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Acronyms

DCSF	UK Department for Children, Schools and Families
Defra	UK Department for Environment, Food and Rural Affairs
DFID	UK Department for International Development
FCO	UK Foreign and Commonwealth Office
IPCC	Intergovernmental Panel on Climate Change
IPT	intermittent presumptive treatment (for malaria)
MDG	Millennium Development Goal
MoD	UK Ministry of Defence
NGO	Non-governmental organisation
NOAA	US National Oceanic and Atmospheric Association
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
WHO	World Health Organization
WMO	World Meteorological Organization

Definitions

mitigation

Measures and actions to reduce the emissions of greenhouse gases that cause climate change, or enhance the sinks that absorb such emissions. (Adapted from the IPCC.)

adaptation

Any adjustment in natural or human systems, in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities. The objective of adaptation is to reduce vulnerability to climatic change and variability, thereby reducing their negative impacts. (Adapted from the IPCC.)

All websites referenced in this document were accessed by the report authors between August and November 2007.

**This report was written for UNICEF UK by
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Agulhas
Applied Knowledge

Foreword



Climate change is with us now. We see the impacts all around us. Here in the UK, flooding is becoming a more common occurrence. Birds are nesting earlier, animals are moving territories, the duration and range of seasons is changing. Adaptation to the impacts in the UK will be costly even though we have good monitoring systems, programmes in place, and funding allocated at both central and regional level. Every day, the reporting on climate change highlights the risks and alerts people to measures they can take to both mitigate and adapt. We have a choice of media, a choice of funding and a choice of strategies.

Others are less fortunate. For the vast majority of people the impact of climate change means an increased risk of losing their homes and livelihoods, more disease, less security and sometimes death. Children in the world's poorest communities are the most vulnerable. They are already seeing the impacts of climate change through malnutrition, disease, poverty, inequality and increasing risk of conflict – and ultimately an increase in child mortality rates.

All the essential effects we are seeing now are associated with a temperature increase since 1850 of less than 1° C. Past actions and the likely trend of emissions of greenhouse gases over the next few years imply that another 1 or 2° C will be hard to avoid, even with responsible action. Adaptation will be difficult but inevitable, and will be particularly costly for developing countries. Rich countries' responsibility for the bulk of past emissions demands that we give our strong support. Business-as-usual or delayed action would lead to the probability of much higher temperature increases which could catastrophically transform our planet. It will be the young and the poor and developing countries that will suffer earliest and hardest. We cannot allow this to happen.

This report draws attention to the impacts of climate change upon children. It strongly argues that both mitigation and adaptation are necessary as highlighted by the Stern Review, the Intergovernmental Panel on Climate Change and the most recent *Human Development Report*. There is increasing global consensus on the way forward, including the need for international collective action.

UNICEF UK has provided a valuable contribution to the analysis and reporting on climate change, drawing attention to the specific risks faced by children, who are more vulnerable and in no way responsible for their position. They have no choice. The state of the planet that we pass on to the next generation – today's children and young people – is our responsibility. Let us face up to this responsibility and address the specific needs of the most vulnerable: our children.

Lord Nicholas Stern

1 Introduction

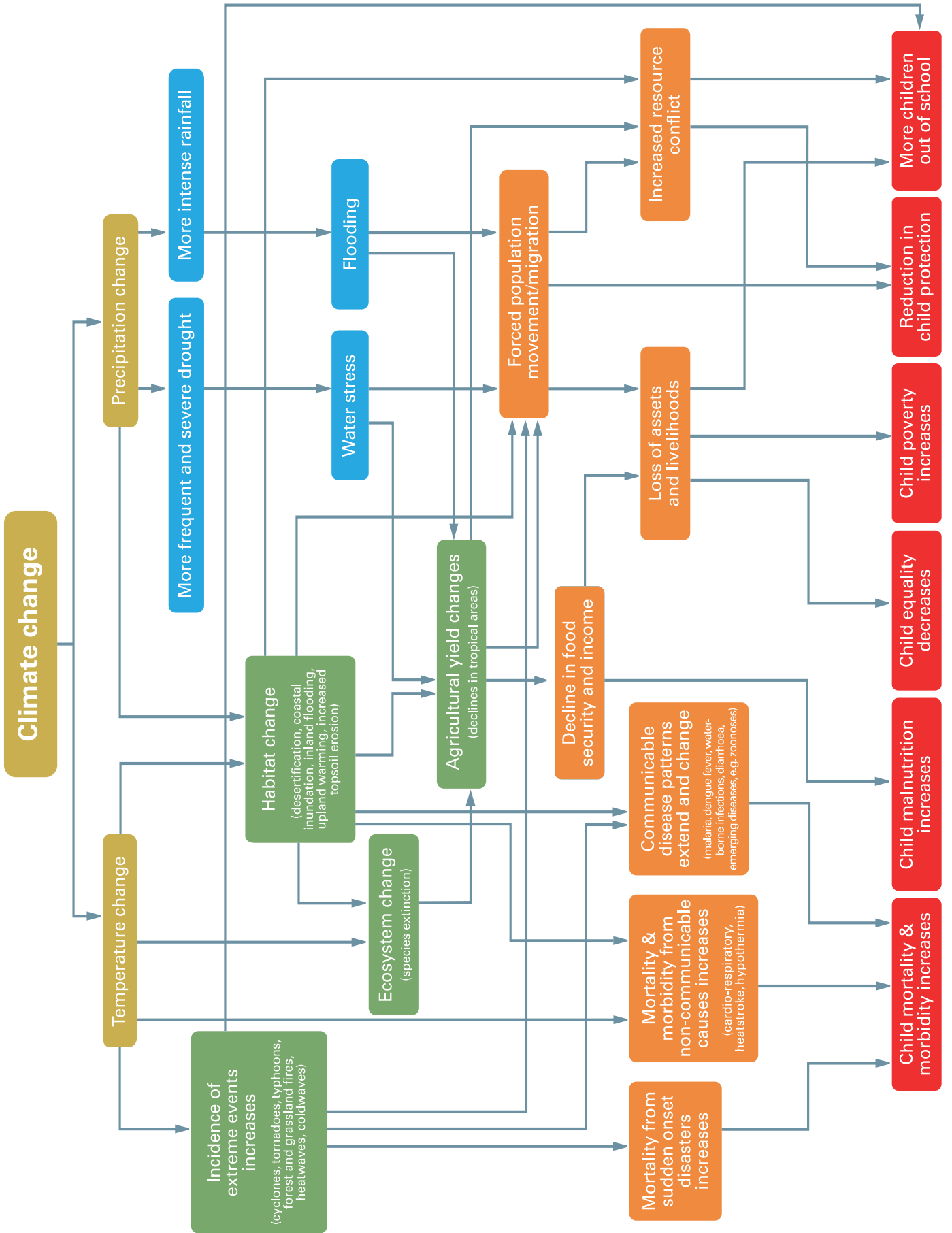
Climate change is a global issue. Addressing it is a shared responsibility. Yet it is increasingly apparent that the world's poorest countries and most vulnerable people will bear the brunt of climate change. Failure to act will render the environments of millions of children and their families even more hazardous. Many poor people already live in fragile climates, where food and clean water are scarce and shelter inadequate – climate change will exacerbate this fragility.

Our children – particularly those in Africa and Asia – are already facing a future in which it appears likely that disasters will increase in number and become more intense, where economic growth will falter and incomes fall, where disease outbreaks will be more frequent, clean water and good sanitation harder to secure, and habitats and communities less stable. As a consequence, children may also have to cope with higher levels of conflict and other pressures which keep them out of school and force them into work too soon.

Many developing countries have poor infrastructure and lack the technologies that could help them cope with a changing climate, such as flood defences and early warning systems. They are thus more vulnerable to the impact of climate change and their children are the most vulnerable of all.

The potential impact on children has been a critical missing element from the debate about climate change. Whilst there is a growing body of literature on the links between climate change and vulnerability, particularly in relation to the impact of natural disasters, research and advocacy activity on climate change and children specifically is less developed.

In publishing this report, UNICEF UK is working to bridge those gaps. The report seeks to illustrate how climate change may impact on every aspect of the most vulnerable children's lives and how children themselves can be central to the response. In doing so, UNICEF UK sets out the challenge before us – to rapidly develop a greater understanding of the impact of climate change on children and take appropriate measures to protect them from its consequences.



Our climate

Evidence that our climate is warming is now deemed “unequivocal” by the Intergovernmental Panel on Climate Change (IPCC). Data, based on global surface temperature records, reveal that 11 of the last 12 years rank among the warmest since 1850.¹ December 2006 was the warmest December since such records began.²

Further, the IPCC recently noted “coherent changes in many aspects of the climate system other than temperature”. Though the extent of human contribution to these trends is somewhat more frequently contested, the IPCC believes “the role of greenhouse gases is clearly understood and their increases are clearly identified” with the net effect of human activity since 1750 now “quantified” and “known to cause a warming at the Earth’s surface.”³

Climate change threatens sustainable development

As the degree of scientific certainty around climate change has grown, so has the significance of the climate agenda in development policy debates. Recent reports have shown that the effects of climate change will make it harder to achieve the internationally agreed Millennium Development Goals (MDGs) and to sustain development progress over the longer term. Many perceive an inequity between those parties, mostly in developed nations, which have contributed most to changes in the Earth’s atmosphere to date, and those beginning to bear the brunt of climate change – namely, those living in fragile environments across Africa, Asia and Latin America. Agencies within the UK and globally are concerned – as are developing country governments and civil society organisations – to understand and account for the implications of climate change for the world’s poorest people, and to ensure the necessary funding and policies are put in place as soon as possible.

Least able to adapt, most affected

The impact of climate change depends on hazard and vulnerability.

- 1. Hazard:** the susceptibility to the physical effects of climate change (for example, drought, flood, storms and changes in weather patterns).
- 2. Vulnerability:** the sensitivity of a country’s physical, economic, social and political systems to the effects of climate change, including its ability to anticipate and adapt to those effects.

Climate science is providing us with increasingly detailed information on the types, levels and distribution of **hazard**. We know, for example, that the water cycle is likely to intensify, increasing the likelihood of both drought and flooding. In tropical areas, even small increases in temperature will lead to declining crop yields, while increasing the prevalence of diseases such as malaria. Rainfall is likely to decline in arid and semi-arid areas, accelerating land degradation and desertification and causing agriculture to become increasingly marginal in many parts of the developing world.

‘...Poor people already live on the front lines of pollution, disaster and the degradation of resources and land ... For them, adaptation is a matter of sheer survival ... The message is clear. Global climate change must take its place alongside those threats – conflict, poverty, the proliferation of deadly weapons – that traditionally monopolized first-order political attention. And the United Nations offers the tools the world needs to respond.’

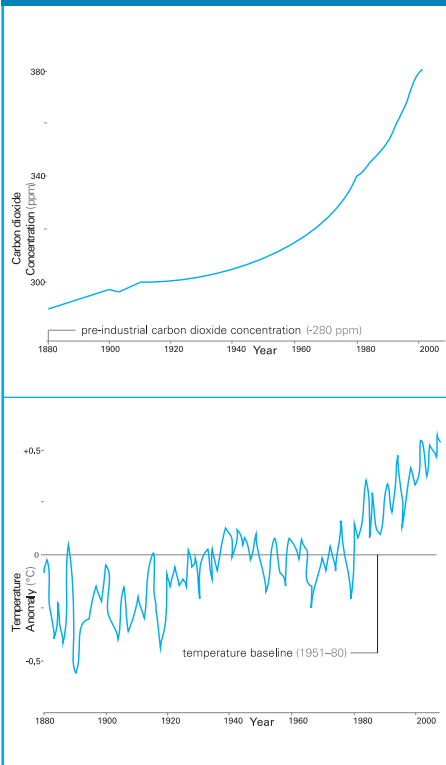
UN Secretary-General Ban Ki-Moon, Statement at the UNFCCC 12th Conference of the Parties, November 2006

1. WMO, 2007a.

2. WMO, 2007b.

3. Manning, 2007.

Carbon dioxide levels



Source: Based on carbon dioxide data from the US Earth System Research Laboratory (ESRL) at the National Oceanic and Atmospheric Administration (NOAA) and ESRL temperature data from NASA Goddard Institute for Space Studies.

