



United Nations



UN-Water

WATER FOR LIFE
2005-2015

WATER FOR LIFE DECADE [2005-2015]

UN-Water is the inter-agency mechanism that promotes coherence in, and coordination of, UN system actions aimed at the implementation of the agenda defined by the Millennium Declaration and the World Summit on Sustainable Development as it relates to water and sanitation.

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Table of Contents

A message from the Secretary-General	3
Water and the Millennium Development Goals	4
Water for women	6
Water for biodiversity and the environment	8
Water for food, agriculture and rural livelihood	10
Water for sanitation and health	12
Water for energy	14

AN INTERNATIONAL DECADE FOR ACTION

The 'Water for Life' Decade aims to promote efforts to fulfil international commitments made on water and water-related issues by 2015, placing special emphasis on the involvement of women in these efforts.



WATER FOR LIFE
2005-2015



Water is essential for life. Yet many millions of people around the world face water shortages and a daily struggle to secure safe water for their basic needs. Millions of children continue to die every year from preventable water-borne diseases. Water-related natural disasters such as floods, tropical storms and tsunamis exact a heavy toll in human life and suffering. And all too regularly, drought afflicts some of the world's poorest countries, exacerbating hunger and malnutrition.

In the past decade, significant progress has been made in providing people with access to clean drinking water and basic sanitation. But a major effort is still required in the decade ahead to extend these essential services to those still unserved, the vast majority of whom are poor people.

Meeting the water and sanitation targets set by the international community for 2015 is a crucial step towards the ultimate goal of providing safe drinking water and adequate sanitation to all. Providing access to water and sanitation is also fundamental for achieving the other Millennium Development Goals, such as alleviating poverty, hunger and malnutrition; reducing child mortality; increasing gender equality; providing more opportunity for education; and ensuring environmental sustainability. Women and girls are overwhelmingly the water haulers of the world, a task that consumes valuable time and energy that girls could otherwise devote to schooling.

Beyond meeting basic human needs, water contributes to sustainable development in other important ways. It is a major source of energy in some parts of the world, while in others its potential as an energy source remains largely untapped. Water is also necessary for agriculture and for many industrial processes. And in more than a few countries, it makes up an integral part of transport systems. With improved scientific understanding, the international community has also come to appreciate more fully the valuable services provided by water-related ecosystems, from flood control to storm protection and water purification. Though some analysts have predicted future conflicts over water, many countries successfully share river basins, inland seas and other water resources, showing that this challenge can also be a powerful catalyst for international cooperation.

THE INTERNATIONAL DECADE FOR ACTION, "WATER FOR LIFE", provides an excellent opportunity for the international community to advance towards a truly integrated approach to the management of the world's water that ensures its sustainable use for generations to come. I urge everyone to give the decade their full support.

KOFI ANNAN

United Nations Secretary-General

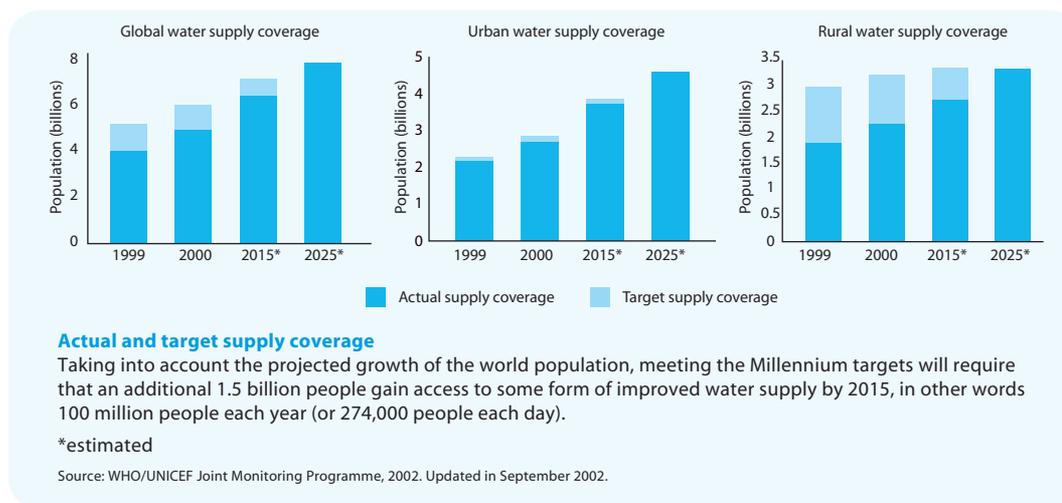
22 March 2005

WATER AND THE MILLENNIUM DEVELOPMENT GOALS

THE MILLENNIUM DEVELOPMENT GOALS, AGREED TO BY ALL 191 UNITED NATIONS MEMBER STATES AT THE MILLENNIUM SUMMIT IN 2000, SET SPECIFIC TARGETS FOR REDUCING POVERTY, HUNGER, DISEASE, ILLITERACY, ENVIRONMENTAL DEGRADATION AND DISCRIMINATION AGAINST WOMEN BY 2015. AMONG THESE TARGETS, GOVERNMENTS AGREED TO REDUCE BY HALF THE PROPORTION OF PEOPLE WITHOUT ACCESS TO SAFE DRINKING WATER BY 2015, THE YEAR TO MARK THE END OF THE INTERNATIONAL DECADE FOR ACTION: 'WATER FOR LIFE'.

