

This key sheet is part of a series aimed at DFID staff and development partners examining the impact of climate change on poverty, and exploring tools for adaptation to climate change.

This key sheet examines the impact of climate variability and climate change on the vulnerability of the poor. The reader will be guided through the key issues of:

- The impact of current climate variability on vulnerability;
- The impact of climate change on vulnerability; and
- Actions to reduce vulnerability to climate change.

Lastly, this keysheet advises on how development policy and economic management can reduce the vulnerability of the poor to the impacts of climate change.

# 03 The impact of climate change on the vulnerability of the poor

Climate change will increase the vulnerability of the poor to shocks of all kinds, not only climatic events.

Current climate shocks and stresses already have a devastating impact on the vulnerability of the poor. Increasing frequency and intensity of weather-related extremes, and gradual changes in the average temperature will exacerbate these impacts. This has implications for the vulnerability of the poor to shocks of all kinds. Climate change adds urgency to understanding and addressing the poor's vulnerability to current and future climate variability and to re-evaluating the role of policies and programmes in reducing this vulnerability.

For further detail on predicted global climate change, see:

- Key sheet 01 Climate change deepens poverty and challenges poverty reduction strategies.

## Defining vulnerability

Vulnerability is an indication of people's exposure to external risks, shocks and stresses and their ability to cope with, and recover from, the resulting impacts. Vulnerability may differ seasonally or at different times within people's lives. It also differs across groups within communities or individuals within a household, owing to their livelihood activities or social standing. Vulnerability of the poor is increasing due to a number of trends, including increasing HIV/AIDS, conflict and pressures associated with globalisation.



Trygve Bolstad, Panos

People draw on a range of coping strategies in times of stress; however, those available to the very poor are likely to be more restricted and less resilient. Changing vulnerabilities can often explain how people move in and out of poverty, suddenly, seasonally or gradually over time. People may use a number of strategies to move out of poverty, but without also reducing their vulnerability they can easily slip back into poverty at a later date.

## The effect of current climate variability on vulnerability

### Climate variability within the context of vulnerability

Climate variability describes seasonal changes, inter-annual variability and the likely frequency of weather-related extreme events. This variability is often an ongoing stress within people's lives. People will therefore take climate into account within their livelihood activities and the other risks that they face. For example, in East Africa, pastoralists take decisions on the movement of their herds in response to a range of different risks, including livestock disease, conflict, market prices, access to land, government and NGO services, as well as climate.

### Climate variability as a source of shock or stress

Even within a livelihood adapted to a particular climatic stress, an increase in intensity of the stress, climate extremes, or unseasonal changes can cause severe shocks that set back households. Coping with such events can result in a loss of assets, negative impacts on health and can require high expenditure in order to recover. In a set of participatory poverty assessments from over 24 countries, the rural and urban poor identified natural hazards, changing climate conditions and unpredictable seasons as contributing to an increasingly fragile environment and increasing the vulnerability of their livelihoods.

During the 1998 floods in Bangladesh, some households were able to use emergency food and change their employment away from agriculture in order to cope. However, poorer households coped through reducing food consumption and through the sale of assets, reducing their resilience to future shocks.

### Poor people's exposure to climate variability

The poor are often the most exposed to climate variability because of where they live or their livelihood activities. The urban landless are particularly vulnerable to climate extremes, as illustrated in Honduras, where hillside shantytowns were amongst the worst affected by intense rainfall and landslides during Hurricane Mitch. Pastoralists are often particularly vulnerable to drought due to their dependence on marginal lands. Within poor communities, women and children may be particularly exposed, as seen in Bangladesh where they made up 90% of the victims during the 1991 cyclone. This incidence rate was related to a range of factors including their capabilities in survival (e.g. swimming), and socio-cultural beliefs that prevented women with their children from congregating in public cyclone shelters.

As a result of social or political restrictions, the poor may also be forced to remain in exposed areas after a shock or stress. Following the torrential rains of 1999 in Venezuela, a large number of the marginalised poor were forced to rebuild their homes in the same risk-prone ravines due to a lack of alternatives.

## The effect of climate change on the vulnerability of the poor

The climate is changing. Future predictions include an increase in the number, frequency and intensity of climatic shocks, along with gradual changes such as temperature increases, sea level rise and alterations in seasonal patterns.

