

Environment, Water and Sanitation

This key sheet is part of a series of awareness raising tools developed by Irish Aid to accompany its Environment Policy for Sustainable Development.



1. Introduction

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Key strategies for implementing the policy are:

- i) mainstreaming, where the environment is recognised as a critical part of sustainable development and is taken into account in all policies, programmes, activities and funding decisions; and
- ii) partnership, where Irish Aid works with national governments, multilateral organisations, international agencies and civil society organisations to contribute to sustainable development.

The first step in mainstreaming is to understand how the environment is linked to the development challenge or sector YOU are responsible for. In this key sheet, we show that water and sanitation are critically linked to the environment and suggest where to find additional information. More detailed guidelines on water and sanitation will be produced at a later date. Additional Irish Aid Environment Key Sheets on Health, Gender, Governance and Poverty Reduction are available as a complement to this key sheet.

In this key sheet, the term “water and sanitation” means water supply for domestic use and the management of human excreta. Related issues — including hygiene promotion, solid waste management, drainage, water resource management for productive uses, air pollution and broad vector control — are not explored in detail here.

Water and sanitation matter to the environment because:

- > Water is a finite although renewable resource that needs careful management to meet the basic needs of populations while respecting the needs of the environment.
- > Water and sanitation provision have an impact on the health of the environment, through downstream pollution in particular.
- > Water and sanitation are a focus of Millennium Development Goal 7 on environmental sustainability and are important components in meeting all the MDGs.
- > Good environmental management is critical to the success of water and sanitation programmes where waste treatment relies heavily on natural processes. Risks to service delivery caused by flooding, erosion, depleted or polluted water resources and soil pollution can be mitigated through sustainable management of the natural environment.
- > Water stress and scarcity are likely to intensify in the future, particularly in developing countries vulnerable to the impacts of climate change.





Access to clean water reduces the incidence of water related disease, which is a key contributor to child mortality. Giacomo Pirozzi/Panos Pictures

2. The links between water and sanitation and the environment

Water and sanitation are environmental issues to their very core, and together constitute one of the top drivers of development. Managing water supplies so they become neither depleted nor polluted, and providing good sanitation, are central to the health of communities and the environment on which they depend.

Poor water and sanitation provision can affect entire communities: one person's bad sanitation is another's contaminated food or water. Even piped systems, if poorly managed, can concentrate any "downstream" problems — such as pollution in rivers, lakes and seas — and further degrade wildlife habitats and contribute to human health problems. Where water and sanitation deficiencies are severe, there are likely to be a range of serious public health hazards.

3. Water, Sanitation and the Millennium Development Goals

According to the World Water Assessment Programme¹, an ongoing assessment process within the UN system, water and sanitation issues permeate all of the Millennium Development Goals (MDGs). Here we look at two MDGs where these issues have most direct linkages with the environment.

3.1 MDG 7: environmental sustainability

Access to water and sanitation is now recognized as a basic human right (see Box 1). However, in 2002 about 1.1 billion people still lacked access to improved water supplies, and 2.6 billion to improved sanitation.² MDG 7, which focuses on ensuring environmental sustainability, has from the start included the target of reducing by half the proportion of people without sustainable access to safe drinking water by 2015.

At the 2002 World Summit on Sustainable Development in Johannesburg, this target was extended to include basic sanitation.

Box 1 The human right to water³

In 2002 the Committee on Economic, Social and Cultural Rights — which operates under the Office of the UN High Commissioner on Human Rights — made the unprecedented move of declaring water a human right.

In a "General Comment" interpreting the provisions of the International Covenant on Economic, Social and Cultural Rights, it said:

Water is fundamental for life and health. The human right to water is indispensable for leading a healthy life in human dignity. It is a pre-requisite to the realisation of all other human rights.

The Committee further defined five core aspects of the water we are all entitled to:

The human right to water entitles everyone to sufficient, safe, acceptable, physically accessible and affordable water for personal and domestic uses.

What this means is that the 145 countries that have ratified the Covenant must now work to ensure access to safe, secure water and sanitation for their people.

Infants, children and women are affected most profoundly by inadequate water supply or sanitation. Related diseases hit infants and children hardest, while women bear the brunt of responsibilities, as it is usually they who nurse the ill. The horrendous health statistics typically linked to inadequate water and sanitation (see Section 4 below) are merely the most easily quantified aspect of a more far-reaching burden.

Health is rarely the only motive for people wanting better water and sanitation. Collecting and carrying water, and dealing with the consequences of sanitary deficiencies, can be both gruelling and demeaning. As these tasks fall mainly to women, they constitute a serious social and economic problem (see Gender and Environment Key Sheets).

