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# Summaries

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## **Vulnerability, Adaptation and Climate Disasters: A Conceptual Overview**

Farhana Yamin, Atiq Rahman and Saleemul Huq

The articles in this *IDS Bulletin* present insights from the Linking Climate Adaptation (LCA) Project that aimed to ensure that poor people benefit from adaptation processes, rather than bearing greater burdens by, for example, having the risks caused by climate change shifted in their direction. The key research aim of the LCA Project was to determine what kind of procedural and institutional frameworks are needed to ensure that locally determined adaptation needs are linked “upwards” to national and international policy and institutional structures. The overview brings together policy relevant insights on this question whilst also explaining the conceptual underpinnings of the project, focusing on the nature of vulnerability and adaptation and policy processes to support community-led adaptation. The key conclusions are that climate change is a serious, ongoing threat to development and will add burdens to those who are already poor and vulnerable, and that climate vulnerability analysis should be incorporated systematically into the three main policy and institutional frameworks relevant for adaptation: development, disaster relief and climate change. Ways of fostering conceptual, operational and institutional linkages between these three domains are described, focusing on how these can help communities take centre stage in conducting vulnerability analysis and implementation to enhance their long-term capacities for adaptation.

## **Case Study 1: China Benefiting from Global Warming: Agricultural Production in Northeast China**

Erda Lin, Xiu Yang, Shiming Ma, Hui Ju, Liping Guo, Wei Xiong, Yue Li and Yinlong Xu  
Adaptation to climate change is crucial for China due to its huge population and various and vulnerable ecosystems. Agriculture will, however, continue to be the most important sector to adapt

to climate change: nearly 70 per cent of China’s population depends directly on agriculture. Like other developing countries, China will need to develop adaptation strategies imposed by climate change against a background of existing poverty, resource and infrastructure constraints. Northeast China was selected for this case study because it illustrates how anticipatory adaptation can lead to positive impacts from climate change. This region is already one of the most important bases of commercial food grains (wheat, rice and maize) and economic crops (soybean, sugar beets). Recent climate warming has on the one hand created favourable conditions for agricultural development in Northeast China through a prolonged growth period, northward movement of accumulated temperature belts and decreases of cold stress. On the other hand, environment and natural resource problems (e.g. water shortage, urbanisation) have placed enormous regional stress on agricultural production and ecosystems, illustrating the complex nature of the impacts of climate change. This case study demonstrates that the positive opportunities provided by climate change will not happen automatically but will require communities to be supported through resources such as extension services, new crop varieties and institutional frameworks that allow experimentation and reward entrepreneurship. Over the longer term and at higher temperatures, the negative impacts of climate change, such as increased water stress and extreme events, may mean a decrease or even a reversal of the potential benefits of temperature increases in the short term.

## **Case Study 2: India Community Adaptation to Drought in Rajasthan**

Kalipada Chatterjee, Anish Chatterjee and Sarmistha Das

Two-thirds of India’s population is dependent on agriculture, which is largely rain-fed and critically dependent on the South-West Monsoon. Climate change is thus of vital interest to India’s social, economic and environmental well-being. This case study focuses on traditional adaptation practises

used by vulnerable communities in the drought-prone Tonk district, Rajasthan. Communities here already bear the brunt of drought and have learnt to cope. Successive droughts over wider geographic areas, combined with other stresses, now threaten to overwhelm coping capacity in ways that might become the norm with climate change. New adaptation strategies have been introduced in Tonk by local non-governmental organisations (NGOs) that build on existing knowledge and expertise about water, agriculture and livestock management. These include: growing new crops such as vegetables, fodder and higher value medicinal crops for commercial sale; use of environmentally sound fertilisers (vermiculture); improved storage for fodder and food grains; and improved water conservation and harvesting techniques through bunding of fields, construction of *anicuts* and digging and deepening ponds and wells. The growing number of people subject to successive droughts in Rajasthan (40 million in 2002–3) suggests, however, re-examination of state and federal policies, such as the National Agricultural Insurance Scheme, would be prudent to ensure these strategies are available to the most vulnerable, in order to prevent, rather than respond to, disaster.