Levels of carbon dioxide in Earth's atmosphere have been increasing since the Industrial Revolution. Increasing combustion of fossil fuels has accelerated the trend since the mid-20th century. Eleven of the 12 warmest years since climate records began have occurred since 1995. The IPCC has concluded that as the world warms, storms, droughts and floods will intensify both in frequency and ferocity, leading to rising sea levels and desertification. Many of the world's low-lying areas will disappear as sea levels rise. Global warming will reduce agricultural production and water supplies in many areas with the possibility of increasing human conflict and migration.

An important share of the world's population may face dry-season water shortages, and the hardest-hit regions, especially in Northern Africa, may be unable to sustain their present population. Rising sea levels may trigger the displacement of tens or hundreds of millions of people in the coming decades. The increasing incidence and severity of adverse weather events will become an increasingly important constraint on development.

Vulnerability to the effects of climate change correlates closely to levels of development. Developing countries have lower economic diversification and are more dependent on agriculture. Lower incomes and savings, and poor education and health status, render poor communities and households more vulnerable both to rapid shocks and to the long-term effects of climate change. Fragile states are particularly vulnerable to conflicts over scarce natural resources, and to the destabilising effects of forced migration. Resource conflicts already pose major risks to fragile states, particularly those with serious ethnic or religious divisions.

Limited capacity in research, analysis, policy-making and strategic planning in many developing countries makes it difficult for national and local authorities to explore future scenarios and to plan their development efforts with these in mind. Their ability to adapt to climate change impacts is restricted. As financial resources are extremely tight – both within public and private institutions and at household level – there is limited capability to invest in disaster preparedness and general strengthening of livelihood resilience or to respond rapidly and effectively when disasters strike.

Hazardous weather events increase in severity and frequency

Already we are seeing increasing evidence of the localised effect of changes in the climate system. For example, local surface temperature anomalies are mapped globally on a monthly basis – though it should be noted that data for developing countries are sparser than for developed countries. The Met Office Hadley Centre data for July and August 2007 reveal warmer than average temperatures across much of the northern hemisphere and across most African countries for which data were available.

In addition to overall patterns of warming, hazardous weather events appear to be increasing in severity. Data from 2006 bear this out. For example, in January 2006 Russia and Eastern Europe experienced a coldwave, with Moscow suffering its coldest temperatures in almost 30 years. A coldwave in India and Bangladesh claimed around 300 lives. However, in Western and Central Europe later that year, many countries experienced the hottest temperatures on record during July and through the autumn season. Severe droughts affected millions of people across China, Afghanistan, Brazil and elsewhere – whilst many other countries experienced extreme flooding. For example, East Africa experienced the worst flooding in 50 years, claiming more than 600 lives in Ethiopia alone.⁴

The global EM-DAT International Disasters Database maintained by the Centre for Research on the Epidemiology of Disasters (CRED) indicates a worldwide increase in the frequency of natural disasters over the last 20 years. Between 1987 and 1997, the worldwide number of natural disasters was 200–250 annually. Yet for each of the years since 2000, around twice as many disasters have been reported. A significant

4. All data from US National Oceanic and Atmospheric Association (NOAA) website 2007. www.noaa.gov

Examples of hazardous weather in 2007

© UNICEF/H008-0202/Njaka Rajaonisaona



July: extreme monsoon rains, South Asia

- ⊙ Northern India, Bangladesh and Nepal worst affected by floods.
- ⊙ More than 2,000 killed and about 30 million people affected.
- ⊙ 4.2 million Bangladeshi children affected – 300,000 of them under the age of five.
- ⊙ Many children living in makeshift camps without proper shelter or access to basic amenities, surviving on meagre supplies of food and water.
- ⊙ Some 3,000 primary schools damaged or destroyed.
- ⊙ Thousands of homes and thousands of acres of land destroyed.
- ⊙ Major outbreaks of waterborne diseases.

July: floods, Africa

- ⊙ 1.5 million people affected by extreme rainfall across 18 countries of West, East and Central Africa.
- ⊙ Floods affect more than 400,000 people in Sudan.
- ⊙ Nearly 200 Sudanese schools damaged, affecting nearly 45,000 children.
- ⊙ Floods also affect 400,000 people in northern and eastern Uganda.
- ⊙ Heavy rains also cause flooding in Ghana, affecting 200,000 people.

August: flash floods, North Korea

- ⊙ Hundreds dead or missing.
- ⊙ 300,000 people affected, 170,000 made homeless.
- ⊙ Thousands of acres of agricultural land destroyed.
- ⊙ 540 bridges destroyed.
- ⊙ Many schools damaged – in some cases beyond repair.

August: tropical storm, Viet Nam

- ⊙ 60 dead.
- ⊙ 48,000 homes and more than 160,300 acres of agricultural land underwater.

August: typhoon, Philippines, Taiwan and China

- ⊙ Typhoon Sepat affected more than 1.53 million people in China alone.
- ⊙ Total damage across region estimated at around US\$700 million.

August: flash floods, Henan, China

- ⊙ 6,000 homes and more than 16,500 acres of crops destroyed.

November: floods, Gulf of Mexico

- ⊙ Hurricane Dean affects 300,000 people in Jamaica, 32,000 made homeless including more than 10,000 children.
- ⊙ Mexico experienced its worst floods for 50 years, affecting more than 1 million people. Thousands of families forced out of their homes by floodwaters in desperate need of water, food and medicine.
- ⊙ Schools damaged and closed in Belize, affecting 17,000 children.

November: cyclone, Bangladesh

- ⊙ Cyclone Sidr leaves a trail of destruction across 30 districts of Bangladesh.
- ⊙ 7 million people affected, 600,000 children under the age of five.

Sources: UNICEF, Associated Press, Reuters, BBC, Hinhua – accessed through NOAA, www.noaa.gov

increase in flooding has contributed in large part to this trend. Asia is the most affected continent.

Dramatic increase in economic costs of hazardous weather

The economic costs of hazardous weather events have increased dramatically in the recent past. Global losses from weather-related disasters amounted to a total of around US \$83 billion during the 1970s, increasing to a total of around US \$440 billion in the 1990s.⁵ The financial costs of extreme weather events represent a greater proportion of GDP in developing countries, even if the absolute costs are greater in developed countries given the higher monetary value of infrastructure and other assets.

Over 96 per cent of all disaster-related deaths worldwide in recent years have occurred in developing countries. Climatic shocks also cause more general setbacks to economic and social development in developing countries. The International Monetary Fund (IMF) estimates average costs of over 5 per cent of GDP per large disaster in low-income countries between 1997 and 2001.⁶

Human impact of other changes only just emerging

There is also evidence of other consequences of a changing climate, which are not identified as directly hazardous to people. These include the earlier arrival of spring – with resulting changes in bird migration, egg-laying and the greening of vegetation – and the shifting of plant and animal species into new geographical zones. Changes in Arctic and Antarctic ecosystems have also been noted, as have changes in areas of snow, ice and frozen ground (including permafrost) – runoff into rivers fed by glaciers has increased, for example. Some marine and freshwater species also appear to be altering their range and number.⁷ The longer-term impact on humans of such changes is only just emerging.

Worse is to come

The examples of the currently unfolding environmental and human impacts of climate change outlined above are striking enough. However, projections of future climate change suggest worse is to come. Significant impacts on water stress, agricultural productivity and human health are anticipated. IPCC scenarios indicate that a warming of 2–3 degrees across the globe is likely within the next 50 years – largely the result of greenhouse gases already in the Earth's atmosphere and secondary effects already in train. Thereafter, levels of potential warming are likely to be significantly influenced by the levels of greenhouse gas we emit over the coming years. Such scenarios predict rising sea levels to threaten large cities in Africa and the densely populated river deltas of the Ganges and Mekong. Glacier melting is likely to disrupt water supplies in Asia and Latin America.

Action now

All of this leaves children in developing countries the most vulnerable to the impacts of climate change. Adaptation capacity is fundamental to assessing their vulnerability. Countries and communities that are unable to anticipate and respond to climate change impacts are at greatest risk.

Yet a catastrophic scenario is not inevitable. More can be done to limit human contributions to further climate change. More can also be done to support the poorest and most vulnerable to cope with the likely increase in global temperature and its effects. There is a strong case for acting on

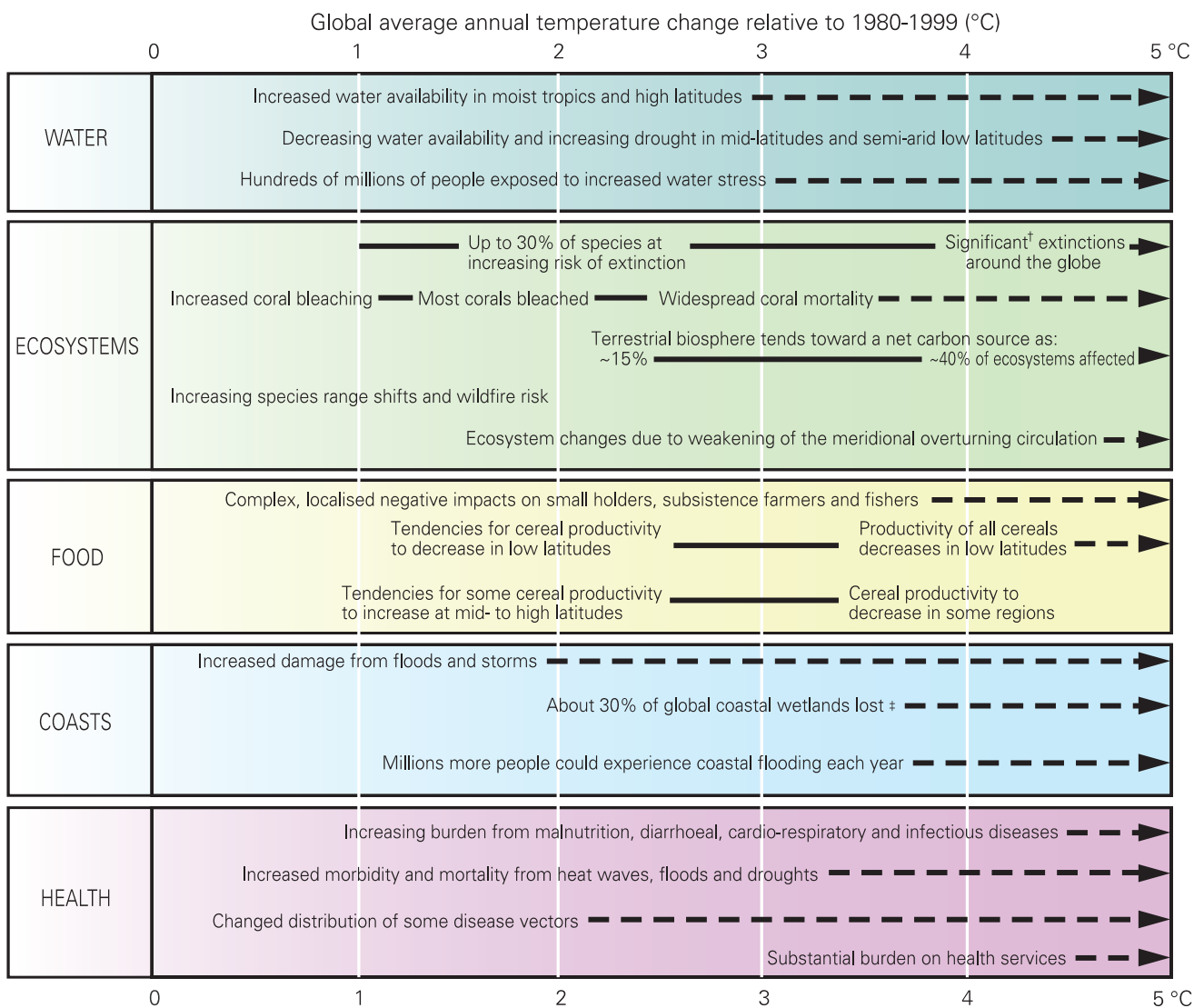
5. Stern et al., 2007.

6. IMF, 2003.

7. IPCC, 2007.

Examples of impacts associated with global average temperature change

(impacts will vary by extent of adaptation, rate of temperature change and socio-economic pathway)



† Significant is defined here as more than 40%. ‡ Based on average rate of sea level rise of 4.2mm/year from 2000 to 2080.

Source: "Summary for Policymakers", *Climate Change 2007: Impacts, Adaptation and Vulnerability: Contribution of Working Group II to the Fourth Assessment of the Intergovernmental Panel on Climate Change*, IPCC, 2007

what we know already in this respect – that is, adopting the “precautionary principle” where some uncertainty remains and taking full responsibility where we know we must act.

