

Briefing

From the Development & Environment Group

Managing water in a changing climate

Water is the lifeblood of our planet, essential for both life and livelihoods. But the water system will be severely affected by climate change, causing increased drought and flooding and consequent impacts on health, sanitation and livelihoods. It is the world's poorest people, living in the least productive and most fragile environments, who are particularly vulnerable to climatic impacts on water. Existing problems with how we allocate and control water use are likely to be exacerbated unless sustainable and equitable water management is prioritised in climate change policy.

Statistics show there is already a water crisis.¹ Nearly 900 million people globally lack access to a safe water supply.² About 1.2 billion people — almost one-fifth of the world's population — live in areas of physical water scarcity, and a further 1.6 billion people face economic water scarcity.³ Nearly all of these people live in developing countries. Moreover, the freshwater ecosystems upon which we depend for our water supplies and other vital services are in crisis. Surveys show that rivers, lakes and wetlands are being damaged and destroyed even faster than tropical rainforests or ocean habitats.⁴

Access to water and sanitation

Tackling the water and sanitation crisis has become even more urgent in the context of climate change. Extreme climatic events can devastate water supply and sanitation infrastructure, and trigger adverse health impacts. These affect urban and rural areas alike.

Two direct impacts of climate change are flooding and droughts. Flooding can

contaminate water through overflows from drainage or pollution from damaged latrines. Falling groundwater tables and reduced surface water flows, brought on by drought, can lead to wells drying up. This extends the distances that people must travel to collect water and increases water source pollution. Rehabilitating existing water infrastructure diverts much needed resources from increasing access to water and sanitation.⁵

This has implications for achieving the Millennium Development Goal (MDG) target of increasing access to water and sanitation. Further research is needed into the specific impacts of climate change on achieving and sustaining MDG targets, however.

Gender

Traditional gender roles in many countries mean that women and men often have different roles and responsibilities when it comes to water. Women tend to provide the labour to collect water for household needs, such as cooking, washing, hygiene and raising small livestock. Children, in particular girls, often share these responsibilities. In

Key issues:

Climate change will hit poorest people first and hardest, primarily through shifts in rainfall and river flows.

Poor people face increasing uncertainty about their water resources.

This uncertainty has implications for water supply and sanitation, agriculture, energy and ecosystem services.

Improving poor people's resilience to climate change means addressing non-climatic pressures, including poor water management and limited infrastructure for sanitation.

Sustainable and equitable water management must be at the heart of climate change policy

developing countries, women and girls spend an estimated 40 billion hours every year hauling up water. This can mean spending as much as nine hours a day carrying up to 40 kilograms of water on their heads or hips.⁶

Women are generally the primary caretakers of the family and are therefore often the first to become aware of environmental changes. As resources become scarce, women's workloads increase and they experience problems in providing for their families.⁷ During times of increased water stress, women and girls may have to walk further to collect water. This leaves even less time for other activities, such as education and earning an income. The longer walks can increase the risk of harassment or sexual assault, particularly in conflict zones. In urban areas, time commitments can also be increased through long hours waiting at communal water points.

Increased water stress can also lead to women collecting water from sources that are more susceptible to pathogens and bacteria, which heightens the risk of diseases. Globally, 3.5 million people a year either die or suffer debilitation from water-related diseases, most of whom are children and women.⁸ Diseases also add to women's workloads, as they are often the primary carers of sick family members.⁹

Food and agriculture

Agriculture uses approximately 70 per cent of global water supplies. While we only need 2–5 litres of drinking water each day, about 3,000 litres of water are necessary to produce enough food to meet our daily dietary needs.¹⁰ This pressure on our finite freshwater supplies will continue to mount as the global

population continues to rise and demand for food increases.

Agriculture is also the main source of livelihood for most poor communities. Smallholder farms feed one-third of the world's population and therefore play an important role in food security, but their reliance on rain-fed agriculture puts this at risk under climate change.¹¹ Additionally, poor people have the lowest capacity and fewest choices available to cope with shocks related to climate change.¹² Many poor people are already being forced to adapt their livelihood and agricultural practices to more frequent and intense droughts and floods.

There is an urgent need to improve the management of water resources. The aim must be to balance the need to ensure food security and reduce poverty with the need to preserve ecosystems. Agricultural patterns should be planned according to water availability and opportunities for increased productivity need to be explored. The greatest potential for increased yields is in rain-fed areas, where many of the world's poorest rural people live, and where managing water is the key to such increases.^{10,12}

Corporate water use

Businesses use water throughout their supply chains. Water-intensive sectors include food processing, bottling plants, manufacturing, and service industries such as tourism (see Case study: Tourism and water in the Caribbean). Linked to the issue of corporate water use, as well as water and agriculture, is the concept of 'virtual water' — the full amount of water needed to produce something but that may not be visible in the final product, which may be exported and consumed elsewhere. Examples include water used to grow and process food and cotton clothing.

