

**This report is presented as received by IDRC from project recipient(s).
It has not been subjected to peer review or other review processes.**

**This work is used with the permission of International Food Policy
Research Institute.**

© 2007, International Food Policy Research Institute



CLIMATE CHANGE

Pro-Poor Adaptation, Risk Management, and Mitigation Strategies

Gary Yohe, Ian Burton, Saleemul Huq, and Mark W. Rosegrant

Climate change results from an increased concentration of greenhouse gases like carbon dioxide, nitrous oxide, and methane associated with economic activities, including energy, industry, transport, and land use patterns. Rich countries emit the majority of these gases, while poor countries are more vulnerable to their negative effects. Further, developing countries are more vulnerable and less able to adapt to these changing climatic conditions because of their locations; greater dependence on agriculture and natural resources; larger variations in weather and temperature conditions; and lower availability of critical resources like water, land, production inputs, capital, and public services.

The inability of developing countries to respond and act immediately to lessen the impacts of climate change will have serious global economic consequences. Appropriate climate change policies, if adopted now, can stimulate pro-poor investment. More specifically, they can increase the profitability of environmentally sustainable practices even as they generate income for small producers and investment flows for rural communities. Climate mitigation through carbon offsets and carbon trading can increase income in rural areas in developing countries, directly improving livelihoods while enhancing adaptive capacity. In its recently released fourth assessment report, the Intergovernmental Panel on Climate Change concluded that a portfolio of both adaptation and mitigation will be required. This brief supports this conclusion as it explores pro-poor adaptation, risk management, and mitigation strategies in response to climate change.

Adaptation and Risk Management Strategies

Emissions of greenhouse gases universally contribute to observed and anticipated climate change, but their benefits are experienced locally. Anthropogenic climate change is thus an exploitation of the global commons that requires, almost by definition, policy intervention. Yet, given the profound uncertainty that clouds our understanding of the climate system and our expectations about how future economic activity will unfold over time, standard cost-benefit techniques are giving way to a risk management perspective within which uncertainty is itself a reason to act. Inasmuch as even the most stringent restriction of emissions would still leave the globe committed to significant risk of climate impacts, a mix of adaptation and mitigation is required. And given the lack of capacity to adapt to climate change in many developing countries—and the

imperative to do so—the key issue is how national governments and the international community can work together to assist poor constituencies in adapting to observed and anticipated climate-related stresses, even as they also work to reduce emissions. This includes the type of assistance required and how it can be targeted effectively to the poor. Further, many communities, not necessarily limited to the poor, are not even well adapted to their current climates. It therefore follows that any efforts toward adaptation must build on present circumstances.

Adaptation Measures, Policies, and Strategies

Most of the literature about adaptation focuses on a variety of adaptation “measures.” In any given context, however, the choice of measures may be constrained by factors such as their expense, lack of knowledge on how to implement them, and countervailing beliefs and cultural practices. Notwithstanding these impediments, farmers and others at risk from climate change can be provided with external help. Possibilities include the provision of technical information, advice, or guidance; the provision of weather and seasonal climate forecasts and warnings; drought or flood relief; and insurance or other forms of financial assistance and risk spreading.

Decisions about adaptation measures are shaped by public policy, which can be supportive or provide barriers or disincentives. Issues include how much the government and international community is doing to create and deploy improved technology and management techniques; the effect of public policy on crop and livelihood diversification; the agricultural policies in place; and how climate variability and change is factored into policy choices. Many of the policies that can be adopted or strengthened represent existing needs.

Effective adaptation requires the judicious selection of measures within a policy context and within a strategic development framework. Market signals are an essential factor in determining the necessary responses to a changing environment, but they also involve potentially significant and expensive time lags, and they overlook equity. A risk management perspective addresses both these issues, but it is the second that provides the measure of success or failure.

Modes of External Assistance

Public intervention in implementing adaptation measures and policies, encouraged and facilitated by the international community, falls into five categories:

1. *Providing information and advice.* Government agencies can provide information and advice about climate risk and available adaptation or coping strategies.
2. *Providing guidance and training.* Beyond information and advice, governments can proactively demonstrate how specific adaptation measures can be designed and implemented.
3. *Promoting adaptation measures.* A further step is for governments to promote desirable adaptation outcomes through policy measures, including eliminating inappropriate measures, such as electricity subsidies in India that promote overuse of electricity and overmining of groundwater.
4. *Mandating adaptation.* In certain cases, it is appropriate for governments to require adaptation to safeguard public health and safety. For example, vulnerability to climate change would rise if irrigation agriculture were to expand beyond available water resources.
5. *Institutionalizing adaptation capacity and policy.* It is not unusual for climate change policy to be managed and kept within the confines of one ministry or department, but some form of interdepartmental cooperation is necessary.