The likely impacts of climate change on children compel us to act, both to minimise the projected increase in global temperature and to build the resilience of nations and communities to withstand its effects.

2 Our children

The Millennium Development Goals relating to child survival and child health

By 2015:

Goal 1: Eradicate extreme poverty and hunger

Goal 4: Reduce by two thirds the mortality rate of children under the age of five

Goal 5: Reduce by three quarters the maternal mortality ratio

Goal 6: Halt and begin to reverse the spread of HIV/AIDS, malaria and other major diseases

8. Stern et al., 2007.

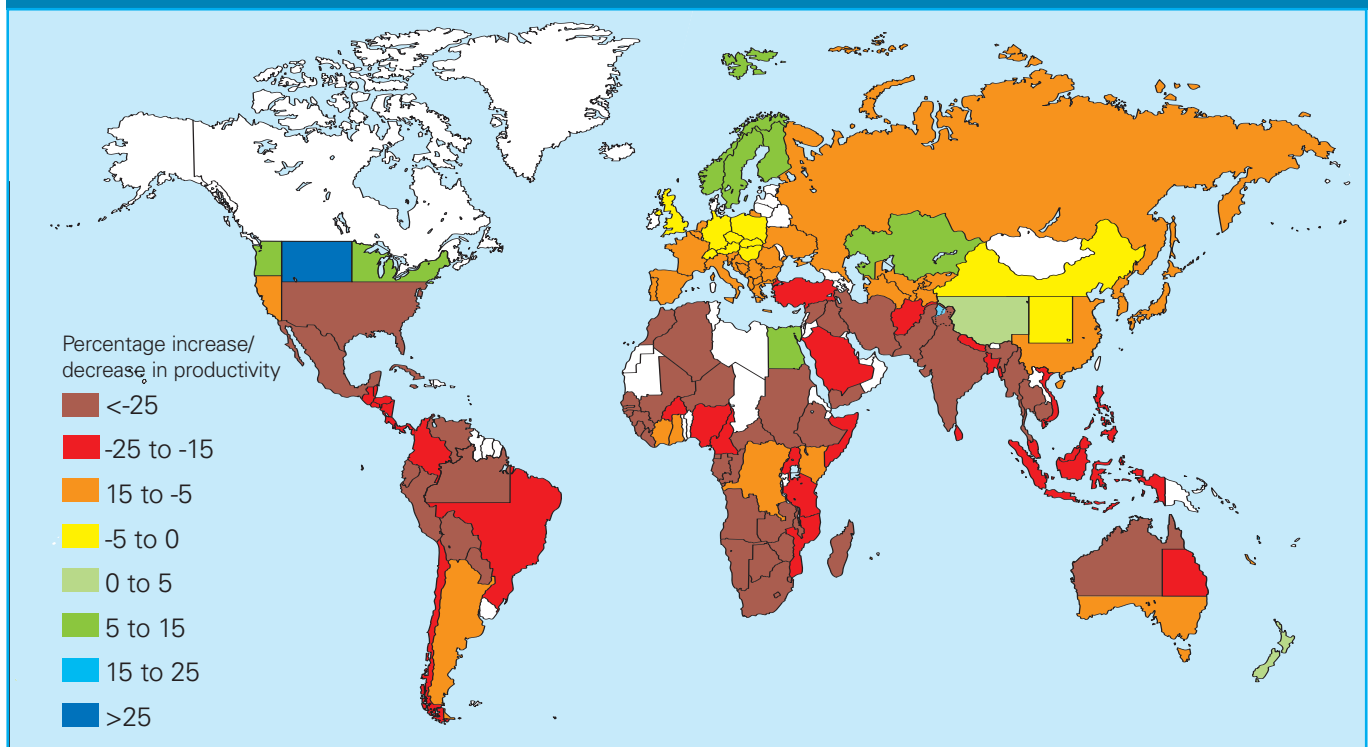
9. Cline, 2007.

Business as usual: not an option

There is now clear evidence that climate change will adversely impact the achievement of MDG 1. The Stern Review found that failure to address climate change could lead to huge reductions in the welfare of people across the world. This would mean, for example, cuts in global per capita consumption of 5–20 per cent now and forever under a business-as-usual scenario. These impacts could be on a scale similar to those associated with World Wars I and II and the economic depression of the 1930s. As a result of climate change, there will be an increasing risk of shocks and potential tipping points. It will be difficult or impossible to reverse these changes.⁸

Climate change will have an overall adverse impact on livelihoods, and thence on all MDGs relating to children, including health, education and gender equality. Impacts on livelihoods can be expected to be sudden, such as droughts and floods, or slower but cumulative. Falling agricultural output and deteriorating conditions in rural areas caused by climate change will increase directly the poverty of households in poor countries. Developing countries across Asia, Africa and Latin America are forecast to see reductions in agricultural productivity of between 5 and 25 per cent by the 2080s due to climate change.⁹

Impact on agricultural productivity by the 2080s



Source: Used with permission from the Center for Global Development and the Peterson Institute for International Economics, from *Global Warming and Agriculture: Impact Estimates by Country*, William R. Cline, 2007.

Water and sanitation

Every year, waterborne diseases like diarrhoea, cholera and typhoid claim the lives of millions of children in the developing world. Water and sanitation-related diseases are one of the major causes of under-five mortality in the world. Every day, nearly 4,800 children die from diarrhoea-related causes alone.

Diarrhoea spreads readily in environments where there is poor sanitation and where safe water is unavailable. Children already suffering from poor diets, the ravages of other diseases, and little or no access to clean water are the most vulnerable. Tragically, access to safe, clean water is a luxury for many communities and it is becoming scarcer by the day as climate change dries up the water tables and depletes rainfall, leaving communities to battle the devastating effects of drought.

Drought in southern Africa is closely related to the Indian Ocean warming due to climate change. The Indian Ocean has warmed more than 1°C since 1950. Rather than falling over the land, rain develops in the rising air above the warm ocean. Between 1950 and 1999, there was almost a 20 per cent decline in summer rainfall in southern Africa. Even a 10 per cent drop in rainfall can reduce river flows by 50 per cent or more.

Zambia, in common with other countries in southern Africa, is prone to droughts and has seen a worsening situation in recent years. Over the last 20 years, the worst affected areas have experienced a 25 per cent reduction in annual rainfall. Since 1992 the water tables have not recovered – they are low and dropping, meaning that an increasing number of water points dry up in the summer.

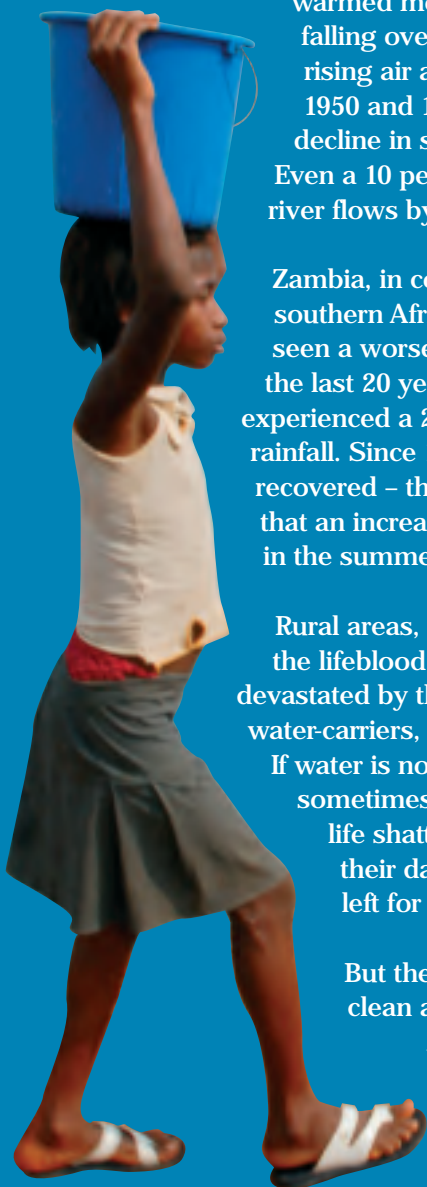
Rural areas, where streams and small rivers are the lifeblood of the community, can be devastated by the loss of water. Women, the water-carriers, are far more affected than men.

If water is not nearby, they must travel, sometimes for days, to get it. This can be life shattering for girls, who spend most of their day collecting water, with little time left for education.

But there is hope. UNICEF is safeguarding clean and sustainable water supplies in **Zambian schools with innovative schemes like roundabout play pumps, which are carbon free**

A girl carries water from a pump in Adjame, southern Côte D'Ivoire. UNICEF helps maintain the pumps.

© UNICEF/HQ06-2789/Bruno Brioni



© UNICEF/HQ06-2789/Bruno Brioni



Standing in floodwater, a girl collects drinking water from a tube-well that has been raised to protect it from contaminated flood water in Mymensingh, northern Bangladesh.
© UNICEF/HQ98-0191/Shehzad Noorani

and pump water with the energy harnessed from children playing on them. This work is complemented by programmes to improve sanitation and basic hygiene practices.

Work is also being carried out in other countries, like Palve village located in the drought-prone district of Maharashtra, western India. This community of 2,200 households has been spared the everyday hardship of fetching water through water pumping initiatives that pump fresh, clean water right into their homes.

In southern Madhya Pradesh, India, tribal girls spent up to 3 hours a day collecting and arranging for water. The girls spent more time fetching water than learning and, as a result, they were lagging behind for their crucial exams in March and April. Now, water is readily available thanks to the “Wise-Water Management” programme implemented by UNICEF and its partners.

“Wise-Water Management” activities include the harvesting of rainwater, recycling of grey water, pumping of water using a roundabout play pump, and dilution of fluoride-contaminated water. This is all monitored by the Water Safety Club made up of tribal school girls, using a water safety plan taught by UNICEF.

UNICEF can play an important role in increasing sanitation standards and access to clean, safe water through education and water management programmes. Simple, sustainable techniques like carbon-free roundabout play pumps and rainwater harvesting can mean the difference between life and death for communities.

Since agriculture accounts for a larger percentage of GDP in developing countries, any percentage decrease in agricultural productivity results in a much greater relative loss in income than in other countries. These impacts will combine with others. For example, vulnerability will be greater in southern Africa because assets are already depleted due to the impact of HIV and AIDS. The joint impact of HIV and climate change may have the potential to destroy the viability of some rural communities.

Human health status projected to decline

There is also an increasing body of evidence relating to the likely direct impacts of climate change on human health – with respect to the availability of clean water and nutritious food, and in relation to shifting disease burdens and other stresses. This evidence implies that countries will face growing difficulty in achieving MDGs 4, 5 and 6, in particular. The IPCC has identified a number of trends relating to climate change exposures and human health in which it has “high confidence” – that is, there is a high degree of consensus between relevant experts that these trends will play out.

Trend: climate change will	Degree of expert confidence
Increase malnutrition and consequent disorders, including those relating to child growth and development	High
Increase the number of people suffering from death, disease and injury from heatwaves, floods, storms, fires and droughts	High
Continue to change the range of some infectious disease vectors	High
Have mixed effects on malaria; in some places the geographical range will contract, elsewhere the geographical range will expand and the transmission season may be changed	Very high
Increase the burden of diarrhoeal diseases	Medium
Increase cardio-respiratory morbidity and mortality associated with ground-level ozone	High
Increase the number of people at risk of dengue	Low
Bring some benefits to health, including fewer deaths from cold, although it is expected that these will be outweighed by the negative effects of rising temperatures worldwide, especially in developing countries	High

Source: Confalonieri et al., “Human health” in *Climate Change 2007: Impacts, Adaptation and Vulnerability, Contribution of Working Group II to the Fourth Assessment Report of the IPCC*, IPCC, 2007.

Children’s rights and climate change

Children have the absolute right to live in a decent environment with all that implies: attending school, enjoying good health and living and growing in safety. This is not simply a moral assertion. It is codified in the UN Convention on the Rights of the Child (CRC) – the world’s most widely ratified human rights treaty and the foundation for UNICEF’s work with and for children. We have a joint responsibility to ensure that future generations are able to realise these rights.

Below are the key articles relating to climate change, bearing in mind that all of the Convention’s 52 articles are interconnected:

Child survival and child health

Article 6

Children have the right to live. Governments should ensure that children survive and develop healthily.

Article 24

Children have the right to good quality health care – the best health care possible – to safe drinking water, nutritious food, a clean and safe environment, and information to help them stay healthy. Rich countries should help poorer countries achieve this.