THE MILLENNIUM DECLARATION EMPHASIZED THE NEED FOR ALL COUNTRIES TO STOP THE UNSUSTAINABLE EXPLOITATION OF WATER RESOURCES. GOVERNMENTS ADDRESSED THIS ISSUE AT THE JOHANNESBURG SUMMIT IN 2002 BY AGREEING TO DEVELOP INTEGRATED WATER RESOURCE MANAGEMENT AND WATER EFFICIENCY PLANS BY 2005. THEY ALSO ADDED A COMPLEMENTARY TARGET TO HALVE BY 2015 THE PROPORTION OF PEOPLE LACKING IMPROVED SANITATION.

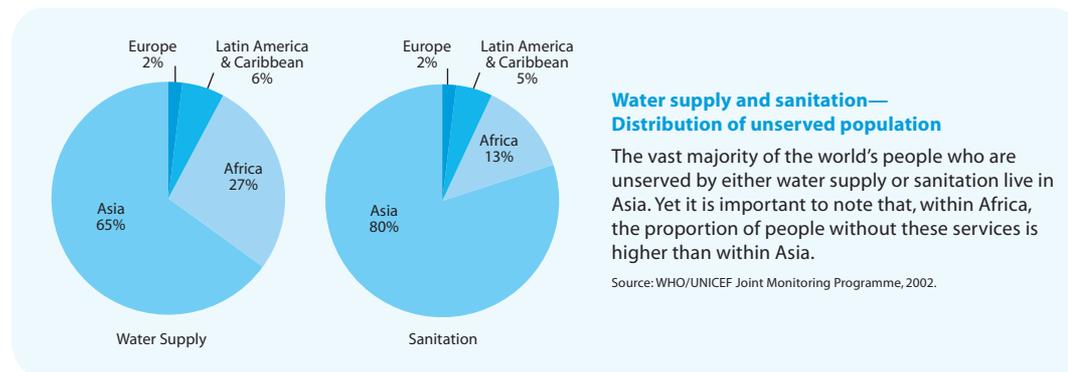
THE PRIMARY GOAL OF THE 'WATER FOR LIFE' DECADE FROM 2005 TO 2015 IS TO ACHIEVE THESE INTERNATIONALLY AGREED DEVELOPMENT GOALS RELATING TO WATER, THROUGH COOPERATION ON WATER ISSUES AND PARTICIPATION OF WOMEN IN THESE DEVELOPMENT EFFORTS.



All the Millennium Development Goals are inter-dependent. Without improved access to freshwater and sanitation, the overarching goal of poverty reduction cannot be achieved. The economic consequences resulting from a lack of clean water and improved sanitation are often underestimated. Hygiene-related illnesses sap economic growth and cost billions of working days each year. Time spent collecting water from far-flung sources prevents women from doing other productive work and girls from attending school.

IN INDIA, IT IS ESTIMATED THAT THE NATIONAL COST OF WOMEN FETCHING WATER IS 150 MILLION WOMEN WORK DAYS PER YEAR, EQUIVALENT TO A NATIONAL LOSS OF INCOME OF 10 BILLION RUPEES (APPROXIMATELY US\$208 MILLION)¹.

Improving access to safe water and sanitation is critical not only to reducing poverty but also to achieving the Millennium targets for health, including reducing maternal and child mortality and combating HIV/AIDS, malaria and other major diseases. More than two million people in develop-

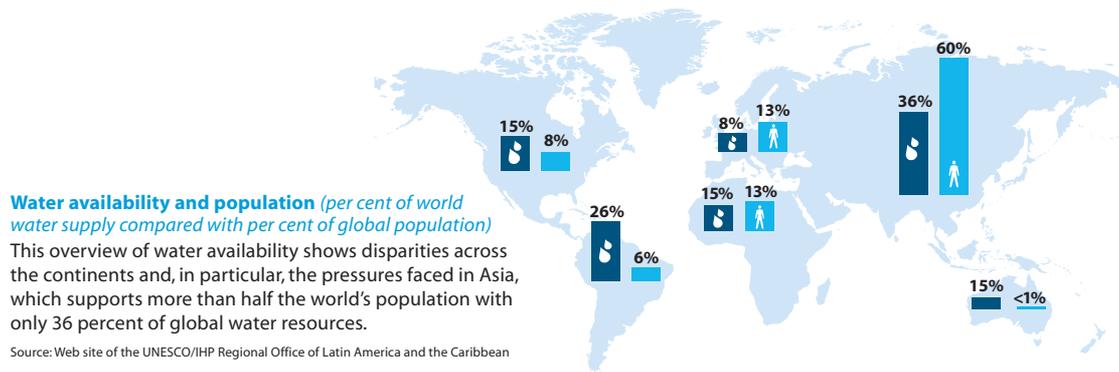


ing countries, most of them children, die each year from diseases associated with unsafe drinking water, inadequate sanitation and poor hygiene.

