

Climate change: Adapting to the greenhouse

Climate change will mean a different world for us all. For millions it will bring higher temperatures, less water, scarcer food and more risk of natural disasters, such as floods and storms. But every country can help itself to cope by accepting and adapting to this new reality.



Climate change is real, and it is here. Sea levels are rising faster, ocean temperatures are increasing, glaciers are declining, and intense and longer droughts have become more widespread since the 1970s. Eleven of the past 12 years (1995–2006) are among the 12 warmest years since records began. The Intergovernmental Panel on Climate Change (IPCC)'s Fourth Assessment Report (2007) estimates that it is more than 90 per cent likely that human activities – not natural variations – are mainly responsible for the warming seen since 1950.

This boy has carried a jug of drinking water two kilometres through flooded waters near Sirajganj in Bangladesh. Climate change will bring greater risk of natural disasters and in the long term, adaptation strategies must be adopted worldwide.

G. M. B. AKASH | PANOS PICTURES

Humans are changing the climate by burning coal, gas and oil, releasing huge quantities of carbon dioxide (CO₂) that traps the sun's heat in the atmosphere. With industry, automobiles, agriculture and deforestation releasing still more greenhouse gases (so-called because they retain heat like a pane of glass), our planet is gradually warming up.

To minimise the risks this poses, international agencies, some governments, researchers and many campaigning organisations are working to cut greenhouse gas emissions – a process of mitigation. But the IPCC also advocates for adaptation. This is particularly important to developing countries, because they will be most affected by climate change. However, the question of why some countries are not ratifying protocols to reduce carbon emissions while others are forced to adapt still needs to be widely debated.

Media toolkit on communicating research

This is the sixth in a series of briefing documents for the media from the RELAY programme. RELAY works with Southern print and broadcast journalists to communicate the findings of academic research in an accessible way. The briefings set out the main issues around a topic, prompting journalists to pursue ideas and do further story research themselves. If you wish to receive future media briefings by email, please contact media@panos.org.uk

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The impact: what climate change will do

'It's the poorest of the poor in the world, and this includes poor people even in prosperous societies, who are going to be the worst hit [by climate change].'

Dr Rajendra Pachauri
chairman of the IPCC

Climate change will affect the entire planet, but this briefing concentrates on the expected impact in Africa and Asia. By 2100 average global temperatures will probably have risen by up to 4° Celsius. Africa could face irreparable water shortages in the next 15–20 years. Crop yields could fall by up to 30 per cent in central and south Asia, where the monsoon may weaken. In both Africa and Asia severe environmental pollution, poverty, war, disasters and the destruction of the natural world will make the effects worse.

Freshwater resources and flooding

Climate change will affect water demand and availability. About 225 million Africans currently have insufficient and unhealthy water. This could rise to as many as 600 million by 2050; in Asia it could be as many as one billion people. Drought is a growing threat: one third of Africans live in drought-prone areas and suffer health problems such as diarrhoea, cholera and malaria. Insects may spread malaria, dengue fever, cholera and meningitis further. Deforestation and fires will increase: by the 2080s desertification is likely to increase Africa's arid and semi-arid lands by 5–8 per cent. Conflicts over water will similarly rise.

In Asia over the next 20–30 years the melting Himalayan glaciers will increase flooding, mudflows and rock avalanches and shrink rivers, decreasing water supplies for millions of people downstream. Severe water stress (in terms of both drinking water and water for agriculture and other needs) will be one of the most urgent environmental problems in south and south-east Asia in the foreseeable future. China, Bangladesh and India face a rise in salt levels in underground water due to freshwater depletion and rising sea levels. And while crop yields in eastern Asia could increase by up to 20 per cent, they are likely to fall in central and southern Asia by up to 30 per cent. Death rates from heat stress will be very high.

Adapting to climate change

The African Rice Centre has crossed African and Asian rice varieties to produce early maturing, higher-yielding, drought-tolerant and pest-resistant crops which can thrive in salty soils. Varieties of this new rice, Nerica, are already being grown in West Africa and Uganda, and by 2009 farmers should be able to plant rice that survives being submerged by floods for up to 17 days.

The policymakers

The Intergovernmental Panel on Climate Change: established in 1988 by the World Meteorological Organisation and the United Nations Environment Programme, the IPCC assesses the scientific basis of the risk of climate change caused by human activities, its potential impacts, and the options for adaptation and mitigation.

The United Nations Framework Convention on Climate Change (UNFCCC): an international treaty agreed at the UN Conference on Environment and Development, also known as the Earth Summit, in Rio de Janeiro in 1992. The UNFCCC aims to reduce greenhouse gas emissions, and relies on updates (called protocols) to set binding emission limits.