Education and equality

Article 28

All children have the right to a primary education, which should be free. Wealthy countries should help poorer countries achieve this right.

Emergencies and child protection

Article 22

Children have the right to special protection and help if they are refugees (if they have been forced to leave their home and live in another country).

Article 38

Governments must do everything they can to protect and care for children affected by war.

Empowering children to act

Article 12

When adults are making decisions that affect children, children have the right to say what they think should happen and have their opinions taken into account.

The language used here and produced by UNICEF simplifies the original text of the Convention.

10. Data covers period from 2000 to 2003. All data from World Health Report 2005, WHO, 2005.

11. UNDP, 2006.

12. See Roll Back Malaria factsheets at www.rbm.who.int

13. TDR, 2005.

Many of these identified trends will impact significantly on children. Indeed, the likely areas of impact identified by the IPCC correspond closely with the current leading causes of death in children under the age of five. In addition to neonatal causes, they are: acute respiratory infections (19 per cent), diarrhoeal disease (17 per cent) and malaria (8 per cent).¹⁰ Even now, it is estimated that 5,000 children die every day due to poor sanitation and a lack of clean drinking water.¹¹

Annually, there are more than 300 million acute cases of malaria, causing more than 1 million deaths – most of whom are children in sub-Saharan Africa.¹² Currently, approximately 50 million people are infected annually with dengue, across more than 100 countries.¹³ Children are more likely to suffer complications through dengue infection. Based on the trends predicted by the IPCC, therefore, we should expect the already significant levels of child morbidity and mortality due to natural disasters, malnutrition, heat stress, respiratory illness, diarrhoeal and vector-borne diseases to be further exacerbated by climate change.

A girl carries firewood at a camp for people displaced by the 2006 drought in southern Sudan. © UNICEF/HQ06-0151/Michael Kamber



Child survival and child health

Assuming the IPCC scenario of 2 to 3 degrees warming within the next 50 years, we can begin to map some of its consequences for child health priorities across two core themes: nutrition, and communicable and non-communicable disease.

Impact on child health: nutrition

Pressures on both large-scale and small-scale farming are likely to have consequences for nutrition. Crop volumes and/or crop diversity may be constrained by water and other climate-related stresses – affecting what is immediately available to the farming household, as well as what can be bought at market. Livestock will also be affected by the changing environment (both by gradual change and by the sudden impact of natural disasters). This may have consequences for the availability of meat and dairy products, and for the use of animals in small-scale agriculture, in, for example, ploughing or transporting goods to market. All of these factors will affect the ability of parents to feed themselves and their children.

Malnutrition is already a leading cause of infant and child mortality. The evidence of progress to date in this area is far from encouraging. Analysis conducted in 2004 suggested that, based on current trends, the proportion of children in Africa who are underweight – this being one of three core indicators of malnutrition – is likely to grow between 1990 and 2015, from 24 to 26.8 per cent. In the Southern and North African sub-regions, and in Asia, analysts forecast a decline in the prevalence of childhood underweight through to 2015¹⁴ – however, as indicated above, these regions appear to be some of the most vulnerable to water stress and/or other natural disasters, so such gains cannot be guaranteed over the long run.

There is a good body of evidence demonstrating the impact that malnutrition and other consequences of climate-related shocks have on child development more broadly. Zimbabwean children ages 12 to 24 months, for example, were found to have lost 1.5 to 2 centimetres of growth in the aftermath of a drought.¹⁵ This loss in growth was not made up during later stages of development and the consequences appeared long-lasting or permanent.

The longer-term consequences of lost growth have been seen in many population groups, and include lower rates of skill acquisition, lower cognitive function and educational attainment, reduced peer interaction, lower adult productivity and premature death. Further, taller women appear to experience fewer complications during childbirth and have a lower risk of maternal or infant mortality. Nutritional and other impacts of climate-related shocks may therefore be passed from generation to generation.

Impact on child health: disease

As land-use patterns change in response to evolving climatic and hydrological pressures this may exacerbate other drivers of communicable disease. For example, researchers in West Africa have recently documented a series of complex interactions between patterns of irrigation and malaria transmission, land degradation and meningitis, and

Figures quoted by the Stern Review suggest that, with temperature increases of 2°C, an additional 30 to 200 million people will be placed at risk of hunger across the world, rising to as many as 550 million with warming of 3°C.

14. de Onis et al., 2004.

15. Hoddinott and Kinsey, 2001.

Drought brings lifelong health consequences for children

- **In Ethiopia**

children age five or under are 36 per cent more likely to be malnourished and 41 per cent more likely to be stunted if they were born during a drought year and were affected by it. This translates into some 2 million additional malnourished children.

- **For Kenya**

being born in a drought year increases the likelihood of children being malnourished by 50 per cent.

- **In Niger**

children age two or under who were born during a drought year and were affected by it are 72 per cent more likely to be stunted.

Source: *Fighting Climate Change: Human Solidarity in a Divided World*, Human Development Report 2007–2008, UNDP 2007.



A toddler wipes his eye at a dust-filled camp for people displaced by drought or civil conflict near Al-Ubayyid, central Sudan.

© UNICEF/HQ91-0914/Roger LeMoyné

deforestation and onchocerciasis (river blindness) – and it is believed these findings can be extrapolated to other infectious diseases, such as schistosomiasis (bilharzia).¹⁶ Such interactions must be better understood and managed if the impacts of climate change on child health are to be mitigated.

Indeed, changing patterns of communicable-disease distribution present a significant threat to infants and children across the world. Again, climate change plays a part. There is a significant body of evidence documenting the impact of climatic variability on vector-borne diseases. The transmission of mosquito-borne diseases such as malaria – which currently claims the lives of around 800,000 children every year – is known to be influenced by factors such as rainfall, humidity, temperature and levels of surface water, all of which affect vector reproduction and lifespan.¹⁷ Changes in these environmental factors are facilitating malaria transmission in areas where it had previously been eliminated – such as the highlands of Kenya¹⁸ and Jamaica.¹⁹ Current estimates of the likely increased range for dengue due to climate change suggest the population at risk could increase to 3.5 billion by 2080 (up from 1.5 billion).²⁰

Serious epidemics more likely among previously less-affected communities

The movement of malaria and other diseases into previously less-affected communities increases the likelihood of serious epidemics, as such populations exhibit less immunity in addition to lower levels of disease-awareness and capacity to respond, including amongst health workers. In addition to heightening the risk of child mortality and morbidity, malaria epidemics present a serious threat to pregnant women – who are 2 to 3 times more likely than non-pregnant women in the same area to develop severe malaria if infected. Malaria (particularly *Plasmodium falciparum* infection) during pregnancy increases the risk of maternal anaemia and maternal death. It also contributes to spontaneous abortion, low birth-weight and neonatal death.²¹

The risks to mothers, neonates and children presented by climate-influenced shifts in malaria transmission are therefore potentially significant and this needs to be taken into account by national malaria programmes. It may, for example, lead to a greater emphasis on the use of intermittent preventive treatment (IPT) during pregnancy and mosquito nets treated with insect repellent in areas that are currently considered at lower risk of malaria but which may become epidemic-prone.

Climate conditions may influence susceptibility to disease

Climate conditions may also influence the susceptibility of the human body to disease. For example, meningitis – which causes significant levels of child mortality and morbidity – may become more prevalent in areas that become drier as a result of climate change. Meningitis lies dormant in most of those affected, but outbreaks in the African Sahel region's “meningitis belt” appear to be triggered in part through physiological changes stimulated by hot, dry weather and dusty environments.²²

Impact on water

Currently, around 1.1 billion people in developing countries have inadequate access to water and 2.6 billion people lack basic sanitation.²³ The world is currently on track to meet the targets it has set for improving access to water, though the pressures presented by climate change could render achievement and maintenance of access more difficult over time.

16. Thomson et al., 2004.

17. Himeidan et al., 2007.

18. Yanda, P. et al., Adaptation to Climate Change/Variability – Induced Highland Malaria and Cholera in the Lake Victoria Region, AIACC Working Paper No. 43, October 2006.

19. BBC, 2006.

20. Data from Stern Review, cited in the Human Development Report 2007–08.

21. Roll Back Malaria, 2003.

22. Molesworth et al., 2003.

23. UNDP, 2006.

Further, those countries making least progress on access to water now are amongst the most vulnerable to existing and potential climate change. Bangladesh, for example, is under increased pressure of flooding, whilst Ethiopia and Niger are threatened by drought and land degradation.²⁴

Threat of waterborne disease likely to grow

Increased rainfall and flooding, particularly in densely-populated urban areas, are likely to exacerbate sanitation problems in future. The threat of waterborne diseases – such as cholera, of which there were nearly 237,000 confirmed cases globally in 2006 (a 79 per cent increase from 2005) – will likely grow in many countries. In addition to its rapid transmission through contaminated food and water, the *Vibrio cholerae* bacterium that causes cholera also appears to use brackish water as a reservoir, and there is some evidence that global warming will favour the bacterium.²⁵

Existing trends in urbanisation look set to continue, and may even accelerate due to the pressures of climate change, as people abandon rural areas due to depletion of natural resources. Strengthening urban water and sanitation infrastructure to cope with these additional pressures is therefore of high priority.

Non-communicable disease threat

Non-communicable disease may also be triggered by changes in environmental conditions. For example, there is evidence of escalating childhood asthma in areas with high ground-level ozone, the concentration of which may increase due to climate change. Climate-influenced increases in levels of other aeroallergens that trigger asthma are also well-documented – particularly pollen, which appears to respond to both warming and increased carbon dioxide concentration. There is some evidence that increased childhood exposure to such allergens enhances the risk of developing other chronic conditions such as eczema and rhinitis.²⁶ Heat or cold stress will increase child deaths from heat exhaustion and hypothermia, in addition to their indirect impacts through exacerbating existing chronic conditions (such as cardiovascular disease) in the wider community.

Children's mental health affected

There is already evidence that anxiety about future climate change is affecting children's mental health. It is also likely that exposure to the effects of climate change – particularly to natural disasters – will exacerbate the burden of depression, anxiety and stress. Research shows evidence of Post Traumatic Stress Disorder (PTSD) and other mental health problems in populations displaced through natural disasters, and several studies have documented symptoms of PTSD (such as increased aggression and bedwetting) in children following catastrophic events such as floods.²⁷

New diseases may emerge

In addition to exacerbating the existing communicable and non-communicable disease burden, climate change has the potential to stimulate the emergence of new diseases. For example, zoonoses – diseases that originate in animal species – often mutate and emerge in humans in response to changing environmental conditions (particularly where disease is transmitted from animal to human through a vector or through contaminated water) or new patterns of human-animal contact. This may be stimulated through forced population movements or rural-urban migration, or through animal migration, for example. Examples of



A displaced family wade through flood waters to get to a well in Kamber, Sindh Province, Pakistan. More than 35,000 people were displaced by the 2007 floods in Kamber. UNICEF provided emergency supplies for the stricken population.

© UNICEF/HQ07-0901/Antonia Paradelo

By 2020, it is projected that some 75–250 million people in Africa will be exposed to increased water stress due to climate change.²⁸

24. See Progress for Children: a report card on water and sanitation (UNICEF 2006) for maps showing progress to date.

25. See WHO factsheet no. 107 "Cholera" (September 2007); and WHO Weekly epidemiological record No. 31, 2007, 82, 273–284 (3 August 2007).

26. Beggs and Bambrick, 2005.

27. See, for example, research on flooding reviewed by Few et al., 2004.

28. IPCC, "Summary for Policymakers" of the Synthesis Report of the IPCC Fourth Assessment Report, 2007.

Malaria migration



Liban Abdikar, age 8, who is severely malnourished and also has malaria, rests in his grandmother's arms, at the feeding centre in the UNICEF-supported Wajir District Hospital in drought-affected Wajir District, North Eastern Province, Kenya.

© UNICEF/HQ06-0386/Guillaume Bonn

Malaria is one of the most climate-sensitive vector-borne diseases. In recent years, the number of epidemics of malaria has increased across East Africa, with devastating effects.

Previous highland malaria epidemics were not as severe or as frequent as they have been over the past two decades. For instance, from the 1960s to the early 1980s, there were virtually no recorded malaria epidemics in the East African highlands.

There is evidence that malaria epidemics in the Western Highlands of Kenya are driven partly by climate change. Certainly the impacts of these epidemics have been devastating. In 2002, for instance, a malaria outbreak affected thousands of people in the Western Highlands of Kenya. These outbreaks are increasingly exposing pregnant women and children to the adverse effects of climate change, as well as challenging their ability to cope with such changes.