Mainstreaming Adaptation into Development Planning

Economic growth is necessary for poverty reduction and promoting adaptation to climate change, but long-term growth cannot be sustained without ensuring that emerging patterns of agriculture, industry, and trade do not unduly impinge on ecological health and resilience. The tendency has been to treat adaptation to climate change as a stand-alone activity, but it should be integrated into development projects, plans, policies, and strategies. Development policy issues must inform the work of the climate change community such that they combine their perspectives in the formulation and implementation of integrated approaches and processes that recognize how persistent poverty and environmental needs exacerbate the adverse consequences of climate change.

Although linkages between climate change adaptation and sustainable development should appear to be self-evident, it has been difficult to act on them in practice. A significant adaptation gap exists in many developing countries, particularly those populated by the rural poor who subsist on agriculture. While mitigation within the United Nations Framework Convention on Climate Change (UNFCCC) includes clearly defined objectives, measures, costs, and instruments, this is not the case for adaptation. Much less attention has been paid to making development more resilient to climate change impacts and to identify the barriers to mainstreaming climate change adaptation within development activities.

Moving Forward

Clearly the adaptation agenda is broad. Much of the action required is at the local level, and its precise

nature depends on local circumstances. But much can be done with international support at the national level to support local adaptation initiatives. Three such actions are described below:

1. *National adaptation action plans.* All countries should have national adaptation plans that take a broad strategic view of future development paths and expected climate change impacts, and examine and adjust policies, including those related to agriculture, forests, fisheries, water, and other natural resources, as well as health, infrastructure, and ecosystems. The policy review could also include the management of extreme weather events and areas of particular risk, such as exposed coastal zones, steep mountain slopes, and so on. Specific adaptation measures could then be evaluated and selected within the context of a climate-sensitive strategy and set of policies.
2. *Financing for national adaptation plans.* A common concern of developing countries is that their participation in multilateral environmental agreements imposes high costs. It seems realistic to suggest that developed countries, acting collectively through the Global Environment Facility (GEF), support the preparation of adaptation plans. This would help not only to ensure that climate is adequately considered in national development plans and sectoral policies, but also to reassure donors and investors that climate change adaptation measures are well conceived and represent sound expenditures. Plans also need to be implemented, requiring further support. Most of the present funding for adaptation has been on a voluntary basis. Funds are established under GEF, developed countries make contributions, and developing countries access the funds indirectly through one of three implementing agencies (the United Nations Development Programme, the United Nations Environment Programme, or the World Bank). The growth in these funds has been slow, partly because donor countries lack sufficient confidence in the modalities for the effective use of the funds. Creation of national adaptation plans could go a long way toward alleviating this problem. Negotiations on the preparation of such plans would require time, so if such ideas are to be included in post-2012 agreements, there is no time to lose.
3. *Climate insurance.* A further suggestion concerns the provision of insurance against climate risk. Countries, communities, and individuals in most developing countries have little or no insurance coverage against extreme weather events. The private insurance industry is poorly developed in many cases, and fear of losses in uninsured catastrophic events is a significant deterrent. The need and opportunity exists to develop public-private partnerships to expand insurance against climate-related events in developing countries. Such initiatives could serve three purposes: first, they could perform the classical insurance function of spreading risk; second, they could ensure continuity of government operations after a severe loss event; and third, and most important in the adaptation context, they could help to ensure that

adequate adaptation measures are taken. Insurance in this case would be an instrument of public policy, not an end in itself, the objective being to reduce vulnerability by encouraging, facilitating, or even mandating the adoption of adaptation measures. Insurance could be made available at concessionary rates, subject to the insured activity or property meeting certain adaptation or vulnerability reduction requirements.

Pro-poor Mitigation Strategies

Since adaptation becomes costlier and less effective as the magnitude of climate changes increases, mitigation of climate change remains essential. The greater the level of mitigation that can be achieved at affordable cost, the smaller the burdens placed on adaptation. Effective reform of carbon trading and carbon offsets to better include farmers and foresters in developing countries could have significant benefits in mitigation in addition to encouraging environmentally sustainable practices and improving rural incomes to enhance adaptive capacity. Global carbon trading will increase dramatically under present trends, but two key constraints need to be overcome before significant benefits can be channeled to rural areas in developing countries: first, the rules of access—which still do not credit developing countries for reducing emissions by avoiding deforestation or improving soil carbon sequestration—must change; and second, the operational rules, with their high transaction costs for developing countries and small farmers and foresters in particular, must be streamlined.