The Kyoto Protocol: the UNFCCC's main update to date, it commits 36 developed countries and the European Economic Community to cut their emissions of six greenhouse gases by an average of 5.2 per cent below 1990 levels by 2012 as a first step towards mitigation. Developing countries do not have to make cuts: the protocol is clear that the industrialised countries chiefly responsible for climate change should be the ones to tackle it first.

The G8 process: agreed at the 2007 meeting of the leaders of the world's eight richest economies. They aim to at least halve global CO₂ emissions by 2050 in a process that will also include the main developing countries.

The Asia-Pacific Pact: aims to develop clean energy technologies and spread them to developing countries. Founded by Australia, China, India, Japan, South Korea and the US, the pact works on energy security, reducing air pollution and climate change, while promoting sustainable economic growth and poverty reduction. Critics say the pact is a diversion from the Kyoto Protocol.

The US Climate Initiative: announced by President George W Bush in September 2007, it emphasises the use of technologies such as nuclear power and clean coal, but rejects the idea of binding emissions cuts. Critics say it is an attempt to avoid hard decisions on climate change.

As water supply and growing seasons are affected by climate change, farmers will be forced to find new crops and growing methods to adapt to the changes. Women traditionally perform many of the subsistence farming tasks. GIACOMO PIROZZI | PANOS PICTURES



Agriculture

New high-yielding crop varieties and an increased use of fertilisers and irrigation led to a surge in crop yields in most developing countries from the 1970s to the 1990s. But uptake of such technologies was lower in Africa, which also lags behind in agricultural technological advance. Some countries that did adopt this approach are now feeling the effects of intensive and modernised agriculture. For example, the green revolution in parts of India has resulted in land falling into disuse due to soil poisoning from high use of pesticides and fertilisers; in other areas the unchecked extraction of groundwater has drained aquifers dry. When countries consider adaptation to climate change, therefore, they will have to take a long-term view of how to restore such land to full use and how to achieve sustainable food production.

Adapting to climate change

In the Bangladeshi village of Kamarjani, farmers are growing their crops in earth packed onto rafts made from floating plant material. When the floods come, these seedbeds will simply rise with the water. The technology works successfully elsewhere in the world.

Spreading the word about ways of adapting is crucial. **A group of farmers in eastern Kenya** pooled their resources to share information on farming technologies – from constructing an earth pan to store floodwater to bucket-drip irrigation and chemical-free ways to kill pests. Since adopting sustainable agricultural techniques, the group's crop yields have increased fourfold.

African farmers in particular will feel the effects of climate change, which will have an impact on the length of growing seasons, crop yields and the areas suitable for growing crops. Women may be more affected as they traditionally perform many subsistence farming tasks.

Asia's agricultural production potential could decrease substantially by 2100, with rice production possibly falling by almost 4 per cent and substantial losses in rain-fed wheat in the south and south-east. Increasing urbanisation and population growth and growing food demand, coupled with shrinking croplands and declining yields, will reduce supply. Subsistence producers may be at greatest risk – both from falling productivity and from the loss of genetic diversity of crops as varieties that are vulnerable to higher temperatures disappear.

Economic activity

Economic development is causing much of today's greenhouse gas emissions. But used in the right way, it can also help to reduce climate vulnerability and improve adaptation.

Yet Africa's capacity for social and economic development is limited by the threats to its biodiversity, from climate, habitat loss, hunting and deforestation. Poor resource management and exploitation by external private corporations leaves little room for local sustainable farming practices. In Asia, economic activities – such as industrial logging for timber exports, deforestation for oil palm plantations, mining and urban development – are mainly to blame for the depletion of natural resources.

Development of the tourism industry will also be affected by climate change, as mangroves, coral reefs and fisheries suffer. Following a 30 per cent loss of corals in 1997/98, tourism fell in Mombasa and Zanzibar, with estimated financial losses of US\$12–18 million.

Development policies such as structural adjustment, market reforms and liberalisation have aggravated the vulnerability of many Africans, particularly farmers, often reducing their productivity and resilience to further climate stresses. Lost production caused by climate change may also drastically increase the number of undernourished people, severely hindering progress against poverty and food insecurity both in Africa and south Asia. This, in turn, will lead to even more internal and external migration and possible conflict over dwindling resources.

Adapting to climate change

The Seed Savers' Network has helped to establish networks in Cambodia, East Timor, Ecuador, India, Japan, the Solomon Islands and the Philippines. It promotes: education programmes to preserve open-pollinated (non-hybrid) seeds and the genetic diversity of plant varieties; non-profit seed exchange programmes; preservation gardens for open-pollinated varieties; seed banks for non-hybrid plants; and scientific research.

The response: what can be done?

Climate change is a global issue and needs a global response – whether creating mitigation and adaptation strategies, providing funding for these strategies, or through additional policy assistance for people who are especially vulnerable to climate change.

