



INTERNATIONAL FOOD  
POLICY RESEARCH INSTITUTE

*sustainable solutions for ending hunger and poverty*

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# CLIMATE CHANGE

## Minimizing the Risks and Maximizing the Benefits for the Poor

**G**lobal climate change poses great risks to poor people whose livelihoods depend directly on agriculture, forestry, and other natural resource uses. IFPRI's climate change research focuses on the assessment of, adaptation to, and mitigation of these risks. Strategic, cost-effective, and pro-poor policy reforms that enhance human welfare in equitable and sustainable ways form the core of IFPRI's Global Change Program. The Program analyzes the complex interrelations between climate change and agricultural growth, food security, and natural resource sustainability.

The Program's comprehensive approach to climate change analysis looks at the key drivers of climate change and their possible evolution over time. A scenario-based framework is used to forecast how these major drivers of change will impact food and agricultural systems and food security. Based in part on these projections, IFPRI is developing adaptation and mitigation strategies, including ones that show how alternative climate policy regimes in a post-Kyoto-Protocol world will affect agriculture, food security, and poor people. Developing countries could finance climate adaptation and mitigation strategies through cap-and-trade and carbon-tax instruments that support agricultural and rural development, but the impacts of these and other approaches need to be better understood. Effective adaptation and mitigation can generate income in rural areas, further increasing local capacity to adapt to climate change, but the best means of encouraging these outcomes need to be identified.



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### IMPACT: MODELING AND PROJECTING THE EFFECTS OF CLIMATE CHANGE ON FOOD SECURITY

A major focus of IFPRI's current work on climate change involves examining the dynamic linkages between three essential components of the agricultural system—agricultural markets, agricultural production, and environmental change. This allows IFPRI researchers to produce an integrated analysis of climate change with a remarkable range of detail at the local, regional, and global levels.

IFPRI begins by analyzing the influence of changes in climate and policy on food production systems. Ongoing research helps determine which regions and sectors will be most vulnerable to climate-driven environmental changes during the next 30-50 years. Based on this research, the linkages that connect environmental change to the welfare of poor people are examined, revealing the impact of climate shocks on livelihoods and possible adaptation strategies to reduce vulnerability. This multifaceted approach is essential to determining how climate change might affect the development and growth of various regions and how it might hinder their progress toward meeting

the first Millennium Development Goal of reducing poverty, hunger, and malnutrition. Allowing for different anticipated trajectories of change in different regions, IFPRI evaluates the effectiveness of policy and investment options in maintaining environmental sustainability and accelerating pro-poor growth. The cumulative body of evidence uncovered by IFPRI's research will help policymakers mitigate and offset the negative welfare effects of climate change more effectively.

Climate change modeling utilizes the MIRAGE model and IFPRI's IMPACT model linked to climate and integrated-assessment models. Since the mid-1990s, IMPACT (the International Model for Policy Analysis of Agricultural Commodities and Trade) has been a cornerstone of IFPRI's forward-looking research and policy analysis. This model is well known for its global and regional projections of food and water supply and demand in the medium to long terms, and its projections have been used in a variety of strategic outlooks on agricultural growth and food security. To assess the impact of climate change on the entire economy, IFPRI is also drawing on MIRAGE, a multiregion, multisector model originally developed by the Paris-based CEPII, and now used by many institutions around the world.

## ADAPTATION: HELPING THE POOR MAKE THE BEST OF CLIMATE CHANGE

Responses to climate change need to occur on several levels, including crop and farm-level adaptations, national-level agriculture-related policies and investments, and regional and global policies and investments. Adaptation strategies include infrastructure investment, water-allocation reform, altered land use, and changes in food trade.

To identify both short- and long-term adaptation measures that reduce the impacts of global change on vulnerable communities, IFPRI works with local partners and stakeholders to characterize vulnerability through focus-group interviews and comprehensive household surveys. It also holds workshops in which partners develop and analyze scenarios for vulnerable countries and assess the effectiveness and relative costs and benefits of response options and adaptation strategies. From there, global and regional adaptation strategies and policy reform options can be developed. IFPRI also helps to enhance international and national adaptive capacity by facilitating exchange of insights and experience among researchers, and by building capacity in national research institutions.

The research results generated through these activities will provide policymakers and stakeholders in developing countries with the tools for making informed decisions about adapting

## BIOENERGY AND THE POOR

As nations move toward developing alternative sources of energy to limit the emission of greenhouse gases, IFPRI has begun to analyze the linkages between energy and agriculture (through the use of IMPACT and other modeling tools) and the effects of the growing demand for biofuels on the developing world. Biofuel expansion will have mixed impacts on the poor as it accelerates the globalization of agriculture, increases crop prices, raises land values, and creates some jobs. Pro-poor policies will need to enhance these benefits and reduce the adverse impacts, particularly with regard to increasing and unstable food prices.

to climate change. Currently, IFPRI is working on adaptation strategies with stakeholders in Ethiopia and South Africa. IFPRI also undertakes collaborative research with the Global Environmental Change and Food Systems program at the Oxford University Center for the Environment.

## MITIGATION: CREATING PRO-POOR ENVIRONMENTAL POLICIES

Current rules governing carbon trading exclude important activities in developing countries such as avoided deforestation and soil carbon sequestration. Regulations on carbon trading impose high costs on developing carbon markets in poor countries. If appropriate carbon-trading and carbon-offset policies are adopted now, they can stimulate pro-poor investment. This can increase the profitability of environmentally sustainable practices, generate income for small producers, and create investment flows for rural communities.

Therefore, IFPRI is initiating new research to systematically assess the potential of a range of new mechanisms to address pro-poor mitigation strategies for climate change. This research focuses on generating knowledge on the impact of alternative mitigation regimes—such as carbon taxes and cap-and-trade—on developing-country agricultural and economic growth, food security, poverty, and environmental sustainability. Specific activities include identifying pro-poor investments and viable governance systems to help small farmers and foresters participate in carbon trading.

IFPRI will also investigate key research issues such as the organizational arrangements and government and community capacity required to implement carbon trading projects, as well as the financial and economic gains of more effective agricultural and forestry development related to carbon mitigation.

With appropriate policy, governance, and management reforms, climate mitigation strategies such as carbon-offset and carbon-trading projects in developing countries, combined with sustainable land use and forestry, can improve rural livelihoods and promote sustainable rural development.

IFPRI's climate change research is led by its Environment and Production Technology (EPT) Division, [ifpri-ept@cgiar.org](mailto:ifpri-ept@cgiar.org).

For more information:

IMPACT Model: <http://www.ifpri.org/themes/impact.htm>

Food and Water Security under Global Change: <http://www.ifpri.org/themes/globalchange/globalchange.htm>

Bioenergy: <http://www.ifpri.org/themes/bioenergy/bioenergy.asp>



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](mailto:ifpri@cgiar.org)

[www.ifpri.org](http://www.ifpri.org)