3.2 MDG 1: halving hunger

MDG 1, which aims to reduce by half the number of people worldwide suffering from hunger, is also key in the context of water supply, sanitation and the environment. Agriculture and irrigation use up some 70 to 80 per cent of the world's

1 UNESCO 2007

2 WHO 2004

3 UNHCR 2002

freshwater. The challenge is to boost food production without putting undue pressure on supplies, and ensure water is allocated equitably for food security.⁴ In the face of rising competition, the poor will be most vulnerable, so this is an issue demanding active involvement from irrigation providers, farmers and policymakers.

A lack of access to water and adequate sanitation are both also linked to malnutrition. The Millennium Project report identified the following factors as strongly correlated with a high incidence of underweight children: poor water, sanitation and health facilities, poverty, low food production, mothers' lack of education, and climatic shocks. Inadequate sanitation and unsafe sources of water, along with frequent bouts of infectious diseases and chronic infections with parasites, can keep adults and children in a state of physical depletion, underweight and eventually malnourished, particularly if health provision and food supply are scant.

Faeces and urine constitute a rich potential agricultural fertiliser that is exploited in many countries, most notably Asia. Treatment through eco-sanitation, stabilisation ponds and composting can help harness this nutrient resource as an affordable alternative to polluting fertilisers, reducing pressure on the capacity of watercourses to absorb nitrates.

Sustainable and equitable management of natural resources, including land and water, are clearly key to combating hunger. Soil enrichment and nutrient exploitation are closely aligned to waste management, water quality monitoring and sanitation provision.

4. Water and sanitation as key factors in environmental health

It's supremely ironic that water — the source of life — is also the ideal breeding ground or vehicle for some of the most devastating diseases known, if correct environmental management techniques are not employed.

Because water flows downstream, whatever happens to it as it makes that journey will determine the quantity and quality available for human use. Wastewater disposal or sanitation practices can introduce pollutants into water used for bathing, washing or fishing.

In Lesotho — one of the world's least developed countries (LDCs) — the garment industry has contributed to several serious downstream issues. The industry, located round the country's capital Maseru, uses about a third of the water available to its residents from the Caledon River. Maseru already experiences critical water shortages. Untreated effluents containing chemicals and fibres from industrial washing processes, are dumped into the river system.⁵

Other problems can arise when poorly managed water and sanitation infrastructure flood and over-saturate soils. Puddles and pools become a breeding ground for disease-carrying insects, or faeces can end up in the soil and lead to intestinal worm infections (see below).

4.1 Faecal-oral diseases

Faeces remain one of the world's most hazardous pollutants, and constitute a major threat to human health. Poor waste management, a lack of sanitation and contamination of watercourses — all problems linked to poverty — are just some of the ways in which faeces can enter the environment and cause disease.

If sanitation is inadequate, there will be more faeces in areas where people live and work, from where it can travel — via fingers, food, fluids and flies — into mouths. If drinking water is contaminated, people will take it in directly. And if there isn't enough water for washing, it is far harder to keep food and hands clean enough to interrupt transmission.

Faecal-oral diseases include cholera, dysentery, typhoid and giardiasis. Most of the diarrhoeal diseases are faecal-oral, and are a severe health burden, particularly for children: of the 1.8 million people who die from them every year, over 90 per cent are children under five.⁶

Improved living environments for the rural and urban poor could prevent most of this. In recent decades mortality rates for children with diarrhoeal diseases have fallen because of better oral rehydration therapy. But it is prevention — via cleaner water, better sanitation and hygiene — that has proven to be the most effective way of blocking transmission routes.

4.2 Other water-related diseases

A number of debilitating water-related diseases pose a significant risk in the tropics and subtropics, these include malaria, dengue fever, river blindness, scabies and schistosomiasis.

⁵ Salm, A. *et al.* 2002

⁶ WHO 2004

Malaria is probably the best known water-related disease, killing 1.3 million people every year — most of those children under five.⁷ Any standing water may become a breeding ground for the *Anopheles* mosquito that carries the malaria parasite, including dammed reservoirs (see Box 2).

➤ Box 2 Malaria magnets? Microdams in Ethiopia

Recent studies⁸ in Ethiopia using community-based incidence surveys revealed a 7.3-fold increase in malaria incidence associated with microdams. The study sites were all at altitudes where malaria transmission is seasonal and associated with the rains. The increase was more pronounced for dams below 1900 metres of altitude, and less above that. Observations suggest that dams increase the transmission incidence of malaria.