The innovative approach of the Chicago Climate Exchange (CCX) to carbon trading suggests that the technical reasons for excluding forestry conservation and soil carbon sequestration can be overcome and transaction costs reduced by simplifying the rules and using modern monitoring techniques. The agricultural, forestry, and land use systems of developing countries can be better developed into the carbon-trading system through policy reforms in global governance of carbon trading, to sectoral and micro-level design of markets and contracts, and institutional development at the community level. Streamlining the measurement and enforcement of offsets, financial flows, and carbon credits for investors is also required.

Greenhouse Gases, Land Use, and Agriculture

Land use change (18.2 percent) and agriculture (13.5 percent) together create nearly one-third of greenhouse gas emissions. The share of these kinds of emissions is far larger in developing countries and still larger in least developed countries. Achieving significant carbon mitigation in developing countries will require tapping carbon offsets from agriculture and land use change. While not as large as the potential for savings from reducing the consumption of fossil fuels, the total potential savings from various agricultural and land use change activities is still substantial and is achievable at a competitive cost. With as much as 13 gigatons of carbon dioxide per year at prices of US\$10–20 per ton, this represents potential financial flows of US\$130–260 billion

annually, comparable to annual official development assistance of US\$100 billion, and foreign direct investment in developing countries of US\$150 billion.

Adopting Innovative Pro-Poor Approaches for Developing Countries

In addition to the crucial steps of including soil carbon offsets and avoided deforestation in the Convention's Clean Development Mechanism (CDM), a number of other changes are needed. To ensure that these emerging carbon markets benefit developing countries, CDM rules should encourage the participation of small farmers and community forest and agroforestry producers, and protect them against major livelihood risks while still meeting investor needs and rigorously ensured carbon offset goals. This can be supported through the following mechanisms:

1. *Broadening the definition of afforestation and reforestation.* Agroforestry, assisted natural regeneration, forest rehabilitation, forest gardens, and improved forest fallow projects should all be eligible under CDM, because they offer a low-cost approach to carbon sequestration while offering fewer social risks and significant community and biodiversity benefits. Short-duration tree-growing activities should be permitted, with suitable discounting. Limiting project types would introduce forest product market distortions unfairly favoring large plantations.
2. *Promoting measures to reduce transaction costs.* Rigorous but simplified procedures as typified by the CCX should be adapted to developing-country carbon offset projects. According to the Marrakesh Accords, small-scale projects can benefit from simplified ways of determining baselines and monitoring carbon emissions. Small-scale agroforestry and soil carbon sequestration projects should be eligible for simplified modalities to reduce the costs of these projects. The permanence requirement for carbon sequestration should be revised to allow shorter term contracts, or contracts that pay based on the amount of carbon saved per year, which would avoid the need for "locking up" land in forest land uses for prolonged periods.
3. *Establishing international capacity building and advisory services.* The successful promotion of livelihood enhancing CDM forestry projects will require investment in capacity-building and advisory services for potential investors, project designers and managers, national policymakers, and leaders of local organizations and federations. Regional centers could be established to assist countries and communities involved in forest carbon trading. Institutional innovations can provide economies of scale and specialization. Companies or agencies can provide specialized business services for low-income producers to help them negotiate deals or design monitoring systems. Locally accountable intermediary organizations can manage projects and mediate between investors and local people.

Finally, further investment in advanced measurement and monitoring can dramatically reduce transaction costs. Measurement and monitoring techniques have been improving rapidly thanks to a growing body of field measurements and the use of statistics and computer modeling, remote sensing, global positioning systems, and geographic information systems, so that changes in stocks of carbon can now be estimated more accurately at lower cost.

Conclusions

Policies focused on mitigating the effects of climate change, if carefully designed, can create a new development strategy that encourages the creation of new value in pro-poor investments by increasing profitability of environmentally sustainable practices. To achieve this goal, it will be necessary to streamline the measurement and enforcement of offsets, financial flows, and carbon credits for investors. It is important to enhance global financial facilities and governance to simplify rules and increase funding flows for mitigation in developing countries.