UNICEF is the world's leading supplier of mosquito nets and has significantly increased its procurement and distribution in recent years as part of its integrated strategy to improve child survival. Together with its partners, UNICEF distributes mosquito nets using routine health services and campaign approaches. UNICEF works with ministries of health, non-governmental organisations (NGOs), and community and village health workers to develop local distribution systems.

In the past five years, the increased availability of mosquito nets has prevented many more Kenyan children from contracting malaria. The nets, treated with long-lasting insect repellent, have proven to be the most effective way to prevent malaria. A study in four rural districts in Kenya shows that the use of nets led to a 44 per cent drop in the number of child deaths (*State of the World's Children 2008*).

UNICEF's partnership with the Making Pregnancy Safer initiative and national antenatal care services helps ensure that Kenyan women and their newborns receive quality antenatal care and reproductive health services, including intermittent preventive treatment against malaria and mosquito nets. Intermittent preventive treatment involves providing pregnant women with at least two doses of anti-malarial medicine at each scheduled antenatal visit after the first trimester. Such preventive treatment has been shown to substantially reduce the risk of anaemia in the mother and low birth weight in the newborn.

zoonotic diseases include plague, tuberculosis, and avian influenza strain H5N1. Emerging diseases often cause high levels of mortality – particularly in children, who are more vulnerable – as there are no vaccines, few if any effective treatments, inconsistencies in diagnosis and case management, and affected populations generally carry no immunity.

Progress on child mortality made more difficult

At an aggregate level, we can assess the existing body of evidence to arrive at an assessment of the ways in which progress towards the health-related MDGs might be affected. Progress towards the child mortality MDG will be made more difficult as our climate changes. Many countries are already off-track in their efforts to meet this goal. The evidence above suggests trends are likely to deteriorate further if efforts are not made to pre-empt the increased risk, particularly of waterborne and vector-borne disease and pressures on child nutrition.

Analysis undertaken for the Stern Review found that climate change could cause an additional 40,000 to 160,000 child deaths per year in South Asia and sub-Saharan Africa through GDP losses alone, under a baseline climate change scenario. Under a high climate change scenario, this increases to an additional 60,000 to 250,000 child deaths per year by 2100.²⁹ These projections are simply illustrative of possible risks associated with a loss in income due to climate change. That is, they reflect the purely income-related effects of climate change on poverty and child mortality, through its dampening effect on GDP, and do not account for the millions of people that will be exposed to other risks such as heat stress or malaria, or the loss of jobs, assets and livelihoods through extreme weather events.

The WHO has undertaken a range of risk assessments in an attempt to quantify the level of premature morbidity and mortality attributable to different risk factors. Climate change is one such risk. For example, it was estimated that climate change caused the loss of more than 150,000 lives and 5.5 million Disability Adjusted Life Years (DALYs) globally in the year 2000. Some of the WHO-commissioned studies also attempted to assess future risks. In doing so, they estimated that climate change would increase the burden of diarrhoeal disease in low-income regions by between 2 and 5 per cent by 2020.³⁰ It should be noted that the estimates produced by such studies are very approximate and have been widely questioned. It is therefore not possible for us to extrapolate further with any accuracy using the available data.³¹

Mitigating the impact of climate change

It is clear that climate change is likely to impact on most drivers of infant and child mortality in the developing world. It is also clear, however, that most of the impacts outlined above can be mitigated to some degree through an intensification of existing strategies – such as the widespread rollout of childhood immunisation programmes, the upgrading of water and sanitation infrastructure, and the expansion of public health messaging and environmental education. That said, choices will need to be made over where to focus greatest effort in resource-constrained environments.

A different approach to development is needed, ensuring that the impact of climate change on child health and survival is taken into account when developing policies and programmes.

During 2006, major international humanitarian assistance was required for 8 million people whose lives were threatened in drought-stricken areas of Djibouti, Eritrea, Ethiopia, Kenya and Somalia – including around 1.6 million children under the age of five. Because of climate shifts, what was once a 10-year drought cycle in the Horn of Africa has now been abbreviated to a cycle of between three and five years. In addition, cholera – a waterborne disease – remains a severe threat. There were recent outbreaks in several countries: including Burundi, Malawi and Mozambique in 2005; and Angola, Kenya and Malawi in 2006.

Source: *Progress for Children: a report card on water and sanitation*, UNICEF 2006.

29. Stern et al., 2007.

30. Confalonieri et al., 2007: citing Campbell-Lendrum and Woodruff, 2006, and others.

31. For illustrative-only purposes, we can use the conservative estimate of a 2 per cent increase in diarrhoeal disease by 2020, and the equally conservative estimate of 2.2 million deaths due to diarrhoeal disease each year – the vast majority of which occur in children in low-income regions – to arrive at a very approximate projection. This suggests that climate change could cause an additional 40,000-plus child deaths in 2020 from diarrhoeal disease alone.

Education and gender equality



The Millennium Development Goals relating to education and gender equality

By 2015:

Goal 2: Achieve universal primary education

Goal 3: Promote gender equality and empower women: Eliminate gender disparity in primary and secondary education preferably by 2005, and at all levels by 2015

One way in which climate change will affect the education and gender equality MDGs is by making it more difficult for children to attend school. The potential impacts on livelihoods outlined earlier may make it more likely that parents remove their children from school – and in most cultures this will almost certainly mean removing girls first – so that they can work to supplement household income.

Girls in particular are often asked to assist their mothers in tasks such as collecting firewood and water, and the pressures on parents to employ children in this way are likely to increase as water and other natural resources become increasingly scarce.

Alternatively, children may need to incorporate paid or unpaid work into their routine whilst still attending school. In the aftermath of Hurricane Mitch in 1998, for example, the proportion of Nicaraguan children simultaneously enrolled in school and working more than doubled: from 8.2 to 18.9 per cent.³²

Girls' education more urgent than ever

Educating girls is a unique investment that is proven to have an impact beyond the classroom – benefiting entire families and communities. Currently there are 115 girls out of primary school for every 100 boys.³³ This stark example of gender inequality is likely to worsen as climate change pressures increase.

32. Baez and Santos, 2007.

33. Data: State of the World's Children 2007 (Women and Children), UNICEF 2006.

Yet against the backdrop of climate change – and the increasing vulnerability of communities – the benefits that education can bring to a girl are more urgently required than ever. An educated girl, for example, will not only be better equipped with strategies for adapting to the realities of a changed climate, but will be better able to protect herself from disease (including HIV); less likely to be drawn into exploitation such as sex work or to be trafficked; and less vulnerable to violence within the family. Educated mothers also have healthier, better-nourished children. In addition, the more schooling a woman receives the more probable it is that her own children in turn will also benefit from education.

Indian women born during a drought or a flood in the 1970s were 19 per cent less likely to attend primary school, when compared with women the same age who were not affected by natural disasters.

Source: Human Development Report 2007–2008

Fit to learn?

Climate change may also impact school attendance and educational attainment through its effects on children's health and nutritional status, as outlined earlier. Quite simply, children may not be fit to learn, even when they have access to schooling. Schools may also be affected by climate change in other ways – for example, through environmental pressures on their water supply and sanitation. The lack of separate sanitation facilities for girls is often cited as one of the most significant reasons why parents keep girls from attending school.

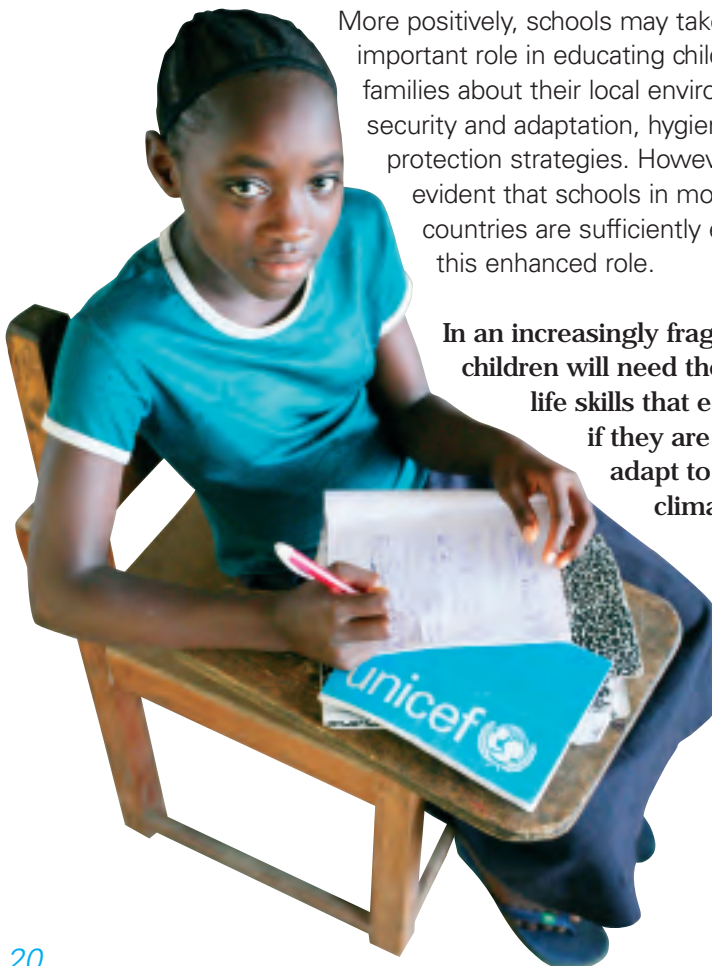
Education spending under pressure

As government budgets are squeezed by dealing with climate change impacts such as disasters or droughts, social sector spending is usually the first area to suffer. For example, the drought of 1991–92 in Zimbabwe resulted in reduced expenditures for health and primary education in particular. As set out above, health outcomes are significantly enhanced by the education of women and girls. A squeeze on education budgets, therefore, will have further adverse impacts on health outcomes and may conspire to keep ever greater numbers of children out of school.

An enhanced role for schools?

More positively, schools may take on an increasingly important role in educating children and their families about their local environment, livelihood security and adaptation, hygiene and other health protection strategies. However, it is far from evident that schools in most developing countries are sufficiently equipped to play this enhanced role.

In an increasingly fragile environment all children will need the knowledge and life skills that education can bring if they are to understand, adapt to and cope with climate change.



Felicia Tamba, age 12, studying at school in north-west Liberia. UNICEF supports the school's Accelerated Learning Programme (ALP), which condenses six years of primary schooling into three to enable children to make up for years lost because of emergencies.

© UNICEF/HQ07-0598/Giacomo Pirozzi

Schools empty as drought wears on



A barefoot boy stands on parched, cracked soil in southern Malawi. In 2005, drought caused a massive food shortage that left 4 million people without adequate food supplies.

© UNICEF/HQ02-0511/Ami Vitale

Mahad Muhumud Yussuf, age 12, used to enjoy walking to school with his big sister, 14 year-old Ayan. He reflected “We were learning together. When I didn’t know the answer she used to tell me.” That was before drought came to his home in Ethiopia’s remote Somali region. The family’s small herd of sheep and goats started to die, hitting their income and basic food supply. Mahad’s parents decided they had no choice but to take Ayan out of Dolal Primary School and get her working to supplement the family finances. Ayan swapped her schoolbooks for the daily drudgery of a housemaid. She was not alone ...

“We have seen lots of drop-outs since the drought started,” said Dolal Deputy Headteacher Mahmoud Abdullahi. “Some of them just disappear. Some come in one day and then you don’t see them for another two or three days. Most of them are working, polishing shoes or just out looking for food. Hungry children can’t understand anything in their lessons. I have seen this personally.”

Source: “In Ethiopia, schools empty as effects of drought wear on,” UNICEF article, June 2006.

Emergencies and child protection

Poverty and lack of development exacerbate people's vulnerability to all extreme weather hazards. People in low-income countries are four times more likely to die in natural disasters than people in high-income countries. Pre-empting the consequences of these extreme events is therefore an important part of any development agency response to climate change. Disaster risk reduction measures have been shown to be highly cost-effective and can also bring significant developmental benefits in normal times. The US Geological Survey and the World Bank estimated that an investment of US \$40 billion in this area would have prevented losses of US \$280 billion during the 1990s.