The Millennium Declaration includes a commitment to achieving gender equality and empowering women. Progress on water and sanitation is essential to empowering women. It is women and girls who suffer most from a lack of freshwater and private sanitation facilities. Women and girls have to fetch and manage water for family and other uses and are most often the caregivers for those who fall

ill. On average, they walk a distance of six kilometres each day, carrying 20 litres of water. If schools lack adequate sanitation facilities, girls often will not attend.

THE WORLD HEALTH ORGANIZATION HAS ESTIMATED THAT, IN ORDER TO MEET INTERNATIONALLY AGREED TARGETS ON WATER SUPPLY AND SANITATION, AN INVESTMENT OF APPROXIMATELY US\$11.3 BILLION PER YEAR ABOVE 2004 LEVELS WOULD BE REQUIRED.



Considering the finite nature of freshwater resources on the one hand, and increasing demand on the other, the need to protect and manage water resources properly is crucial. Through the Millennium Development Goals, Governments have committed to ensuring environmental sustainability and reversing the loss of environmental resources. Reducing poverty and addressing unsustainable consumption patterns are critical to halting environmental degradation and ensuring environmental sustainability.

¹ As reported in: Jal Swaraj Abhiyan (Campaign for Water Liberation), NAVDANYA/Research Foundation for Science, Technology & Ecology – equivalency US\$1 = 48.1 rupees

WATER FOR WOMEN



WOMEN'S LIVES ALL AROUND THE WORLD ARE CLOSELY CONNECTED TO WATER. THE 'WATER FOR LIFE' DECADE RECOGNIZES THE CENTRAL ROLE THAT WOMEN PLAY IN PROVIDING, MANAGING AND SAFEGUARDING WATER AND AS THE MAIN ROLE MODELS WITHIN THE FAMILY WHEN IT COMES TO SANITATION AND HYGIENE. DURING THE DECADE IT IS CRUCIAL TO ENSURE THE FULL PARTICIPATION AND EQUAL INVOLVEMENT OF WOMEN IN WATER-RELATED DEVELOPMENT EFFORTS AND TO APPROACH WATER AND SANITATION ISSUES FROM A GENDER PERSPECTIVE.

THE CHALLENGE

In most societies, women have primary responsibility for water supply, sanitation and health at the household level. Water is necessary not only for drinking but also for food preparation, care of domestic animals, crop irrigation, personal hygiene, care of the sick, cleaning, washing and waste disposal — all activities that are largely the responsibility of women. Women and girls have the greatest need for private and safe sanitation facilities.

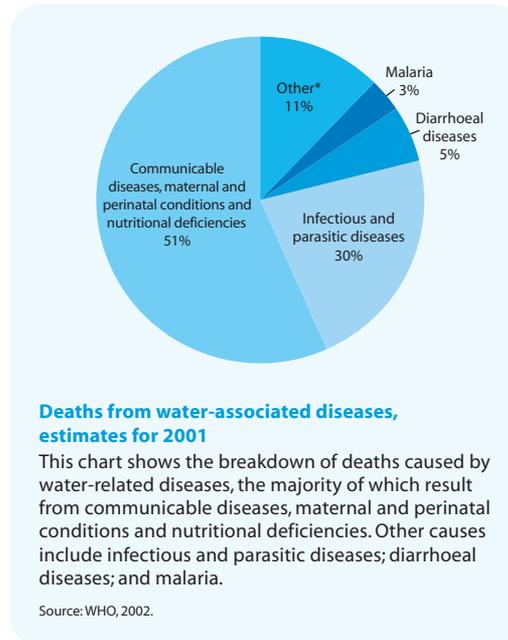
Women also suffer disproportionately in water-related disasters, such as floods, as they often do not receive warnings or other information about hazards and risks.

Women have considerable knowledge about water resources, including location, quality and storage methods, and they are often the most motivated to ensure that water supply and sanitation facilities work. Indigenous women in particular often have extensive traditional knowledge regarding water sources, conservation and management.

This central role of women is often overlooked in efforts to improve management of water resources and extend access to adequate sanitation. Women often have no voice in decisions about the kind of services they receive.

WHAT NEEDS TO BE DONE?

By approaching water supply and sanitation from a gender perspective, the benefits and costs of water use can accrue equitably to all groups, and the creativity, energy and knowledge of both



women and men can contribute to making water schemes work better.

Importantly, improvements in access to safe water and sanitation that involve both women and men will lead to multiple benefits in other areas such as reducing poverty, enabling girls to get an education, and reducing child and maternal mortality.

Recommendations for action include:

Involve women and men equally in decision-making. Projects work better where women are fully

involved in selecting the location, design and technology of water and sanitation facilities.

Pay attention to the privacy and security needs of women and girls with regard to the location and design of sanitation facilities. The lack of latrines in schools can prevent girls from receiving an education, and women who must travel long distances or through unsafe areas to relieve themselves can be subject to violence.

Improve access to water for all. Improving access allows women and girls to use the time spent collecting water on other activities such as attending school, caring for children, generating income or growing food for the family.

Accord women equitable access to land and other resources. In many countries laws and customs relating to land title and control of resources discriminate against women. Equitable access to water and land for productive uses such as caring for domestic animals, growing foods and preparing them for market enables women to earn an income for their families.

