



postnote

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ADAPTING TO CLIMATE CHANGE IN DEVELOPING COUNTRIES

Climate change poses a serious threat to development and poverty reduction in the poorest and most vulnerable regions of the world. Minimising the impacts of climate change requires adaptation. In 2005, under the UK's presidency, the G8 Plan of Action¹ included an agreement to assist developing countries adapt to climate change. This POSTnote examines how adaptation to climate change is being approached in developing countries. It will also address the role of the international community and how the UK government is helping developing countries to build their capacity to adapt to climate change and assisting in adaptation.

Background

The impacts of climate change are already being experienced across the globe. The Intergovernmental Panel on Climate Change (IPCC)² concludes that human activity (primarily related to fossil fuel consumption) is largely responsible. While climate change will affect everyone, it is expected to have a disproportionate effect on those living in poverty in developing countries.

The IPCC Third Assessment Report, which assesses climate change research up to 2001, concludes that:

- global average surface temperature has increased by 0.6°C (±0.2°C) over the 20th century, and is predicted to increase by 1.4 to 5.8°C between 1990 and 2100;
- average precipitation has increased over tropical latitudes by about 2 to 3% throughout the 20th century, and on average has decreased by about 3% in the sub-tropics.

These changes are leading to environmental impacts summarised in Table 1, such as a global average sea level rise of 10 to 20cm over the last 100 years (expected to rise a further 10 to 90cm by 2100), and an increase in frequency and intensity of drought in parts of Asia and Africa in recent decades. Many of these changes have already led to multiple socio-economic impacts.

Table 1 Climate change impacts in developing countries

Environmental Impacts	Socio-economic resources and sectors affected
• Changes in rainfall patterns • Increased frequency and severity of: Floods Droughts Storms Heat waves • Changes in growing seasons and regions • Changes in water quality and quantity • Sea level rise • Glacial melt	• Water resources • Agriculture and forestry • Food security • Human health • Infrastructure (e.g. transport) • Settlements: displacement of inhabitants and loss of livelihood • Coastal management • Industry and energy • Disaster response and recovery plans

Vulnerability of developing countries to climate change

The majority of developing countries are in tropical and sub-tropical regions, areas predicted to be seriously affected by the impacts of climate change: Africa, Asia, Latin America and the Small Island States (for example Mauritius) have all been identified as regions of concern. This is compounded by the fact that developing countries are often less able to cope with adverse climate impacts:

- **Poverty exacerbates, and is exacerbated by, the impacts of environmental change:** Between 1990 and 1998, 97% of all natural disaster-related deaths occurred in developing countries. 90% of all natural disasters are climate, weather and water related.
- **Livelihoods are highly dependent on climate-sensitive resources:** agriculture in Sub-Saharan Africa, of which up to 90% is rain-fed, accounts for 70% of regional employment and 35% of gross national product.
- **Low adaptive capacity:** the poorest inhabitants of developing countries, especially those in the Least Developed Countries (LDCs), already struggle to cope with current extreme weather events and climate variability. In 2004 severe flooding in Bangladesh, caused by excessive rains of the annual Asian Summer Monsoon, killed over 600 people and displaced over 20 million. The greater frequency and severity of climate shocks is repeatedly eroding coping capacity.

The most vulnerable sectors of society include:

- **Those dependent on natural resources:** especially subsistence farmers dependent on rain-fed crops.
- **Shanty town dwellers:** living on unsuitable land, often unstable and/or flood prone and lacking infrastructure.
- **Those living in extreme poverty:** the UN estimate that 1.3 billion people live on less than \$1 per day.

Climate change has the potential to undermine poverty reduction efforts and could compromise the Millennium Development Goals (MDGs)³, such as the eradication of extreme poverty and hunger by 2015. The OECD⁴ and the World Bank estimate that 40% of overseas development aid may be climate sensitive. Additionally, funding for humanitarian response to disasters (73% of which are climate related), which now cost donors US\$6 billion per year, may result in the reallocation of funding from on-going development activities. This can set back the development process for decades.

Mitigation and adaptation

The scale of action needed to tackle climate change is unprecedented and involves two concurrent approaches:

- **Mitigation:** actions that **tackle the causes** of climate change, such as reducing greenhouse gas emissions.
- **Adaptation:** actions that **minimise the consequences** of actual and expected changes in the climate.