Extreme weather threatens children's homes

An important way in which extreme weather hazards may increase child vulnerability is through their impact on habitat security. Increased rainfall, storms and flooding – and consequent events such as landslides – will claim greater numbers of homes, in both urban and rural areas. As a consequence, greater numbers of families will be forced into temporary shelter – which is likely to be even more vulnerable to adverse weather. In 2007, it was estimated that more than 1.5 million people had been left homeless due to rains and flooding across 18 African countries. In Uganda, for example, 80 per cent of the 200,000 people forced from their homes were women and children.

When a family's home is destroyed, they lose many of their possessions, including vital supplies such as clothing, cooking equipment, bedding and medicines. A child's few precious possessions such as a toy or school supplies are also likely to be lost. Such traumatic circumstances may undermine a family's ability to protect children from abuse and exploitation. The impact of natural disasters on family welfare and children's development can be catastrophic.

Forced population movements more likely

As habitats become unsustainable, families – or even whole communities – may be forced to move. For pastoralists, this is already a way of life – though there is some disagreement over whether this equips them better to withstand the pressures of a more volatile climate.³⁴ However, forced population movement is likely to become more common across settled communities as well. Drought, severe flooding and other natural disasters are likely to force people to move with increasing frequency, both within and between countries, in search of secure shelter and livelihoods. Such displacement has serious consequences for children. It fragments families and disrupt social networks; it interrupts children's education and may result in them leaving the school system altogether; it reduces continuity in health care provision (for example, by interrupting routine immunisation programmes) and may leave families with limited access to health care in the longer term. Finally, disease outbreaks are common within displaced or refugee communities – communicable diseases such as cholera are rapidly transmitted between groups of people living in close proximity and with limited sanitation, and there is some evidence that underlying chronic conditions or latent infections (such as tuberculosis) may be more likely to emerge when people move into a new environment, due to immune system and other pressures.³⁵

The Millennium Development Goals relating to emergencies and child protection

By 2015:

Goal 7: Ensure environmental sustainability

Goal 8: Develop a global partnership for development



Three boys displaced by flooding peer from beneath a UNICEF-supplied tent at a temporary camp in Bihar, eastern India. In August 2007, floods caused by unusually intense monsoon rains left millions of children stranded and in urgent need of fresh water, food and shelter.

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34. IUCN, 2007.

35. See Kristiansen et al., (2007) "Health effects of migration" in Dan Med Bull 2007; 54:46-7 for a summary of the key issues in migrant health.



Two women, one carrying a toddler, wade through a flooded area as they attempt to leave the city of Gonaives, northern Haiti. In September 2004, massive flooding caused by Tropical Storm Jeanne killed nearly 1,000 children in Gonaives, left many more homeless or missing, and vulnerable to disease and epidemics from contaminated water.

© UNICEF/HQ04-0725/Daniel Morel

Women and children at risk

Women and children appear to be more vulnerable to the impacts of natural disasters. They find it harder than men to escape from a catastrophic event due to their smaller average size and physical strength. Pregnant and nursing women, and those with small children, are particularly vulnerable. Women may also be subject to cultural restrictions on their mobility, including dress codes and seclusion practices.³⁶

Women and children account for more than 75 per cent of displaced people following natural disasters.³⁷ The vulnerability of women and child refugees to sexual violence, both during transit and in refugee camps, has been extensively documented – in contexts ranging from New Orleans, USA, following Hurricane Katrina to Pakistan after the 2005 earthquake. Indeed, following the Asian tsunami in 2004, WHO expressed concern that children in the region were particularly vulnerable to trafficking and other forms of exploitation, as many more women than men appeared to have died. One reason for this was thought to be that many mothers attempted to rescue their children and other family members, thereby increasing their own vulnerability.³⁸

Longer-term livelihood consequences may also impact disproportionately on women and girls. In Bangladesh, a common result of extreme floods – for instance in 1998 – is an increase in the number of girls forced off the land to become sex-workers in the capital Dhaka. Finally, in male-dominated societies, women and children tend to be excluded from risk mitigation, disaster preparedness, planning and reconstruction strategies, unless specific efforts are made to include them.³⁹

Water stress increases pressure on families

Water stress will become an increasingly significant contributor to vulnerability. The *Human Development Report 2006–2007* on water was careful to underline that the principal drivers of water access are institutional and political, rather than hydrological, but it is clear that climate change will introduce further pressures.⁴⁰

Some regions will experience greater water scarcity. Across sub-Saharan Africa, for example, a drop of 10 per cent in the level of rainfall is predicted by 2050 – though exact patterns of rainfall and the degree of impact on groundwater levels will vary significantly across the region. Southern Africa appears particularly vulnerable, with areas around Cape Town predicted to lose around half their perennial groundwater supply.⁴¹ In coastal regions, rising sea levels may cause existing freshwater resources to become brackish, affecting drinking water availability and flora, fish and other fauna.

Other regions will experience flooding. There is widespread consensus that climate-influenced factors will combine to increase the risk of severe flooding in future. The heavily populated deltas of East, South and South East Asia will be at greatest risk. There are many climate-influenced causes of flooding, including increased runoff, higher levels of precipitation, sea-level rise, tidal and wave extremes and “storm surges”; and poor surface drainage. The abundance of surface water in affected areas increases the risk of drinking water contamination and the spread of disease – and, particularly where stagnant, may provide breeding grounds for disease vectors such as mosquitoes. Endemic morbidity and mortality due to diarrhoeal disease primarily associated with floods and droughts are expected to rise in East, South and South East Asia due to projected changes in the hydrological cycle.⁴²

36. Hannan, 2002.

37. Chew and Ramdas, 2005.

38. WHO, 2005. See “Protecting Children from Sexual Exploitation and Sexual Violence in Disaster and Emergency Situations: a guide for local and community based organisations,” ECPAT, 2006, for more on this topic.

39. ICIMOD, 2007.

40. Beyond scarcity: power, poverty and the global water crisis, UNDP, 2006.

41. Thomson et al., 2003; de Wit et al., 2006.

42. IPCC, “Summary for Policymakers” of the Synthesis Report of the IPCC Fourth Assessment Report, 2007.

Children's voices



"In times of drought, or if the crops are not good, animals do not have anything to eat. As far as my own family is concerned, the crops are always bad, and we don't have enough food. There isn't enough money to buy school supplies for me and my brother, or medicine when we are sick. My mother is very poor because of the drought.

Irene Phungo from Kenya, age 16, addresses the 2007 BioVision World Life Sciences Forum at Lyon, France. From 7 to 10 March 2007, children and young people involved in life sciences projects from every region participated in the UNICEF-supported forum. The participants produced a call for action to scientists, business leaders and civil society.

© BioVision Children's Forum

"For the community, it is even more serious since everything is bought with money from agricultural products. When the crops are bad, there is no money to spend. Every year, there is a food shortage. Children quit school because they cannot afford supplies and school fees, or because they have nothing to eat during the school day. Some of these children beg or steal; old people beg, too.

"Girls sometimes prostitute themselves with shopkeepers and may end up with an unwanted pregnancy or a sexually transmitted disease. People do not go to health centres, and some contract diseases caused by a lack of hygiene."

Source: Alizeta Ouedraogo, a 16-year-old girl from Burkina Faso selected as a delegate to the BioVision Children's Forum, part of the BioVision 2007 World Life Sciences Forum in France. Researched and developed for *Children and Climate Change*, UNICEF 2007.

UNICEF's India health chief Marzio Babilie says what many now believe – climate change has led to a dramatic increase in the scale and frequency of natural disasters, and demands a completely new response.

"What emerges from my experience in Bihar is that the scale of the inundation is so vast, even communities that are used to coping with floods were completely overwhelmed," he said. "We cannot continue to respond to these kinds of challenges with the same pace or technology we did 10 years ago."

Source: Reuters 'Floods find India wanting as climate change looms' Planet Ark, 9 August 2007.

"They [the factories] use so much water while we barely have enough for our basic needs, let alone to water our crops."

Gopal Gujur,
farmer, Rajasthan, India

Source: Human Development Report 2006–2007

Water stress and other climate change impacts also present challenges for the agricultural sector and other areas of economic productivity – at both subsistence and industrial ends of the scale. When water resources are depleted, industrial requirements – including electricity generation, industrial plant operation and large-scale crop irrigation – may be given precedence. This places additional pressure on ordinary people seeking water for household use and subsistence or small scale farming.

Decreasing water resources may drive violent conflict

A world affected by climate change is likely to be less stable and secure. The potential population movements outlined above may increase tension between communities as they are inevitably forced to compete over scarce economic and natural resources and for access to basic services, particularly where there are cultural and linguistic barriers to overcome.

Water scarcity is likely to be a particularly important driver of conflict both within and between nations. All major African rivers, for example, cross international boundaries – indeed, almost 40 per cent of these boundaries are formed by rivers.⁴³ The potential for increased conflict between communities over water resources is well-documented. Indeed, drawing on such commentary, the Global Policy Forum has suggested that "more than 50 countries on five continents might soon be caught up in water disputes unless they move quickly to establish agreements on how to share reservoirs, rivers, and underground water aquifers".⁴⁴

UN Secretary-General Ban Ki-Moon recently asserted that "the Darfur conflict began as an ecological crisis, arising at least in part from climate change."⁴⁵ Ban Ki-Moon cited evidence that the nomadic and settled farming communities first clashed when competing over fertile lands amidst failing rains. We now know all too well the devastating impact the resulting conflict has had on children, particularly girls who are exposed to sexual violence. Natural resource pressures play a role here, since it is often when women and girls are forced to leave refugee camps in search of firewood or water that they are attacked. Further, the environmental pressures and resulting tensions may increase – recent analysis suggests that the agricultural productivity of Sudan could decline by as much as 56 per cent by the 2080s.⁴⁶

A global partnership for development?

The evidence is clear: climate change will make it more difficult to achieve the MDGs 1, 4, 5, 6 and 7 in particular. But what of MDG 8?

The goal of developing a "global partnership for development" has amongst its targets those relating to addressing the special needs of least developed countries (LDCs) and small-island developing states (SIDS) – which are more vulnerable to climate change and its impacts – and making available the benefits of new technologies. Supporting LDCs, SIDS and others to adapt to the impact of climate change is directly relevant to these targets. Indeed, without such support, many LDCs and SIDS will find it difficult to achieve and sustain progress towards any of the MDGs. International development partners therefore need to ensure that they are doing enough to support poor and vulnerable people in developing countries to adapt to the world's changing climate. This entails mobilising quickly and with adequate resources.

Protecting the world's most vulnerable children will not be possible without specific measures to protect them from the consequences of a changing climate.

43. de Wit et al., 2006.

44. See the Global Policy Forum website, www.globalpolicy.org

45. Ban Ki-Moon, 2007.

46. See brief on 2007 Cline Report, Center for Global Development website, www.cgdev.org

Disaster preparedness



Every year, natural disasters devastate millions of lives and livelihoods in developing countries. Floods, drought, cyclones, earthquakes and landslides occur with deadly regularity, barely giving some communities time to recover before they are struck again.

Inevitably it is the poor who are most vulnerable, as their livelihoods are often dependent on land, crops or livestock. They are also more likely to live in high-risk locations such as flood plains, river banks, steep slopes, on reclaimed land, and in densely populated slums of poorly constructed houses.

Today, millions of children and women are suffering from the effects of natural disasters and things are predicted to get worse as storms, floods and drought become more severe and frequent – spurred on by climate change.

Subhagi Devi is one of these women. In August 2007, three days after giving birth to her son, Subhagi had to flee in the middle of the night from the floods that submerged her village in Bihar, India. “I was scared all the time,” she says, “Sometimes I thought I would lose my footing, but I was more scared for my baby.” Her neighbour Parmila Devi, in the last stages of her pregnancy, was lucky to be rescued by boat. She gave birth three days later.

Sadly, there are millions of women like Subhagi and Parmila, fighting to keep their livelihoods, families and homes intact and, as the effects

A volunteer doctor dispenses medicine and other supplies to children and families affected by the floods in Bihar, eastern India. In 2007, floods caused by unusually intense monsoon rains left millions of children stranded and in urgent need of fresh water, food and shelter. UNICEF worked with the Government of India and other partners to transport medical teams, immunise children against measles, and distribute emergency supplies.

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of climate change begin to bite, the fight is getting harder. The 2007 floods that engulfed Subhagi's home were the worst floods in a decade in flood-prone Bihar. They claimed more than 650 lives and affected more than 2 million people.

As global temperatures continue to rise, it is predicted that such floods will increase in frequency and intensity. This is likely to swell the incidence of waterborne diseases such as cholera and could lead to more food shortages and severe malnutrition. But there is hope. By preparing for such disasters, communities can regain a sense of independence and control over their future.