Challenges and opportunities are not quite as clear when it comes to adaptation, however. There is no single definition of what it means to adapt to a stress, and there are no firm quantitative measures for adaptive capacity. It is, however, widely accepted that the underlying determinants of a high capacity to adapt (and to mitigate, for that matter) include routine access to resources, strong social and human capital, and routine access to risk-spreading mechanisms. The rural poor are lacking in most of these factors; thus, they are highly vulnerable under climate change. Moreover, climate impacts vary over space and time. As global adaptation funds accrue (as more members of the UNFCCC sign on to Kyoto and a successor agreement to Kyoto is developed), care must be taken to allow

countries to follow their own approaches; but success across nations must be measured against consistent and as yet undefined standards.

Some will read these recommendations with trepidation because very little climate change has occurred to date in many—but not all—places, so fears arise that large-scale adaptation programs may be premature or run the risk of being misdirected. It is also widely understood that the sources of low adaptive capacity are extraordinarily diverse. Will poor farmers in a particular location, for example, fail to adapt because of lack of knowledge, lack of resources, or poor government policies, and what would be the appropriate role of the international community in each case? The counterargument presented here is that these concerns do not constitute reasons not to act but rather are reasons to proceed cautiously in recognition that no single approach will work everywhere. The only way to learn what works, where, and why is to try, and—in the most difficult circumstances where action can actually begin to help the most vulnerable—now is the time to start trying in earnest.

For Further Reading: N. Adger, J. Paavola, S. Huq, and M. J. Mace, eds., *Fairness in Adaptation to Climate Change* (Cambridge, MA: Massachusetts Institute of Technology Press, 2006); K. A. Baumert, T. Herzog, and J. Pershing, *Navigating the Numbers: Greenhouse Gas Data and International Climate Policy* (Washington, DC: World Resources Institute, 2005); Intergovernmental Panel on Climate Change (IPCC), *Climate Change 2007: The Science*, Contribution of Working Group I to the Fourth Assessment Report, S. Solomon, D. Qin, M. Manning, M. Marquis, K. Averyt, M. M. B. Tignor, and H. Miller, eds. (Cambridge University Press, 2007); IPCC, *Climate Change 2007: Impacts, Adaptation and Vulnerability*, Contribution of Working Group II to the Fourth Assessment Report, M. L. Parry, O. F. Canziani, J. P. Palutikof, P. J. van der Linden, and C. E. Hanson, eds. (Cambridge University Press, 2007); IPCC, *Climate Change 2007: Mitigation of Climate Change*, Contribution of Working Group III to the Fourth Assessment Report, B. Metz and O. Davidson, eds. (Cambridge University Press, 2007).

Gary Yohe (gyohe@wesleyan.edu) is Woodhouse/Sysco Professor of Economics at Wesleyan University, Middletown, Connecticut, U.S.A.; **Ian Burton** (ianburtonian@aol.com) is scientist emeritus at Environment Canada, Toronto; **Saleemul Huq** (saleemul.huq@iied.org) is group head of the Climate Change Program at the International Institute for Environment and Development, London; and **Mark W. Rosegrant** (m.rosegrant@cgiar.org) is director of the Environment and Production Technology Division at the International Food Policy Research Institute, Washington, DC.

Suggested citation: Gary Yohe, Ian Burton, Saleemul Huq, and Mark W. Rosegrant. 2007. Climate Change: Pro-poor Adaptation, Risk Management, and Mitigation Strategies. 2020 Focus Brief on the World's Poor and Hungry People. Washington, DC: IFPRI.

The views expressed in this brief are those of the author(s) and are not necessarily endorsed by or representative of IFPRI, or of the cosponsoring or supporting organizations.

This brief was prepared for a policy consultation process coordinated by IFPRI and focused on the World's Poor and Hungry People. IFPRI gratefully acknowledges the contributions of: Asian Development Bank (ADB), Bill and Melinda Gates Foundation, Canadian International Development Agency (CIDA), Deutsche Welthungerhilfe (German Agro Action), European Commission, German Federal Ministry for Economic Co-operation and Development, with Deutsche Gesellschaft für Technische Zusammenarbeit (BMZ/GTZ), International Development Research Center (IDRC) Canada, and Irish Aid.



INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE
2033 K Street, NW, Washington, DC 20006-1002 USA
T: +1 202 862 5600 • F: +1 202 467 4439
ifpri@cgiar.org • www.ifpri.org



FOR FOOD, AGRICULTURE, AND THE ENVIRONMENT

Copyright © 2007 International Food Policy Research Institute. All rights reserved. Sections of this material may be reproduced for nonprofit use without written permission but with acknowledgment to IFPRI. For further information: ifpri-copyright@cgiar.org.