Target women and men equally in water and sanitation education and training programmes. Hygiene education programmes should be aimed first at mothers and girls, as women are the main role models within the household. Similarly, including women as well as men in training programmes for the operation and maintenance of water and sanitation facilities can help ensure sustainability of technologies and infrastructure.

WATER FOR BIODIVERSITY
& THE ENVIRONMENT



WATER IS CRUCIAL FOR PRESERVING BIODIVERSITY IN ALL ENVIRONMENTS — FROM FRESHWATER LAKES AND RIVERS, TO MOUNTAIN REGIONS, WETLANDS, ESTUARIES, COASTAL ZONES AND OCEANS. THE **INTERNATIONAL DECADE FOR ACTION: 'WATER FOR LIFE' 2005-2015** PROVIDES AN OPPORTUNITY FOR INCREASED COOPERATION TO PROTECT THIS VITAL RESOURCE FOR THE FUTURE OF THE EARTH'S DIVERSE ECOSYSTEMS.

THE CHALLENGE

Increasing demand for water is exerting severe pressure on our environment. Freshwater ecosystems are in crisis globally, with many rivers and lakes already polluted or severely degraded as a result of diminishing natural ecosystems, such as forests and watersheds. High levels of discharge of heavy metals and hazardous wastes from industry and agriculture are resulting in increased groundwater contamination and depletion.

The decline in the quantity and quality of water resources is causing extinction of freshwater species and a severe loss of biodiversity. Coastal zones, the most productive ecosystems on earth, are particularly vulnerable due to the decline in rivers as they move towards the sea, threatening human and animal life and entire ecosystems.

Some four out of every ten people live within 100 kilometres of a coast. However, some 30 per cent of land in the world's coastal ecosystems has been extensively degraded by growing demands for housing, industry and recreation. In recent decades, increasing pollution from inland, along with loss of coastal habitats that filter pollution, has led to extensive "dead zones" where fish are unable to survive, such as in the Gulf of Mexico.

More than half of humanity relies on the freshwater that accumulates in mountain regions. Yet these areas are under pressure from deforestation, agriculture and tourism, which can place unsustainable demands on water resources.

WHAT NEEDS TO BE DONE?

In poor nations, degradation of water resources is generally caused by poverty, as short-term survival supersedes long-term resource protection. In more developed countries, degradation of water ecosystems is more often the result of unsustainable consumption patterns. During the 'Water for Life' Decade and beyond, the various causes of environmental degradation need to be addressed, and freshwater ecosystems conserved and restored to ensure sustainable water resources for the future.

Recommendations for action include:

Awareness raising and involvement of communities in decision-making on issues of conservation and management.

Recognition of the true value of environmental resources. Applying quantitative and qualitative measures to ecosystem goods and services demonstrates their value in real economic terms. People can then truly appreciate the benefits of protecting natural resources and endangered species.

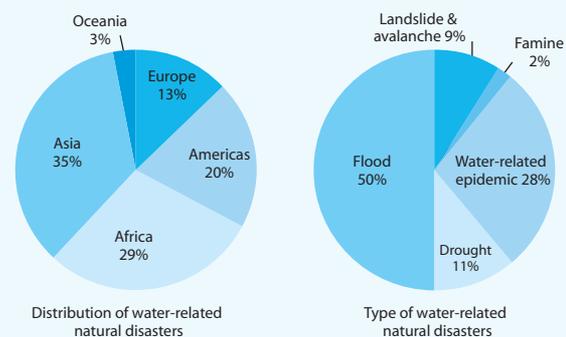
Integrated planning and management of land and water use within a broader ecosystem context.

Utilization of environmental impact assessments to measure the benefits of conservation against the costs of other developments.

Use of financial and other incentives or disincentives, such as "the polluter pays principle", can promote conservation and discourage degradation.

Cooperation across borders. International water courses can serve as incentives for peaceful cooperation among states and catalysts for sustainable development.

Effective implementation and enforcement of international agreements that aim to protect ecosystems, such as the Convention on Biodiversity and the Ramsar Convention on Wetlands.



Types and distribution of water-related natural disasters, 1990–2001

More than 2,200 major and minor water-related disasters occurred in the world between 1990 and 2001. Asia and Africa were the most affected continents, with floods accounting for half of these disasters.

Source: CRED, 2002.

WATER FOR FOOD, AGRICULTURE & RURAL LIVELIHOOD



AGRICULTURE IS THE MAIN SOURCE OF THE WORLD'S FOOD SUPPLY AND THE PRIME SOURCE OF LIVELIHOOD FOR BILLIONS OF PEOPLE IN RURAL AREAS. IRRIGATION FOR AGRICULTURE CONSUMES LARGE QUANTITIES OF FRESHWATER, LEADING IN MANY PLACES TO INCREASING WATER SCARCITY. MOUNTING PRESSURE ON NATURAL RESOURCES BY A GROWING POPULATION LEADS TO LAND AND WATER DEGRADATION. THE **INTERNATIONAL DECADE FOR ACTION: 'WATER FOR LIFE' 2005-2015** PRESENTS AN OPPORTUNITY TO PROMOTE THE SUSTAINABLE MANAGEMENT OF WATER IN AGRICULTURE AND TO CONTRIBUTE TO MEETING THE GOALS OF POVERTY ERADICATION AND ENVIRONMENTAL SUSTAINABILITY.