Virtual water is measured by calculating the 'water footprint'.¹³ One calculation estimates that about 62 per cent of the United Kingdom's total water footprint is related to the consumption of imported products. Often these products are sourced from developing regions, such as cotton from South Asia or vegetables from Africa. The implication is that the consumption of food and clothing in the developed world is inextricably linked to the continuing security and good management of water resources in other parts of the world.¹⁴ Failure to address water scarcity that is the result of, or amplified by, business activity can undermine efforts to reduce poverty and damage relationships with local communities, on whom the business may depend. Businesses,

Women can spend as much as nine hours a day carrying up to 40kg of water to meet their household needs.



Case study: Tourism and water in the Caribbean

Many small island developing states in the Caribbean are heavily dependent on the tourism industry, including Barbados, the Dominican Republic, Jamaica, Saint Lucia, and Trinidad and Tobago. Cruise ships, luxury hotels, landscaped gardens, swimming pools and golf courses characterise the typical Caribbean tourism experience. But due to climate change — which is in part caused by aviation emissions from tourism — the region has become increasingly afflicted by drought.

These droughts are stretching the capacity of the islands' water resources and placing a strain on both arable and livestock farming.¹⁸ In 2010, Trinidad and Tobago suffered rainfall deficits of 75 per cent and 95 per cent in January and February respectively.¹⁹ During the same period, Guyana announced that its agriculture sector was facing estimated food crop losses worth millions of dollars as a direct result of the drought. Farmers' crop yields were negatively affected by the lack of rain, which in turn reduced the income of rural families. Reduced yields can also lead to an increase in crop prices and overall inflation, and erode people's purchasing power.²⁰

The situation in the Caribbean was so severe in 2010 that the International Federation of the Red Cross and Red Crescent Societies deployed Regional Intervention Teams to undertake damage and need assessments. They also supported the National Societies of Barbados, Grenada, Guyana, Saint Lucia and Trinidad and Tobago to help islanders cope with the effects of the drought.

The lack of infrastructure in the Caribbean means that many poor urban and rural dwellers have limited access to water for their basic needs. Such deprivations lie in stark contrast to the experience of most tourists; in Trinidad and Tobago, tourists reportedly consume on average one-third more water per day than local inhabitants,²¹ with the peak tourist season coinciding with the dry season (December to April). The high economic dependency on tourism means it is unlikely that governments will take action to redress the sector's current unsustainable and inequitable levels of water consumption.

particularly those with a high dependence on water, therefore have a significant role to play in addressing the water scarcity challenge.¹⁵ Responses should include stakeholder consultations, including communities both up and downstream of where the water is used, to assess the impact of the water use and devise solutions that work for all water users.¹⁴

Ecosystems and environmental flows

The impacts of climate change on water do not just affect humans. Ecosystems suffer wide and often irreversible changes when water is in short supply or of poor quality. These changes can aggravate the problem by reducing the ecosystem's ability to purify, store and generate water.

Changes to river flows are expected to be among the most severe ecosystem impacts of climate change. An 'environmental flow' is a basic amount of water that is kept flowing down a river in order to maintain the river in a desired environmental condition. Around the world today, there are rivers that have stopped flowing or only carry waste water. As well as increasing the risk of diseases such as malaria or cholera, these reductions in river flows have an adverse impact on freshwater biodiversity and ecosystem services. It is increasingly evident that, on regional and global scales, freshwater biodiversity is more severely endangered than that of terrestrial or marine systems.¹⁶

Well-managed freshwater ecosystems can help buffer poor people from the impacts of climate change by ensuring the continued flow of water along rivers to downstream users, by providing alternative food sources (such as the fisheries of the African Rift Valley lakes) and by recharging depleted aquifers. But as climate change exacerbates the impacts of non-climate related environmental stresses, many of these ecosystem 'goods and services' will come under further stress. This will affect the people, communities and sectors that depend on them.

Ecosystems need to have the flexibility to respond to change, particularly in the context of climatic uncertainty. Yet in many places, current methods of water resource planning and management are likely to result in water infrastructure that limits this ability to adapt. This can be addressed by using the well-established principles of sustainable watershed management to protect the quantity, quality and timing of water flows. A key contribution to improving water management will be strengthening the water institutions that decide who gets water and when.

Climate, water and development policy

Across the world, individuals, communities, the private sector and governments need to adapt to the impacts of climate change, not least its impacts on water resources. While

the process of adaptation to climate change is not new, the current pace of change and the scale of impacts, including extreme events, are unprecedented.

Sustainable and equitable water management must be at the heart of climate change policy. How we administer, allocate, control and regulate water uses, which are often the crux of water scarcity and will be augmented by climate change, are key challenges. And it is poor people, who lack political and financial capital, whose well-being is most vulnerable to inadequate or unfair water resource management.