Dengue is less well known than malaria but more closely linked to domestic water supplies in urban areas. The *Aedes* mosquito, which carries the four distinct but related dengue viruses,⁹ commonly breeds in jars or cisterns used for domestic water storage, or in discarded objects such as bottles or automobile tyres after heavy rainfall. Effective prevention in towns and cities involves removing rubbish that can collect rainwater, covering water storage vessels and using insecticide judiciously.¹⁰

5. Challenges to managing water as a vital natural resource

Water stress and scarcity are already growing problems in many parts of the world, causing problems ranging from falling water tables to disappearing rivers. About 700 million people in 43 countries face water stress — that is, they have less than the 1700 cubic metres of renewable water resources per capita per year that is needed to support us and the environment. By 2025, some 3 billion people could be living in water-stressed countries, and 14 nations could face water scarcity.

Meanwhile, water demands per capita are also growing. Global water withdrawals by humans are estimated at about 4000 cubic kilometres (over half is consumed, and the rest returned to the original source).

7 WHO 2004

8 Ghebreyesus *et al.* 1999

9 WHO 2007a

10 WHO TDR

While agriculture takes the lion's share, a significant amount of water withdrawn, is returned to its source only slightly changed. With careful management watersheds can be made sustainable, even in areas suffering from water stress (see Box 3).

➤ Box 3 Happy valleys: Integrated watershed management in Africa¹¹

Land and water resources in Ethiopia are threatened by overcropping, overgrazing and an over-reliance on fuelwood. Irish Aid has used an integrated watershed management approach for dealing with large-scale environmental degradation and poverty in the country.

This approach involves conserving water and preventing erosion in catchment areas through terracing higher ground in the valleys, planting trees and shrubs to bind the soil, and 'half-damming' the rivers. With new farming technologies and concerted efforts to prevent felling of trees for firewood, this method can help regenerate vegetation in catchment areas.

The project was first piloted in Gergera Valley, Tigray, as a joint effort with the regional Bureau of Agriculture and Natural Resources Development. The success of water conservation through the watershed technique has led to improvements in economic, social and environmental conditions for the local community, who were fully involved from the outset and contributed building materials and labour. Access to fertilizer and better animal husbandry has led to a 40 per cent increase in agricultural production in the area. The farmers no longer need to walk 14 kilometres to get fodder for their livestock, and having water available locally means the children can attend school.

Capacity building in the community was provided to ensure a lasting legacy for the project. Training was given in disciplines ranging from modern beekeeping (which has increased honey production 15-fold) and poultry raising to soil and water conservation, setting up and running tree nurseries, crop production and animal husbandry.

The success has spread. There are now 11 other thriving areas in Tigray, with 44 more to follow. Neighbouring villages are eager to initiate similar projects with minimal external assistance, suggesting that the new technologies are already being disseminated among communities. Meanwhile, other NGOs in Ethiopia want to adopt watershed management.

11 Development Cooperation Ireland 2002.

What of the future? As climate change grips, it is predicted that water stress in some regions will worsen (see Box 4). And there are other potential problems in store.

With less water available for domestic and agricultural use in areas such as sub-Saharan Africa, sewer systems may silt up, causing blockages, leakage and potentially releasing high concentrations of bacteria and other microorganisms into urban environments. Water scarcity may force people to revert to water sources such as rivers, which are often contaminated, with negative implications for health and wellbeing as well as river flows. So assessing the implications of climate change and planning appropriately will figure larger in future design and management of water supply and sanitation.¹² Biodiversity can be threatened where watercourses are stressed from waste and nutrient overload and where water resources are diverted to meet large population demands.

On the positive side, there are opportunities for appropriate technologies such as rainwater harvesting, water re-use and leakage management to reduce demand on water for domestic uses and cut the costs of service provision.

↘ Box 4 Thirsty future: climate change and water stress¹³

The impacts of climate change — changes in rainfall patterns, more extreme weather events in certain regions — are likely to have a knock-on effect on water stress in a number of countries. Future scenarios of water availability worked out by the Intergovernmental Panel on Climate Change show a decline of 30 per cent or more in rainfall runoff for Angola, Malawi, Zambia and Zimbabwe; Senegal, Mauritania, and much of North Africa and the Middle East; and much of Brazil, parts of Venezuela, and Colombia.

Issues arising from this shift could include a risk to rainfed agricultural production, the source of livelihood for most of the world's poorest people; rising water insecurity; and declining grain productivity in many developing countries.