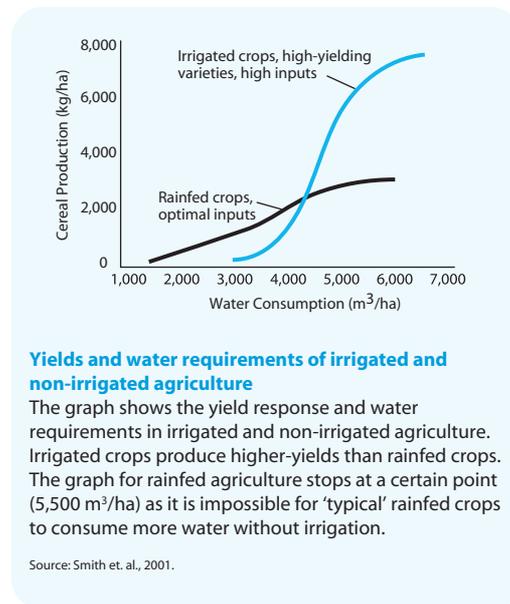
THE CHALLENGE

Global food production will have to increase by 60 per cent from 2000 to 2030 to meet growing demands resulting from population growth. This requires a 14 per cent increase in water used for irrigated agriculture.

Irrigated land, which represents only about 20 per cent of the world's farmland, produces around 40 per cent of the world's food supply and 60 per cent of cereals. Though more productive than rainfed agriculture, irrigation is coming under close scrutiny for its relatively poor yield considering the resources used. Growing water scarcity in many regions calls for a much more productive use of water in agriculture and for more transparent water allocation mechanisms between sectors, giving special attention to the needs of the environment.

One in five people in the world depend on fish as their primary source of protein, and fisheries provide direct or indirect livelihoods for 400 million people. Over 70 per cent of the world's fish stocks are either fully exploited or depleted, according to a Food and Agriculture Organization study, posing a serious challenge to food sources and employment in the future.

Over-exploitation of water for irrigation and the intensification of agriculture also pose a threat to the sustainability of agricultural systems in many regions of world. In recent decades, shallow groundwater has become an important source of water for irrigation, but has also led in most places to over-pumping of aquifers and pollution from



Yields and water requirements of irrigated and non-irrigated agriculture

The graph shows the yield response and water requirements in irrigated and non-irrigated agriculture. Irrigated crops produce higher-yields than rainfed crops. The graph for rainfed agriculture stops at a certain point (5,500 m³/ha) as it is impossible for 'typical' rainfed crops to consume more water without irrigation.

Source: Smith et. al., 2001.

agro-chemicals. The inappropriate use of fertilizers and pesticides can lead to pollution of drinking water, rivers and lakes.

Wastewater is used widely in developing countries for irrigation and can be invaluable where water is scarce. However, it must be properly treated. In poor countries, sewage is often applied directly to the land, exposing farmers and food consumers to parasites and organic and chemical contaminants.

WHAT NEEDS TO BE DONE?

During the 'Water for Life' Decade and beyond, a greater effort is needed to help farmers around the

world produce more food of better quality with less water and less stress on the environment. Only then can we expect to meet the dual goal of poverty eradication and environmental sustainability.

Recommendations for achieving more sustainable water use while meeting growing food demands include:

Put the right policies in place. Employ policies that provide farmers with the right incentives to allow them to contribute to their region's economy through sustainable agricultural practices that make productive use of water, in both rainfed and irrigated agriculture.

Investments by individual farmers and the private sector to develop efficient agriculture should be supported by public investments.

Improve governance and radically change the way water is managed in agriculture. Water users at all levels must be involved in the planning and management of irrigation and empowered to make decisions through appropriate mechanisms such as water users associations. Water services must become much more flexible, reliable and equitable to ensure productivity gains in agricultural water use.

Ensure that women have equal access to resources such as land, technology, water and research, and involve them equally in decision-making.

Continued research and capacity building in sustainable agriculture techniques, modern technologies and efficient water usage and sustainable farming.

WATER FOR SANITATION & HEALTH

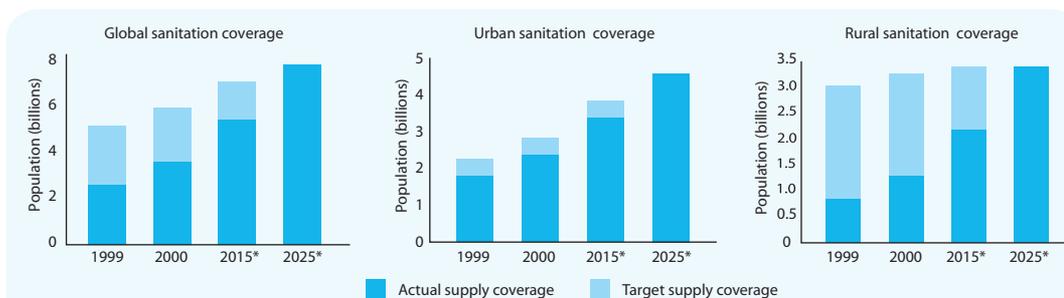
CLEAN WATER AND ADEQUATE SANITATION ARE TWO CRITICAL FACTORS IN ENSURING HUMAN HEALTH AND PROTECTION AGAINST A WIDE RANGE OF DISEASES. **THE INTERNATIONAL DECADE FOR ACTION: 'WATER FOR LIFE' 2005-2015** CALLS ON THE INTERNATIONAL COMMUNITY TO STRENGTHEN EFFORTS TO INCREASE ACCESS TO WATER AND SANITATION FOR ALL BY 2015 IN ORDER TO COMBAT DISEASE AND IMPROVE THE HEALTH AND WELL-BEING OF THE WORLD'S POPULATION.