In 2000, floods affected over 21 million people in West Bengal, leaving nearly 1,500 people dead or missing. Around 2 million homes, 2 million hectares of farmland, and 300,000 farm animals were lost.

UNICEF and the state government, along with local and international humanitarian organisations worked with communities to establish action plans to prepare better for future disasters. Villagers identified high-risk and low-risk areas as well as the most vulnerable people in their village (including the elderly, disabled and sick, lactating mothers, pregnant women, and young children). They organised themselves into groups to take care of flood warning, rescue, evacuation, first aid, water and sanitation. Some learned how to construct rafts and life jackets, using local materials where possible. Each family learned to prepare a survival kit (dry food for up to 10 days, candles, matches, kerosene oil) and safe keeping of valuables and important documents. In all, 1,500 villages prepared action plans, each one approved by the state government.

In 2004, when massive floods occurred again, families and local authorities credited preparation in saving lives and livelihoods.

In one village of more than 6,000 families:

- in 2004, no person and no livestock died as a result of the flood; compared to 11 people killed and 700 farm animals lost in 2000,
- in 2004 no family lost valuable documents; compared to 3,000 families losing valuable documents in 2000.
- in 2004 every family had stockpiled enough food to meet their needs for 10 days and there was no disease outbreak.

UNICEF can play a vital role in helping communities reduce the impact of climate change through Community-Based Disaster Preparedness Projects (CBDPs). Drawing on the West Bengal example, UNICEF India has begun systematically expanding similar projects in other states and has intensified existing projects. UNICEF is aiming to develop CBDPs in other vulnerable areas to help communities guard against damage caused by climate change and increased natural disasters.

By equipping communities with the knowledge and skills they need in order to prepare for an emergency – rather than reacting once a disaster strikes – communities are able to exercise some control over the scale of their impact. Good preparation can prevent loss of life and livelihoods, reduce malnutrition and disease, as well as providing communities with independence and autonomy.

Empowering children to act

Children themselves exhibit a high level of awareness and concern about climate change. This in turn affects their visions of – and anxieties about – their own future and that of the world in general. A survey conducted in 2005 by the UK Department for Education and Skills (DFES – now the Department for Children, Schools and Families) found that 24 per cent of the 1,000 10- to 18-year-olds questioned believed climate change presented the greatest threat to the world’s future.⁴⁷ A more recent survey of 1,150 children undertaken by UK supermarket chain Somerfield found that around 50 per cent of children age 7 to 11 are anxious about global warming and “often lose sleep” over it.⁴⁸



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“We here in our community are suffering from a lack of drinking water. Where safe water is available, it is too far away; most times we have to walk 10 to 15 minutes to places where we can access safe drinking water. I think the solution would be for us to recycle our waste water, as I am told has been done in some countries of the world.”⁴⁹

Rasheeda, age 13, Nigeria

“My community was affected by drought which caused our crops to die and there is no more food security. People died, our cattle died and the land became a desert.”⁴⁹

Kamdoun, age 11, Cameroon

What children learn today will shape the world tomorrow

Based on the premise that what children learn today will shape the world tomorrow, instilling environmental awareness at a young age is an effective way to protect the environment. Yet in order for them to become effective agents of change, avenues must exist for children and young people’s knowledge to be translated into advocacy and action. To this end, the UN Environment Programme and UNICEF are developing an Environmental Education Resource Pack for Child-Friendly Schools, which will offer comprehensive solutions designed to empower children. The Pack will support risk-mitigation efforts and disaster risk reduction and promote an understanding of one’s physical surroundings, self image, health and capacity to learn.

Source: *Children and Climate Change*, UNICEF 2007.

Engaging children in the response

There is a strong case for engaging children as actors in the climate change agenda, rather than treating them as passive observers or victims. When defining a child-centred response, it is also important to consider the level of fear and anxiety felt by children and adolescents in relation to climate change and to reassure children that this is a threat that can be addressed. Learning from the Cold War could be utilised here, where children were informed of the nuclear threat in a way that did not leave them feeling helpless. The specific needs of children globally must be taken into account as these will vary widely.

Two Somali boys search for food after their family lost their house to the flooding in 1997. The severe flooding in southern Somalia affected 1 million people, killed almost 2,000 and displaced more than 230,000.

© UNICEF/HQ97-0735/Radhika Chalasani

“The boy has drawn, in his third-grade class [in the US], a global warming timeline that is his equivalent of the mushroom cloud. ‘That’s the Earth now’, the 9-year-old says, pointing to a dark shape at the bottom. ‘And then’, he says, tracing the progressively lighter stripes across the page, ‘it’s just starting to fade away.’ ... For many children and young adults, global warming is the atomic bomb of today. Fears of an environmental crisis are defining their generation.”

Washington Post, 16 April 2007



Initially, children’s own awareness of the determinants of climate change, its impacts and how to mitigate them, is the key to influencing wider household and community actions and, therefore, policy responses. As today’s children grow, their ability to address and adapt to the impacts of climate change will be crucial to sustaining development outcomes.

Effective action must be taken globally to limit climate change and its impacts, and this action must be evident to children. We need to ensure that children and young people can learn about climate change and what can be done about it, and can play a part through their own actions and by campaigning for effective action by others.

“We are not asking for the moon. We are simply asking to be considered as partners in development efforts to ensure healthy food, safe water and sanitation to all children and to live in a world of peace.” Children’s Call for Action, BioVision Children’s Forum – part of the BioVision 2007 World Life Sciences Forum at Lyon, France.

47. BBC, 2005.

48. Jones, 2007.

49. Rasheeda and Kamoun were quoted in Climate Change and Children, UNICEF, 2007

3 Our responsibility



Tackling the drivers and impacts of climate change is a collective responsibility. We all have a responsibility to ensure that each person across the world is protected from the impacts of climate change, wherever they live, and that our children – and their children in due course – are not asked to bear the brunt of the consequences stemming from today's unsustainable patterns of production and consumption.

Boys carry containers of water that they have collected from a generator-powered well in the remote mountainous village of Dora, eastern Djibouti. The UNICEF-provided well is the only source of water for the village, where it has not rained for three years.

© UNICEF/HQ06-0200/Michael Kamber

UNICEF, the UN agency charged with safeguarding the development of the world's children, has a critical role to play within this collective endeavour.

UNICEF will build on its efforts to help communities adapt to the realities of climate change in more than 150 countries through a range of activities that includes the following:

- ⦿ Water and sanitation programmes, including rainwater harvesting and providing wells and pumps, to tackle problems of contaminated or diminishing water supplies.
- ⦿ Ensuring that communities are equipped to deal with the threat posed by malaria, including: providing mosquito nets treated with long-lasting insect repellent, delivering intermittent preventive treatment to pregnant women, and ensuring health services can respond rapidly with the newest combination therapies when children fall ill.

“Looking at the moral responsibilities of this generation, many would argue that future generations have the right to enjoy a world whose climate has not been transformed in a way that makes human life much more difficult; or that current generations across the world have the right to be protected from environmental damage inflicted by the consumption and production patterns of others.”

Stern Review on the Economics of Climate Change, 2007

50. “World Bank goes carbon neutral,” press release, June 2006.

- ⊙ Providing water, schools, health clinics, and support for rural communities whose livelihoods are becoming more challenging due to climate change.
- ⊙ Programmes that improve the availability and quality of environmental education, within schools and their wider communities, providing a voice for children and promoting their participation in local environmental initiatives.
- ⊙ Working with schools and youth groups to support children to plant and care for indigenous trees, thereby delivering environmental improvements and supporting education programmes.
- ⊙ Using solar power in place of fossil fuels to power fridges in the cold chain, to provide lighting for schools or to power water pumps.
- ⊙ Supporting communities to prepare for and cope with natural disasters such as storms, floods and drought, as they become more frequent and severe in the face of climate change, and ensuring that children are at the heart of disaster response strategies.

Many agencies are working to limit their own contributions to climate change. The World Bank, for example, is the first UN agency to make its headquarter operations and staff travel carbon neutral.⁵⁰

UNICEF UK has developed an organisation-wide agenda to prioritise climate change issues. It includes:

- ⊙ Auditing and minimising UNICEF UK’s carbon footprint and other environmental impacts, reporting on this and encouraging staff to take similar measures.
- ⊙ Identifying and prioritising programmes which promote adaptation and mitigation.
- ⊙ Sharing ideas and engaging in debate about climate change and children with core partners.
- ⊙ Identifying opportunities for immediate and longer-term follow up, with respect to research, advocacy and action. UNICEF UK is also a member of the Stop Climate Chaos coalition.

Planting trees for life in Ethiopia

The world is losing its natural forests. So much so that deforestation contributes more to global carbon emissions every year than the transport sector. Yet trees are a natural environmental power house. The oxygen they produce removes air pollution, lowers temperatures and adds moisture to the air. By holding soil in place and reducing run-off from streams, they prevent soil erosion, control avalanches and mitigate desertification.

With forests storing 283 gigatonnes of carbon in their biomass alone, curbing deforestation – and re-planting trees – is a highly effective way to reduce carbon emissions.

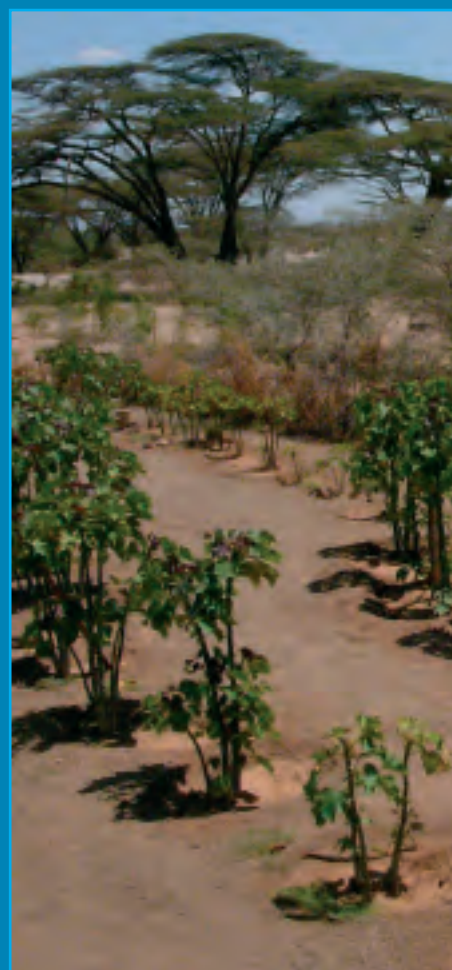
At the turn of the 20th century, 40 per cent of Ethiopia was covered by forest. Today that figure is just 3 per cent. As a consequence, deforestation is jeopardising livelihoods and taking its toll on children's development, most especially in its remote and underdeveloped regions.

In 2007, as part of its millennium celebrations, the Government of Ethiopia pledged to plant more than 60 million trees across the country. UNICEF, a key partner in this highly ambitious initiative, is contributing to the planting of at least 20 million trees. The overall aim is to create a safer, healthier environment for Ethiopia's future generations whilst taking action on the deforestation which is contributing to flash-flooding and the destruction of homes and crops.

UNICEF believes it is vital that children and young people are able to play a role in protecting their environment. To that end, Ethiopia's Millennium Tree Planting Campaign has enlisted children and young people as major partners.

Two year-old seedlings – from five indigenous species – are being planted and nurtured by children and young people in school compounds and areas selected by local communities. The campaign is raising public awareness about broader environmental issues and with the children's enthusiastic involvement is, quite literally, putting one aspect of environmental protection firmly in their hands.

Ethiopia's Millennium Tree Planting Campaign is part of UNEP's 'Plant for the Planet: Billion Tree Campaign'. Individuals, children and youth groups, schools, community groups, NGOs, farmers, the private sector, local authorities and national governments are all encouraged to enter tree-planting pledges online. Each pledge can be anything from a single tree to several million trees.



Saplings planted in the grounds of a UNICEF-supported school for nomadic children. The trees provide shelter and fodder.

© UNICEF UK/Christian Humphries

Sources: UNICEF Country Programme, Ethiopia, "Climate Change and Children", UNICEF 2007

Solar energy in Mauritania: empowering children



Studying by solar lamp at school in Mauritania.

© UNICEF Mauritania

Most households in Brakna, southwest Mauritania, cook using firewood from the region's sparse population of trees. This practice is reducing the natural green belt of the Sahel and speeding up the process of desertification.