### **Case Study 3: Bangladesh Floods in Bangladesh: A Shift from Disaster Management Towards Disaster Preparedness**

Dwijendra Lal Mallick, Atiq Rahman, Mozaharul Alam, Abu Saleh Md Juel, Azra N. Ahmad and Sarder Shafiqul Alam

Bangladesh is a Least Developed Country (LDC) facing many impacts of climate change in the form of more frequent and severe floods, cyclones, droughts, sea level rise and salinity affecting large parts of the population through impacts on livelihoods, natural systems, agriculture, water supply and health. In the last two decades, Bangladesh has experienced four devastating floods, which may provide an early indication of the kinds of impacts associated with increased frequency and intensity of floods. This case study focuses on how the Disaster Management Bureau (DMB) takes into consideration the real needs and priorities of the community, while formulating and implementing programmes to enhance flood preparedness. This is being done through the Comprehensive Disaster Management Programme (CDMP). Traditional

disaster management models focus on disaster relief and recovery. But these have done little to redress rising levels of risk. An all-risk management framework set out in the CDMP seeks to raise the capacities of at-risk communities, while lowering their vulnerability to specific hazards. The aim is to target resources towards risk reduction through mainstreaming disaster management within development and emergency relief programmes and away from pure relief. Making an active shift towards a holistic risk reduction approach that shifts attention towards prevention and preparedness makes good sense for governments, funders and communities. But it requires fundamental transformations in policy and institutions. This takes time and requires true involvement and dedication due to resource constraints, bureaucracy, vested interests and poor governance.

### **Case Study 4: Senegal Adaptation and Mitigation Through “Produced Environments”: The Case for Agriculture Intensification in Senegal**

Moussa Seck, Moussa Na Abou Mamouda and Salimata Wade

The Senegal case study looks at one example of how adaptation and mitigation can be usefully combined in a way which enhances incomes and diversifies livelihoods of the poor, while also securing benefits for biodiversity, gender equality and carbon sequestration. The case study describes how a pilot farm in Niayes, Senegal, launched in the 1970s, has evolved over time to address significant variations in climate change. The Sébikotane programme has had to adapt to successive droughts, a drying climate and a growing population increasingly gravitating to urban centres. Planting dense perennial hedges that act as windbreakers helps to generate an agriculturally conducive microclimate. Traditional predominantly rain-fed forms of agriculture have been replaced by irrigation-based commercial crops. The windbreakers fight wind-related soil erosion and desiccation of crops, which had not previously been addressed. They also provide valuable fuelwood for cooking, lessening the burden on girls and women to collect wood. The use of windbreaks to “produce the environment” has led to increased production of fruit and vegetables for commercial sale in domestic and high-value export markets as

well as demonstrated carbon sequestration benefits. It also provides employment for young people and has helped train a new generation of farmers. The innovations and adaptation practises used in Sébikotane have been taken up nationally and supported internationally as being relevant to other sub-Saharan countries, as they illustrate an innovative, integrated way of managing the environment to provide adaptation and mitigation benefits locally as well as globally.

### **Case Study 5: Kenya Seed Fairs as a Drought Recovery Strategy in Kenya**

**Victor A. Orindi and Andrew Ochieng**

Adaptation to climate change is a critical issue for Kenya's food security and future economic growth. Agriculture directly or indirectly supports 80 per cent of the population and much of Kenya's economy is based on agro-based industries. Climate change puts Kenya's development at risk through potential changes in precipitation in semi-arid areas, increased incidence of waterborne diseases in humid areas and increased rates of depletion of biomass and biodiversity. The case study of Eastern Kenya examines different institutional mechanisms for seed distribution in the wake of successive droughts from 1991–2004, interspersed with floods, which resulted in a massive loss of crops, livestock and rural infrastructure. Seed fairs, organised by local communities with support from external NGOs, are found to be a more cost-effective mechanism for rapid seed distribution to the neediest sections of society than conventional, commercial channels. The latter wrongly assume that in periods of emergency local seed varieties are unavailable, when the key issue is of securing access. Seed fairs ensure seed varieties better adapted to local conditions are available during emergency periods. They also avoid the creation of dependency, help to build affected communities' social capital and contribute positively to the maintenance of biodiversity.