The impacts of current and future climate variation are summarised in Figure 1.

### Increasing frequency of climate extremes

The increased frequency of climate extremes is of particular concern since it reduces the time for poor households to recover from one climatic shock to another. There is also the risk of unprecedented shocks, such as the flooding experienced in East Africa following extended drought. Traditional coping strategies may not be sufficient in this context and will lead the poor to rely on ad-hoc and unsustainable responses. This not only reduces resilience to the next climatic shock but also

Higher frequencies of climate extremes reduces the time for poor households to recover from one climate shock to another

to the full range of shocks and stresses that the poor are exposed to.

### **Increasing climate variability**

Rainfall is predicted to become more variable over a number of different regions. This has implications for managing water security, agricultural outputs and food security and climate-related diseases.

### **Systematic changes in the climate in vulnerable locations**

Systematic changes in mean temperatures and precipitation are projected to affect the most vulnerable locations. Areas already suffering from drought are expected to have an increased risk of drought due to climate change, and heavily populated coastal areas are the most at risk from increased cyclone activity and sea level rise.

It is estimated that the number of people at risk of annual flooding will increase from 75 to 206 million, given a 40cm rise in sea levels and further increases in coastal populations. Ninety per cent of those at risk will be within Africa and Asia.

An OECD report on the impacts on climate change in Nepal found that rising temperatures have increased glacial retreat and glacial lake outburst floods, which reduce the availability of water and energy (from hydropower), both of which are important factors in vulnerability reduction.

### **Degradation of ecosystem goods and services**

Climate changes that erode or cause changes in natural resources will further reduce poor people's resilience, as they are often reliant on these sectors for employment and food security. Desertification and salinisation are potential adverse impacts of climate change on agricultural land. For example, it has been estimated that a 2-3.5°C increase in temperature in India could result in a 9-25% decline in farm revenues. Additionally, climate plays a role in the productivity of fisheries as seen during the dramatic decline of the Peru anchovy fishery during El Niño episodes and the reduction in fish biomass following Hurricane Lenny in St Lucia.

### **Climate change impacts on economic growth**

Climate change is also likely to have a number of impacts on economic growth. This will affect the poor by reducing their ability to diversify livelihoods and their ability to afford

sustainable and unrestricted coping strategies.

This is explored in more detail in

- Key sheet 02 The impact of climate change on pro-poor growth.

## **Coping with climate**

People develop coping strategies to deal with climate variability as with other shocks or stresses. These include building social networks as forms of insurance, traditional forecasting in order to be prepared for climatic changes and ingenious means of protecting assets such as the use, in Asia, of floating seed beds in times of floods. However, the poor's range of coping strategies is naturally more restricted by their lack of assets and by the other stresses on their livelihoods. These stresses are increasing following a number of trends such as increasing prevalence of HIV/AIDS, conflict, globalisation and environmental degradation.

The poor are already struggling to cope with current climate variability. The climate is becoming more variable and creating additional risks so that the poor are becoming more vulnerable. As climate extremes are 'covariant risks' (i.e. simultaneously affecting a wide range of people), current safety nets are likely to be overwhelmed. This includes both formal systems (e.g. social assistance), and informal systems (e.g. social networks).