Mauritania receives almost 365 days of annual sunshine, but this abundant source of environmentally friendly energy has remained largely untapped because of a lack of capital investment.

However, Mauritians themselves have started to acknowledge the benefits of solar energy. The use of solar energy for cooking stoves was welcomed by poor rural communities in Bababé, Aleg, and Kaédi – key areas where UNICEF works to improve the lives of children and families in Brakna.

UNICEF promoted the introduction of solar stoves through Nissa Bank – a microfinance network that caters for around 100,000 poor women. The solar stoves save women time and energy in searching and gathering scarce wood. They also reduce the felling of trees and thereby might help to reduce the rate of desertification.

UNICEF interventions in education have also proved successful for supporting solar energy in Brakna. This success is due in part to the efforts of Mariata, a young woman school teacher in Brakna. Mariata promoted a school initiative to improve the learning environment in order to encourage children, particularly girls, to attend school and to stay at school. In support of the initiative, UNICEF provided school kits with stationery supplies, sports equipment and solar energy lamps. The lamps have helped improve the quality of learning as children can study better at school and in their homes at night. The solar lamps are low cost and operate for long periods with minimal maintenance and emit bright, powerful light. Mariata says “the solar lamps do not cause any environmental damage or hazard as was the case with the kerosene lamps”.

To date, some 125 rural schools in areas without electricity have received solar lamps and held evening classes for school children. The programme has delivered an impressive increase in school attendance and in the numbers of children continuing their education to secondary level: 52 per cent of children in the 125 schools in the programme continue to secondary level, compared to only 43 per cent of untargeted schools in the same region.

UNICEF also provides the schools with a water supply and separate toilets for boys and girls. We also supplied the schools with fencing and horticultural materials to ensure a healthy school environment.

UNICEF has also helped to equip 74 health centres with solar powered fridges that have proved highly successful in maintaining the cold chain system and safeguarding vaccine supplies in remote rural areas.

Recommendations for action in the UK

Climate change presents an urgent challenge that all actors need to work towards addressing as quickly and comprehensively as possible. The focus of UNICEF's work is the most vulnerable children in developing countries. Our policy recommendations on climate change therefore focus on development responses and support for mitigation and adaptation measures in developing countries. Nevertheless, it is essential that these measures are taken in the context of action by all major emitters, including the UK, to minimise their own emissions that have adverse impacts on vulnerable children globally.

We urge the UK Government to ensure that the implications of climate change for children are on the agenda of the UNFCCC Copenhagen meeting in December 2009 and to take action on the points below before then in order to demonstrate its leadership on this issue.

Mitigation by the UK

1. UNICEF UK calls on the UK Government to commit to a reduction in carbon dioxide emissions of at least 80 per cent against 1990 levels by 2050.⁵¹
2. We call for the UK's share of emissions from international aviation and shipping to be included in the reduction targets.

Adaptation – do development differently

The Stern Review, the World Bank and the IPCC acknowledge that climate change requires an adaptation response that includes more and better development. So far, total additional specific funding allocated to this has been “derisory”.⁵²

UNICEF UK calls on the Government to mainstream the climate change implications for children across its work. As a first step, the Government's *Public Service Agreement 27 (Lead the global effort to avoid dangerous climate change)* needs to include the impact of climate change on children.

Furthermore, we call on DFID to do development differently by:

1. climate screening all new investment with the impact on children as a specific assessment criteria.
2. ensuring that the screening procedure is kept live and responsive to the fast-evolving understanding of the impacts of climate change on children.
3. reviewing aid modalities, direct budget support and support to fragile states in terms of their responsiveness to the climate change implications for children.

UNICEF UK calls on DFID to work with partner governments to:

1. include the climate change implications for children in national mitigation and adaptation plans.
2. ensure that plans to meet the MDGs include actions, and allocate sufficient financial resources, to address the impact of climate change on children.

Together these measures should support an urgent increase in funding for adaptation.



Child delegate Greer Jackson, age 11, from Guyana speaks on behalf of Children's Forum delegates, at a reception on Climate Change and Children at the United Nations Headquarters in 2007.

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Support adaptation

UK companies and individuals need to substantially reduce their emissions and also contribute to the costs of supporting vulnerable communities to adapt to the impact of climate change. Although carbon offsetting has become widespread recently, it only deals with part of the problem. Climate change is hitting the world's poorest and most vulnerable children and their communities first and worst. Those who have emitted least are suffering most. Companies and individuals need to empower and assist the communities affected to adapt to the realities of our changed and changing climate.

Children as decision-makers now and in the future

Children have the right to participate in decisions affecting them (UN Convention on the Rights of the Child, Article 12). Decisions on climate change mitigation and adaptation are critical to the future well-being of children, and as such children should be centrally involved in them – most crucially at the UNFCCC Copenhagen meeting in December 2009, where decisions will be taken that impact on them for the rest of their lives.

When children have information and decision-making influence, they are powerful agents of change: helping homes, schools and communities adapt to climate change and reduce its impact.

Children have the right to be heard in decisions that affect their lives. To empower them for this role, UNICEF UK calls on DFID to:

1. ensure children's voices on climate change are heard and children are involved in the development of key documents such as Poverty Reduction Strategy Papers (PRSPs), Country Assistance Plans and National Adaptation Programmes of Action.
2. undertake research to feed into the December 2009 UNFCCC Copenhagen meeting, on how climate change affects children across the world, and how children can and do contribute as agents of change on climate change adaptation and mitigation objectives.

51. Höhne, D., Phylipsen, D. and Moltmann, S., Factors underpinning future action – 2007 update, report for Defra, Cologne, Ecofys, 2007.

52. Human Development Report 2007–2008: Fighting Climate Change – Human solidarity in a divided world, Summary, p.25, UNDP, 2007.

Bibliography

- Baez, J.E. and Santos, I. V., "Children's Vulnerability to Weather Shocks: a Natural Disaster as a Natural Experiment," unpublished manuscript, April 2007.
- Ban, Ki-Moon, 'A Climate Culprit in Darfur', Washington Post, 16 June 2007.
- BBC, "Climate change 'worries children'", BBC News online, 23 June 2005.
- BBC, "Jamaica fights malaria outbreak," BBC Caribbean online, 6 December 2006.
- BBC, "Africa flood zones face more rain," BBC News online, 19 September 2007.
- Beggs, P.J. and Bambrick, H.J., "Is the Global Rise of Asthma an Early Impact of Anthropogenic Climate Change?," Environmental Health Perspectives, 113(8):915–919, 2005.
- Cambell-Lendrum, D. and Woodruff, R., "Comparative Risk Assessment of the Burden of Disease from Climate Change," Environmental Health Perspectives, 114(12):1935–1941, 2006.
- Chew, L. and K.N. Ramdas, "Caught in the storm: impact of natural disasters on women," Global Fund for Women, San Francisco, 2005.
- Christian Aid, The climate of poverty: facts, fears and hope, London, May 2006.
- Cline, W., Global Warming and Agriculture: Impact Estimates by Country, Centre for Global Development, Washington, D.C., 2007.
- Confalonieri, U., et al., "Human health," Contribution of Working Group II to the Fourth Assessment Report of the IPCC, Climate Change 2007: Impacts, Adaptation and Vulnerability, Parry, M.L., Canziani, O.F., Palutikof, J.P., van der Linden, P.J., and Hanson, C.E. eds., Cambridge University Press, Cambridge, UK, 391–431.
- CRED, Annual Disaster Statistical Review: Numbers and Trends – 2006, Centre for Research on the Epidemiology of Disasters (CRED), School of Public Health, Catholic University of Louvain, Belgium, 2007.
- DFID, Key sheets on "Climate change and poverty," August 2004.
- Few, R. et al., Floods, health and climate change: a strategic review, Tyndall Centre for Climate Change Research, Working Paper 63, November 2004.
- Hannan, C., "Mainstreaming gender perspectives in environmental management and mitigation of natural disasters," presentation to a roundtable discussion on the disproportionate impact of natural disasters on women, UN, New York, 17 January 2002.
- Himeidan, Y.E. et al., "Climatic variables and transmission of falciparum malaria in New Halfa, eastern Sudan," Eastern Mediterranean Health Journal, Vol. 13, No. 1, 2007.
- Hoddinott, J. and Kinsey, B., "Child growth in the time of drought," Oxford Bulletin of Economics and Statistics, 63(4):0305–9049, 2001.
- ICIMOD, "Women and children suffer most when natural disaster strikes," International Centre for Integrated Mountain Development, Press release, 9 May 2007.
- IMF, "Fund assistance for countries facing exogenous shocks," prepared by the Policy Development and Review Department (in consultation with the Area, Finance, and Fiscal Affairs Departments), Washington, D.C., International Monetary Fund, 2003.
- IPCC, "Summary for Policymakers," Climate Change 2007: Impacts, Adaptation and Vulnerability, Contribution of Working Group II to the Fourth Assessment Report of the IPCC, eds. Parry, M.L. et al., Cambridge University Press, Cambridge, UK, 7-22, 2007
- IPCC, "Summary for Policymakers" of the Synthesis Report of the IPCC Fourth Assessment Report, 2007.
- IUCN, Change of Wind or Wind of Change? Climate change, adaptation and pastoralism, Nori, M., and Davies, J., IUCN, Nairobi, 2007.
- Jones, A., "Children losing sleep over global warming," The Scotsman, 23 February 2007.
- Manning, M., "Climate Change 2007: Observations and Drivers of Climate Change," presentation for IPCC Working Group 1 to the World Meteorological Organization Congress, 15 May 2007.
- Molesworth, A.M. et al., "Environmental Risk and Meningitis Epidemics in Africa," Emerging Infectious Diseases, Vol. 9, No. 10, October 2003.
- OCHA, "Millions affected by floods in South Asia," UN Office for the Co-ordination of Humanitarian Affairs, Press release, New York, 7 August 2007.
- de Onis, M. et al (2004) "Estimates of Global Prevalence of Childhood Underweight in 1990 and 2015," Journal of the American Medical Association, 291:21, 2 June 2004.
- Roll Back Malaria, The Africa Malaria Report 2003, Roll Back Malaria, Chapter 4 "Malaria during pregnancy," 2003.
- Save the Children, Legacy of disasters: The impact of climate change on children, SCFUK, London, 2007.
- Schneider, S.H., et al., "Assessing key vulnerabilities and the risk from climate change," Climate Change 2007: Impacts, Adaptation and Vulnerability, Contribution of Working Group II to the Fourth Assessment Report of the IPCC, Parry, M.L., et al. eds., Cambridge University Press, Cambridge, UK, pp.779–810.
- Stern et al., The Economics of Climate Change: The Stern Review, Cambridge University Press, Cambridge, UK, 2007.
- TDR, Making Health Research Work for Poor People: 17th Programme Report – Progress 2003–04, WHO Tropical Disease Research (TDR), 2005
- Thomson, M.C. et al., "El Niño and Drought in southern Africa," The Lancet, Vol. 361, 1 February 2003.
- Thomson, M.C. et al., "Land-Use Change and Infectious Disease in West Africa," Ecosystems and Land Use Change, Geophysical Monograph Series 153, American Geophysical Union, 2004
- UNDP, Beyond scarcity: Power, poverty and the global water crisis, Human Development Report 2006–2007, 2006.
- UNDP, Fighting Climate Change: Human Solidarity in a Divided World, Human Development Report 2007–2008, 2007.
- UNICEF, Climate Change and Children, 2007.
- Washington Post, "Climate Change Scenarios Scare, and Motivate, Kids," Darragh Johnson, 16 April 2007, pA01.
- WHO, "Children are vulnerable because more women died in the Tsunami," WHO press release during Tsunami health conference, Phuket, Thailand, 5 May 2005.
- de Wit, M, et al., "Changes in Surface Water Supply Across Africa with Predicted Climate Change," Science, 311:1917, 2006.
- WMO (2007a), Climate change and desertification, World Meteorological Organization, 2007.
- WMO (2007b), WMO statement on the status of the global climate in 2006, World Meteorological Organization, 2007.
- Yanda, P. et al., Adaptation to Climate Change/Variability – Induced Highland Malaria and Cholera in the Lake Victoria Region, AIACC Working Paper No. 43, October 2006.

A boy eats breakfast in his home, surrounded by floodwaters, at the Ifo refugee camp near Dadaab, North Eastern Province, Kenya. In November 2006, heavy and prolonged rains caused widespread flooding. Many homes in the camp collapsed and 100,000 refugees needed emergency assistance.

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*Children stand in the flooded River Shabelle,
southern Somalia.*

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