THE CHALLENGE

Lack of safe water and adequate sanitation is the world's single largest cause of illness. Two million people, most of them children, die every year from water-borne diseases such as diarrhoea, and millions become seriously debilitated.

Lack of safe water and poor management of human wastes can spread diseases such as diarrhoea, cholera, dysentery, typhoid, hepatitis, polio, trachoma and tapeworms – many of which can be fatal to people in the developing world. Other water-associated diseases such as malaria and filariasis affect vast populations worldwide. More than one million people die every year from malaria alone.

Unsafe water and lack of sanitation are major factors underlying many of the ten million child deaths every year. Repeated episodes of water-borne diseases like diarrhoea can push children to the brink of survival, leaving them too weak and malnourished to survive even common childhood illnesses.



Actual and target sanitation coverage

The 2002 World Summit on Sustainable Development (WSSD) set the target of halving, by 2015, the proportion of people who do not have access to basic sanitation. Given the projected growth of the world population, this target implies that an additional 1.9 billion people will require access to improved sanitation by 2015 (in other words 125 million people each year, or 342,000 people each day).

*estimated

Source: WHO/UNICEF Joint Monitoring Programme, 2002. Updated in September 2002.

Most of these deaths are preventable. It is estimated that almost half of the nearly two million deaths from diarrhoea every year could be prevented through an understanding of basic hygiene.

OVER HALF OF THE HOSPITAL BEDS IN THE DEVELOPING WORLD ARE OCCUPIED BY PEOPLE SUFFERING FROM PREVENTABLE DISEASES CAUSED BY UNSAFE WATER AND POOR SANITATION.

Water scarcity forces people to consume contaminated water, leading to water-borne diseases. In 2005, half a billion people lived in countries defined as water-stressed or water-scarce. This figure is expected to increase to 2.4 billion and 3.4 billion, respectively, by 2025, with North Africa and West Asia particularly affected.

ABOUT ONE MILLION PEOPLE IN AFRICA DIE FROM MALARIA EACH YEAR, MOST OF THEM CHILDREN UNDER 5 YEARS OLD.

Increased urbanization is placing an enormous strain on existing water and sanitation infrastructure. Urban centres in developing countries have grown rapidly without adequate infrastructure planning, resulting in millions of immigrants who have little access to safe sanitation or water supplies. This puts the entire population at risk, causing serious environmental damage.

Growing numbers of HIV-positive people, who are especially susceptible to disease and infection, depend on clean water for their health and survival.

WHAT NEEDS TO BE DONE?

The 'Water for Life' Decade is an opportunity to increase efforts to provide safe water and sanitation for all by 2015 and to ensure a healthy living environment.

Recommendations for action include:

Effective and sustained advocacy on water, sanitation and hygiene at all levels. Many decision makers underestimate the critical role that water, hygiene and sanitation play in poverty alleviation. The economic and health benefits of providing access to water and sanitation facilities significantly outweigh the cost of investment.

Water, sanitation and hygiene education programmes in every school will have a profound impact on the health of children, on learning, on the teaching environment, and on girls' education.

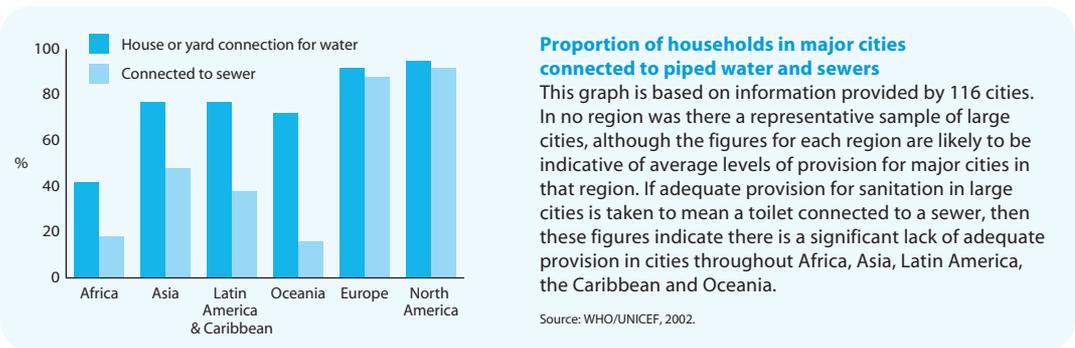
Investment in sanitation infrastructure such as latrines and toilets in homes and in every school is critical to provision of a healthy environment and a sustainable health policy. In areas affected by high unemployment, villagers can be engaged as latrine builders, masons and water pump operation and maintenance stewards.

