of sustainable development.

Private sector participation has become an important aspect of the UK water related activities in providing access to affordable and sustainable water supply and sanitation services to poor developing countries where governments are generally unable to generate and sustain the huge investments as well as required technical skills. Private companies seek to introduce appropriate services, payment and management options to increase water quality and sustainability of water supply and use in developing countries. The UK has a particularly high reputation for its consultancy advice in this area.

Prospects for addressing the global water crisis

In 1995, 436 million people in 29 countries experienced water stress or scarcity. The World Bank estimates that by 2025, this may rise to 1.4 billion people in 48 countries. These will include Pakistan, South Africa, and large parts of India and China where water is not currently scarce. To meet their needs, and avoid possible conflict, water may have to be transferred from agriculture to other sectors, increasing these countries' dependence on imported food. Maximising the efficiency of water use where it is available will also be essential⁵.

The World Summit on Sustainable Development (WSSD, also known as 'Rio+10') is expected to provide the impetus to promote economic growth, social development and environmental protection world-wide. The final agenda for the Johannesburg Summit has not yet been finalised, but the UK Government has proposed the issues of poverty eradication, improved management of water resources and access to safe water and adequate sanitation as important topics to be addressed.

Endnotes

- 1 World Summit on Sustainable Development 26/8/02– 4/9/02
- 2 Finding Solutions to Water Disputes. <http://www.gefweb.org>
- 3 Engelman, R. and Le Roy, P. (1993). *Sustaining Water: Population and the Future of Renewable Water Supplies*, Population and Environment Programme, Population Action International, 1993.
- 4 Postel, S.L., Daily, G.C., Ehrlich (1996) Human appropriation of renewable freshwater. *Science* 192, 785-788
- 5 <http://www.cgiar.org/iwmi/home/wsmmap.htm>
- 6 Cosgrove, W.J. and Rijsberman, F.R. (2001). *Water Vision. Making water everybody's business*. World Water Council.
- 7 Botkin, D (1998) *Environmental Science*
- 8 UNDP (1999) Human Development Report
- 9 Global Water Partnership (2000) *Towards Water Security: A framework for Action*

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