Mitigation and adaptation

Mitigation needs international agreement and national enforcement; emissions from one country threaten everybody, and cutting them will take time. Adaptation, on the other hand, is immediate and local: people who are affected by climate change make the changes, pay the costs and feel the benefits.

A global response to climate change needs to include both mitigation and adaptation, and have input from many quarters. For example, researchers could work on enhancing existing adaptation techniques or finding new ways to adapt (other than drastic options such as migration); journalists could then inform people of the existing options and costs, while challenging governments to build national capacity. Communities must also unite to make their voices stronger at international policy forums.

Adapting to climate change

The Alliance of Small Island States (AOSIS)

is a coalition of small island and low-lying coastal countries that share similar development challenges and concerns about the environment – especially their vulnerability to the effects of global climate change. It functions primarily as a lobby and negotiating voice for small island developing states within the United Nations system.

Countries and communities must find new ways to manage their resources – for example, by planting climate-suitable crops that tolerate or resist drought, salt and pests. Governments also need to improve planning regulations and bring in fresh policies to encourage low-energy buildings and transport systems and the use of recycled water.

Existing communication networks – both formal and informal – could play a vital role in this process. Governments can improve disaster preparedness by providing early warning of epidemics and natural disasters. The media could play a vital part in disseminating information rapidly and to a large number of people. It is also important to embrace indigenous knowledge systems, and for communities to share knowledge between themselves (for example, farmer to farmer). A Practical Action project in Zimbabwe found that radio was the most efficient mode of communication.

A man on Tuvalu negotiates flooding caused by sea water seeping up through the ground, a common problem during spring high tides. Tuvalu is a member of the Alliance of Small Island States, formed to lobby the United Nations on the potentially dire effects of climate change on member countries.

JOCELYN CARLIN | PANOS PICTURES

Adapting to climate change

The Kigali Institute of Science, Technology and Management in Rwanda has developed large-scale sewage treatment and biogas plants in the country's prisons, which generate fuel for cooking and fertiliser as a by-product of treating toilet waste. Each prison is supplied with a linked system of underground digesters that remove the sight and smell of the sewage. Institute staff manage the building of the system and provide on-the-job training to civilian technicians and prisoners. The biogas is piped into the prison kitchens, halving the use of fuelwood.

One of the world's most successful small-scale decentralised wind energy programmes is in Inner Mongolia, China, where around 130,000 small-scale wind energy systems – wind turbines – provide electricity for more than 500,000 people.

International support

The UNFCCC has two funds available for adaptation work:

- **Least Developed Countries Fund (LDCF):** designed to support projects addressing urgent and immediate adaptation needs identified in a country's national adaptation plans of action.
- **Special Climate Change Fund (SCCF):** provides funds for adaptation projects; technology transfer; capacity building; energy; transport; industry; agriculture; forestry; waste management; and economic diversification.

The international charity Oxfam estimates that the cost of adaptation in developing countries will be at least US\$50 billion every year. The World Bank estimates that project preparation costs could increase by up to 15 per cent.

A country's ability to adapt depends on economic and natural resources, institutions and governance, technology, and whether adaptation is physically possible. Some apparent remedies may be traps: the race to expand biofuel production is a warning. As the International Institute for Environment and Development's (IIED) *Up in Smoke* report states, if developing clean energy to replace fossil fuels means destroying forests to grow palm oil, the solution may be worse than the problem.





The media could scrutinise government policymaking to see whether it incorporates adequately funded schemes for climate change adaptation. The British Government is keen to generate more energy from renewable sources, such as wind power, by 2020 but must work on making its plans cost effective.

DAVID ROSE | PANOS PICTURES

Reducing vulnerability

Poor people are highly vulnerable because they have little hope of earning a decent living or finding a safe place to live. Women in subsistence farming communities are particularly vulnerable. Their lack of access to, and rights over, resources and wealth such as agricultural land, combined with fragile property rights and security of tenure, leave them more exposed in a changing climate. They are often more vulnerable than men to weather-related disasters, partly because they bear a greater burden of care for their families.

Shifting policy away from reactive disaster management to more proactive capacity building can reduce gender inequality. Higher incomes, better education and technical skills, better food distribution, disaster preparedness and management, and improved healthcare can all substantially reduce climate vulnerability.

Adaptation is sustainable when it is linked to effective governance, civil and political rights, and literacy – in other words, when it is part of mainstream national development planning. Insufficient information and knowledge about climate change will continue to hinder effective adaptation. More relevant information is therefore vital – about increased crop yields linked to changes in planting dates, or the cost of coastal protection investment, for example. But Asia and Africa face other urgent priorities, such as domestic conflicts, pervasive poverty, hunger, epidemics and terrorism. In these situations, it is easy for people to forget about climate change and the need to adapt.