Focus on long-term, sustainable service delivery in addition to the construction of facilities.

Involve women fully in the planning and design of water and sanitation facilities and look at water and sanitation issues from a gender perspective. Successful training of women in hygiene and sanitation practices will improve the health of the entire population.

Involve the community to ensure long-term solutions. Community approval and commitment to safe sanitation has proven critical to the grassroots success of water and sanitation projects, especially in rural areas. Empowered communities manage water supply and sanitation programmes that achieve long-term success.

Prioritize water and sanitation in disaster-response planning. People affected by natural and man-made disasters are more likely to become ill and die from diseases related to inadequate or contaminated water and lack of adequate sanitation than from any other single cause. There is an urgent need to develop minimum standards for post-disaster sanitation as well as emergency sanitation services.



WATER FOR ENERGY

DURING THE INTERNATIONAL DECADE FOR ACTION: 'WATER FOR LIFE' 2005-2015, NATIONAL GOVERNMENTS, INTERGOVERNMENTAL ORGANIZATIONS AND THE PRIVATE SECTOR WILL BE SEEKING WAYS TO EXPAND THE QUALITY AND QUANTITY OF ENERGY SERVICES WHILE ENSURING THAT THE ENVIRONMENT IS PROTECTED FROM THE HARMFUL IMPACTS ASSOCIATED WITH ENERGY USE.

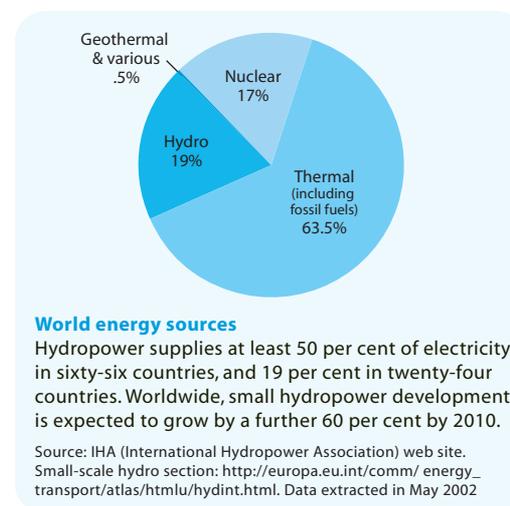
WATER IS CRUCIAL FOR THE PRODUCTION OF ENERGY; IT IS USED TO GENERATE HYDROELECTRIC POWER AND FOR COOLING IN THERMAL ELECTRICAL POWER STATIONS, AND ALSO IN THE GENERATION OF TIDAL POWER, WAVE ENERGY AND GEOTHERMAL ENERGY SOURCES. **ACCESS TO AFFORDABLE ENERGY SERVICES SIGNIFICANTLY IMPROVES THE LIVES OF PEOPLE IN DEVELOPING COUNTRIES AND MAKES ECONOMIC GROWTH AND DEVELOPMENT POSSIBLE. JOINT MANAGEMENT OF WATER AND ENERGY RESOURCES IS CRITICAL TO ACHIEVING SUSTAINABLE DEVELOPMENT IN RURAL AREAS.**

THE CHALLENGE

Global economic growth, population increase and urban expansion are all driving energy consumption and water use to record levels. World energy consumption has increased greatly since the 1990s and is expected to grow at the rate of 2 per cent a year until 2020, doubling energy consumption by 2035 relative to 1998, and tripling it by 2055.

Energy services are currently dominated by burning fossil fuels and nuclear power, accounting for around 87 per cent of all energy produced in the world in 2001. Yet, energy generated by fossil fuels results in air pollution and emissions of greenhouse gases that contribute to climate change.

Energy generated by the force of water—hydropower—can provide a more sustainable, non-polluting alternative to fossil fuels, along with other renewable sources of energy such as wind, solar and tidal power, bioenergy and geothermal energy. Together these sources currently supply about 14 per cent of the world's primary energy



needs. Small-scale hydroelectricity is well suited for 'off-grid' rural electricity applications, while other renewable energy sources such as wind, solar and biomass can be beneficially used as fuel for pumping groundwater for drinking and small-scale irrigation in remote rural areas or small villages.

Considerable potential exists to expand the contribution of large-scale hydroelectric power in developing countries. However large-scale dam projects may cause severe environmental impacts on wildlife habitats, fish migration and water flow and quality, as well as serious socio-economic impacts related to resettlement of local communities.

Financing of infrastructure for essential services such as water and electricity in developing countries is also a significant problem that remains to be addressed. Without a reliable energy infrastructure and supply of electricity, potential for economic growth is limited. Of the approximately 2 billion people worldwide without access to electricity, many live in rural or peri-urban areas and also lack access to clean water and sanitation services.