### **Case Study 6: Zimbabwe Climate Proofing Infrastructure and Diversifying Livelihoods in Zimbabwe**

**Johannes Chigwada**

The history, lifestyle and economic foundation of Zimbabwe are rooted in and around land and land-use for agriculture. Poverty is the main driver in

causing unsustainable farming, grazing and wood-fuel gathering that have led to dryland degradation and desert encroachment which present day governance structures cannot resolve. HIV/AIDS also imposes enormous burdens now and into the foreseeable future. Increasing temperatures will bring unpredictable precipitation patterns leading to more parched and dry conditions and possible increases in the frequency and intensity of extreme events such as cyclones. This case study examines how a small group of villagers in the Beitbridge District came together to reduce their climate vulnerabilities through livelihood diversification. Rather than trying to rebuild a dam that had been destroyed by an unexpected cyclone, the villagers chose to use the leftover funds to rehabilitate wetland, buy goats, set up seed nurseries and switch from maize, which is difficult to grow in persistent drought conditions, to drought-tolerant and pest-resistant sorghum. A key part of their success lies in their establishing a new community institution endowed with legal personality: the Tongwe Community Development Group. The villagers were then able to receive, manage and utilise external funds in a timely fashion without intermediaries. This case study illustrates the need to "climate proof" future infrastructure to ensure precious investments are not "washed away" with climate change.

### **Linking Climate Adaptation and Development: A Synthesis of Six Case Studies from Asia and Africa**

**Saleemul Huq, Farhana Yamin, Atiq Rahman, Anish Chatterjee, Xiu Yang, Salimata Wade, Victor Orindi and Johannes Chigwada**

Increased temperature, floods, droughts, extreme events and changes in precipitation pose additional risks for developing countries and vulnerable communities striving to alleviate poverty and to achieve sustainable development. Knowledge and experience of adapting to climatic conditions has been built up over a millennia by communities in many parts of the world, including developing countries, often on the basis of experimentation initiated by communities. The synthesis brings together the main insights and conclusions from case studies describing examples of successful community-led interventions in six countries: China, India, Bangladesh, Senegal, Kenya and Zimbabwe. The climate impacts studied include "headline-grabbing" extreme events, such as national floods,

and quieter forms of climatic disaster such as long-term aridity/drought, temperature increase and wind-related land degradation. The synthesis examines the roles played by formal and informal institutions, policy champions, donors, knowledge and research in decreasing vulnerabilities and supporting community-led adaptation to climate change.

### **Developing the Linking Climate Adaptation Network: Progress and Prospects**

**Farhana Yamin, Saleemul Huq and Atiq Rahman**

This article provides a brief overview of the rationale, functioning and future plans of the Linking Climate Adaptation Network which was one of the final components of the DFID-funded Linking Climate Adaptation (LCA) Project. The core objective for the Network was to assist communities and adaptation experts share theoretical, policy and experiential knowledge to support community-led adaptation in developing countries. For many reasons, communities are not well connected to formal scientific and policy processes. Knowledge system approaches that analyse how knowledge and information is generated, shared, negotiated and transformed into policy partly explain why the knowledge, preferences and perspectives of the poor are not fully taken into account. Allowing geographically dispersed communities with fewer resources to communicate better “upwards” with those engaged in formal scientific and policy responses was thus considered an important objective of the LCA Project. This article sets out how this objective was achieved through the LCA Network by explaining the rationale for the Network, its current operation and plans for its further elaboration.

### **Linking Climate Adaptation: A Research Agenda**

**Farhana Yamin, Thomas Mitchell and Thomas Tanner**

Apart from the case studies, an additional output of the Linking Climate Adaptation (LCA) Project was to identify the longer-term research agenda needed to support community-led adaptation. One aim of sharing this agenda here is to catalyse discussions among a wider group active in the climate change, development and disaster/humanitarian relief communities about how best to support community-led adaptation. As set out in the Conceptual Overview in this *IDS Bulletin*, one of the main conclusions of the LCA Project is to suggest strengthening research, policy and operational linkages between these three, currently quite separate, communities. The selection and formulation of research questions reflects a judgement on the part of the authors. The questions are broadly defined to allow elaboration, challenges, re-framings and add-ons, as we may have neglected issues outside our frame of focus: how community-led adaptation in vulnerable countries can be supported through the generation, dissemination and use of research. For convenience, the research agenda is structured around three overarching issues: (1) the sources, nature and dynamics of vulnerability, (2) the costs and benefits of adaptation, and (3) integration of climate change adaptation into disaster risk reduction and development. A separate concluding section sets out cross-cutting methodological issues that are particularly germane to how future adaptation research should be conducted, by whom and across what time frames.