These processes are inherently linked. The degree to which society needs to adapt depends on the extent of climate change, which depends on greenhouse gas emissions. The Kyoto Protocol (1997) to the United Nations Framework Convention on Climate Change (UNFCCC)⁵ requires ratifying industrialised countries to limit their greenhouse gas emissions by agreed amounts below their 1990 levels over the period 2008-2012. The UK government has agreed on a 12.5% reduction by 2012. However, human activities have already led to changes in the atmospheric composition, and due to time lags in the climate system, climate change is expected to continue over the next few decades, irrespective of how rigorous mitigation efforts might be.

Dealing with uncertainty

Significant uncertainties remain concerning the direction of climate change, especially in Africa and at a regional level, where there is a lack of observational data and where modelling studies are limited. Uncertainty lies in the exact magnitude, rate and geographical impact of climate change. This is often seen as a barrier to precautionary action or adaptation, but development and aid agencies stress that this should not prevent or slow down adaptation efforts. The International Development Committee⁶ recommends that the 'precautionary principle' should underpin adaptation actions (see POSTnote 220), stressing that there may be uncertainty as to the extent of climate change but there is certainty that climate change is happening.

Adapting to the impacts of climate change

Adaptation is a way of reducing vulnerability, increasing resilience, moderating the risk of climate impacts on lives and livelihoods, and taking advantage of opportunities posed by actual or expected climate change.

Building capacity to adapt to climate change

Improving social, economic and technical resilience and increasing flexibility within systems is a form of adaptation and allows further adaptation to take place more easily, for example by increasing water storage capacity and extending water supply services. Increasing adaptive capacity may be achieved through sustainable development, supporting the idea that adaptation activities can occur even in the face of uncertainty. Development plans that incorporate adaptive capacity provide the ability to respond to future uncertainties.

Governments and development agencies are beginning to treat adaptation to climate change not as a standalone effort, but rather as an issue to be mainstreamed through all development and environmental policies. Lack of integration can undermine action in both areas.

Building on traditional coping mechanisms

Communities that rely on natural resources have been developing methods to cope with environmental change for generations. Tribes in the Turkana region of northwest Kenya have adopted a nomadic lifestyle to cope with the harsh environmental conditions. However, adapting to predicted climate change presents a major challenge. Adaptation should aim to strengthen traditional coping mechanisms: optimising current systems whilst building flexibility to cope with the uncertainties posed by climate change. Introducing new technology can be sustainable where it strengthens and builds on traditional approaches and reinforces local knowledge (see Box 1).

Box 1 Case Study: NERICA-New rice for Africa⁷

This project is helping to improve food security and reduce reliance on rice imports in countries experiencing crop failure due to excessive drought. The African Rice Centre crossed varieties of African and Asian rice to produce early maturing, higher yielding, drought tolerant, pest resistant crops able to thrive in saline soils. Varieties of this new rice, NERICA, are being planted in Côte d'Ivoire, Guinea and Uganda.

'Rice Gardens' in target villages, containing NERICA varieties alongside popular local and regional varieties. Once they gain a level of acceptance, distribution is assisted using a community-based seed system that builds on traditional seed-saving practices. Farmers are also provided with some training in methods of seed harvest, preparation, storage and maintenance.

Adaptation options will evolve as knowledge relating to climate change increases, and information is gathered on the success or failure of adaptation options. There is not a 'one size fits all' solution, but policy frameworks to facilitate capacity building and environmental awareness, encourage appropriate adaptations to be implemented.

Stimulating adaptation efforts through awareness

Although adaptation activity is beginning to take place, further efforts may be stimulated by increasing awareness and education of the potential impacts of climate change.

Increasing scientific capacity

Increasing scientific capacity by improving access to climate data, development of modelling capabilities, and having mechanisms in place to process and disseminate

the data for users, helps promote awareness of potential climate change impacts. It also equips nations with climate information necessary for national impact assessments, and adaptation and development planning (see Box 2), hence increasing their capacity to adapt.

Box 2 Examples of national capacity building **GCOS- The Global Climate Observing System Programme**

GCOS will allow developing countries access to observational climate data. Initial work will focus on linking seasonal forecasts with health and agricultural planning to build resilience to short-term climate variability. Strengthening of climate monitoring networks will take place in regions with data deficiency, such as Africa. DfID has allocated £5 million to GCOS over 5 years.