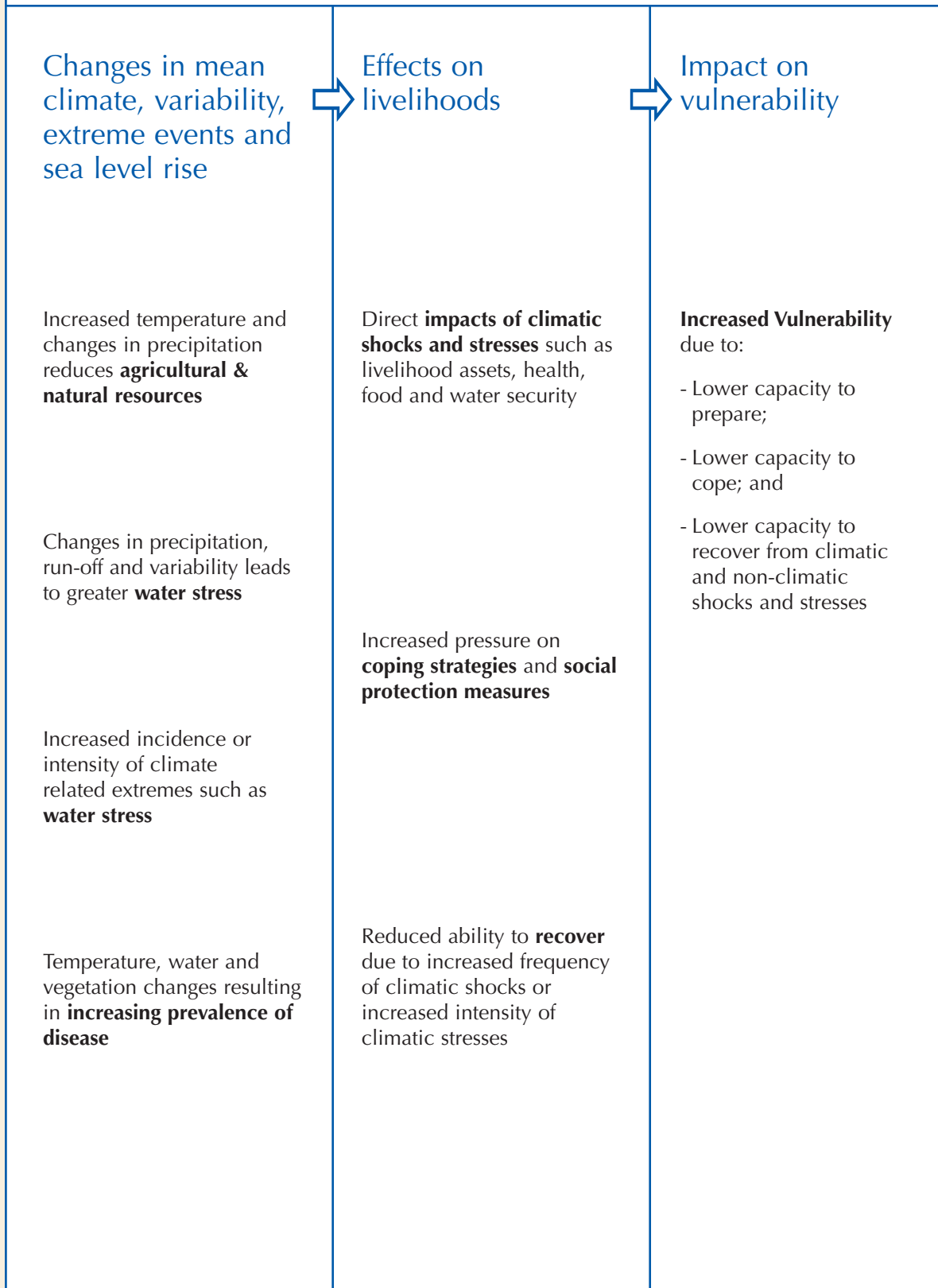
Systematic changes in the mean of temperature and rainfall are projected to affect the most vulnerable locations

Climate change will impact on water security, food security and climate-sensitive diseases



Figure 1

## Impact of climate variability and climate change on vulnerability



# The country-level response

The climate is changing and this has consequences for the poor in developing countries. It is therefore necessary to ensure that policy and institutional frameworks and mechanisms are strengthened to support the poor's range of response options to climate change. The best way will be to support the reduction of vulnerability to the current climate, ensuring that this is not a stand-alone activity but integrated into sustainable development and poverty reduction.

## Understand climate variability within the context of vulnerability

Vulnerability analysis, feeding into poverty reduction strategies and other macro-economic planning tools, needs to take the level and type of impacts of climate variability into account. Additionally, any action taken to reduce specific impacts of climate variability needs to be designed and undertaken with an understanding of the overall vulnerability context, not forgetting the special needs of vulnerable groups such as women, children and the elderly.

Vulnerability assessments should be combined with hazard information to assess the level of risk to communities. This hazard information can be obtained from seasonal weather forecasts and longer-term climate predictions.