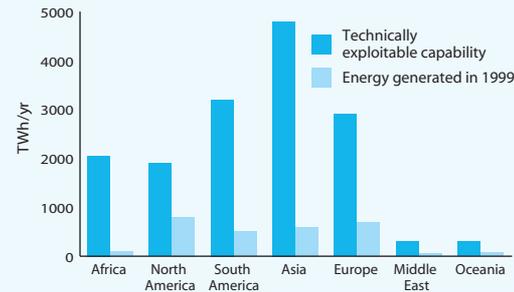
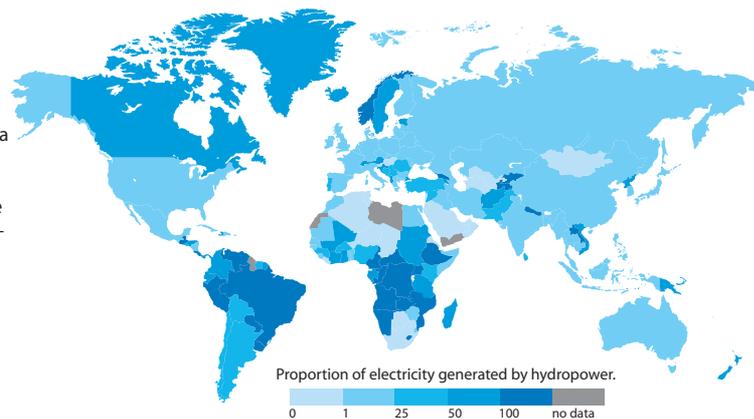
WHAT NEEDS TO BE DONE?

During the 'Water for Life' Decade and beyond, using water and energy in ways that support sustainable development will require more efficient use of energy, increased reliance on renewable energy sources and accelerated development of new energy technologies.

Proportion of electricity generated by hydropower, by country

Large areas of Latin America, sub-Saharan Africa and North America depend heavily on hydropower for their electricity, to a much greater extent than in Europe and Asia. There remains, however, much hydropotential as yet untapped.

Source: Map produced for the World Water Assessment Programme (WWAP) by the Centre for Environmental Research, University of Kassel, based on data from the International Hydropower Association (IHA) and the *International Journal on Hydropower and Dams*, 2002.



Small-scale stand-alone hydropower schemes will generally have a small-scale environmental impact and can particularly benefit rural and remote areas.

For any hydropower project, large or small scale, it is crucial to carry out a detailed *environmental and socio-economic impact assessment* as part of the planning process.

International declarations and agreements such as the Declaration of the Bonn International Renewable Energies Conference (2004) and the Beijing

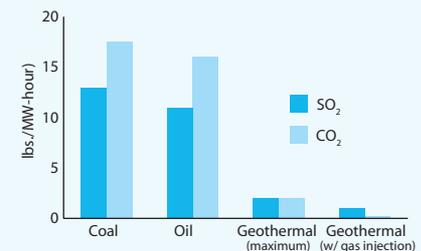
Hydro potential

The potential energy that could be produced by hydropower worldwide totals about 14,400 billion kilowatt hours (TWh) per year, of which just over 8,000 TWh per year is currently considered to be economically feasible for development. Installed hydroelectric generating capacity totals some 692 gigawatts with a further 110gw under construction.

Source: World Energy Council and the *International Journal on Hydropower & Dams*.

Declaration on Hydropower and Sustainable Development (2004) provide the framework for advancing renewable energy sources, providing equitable access to energy and increasing energy efficiency.

Effective energy policies will provide the right economic signals to the market to ensure responsible and sustainable use of energy. These would include such actions as phasing out harmful subsidies that benefit heavy users of electricity and restructuring tax codes to encourage sustainable energy use.



Comparison of emissions

Geothermal energy use has a net positive environmental impact. Geothermal power plants have fewer and more easily controlled atmospheric emissions than either fossil fuel or nuclear plants. Direct heat uses are even cleaner and are practically non-polluting when compared to conventional heating.

Source: World Energy Council.

food It takes about 3000 litres of water to produce our daily food ration, about 1000 times what we need for drinking purposes **health** Over half of the developing world's hospital beds are occupied by people suffering from preventable diseases caused by unsafe water and poor sanitation **environment** Water-related disasters such as tsunamis, floods and droughts are the second most frequent and devastating natural disasters after windstorms **disaster prevention** Approximately 13 times more people die per reported disaster in developing countries than in developed countries **energy** Hydropower supplies at least 50 per cent of electricity production in sixty-six countries, and 19 per cent in twenty-four countries. Worldwide small hydropower development is expected to grow by a further 60 per cent by 2010 **transboundary water issues** 145 nations have territory within a transboundary basin, and 21 lie entirely within one. In the last half century, approximately 200 treaties have been signed concerning transboundary water basins **scarcity** By 2025, it is expected that 3.4 billion people will be living in countries defined as water-scarce **culture** In nearly all the world's major religions, water is attributed important symbolic and ceremonial properties **sanitation** One dollar invested in water supply and sanitation can provide an economic return of up to 34 times, depending on the region **pollution** In developing countries, more than 90 per cent of sewage and 70 per cent of industrial wastewater is dumped untreated into surface water **agriculture** Irrigation increases yields of most crops by 100 to 400 per cent. Over the next 30 years, 70 per cent of gains in cereal production will come from irrigated land. ■







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