PRECIS- Providing Regional Climates for Impact Studies

Based on the UK Met Office model, PRECIS can be run from a PC to provide regional seasonal forecasts and climate prediction data. PRECIS helps build climatological expertise and scientific capacity in developing countries. Workshops provide training, advice on model limitations and promote regional collaborations: a Brazilian led team use PRECIS to provide data for Brazil, Ecuador, Peru, Venezuela, Suriname, Guyana and Colombia.

NAPAs- National Adaptation Programmes of Action

A process supported by the UNFCCC through which LDCs are encouraged to use available information (see above) to assess vulnerability to the potential impacts of climate change, identify key adaptation measures and develop adaptation strategies.

Increasing awareness through education

Aid agencies, such as the Red Cross, find that people in developing countries are aware of changes taking place and have begun to adjust through long and short-term coping methods. However, there is a lack of awareness of climate change behind these observations and actions. An understanding of climate change is important for encouraging and implementing appropriate adaptations. Information needs to be disseminated concerning:

- the nature of climate change and its potential to cause problems in all aspects of life;
- the potential impacts both in the short and long-term;
- adaptation options applicable to the individual.

This may be achieved through the media, public outreach programmes (see Box 3), national campaigns, presentations and stakeholder workshops. These help communities gain information about potential climate change impacts, and encourage sharing of local coping strategies and methods of capacity strengthening.

Box 3 United Nations Education Programme

UNEP Climate Change Outreach Programme: supported by the UNFCCC, this project provides governments in developing countries with advice on promoting climate change awareness at the national level. Supporting NGO efforts to provide accurate and accessible messages of the IPCC to target audiences.

Climate Outreach to Youth in India: a programme, in partnership with The Energy and Resources Institute (TERI) in New Delhi, to promote awareness amongst school children in India on policy issues related to climate change. Initiatives include climate clubs, workshops and guidelines for teachers.

Sharing of adaptation options

A wealth of expertise on adapting to climate change exists. However, knowledge is often isolated due to the

localised nature of responses. Improving communication and knowledge transfer between developing countries and communities is a key policy objective. An aim behind projects currently funded by DEFRA (see page 4) is to build an impacts study and adaptation project 'portfolio', using examples that range across countries and sectors. Similar approaches are being developed at the Institute of Development Studies through a DFID funded Linking Climate Adaptation Network, and through a University of East Anglia, Stockholm Environmental Institute and International Institute for Environment and Development collaboration to create a coping strategies database.

Adaptation to climate extremes

Preparedness for current climate variability is essential for limiting the chaos and costs that ensue from existing climate impacts. Extreme events are often the driver for adaptation efforts because impacts are visible and the damage can be economically devastating. Preparedness and adaptation for existing extremes is likely to increase resilience to changes in mean climate conditions.

Adaptation policy and assistance

Although climate change is a global issue, the impacts of climate change are felt locally. Managing the impacts, including adaptation, is a national issue, taking place at national (for example energy and water management), community and individual level. Adaptation requires a very different project development and implementation framework than climate change mitigation efforts.

International negotiations

International negotiations have been dominated by the interests of developed countries, focussing on mitigation issues (for example the Kyoto Protocol) and paying less attention to adaptation. A recent DfID White Paper on eliminating world poverty⁸ identifies the need for the UK to help developing countries, especially LDCs, enhance their negotiating power in international climate change discussions and raise the profile of their concerns.

The role of developed nations

All countries must adapt. However, developing countries may require assistance from developed countries where there are gaps in economic, material and/or knowledge resources. Adaptation efforts may be assisted through:

- helping build adaptive capacity;
- assisting the education process;
- promoting the sharing of adaptation options;
- providing tools for impact assessment and adaptation;
- providing funding (see Box 4) and insurance.

Box 4 Sources of funding for adaptation

Developing countries, to varying degrees, lack social, technical and financial resources to cope with impacts of climate change. A number of funds to support adaptation were set up in 2001 during the international Bonn-Marrakech agreements:

- UNFCCC funds include the **Least Developed Countries Fund** and **Special Climate Change Fund**. DfID has contributed £20 million over three years to the UNFCCC funds.
- **Kyoto Protocol Adaptation Fund:** financed from a levy on Clean Development Mechanism (CDM) Projects.