## Support the response-capability of the poor by strengthening their assets

- Social capital: supporting social networks that provide safety nets;
- Natural capital: protecting the resilience of natural systems to support livelihoods of the poor;
- Physical capital: assisting the poor to make their physical capital more climate-resilient;
- Human capital: supporting the flow of climate information to the poor; and
- Financial capital: supporting the poor to reduce and spread their financial risks.

There are a number of tools that can help to achieve these aims including disaster preparedness and social protection. It will also be necessary to incorporate vulnerability reduction into wider policies and programmes.

## Support disaster preparedness and response

Of particular importance will be the empowerment of communities to take collective action to prepare for, cope with and recover from shocks and stresses and to improve information on impending shocks and stresses.

## Support social protection measures

Their design requires a clear understanding of the vulnerability context for all groups, which should by its nature take climate variability into account. There may also be an increasing role for financial insurance mechanisms in assisting the poor to spread and reduce their risks.

## Incorporate vulnerability reduction into wider policies by:

- Improving the flexibility and responsiveness of food security mechanisms to climate shocks, e.g. food intervention systems;
- Improving the resilience of the poor's health and the health care system;
- Ensuring macroeconomic policies reduce poor people's vulnerability; and
- Protecting natural resources in poor people's livelihood and coping strategies.

These issues are explored in more detail in the following key sheets:

- Key sheet 04 The impact of climate change on the health of the poor;
- Key sheet 05 Responding to the risks of climate change: Are different approaches to poverty eradication necessary?
- Key sheet 06 Adaptation to climate change: Making development disaster proof;
- Key sheet 07 Adaptation to climate change: The right information can help the poor to cope;
- Key sheet 08 Adaptation to climate change: Can insurance reduce the vulnerability of the poor? and
- Key sheet 09 Taking initial steps towards adaptation.

## Further reading

- Beckam, M., van An, L. and Quang Bao, L. 2002 Coping and Adaptation Strategies of Households and Local Institutions in Central Vietnam. Stockholm Environmental Institute SEI/REPSI Report Series No. 5.
- Brocklesby, M.A. and Hinshelwood, E. 2001 Poverty and the Environment – What the Poor Say. Department for International Development.
- Chambers, R. 1989 Vulnerability, coping and policy. IDS Bulletin 20(2).
- Davies, S. 1996 Adaptable Livelihoods. Macmillan Press.
- Del Ninno C., Dorosh P.A., Smith L.C. and Roy D.K. 2002 The 1998 floods in Bangladesh: disaster impacts, household coping strategies and response. International Food Policy Research Institute. Research Report 122.
- International Federation of Red Cross and Red Crescent Societies 1999, 2001 & 2002 World Disaster Report. Reports produced annually.
- Martens, P. et al 1999 Climate change and future populations at risk of malaria. Global Environmental Change 9:S89-S107.
- Nicholls, R.J., Hoozemans, F.M.J. and Marchand, M. 1999 Increasing flood risks and wetland losses due to global sea-level rise: regional and global analyses. Global Environmental Change 9: S69-S87.
- OECD 2003 Development and Climate Change Project: Case study of Nepal.
- Panos Institute/SOS Sahel 1994 At the Desert's Edge: Oral Histories from the Sahel.
- Parry, M., Rosenzweig, C., Iglesias, A., Fischer, G. and Livermore, M. 1999 Climate change and world food security: a new assessment. Global Environmental Change 9: S51-S67.
- Rosenzweig, C. and Parry, M. 1994 Potential impact of climate change on world food supply. Nature 367, 122-138.

## Contact details

### **DFID Public Enquiry Point**

Tel: 0845 300 4100  
(local call rate from within the UK)  
Tel: + 44 (0) 1355 84 3132  
(from outside the UK)  
Fax: + 44 (0) 1355 84 3632  
Email: [enquiry@dfid.gov.uk](mailto:enquiry@dfid.gov.uk)  
Website: <http://www.dfid.gov.uk/>

### **Global and Local Environment Team, Policy Division, DFID**

Tel: + 44 (0) 20 7023 0934  
Fax: + 44 (0) 20 7023 0074  
Email: [s-pieri@dfid.gov.uk](mailto:s-pieri@dfid.gov.uk)

© Crown Copyright 2004. Any part of this publication may be freely reproduced providing the source is fully acknowledged.