Climate risk-based approaches, which address climate variability and climate change, need to be integrated within water policy frameworks.¹⁷ Increased funding will be available for climate change adaptation

over the coming years, and it is vital that this money benefits the people who are most vulnerable. Addressing the issues and needs of the water sector in a changing climate, with a greater focus on water resource management, should be one of the main priorities for this funding.

Written by members of **Bond's UK Water Network**.

This information and advocacy network focuses on achieving universal access to clean water and basic sanitation for poor people, and sustainable and equitable water resources management. Specific thanks to Freshwater Action Network, Progressio, Tearfund, Tourism Concern and WWF for their contributions.

Notes

- ¹ UN Water. 2010. *Climate Change Adaptation: The Pivotal Role of Water*. ● ² WHO/UNICEF. 2010. *Progress on Sanitation and Drinking Water. 2010 Update*. World Health Organization, Geneva. ● ³ 'Economic water scarcity' refers to when there is physical water availability but human, financial or institutional capital limit access. See Comprehensive Assessment of Water Management in Agriculture. 2007. *Water for Food: a Comprehensive Assessment of Water Management in Agriculture*. Earthscan, London; International Water Management Institute, Colombo. ● ⁴ Millennium Ecosystem Assessment. 2005; WWF. 2010. *Living Planet Report*. WWF International, Gland. ● ⁵ WHO and DFID. 2009. *Vision 2030: The Resilience of Water Supply and Sanitation in the Face of Climate Change. Summary and Policy Implications*. WHO, Geneva, and Department for International Development, London. ● ⁶ Cap-Net, GWA and UNDP. 2006. *Why Gender Matters. A Tutorial for Water Managers*. Cap-Net, Pretoria, and GWA, Dieren. ● ⁷ BRIDGE. 2008. *Gender and Climate Change: Mapping the Linkages*. Institute of Development Studies, University of Sussex, Brighton. ● ⁸ Prüss-Ustün, A. et al. 2008. *Safer Water, Better Health. Costs, Benefits and Sustainability of Interventions to Protect and Promote Health*. WHO, Geneva. ● ⁹ Thaxton, M. 2004. *Gender Makes the Difference: Water*. International Union for Conservation of Nature, Gland. ● ¹⁰ Comprehensive Assessment of Water Management in Agriculture. op. cit. ● ¹¹ International Fund for Agricultural Development. 18 February 2009. President issues wake-up call. IFAD press release, Rome. See www.ifad.org/media/press/2009/9.htm. ● ¹² Fuller, R. 2010. *Sustainable Agriculture – Links to International Development*. WWF-UK, Godalming. ● ¹³ See, for example, Progressio, Centro Peruano de Estudios Sociales and Water Witness International. 2010. *Drop by Drop: Understanding the Impacts of the UK's Water Footprint through a Case Study of Peruvian Asparagus*. Progressio, London. ● ¹⁴ Chapagain, A., Orr, S. 2008. *UK Water Footprint. The Impact of the UK's Food and Fibre Consumption on Global Water Resources*. Volume 1. WWF-UK, Godalming. ● ¹⁵ SABMiller plc, WWF-UK and Deutschen Gesellschaft für Technische Zusammenarbeit (GTZ). 2010. *Water Futures: Working Together for a Secure Water Future*. WWF-UK, Godalming. ● ¹⁶ O'Keefe, J., Le Quesne, T. 2009. *Keeping Rivers Alive. A Primer on Environmental Flows*. WWF-UK, Godalming. ● ¹⁷ See, for example, Venton, P. 2010. *How to Integrate Climate Change Adaptation into National-level Policy and Planning in the Water Sector*. Tearfund, London. ● ¹⁸ Richards, P. 4 March 2010. The thirsty Caribbean. IPS News. See www.ipsnews.net/news.asp?idnews=50544. ● ¹⁹ Government of the Republic of Trinidad and Tobago. 16 March 2010. WASA declares a meteorological drought. See www.news.gov.tt/index.php?news=3483. ● ²⁰ IFRC. 2010. *DREF Final Operation Report: Caribbean Drought*. International Federation of Red Cross and Red Crescent Societies, Geneva. ● ²¹ Henry, D. 23 December 2010. Making it right – water tourism industry. Tobago News. See www.thetobagonews.com/opinion/Making_it_right___water___tourism___industry-112412244.html.

About Bond DEG

The Bond Development and Environment Group (DEG) provides a forum where NGOs working at the interface of environmental and poverty issues can exchange information, enhance their analysis and coordinate their advocacy towards the UK Government and other relevant institutions.

Bond DEG is the main vehicle for NGO engagement with the UK Government on development and environment concerns. The group has a membership of over 70 organisations, representing a diverse range of agendas and a support base of millions. It also works more widely in the sector with other networks, organisations and individuals.

Contact us

Kate Munro
kate.munro@iied.org

International Institute
for Environment and
Development
3 Endsleigh Street
London WC1H 0DD

Tel: +44 (0)20 7388 2117
Fax: +44 (0)20 7388 2826

www.iied.org