Role of the UK

Responding to climate change is stated as one of the UK government's top priorities. POSTnote 267 describes how the UK is adapting to climate change itself. The UK government bodies involved in overseas adaptation assistance include the Department for Environment, Food and Rural Affairs (DEFRA) and the Department for International Development (DfID). DEFRA focuses on the scientific aspects of adaptation. Current work includes investigating climate change impacts in India and China as well as supporting a major project to enhance knowledge and build adaptive capacity in Africa. DfID is working to integrate climate risk assessment and management into its own development policy and practice and to support partner governments to do this.

Issues

Climate change risk management

Potential risks posed by climate change should be at the forefront of decision-making and planning. The G8 has encouraged development organisations, such as the World Bank¹⁰, to develop climate risk assessment tools to ensure that development activities are both 'climate friendly' (have limited impact on the climate) and 'climate proof' (minimally affected by climate change).

Competing pressures in developing countries

Individuals and governments of developing countries are faced with problems which are perceived as more urgent and tangible than adapting to the threat of climate change, for example poverty, disease (such as HIV and malaria) and conflict. This is especially true when climate change is presented in a long-term, abstract or academic manner. However, it is probable that the impacts of climate change may worsen these competing pressures³.

When the only option is migration

There are limitations to adaptation; migration may be the only option for low-lying states, such as Bangladesh, and small island states, such as Tuvalu, a coral atoll in Polynesia, the highest point of which is just 5m above mean high water. Red Cross research reveals that more people are now displaced by environmental disasters than war. The UN University predict that by 2010, as many as 50 million people may be driven from their homes by environmental crisis. They are currently looking at the issue of environmental refugees and how to best recognise and support them.

The security threat of climate change

Cross-border migration can cause tension, especially in regions with political instability. Additionally, climate refugees currently do not have the same status or rights as political refugees⁹. DfID supports migration as a viable method of adaptation. However, the UK currently has no policy to deal with 'environmental refugees'. This will be an important issue considering the vulnerability of several of the British Overseas Territories, including the Cayman Islands. Cross-border issues relating to resources, such as water, may also worsen tensions and could result in conflict (for example between Sudan and Egypt).

Responsibility

The International Institute for Environment and Development (IIED) is keen to promote assistance and funding for adaptation in developing countries to be seen as a form of compensation rather than aid. This means altering public perception within developed countries about responsibility for human-induced climate change.

Public concern in developed countries

There is much debate over the role of developed countries and whether they are contributing enough, and in the right way, towards helping developing countries adapt. Broad-based coalitions of civil society organisations, such as 'Stop Climate Chaos' and 'Up in Smoke', which consist of environmental, development and humanitarian organisations, are working together to mobilise public concern, and to develop support and funding for adaptation efforts as well as mitigation.

Overview

- The environmental and socio-economic impacts of climate change pose a serious threat to development and poverty reduction in developing countries.
- Tackling the causes of climate change (mitigation) and minimising the consequences (adaptation) are inherently linked processes and are both essential.
- Building adaptive capacity to climate change may be achieved through the mainstreaming of climate risk into sustainable development strategies, however to do this successfully it is necessary to have awareness and understanding of climate change issues.
- Specific adaptation actions take place at community or individual level. These actions should build on existing coping methods. Communication between communities will allow coping strategies to be shared.

Endnotes

- 1 *Climate Change, Clean Energy and Sustainable Development*. Gleneagles Plan of Action 2005.
- 2 IPCC Third Assessment Report 2001. *Impacts, Adaptation and Vulnerability*. Working Group II.
- 3 *Poverty and Climate Change: Reducing vulnerability of the poor through adaptation*. Multi-donor collaboration paper 2003.
- 4 *Bridge over troubled waters- linking climate change and development*. OECD 2005.
- 5 <http://unfccc.int>
- 6 International Development Committee Report 2002. *Global Climate Change and Sustainable Development*.
- 7 *Application of environmentally sound technologies for adaptation to climate change*. UNFCCC Technical paper 2006.
- 8 *Eliminating world poverty- making governance work for the poor*. Chapter 7: *managing climate change*. DFID White Paper, July 2006.
- 9 *Up in smoke?* Working group for climate change and development 2004.
- 10 *Disaster Risk Management in a Changing Climate*. World Bank 2005.

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