There are a number of uncertain complicating factors. As glaciers shrink, for example, water flows in rivers can lessen, with serious implications for downstream users. Sea level rise can flood coasts, leaving freshwater supplies salinised and sanitation crises in its wake. What is clear is that adaptation measures need to factor in water supply and sanitation as a matter of course. Water conservation, through damming rainwater, and the planting of drought-tolerant species are just two methods of staving off undue water stress.

6. Mainstreaming the environment into water and sanitation issues

- 1. If you work with Poverty Reduction Strategy processes** help to ensure that they reflect the priority that those living in poverty give to water and sanitation improvement and engage in dialogue with other donors and the government on the importance of the environment in water and sanitation interventions.
- 2. If you work with community groups** identify and support successful locally driven efforts and innovative technologies from other regions to secure better water and sanitation provision. In addition support funds that such groups can use to improve local conditions and environmental management proposals that contribute to water and sanitation services.
- 3. If you work with small enterprise development**, support improvements in small water and sanitation enterprises, as they often provide complementary services in low-income areas. Enable the decentralisation of service delivery by supporting the development of local contractors. Ensure access to affordable finance at local level to improve access to water and sanitation and strengthen local livelihoods.
- 4. If you support community led research**, explore opportunities for Total Sanitation (eradicating the practice of open defecation through education and toilet construction) to provide local groups with a better basis for both solving their own problems and negotiating for better services. Enable local research into water quality monitoring, water pricing, alternative environmentally friendly technologies and land and water rights.
- 5. If you work with national planning efforts**, assist in the development of strategic water, sanitation and environmental policies based on international best practice, targeting marginalised areas and supporting local efforts to improve provision. Be aware that responsibility for water and sanitation is generally shared among several ministries and that special attention is needed to facilitate coherent and cooperative approaches to water management and sanitation. Ensure that the relevant ministry for the environment is included in planning discussions. Support approaches that recognise equity, access and affordability. Recognise the importance of investment in information systems to map coverage of services and to monitor quality and quantity of water resources including groundwater mapping river flows or lake levels.

12 UNEP and UNFCCC 2002a and 2002b; WaterAid 2007

13 UNDP 2006

- 6. If you work with urban authorities**, support slum upgrading, best practice in relation to crosscutting issues (e.g. gender equality and environment sustainability) and measures that can improve relations between local authorities and the residents of 'illegal' settlements, e.g. recognition of settlements and formal land rights to allow service providers to formalise provision. Promote water conservation, appropriate water and wastewater treatment and outflows and leakage management in piped water systems. Promote the application of systematic Environmental Impact Assessments prior to detailed planning of services.
- 7. If you are involved in water sector reform**, offer support to locally driven reforms, particularly those likely to extend services to deprived urban and rural settlements. Promote equity and affordability and protect water-related resources for future generations.
- 8. If you are involved in peace building and conflict resolution**, ensure access is provided to safe water and sanitation in refugee hosting areas in line with the Sphere Minimum Standards. Carry out environmental impact assessments when setting up refugee camps and displaced person's camps. Ensure that humanitarian or development actions don't contribute to conflict over natural resources such as land and water.
- 9. If you work in emergency and contingency planning and disaster risk reduction**, support initiatives to monitor flooding, drought, early warning systems, meteorological reports and community-based risk mapping, all of which assist with improved water resource management.

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Sudanese women carrying buckets and jerry cans to collect water at Touloum refugee camp, Touloum, Eastern Chad, Chad. Panos/Tim Dirven

Useful websites

- Building Partners for Development in Water and Sanitation
www.bpd-waterandsanitation.org
- Freshwater Action Network
www.freshwateraction.net
- Global Water Partnership
www.gwpforum.org
- International Water Management Institute
www.iwmi.cgiar.org
- The IRC International Water and Sanitation Centre, the Netherlands
www.irc.nl/
- The London School of Hygiene and Tropical Medicine
www.lshtm.ac.uk
- Practical Action
www.itdg.org
- Total Sanitation Campaign
<http://ddws.nic.in/tsc-nic/html/index.html>
- UN Development Programme Water Governance site
www.undp.org/water
- UN International Decade for Action: Water for Life, 2005-2015
www.un.org/waterforlifedecade
- WASH Collaborative Council
www.wash-cc.org
- Water and Sanitation Programme
www.wsp.org
- The WELL resource centre for water, sanitation and environmental health, managed by the Water, Engineering and Development Centre, Loughborough University (UK)
www.lboro.ac.uk/well/
www.lboro.ac.uk/well/resources/fact-sheets/fact-sheets.htm
- World Bank Water Resources Management site
www.worldbank.org/water
- World Health Organization Water, Sanitation and Health site
www.who.int/water_sanitation_health

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