Highlights from the UN's climate change conference – Bali, December 2007

- Australia ratified the Kyoto Protocol prior to the summit and had a strong presence during the summit. The US is now the only rich country still to ratify it.
- A 'Bali roadmap' set 2009 as the deadline for agreeing on the framework that will follow the Kyoto Protocol after it expires in 2013. Although it does not specify exact targets for reducing emissions – a hot topic of debate during the summit – it does state that 'deep cuts' are needed to curb global warming, and that rich countries should assume the majority of costs for combating climate change.
- Progress was made towards an agreement for developed countries to share clean technology with developing countries to help them adapt to climate change.
- It was agreed that the Adaptation Fund would finance projects in developing countries that assist people in dealing with the effects of climate change over the next four years. The fund will be administered independently of the Global Environment Facility (GEF), although the GEF will assist in the initial set-up during the first three years. It will be financed by a 2 per cent levy from the value on credits from projects undertaken under the clean development mechanism.
- Deforestation was a major topic of discussion. Countries agreed on a range of measures to study and assess the issue – from how to calculate emissions to encouraging demonstration projects that address the needs of local and indigenous communities.

The role of the media in climate change adaptation

Editors (and readers) often want journalists not just to describe problems, but to suggest solutions to them. Telling people how to adapt to increased heat and a lack of water are central to any response to climate change. In other words, journalists need to tell readers what works and how it works. This could mean:

- **Talking to scientists and technological experts** to help them explain their work in a way that everyone understands.
- **Holding politicians and officials to account** by asking whether they are:
 - spreading the word about the need for adaptation and how it works
 - providing the money to pay for adaptation
 - building adaptation into every policy
 - ensuring that the health system, agriculture, transport and development planning are helping people to adapt.
- **Holding businesses and industry to account** by asking what they are doing to help people adapt.
- **Building relationships with community groups** schools, farmers, tenants and trade unions often have both answers and questions for journalists.
- **Scrutinising international support for adaptation** by asking whether funders:
 - are prioritising adaptation and making it part of mainstream funding
 - are providing realistic sums to fund it
 - regard it as part of their development budget, or as compensation for the climate damage the industrialised world has caused.

Adapting to climate change

The Aga Khan Rural Support Programme has installed more than 180 micro-hydro power units in Chitral District, North-West Frontier Province, Pakistan. These supply electricity to about 175,000 people. The main use is for improved lighting, but they also enable local people to use radio, television and appliances like electric butter churners. They traditionally used unreliable smoky pinewood torches and, more recently, expensive kerosene lamps. But the many fast-flowing rivers in the region make it ideal for small-scale electricity production which does not need large dams to be built.

A UK company, BushProof, makes drinking water and renewable energy products. Its micro-solar products include small photovoltaic panels suitable for powering radios, flashlights and mobile phones. It also provides house lighting kits that are suitable for people living beyond the power grid. Most of its products are assembled in Madagascar, providing jobs while keeping costs affordable to the rural poor, the company's main customers.

Web resources

Aga Khan Rural Support Programme
www.akrspllessons.org/akrsp.php

Alliance of Small Island States
www.sidsnet.org/aosis

Andrew Lees Trust – social and environmental projects in Madagascar
www.andrewleestrust.org

The Ashden Awards for sustainable energy
www.ashdenawards.org/finalists_2007

Bali conference on climate change
www.un.org/climatechange

BushProof
www.bushproof.com

Eldis research site climate change adaptation case studies
www.eldis.org

International Institute for Environment and Development climate change pages
www.iiied.org

International Institute for Sustainable Development – Vulnerability and Adaptation in the South
www.iisd.org/climate/south

Intergovernmental Panel on Climate Change Working Group II: Impacts, adaptation and vulnerability
www.ipcc-wg2.org

Kigali Institute of Science, Technology and Management
www.kist.ac.rw

The Linking Climate Adaptation Network, Institute of Development Studies, University of Sussex, UK
www.linkingclimateadaptation.org

Practical Action – 'Making knowledge networks work for the poor'
www.practicalaction.org

SciDev.Net – Science and Development Network
www.scidev.net > dossiers > climate change

Seed Savers' Network
www.seedsavers.net

Southern African Regional Poverty Network
www.sarpn.org

Tiempo Climate Portal, University of East Anglia, UK
www.tiempocyberclimate.org

Tyndall Centre for Climate Change Research, University of East Anglia, UK
www.tyndall.ac.uk > adaptation

United Nations Environment Programme
www.unep.org

UNFCCC Asian Regional Workshop on Adaptation
www.iisd.ca/climate/ccaaw

UNFCCC African Regional Workshop on Adaptation
www.iisd.ca/africa/vol02/arc0201e.html



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