AGRICULTURE AND CLIMATE CHANGE:
AN AGENDA FOR NEGOTIATION IN COPENHAGEN

Adaptation to Climate Change: Household Impacts and Institutional Responses

FUTOSHI YAMAUCHI AND AGNES QUISUMBING

2020 VISION FOR FOOD, AGRICULTURE, AND THE ENVIRONMENT

FOCUS 16 • BRIEF 12 • MAY 2009

Climate change will bring with it increased frequency of two types of natural disasters that affect agriculture and rural households: droughts and floods. It will also alter rainfall patterns, thereby changing farming practices, household behavior, and welfare.

Households all over the world use a variety of formal and informal mechanisms to manage risk and cope with unexpected events that negatively affect incomes, assets, or well-being. These mechanisms include both preparation for and responses to natural disasters. In low-income settings, where formal insurance and government supports are limited, households tend to rely on informal coping strategies, such as transfers from friends and neighbors, remittances, or investments in a diverse range of assets, from livestock to human capital. When disaster-related shock affects only a few households at a time, informal mechanisms can be quite effective in dealing with the situation. However, if the shock affects large areas simultaneously, small-scale coping mechanisms become ineffective.

Research on several climate-related national disasters—the 1998 floods in Bangladesh, the 2001 drought in Ethiopia, and the 2001–02 failed maize harvest in Malawi—suggests that the upcoming negotiations in Copenhagen need to explicitly define, support, and expand policies that protect vulnerable populations from the expected increase in climate-change related weather events.

Household responses: Ex ante and ex post

People adopt different response strategies based on the scale of a perceived hazard. Because individuals cannot distribute risk equally among other individuals and households, they need to reallocate resources accordingly, either by accumulating physical or human capital assets over time or by entering into contracts that are valid only if certain outcomes occur.

Households in the three disaster-prone regions studied had similar responses to the effects of a natural disaster. Relatively low disaster probabilities do not sufficiently motivate households to invest in assets to diversify against risk. However, if the perceived threat of disaster is sufficiently high, they will allocate more of their resources to human capital and livestock, which are both relatively mobile. For example, in Bangladesh and Malawi, households increased human capital relative to land, while, in Ethiopia and Malawi, households held more livestock relative to land. These differences suggest that beneficial ex ante actions depend on market returns to these assets as well as the effectiveness of ex post institutional responses to previous disasters. The importance of ex ante actions will increase as natural disasters occur more frequently.

Households with more schooling are also better prepared in both the short and long term. Human capital is less affected by natural disasters than physical capital; it is portable and remunerable in different locations and obtains more stable returns. Additionally, better health and nutritional status of children raises their survival probability and resilience to disasters. Taller children are less likely to become sick even in unsanitary post-disaster environments. In Bangladesh, for example, taller children were less affected by the adverse effects of the 1998 floods and made up missed schooling much sooner than shorter children. In Ethiopia and Malawi, the exposure to highly frequent droughts reduced schooling for some, but with more negative impacts on shorter children.

The significance of ex ante actions and preparedness also depends on the effectiveness of public assistance, both before and after a disaster. In Ethiopia, public assistance after disasters played a more important role than ex ante actions in mitigating the impact of the shocks on child schooling. In contrast, Malawi relied on private ex ante actions, since public aid was largely insignificant. Both ex ante and ex post actions were important in Bangladesh.

Institutional responses: Targeting and effectiveness

IFPRI conducted studies of governmental emergency assistance provided in three climate-related natural disasters. Evaluations were based on detailed household surveys completed between eighteen months and five years after the disaster and, in most cases, several months after emergency food aid disbursements had stopped.

Bangladesh

Following the 1998 floods, two existing relief programs provided the bulk of food assistance. Gratuitous Relief (GR) provided free food targeted both across and within localities, with community-level decisionmakers allocating relief directly to the most affected households. The Vulnerable Group Feeding (VGF) program also used community targeting, employing criteria such as assets, income, occupation, and demographics (for example, female-headed households). GR was mobilized immediately after the flood, while VGF was implemented months later and was broader in scope. GR community relief committees appear to have channeled relief more effectively to flood victims, while VGF directed food more to the poor rather than to those severely affected by the flood. GR functioned better as a disaster-relief mechanism, suggesting that community-level decisionmakers are better equipped to decide who should receive emergency assistance.

Ethiopia

After a severe drought in 2002, two types of emergency assistance were made available in the most severely affected areas: Food-for-Work (FFW) and targeted free food distribution or gratuitous relief (GR). Ethiopia's National Food Aid Targeting Guidelines gives local communities responsibility for creating criteria for the allocation of drought relief. For public work provided under FFW or Employment Generation Schemes (EGS), locally set targeting criteria seem to have been poorly understood. Instead of targeting resources to those most severely affected by the drought, EGS reached out to households with able-bodied individuals who were willing to work and set the wage in such a way that the richest households were only slightly less likely to participate. Targeting criteria were better understood in the GR program.

Malawi

When Malawi's maize harvests failed in 2001 and 2002 after a severe drought, the initial response to the food crisis was delayed due to

poor information, trade and transport bottlenecks, and a general lack of institutional preparedness in dealing with large-scale emergencies. Food assistance arrived late, although it was quickly scaled up. Most of the aid was administered by nongovernmental organizations in partnership with district- and village-level institutions, using community-based targeting. The largest program, General Food Distribution, targeted the "poorest of the poor," with a special emphasis on households with orphans and/or malnourished children, families with elderly or ill members, female-headed households, and those who had suffered the most from the drought.

IFPRI research found that when targeting criteria are easily verified—for instance, female-headed households or households with orphans—aid institutions were more likely to abide by the targeting guidelines. When the criteria were not easily identified, as in the case of defining the "poorest of the poor," they were less likely to be implemented.

Community-based targeting worked well in Bangladesh, moderately in Ethiopia, and minimally in Malawi. Three features are of note. First, targeting experience improves performance. Bangladesh, the most successful in reaching targeted populations, also had the most experience with targeting emergency assistance on a unified, national scale. Ethiopia, while responding to droughts over a similar period of time, had a historically decentralized approach, with national coordination being relatively recent. Malawi had not experienced a similar crisis since the 1940s and was ill prepared for a national food emergency. Second, community-based targeting is more effective under tight budgets. For example, in Ethiopia, where communities allocated both public works and free distributions, targeting was better in the latter program, which was more resource-constrained. Finally, more information within communities can improve the effectiveness and consistency of targeting as well as increase residents' trust that relief is being disbursed fairly and rationally.

In addition to mitigating the short-term effects of natural disasters on food consumption, targeted emergency food relief can reduce households' need to sell physical and human assets, thereby having longer term impacts on asset holdings and the overall future well-being of those affected by disaster. It appears that the long-term effects of either Food-for-Work or free food distribution on asset holdings and consumption was limited, although positive impacts were found for some groups of recipients in all three countries. In Bangladesh, GR was effective in protecting the asset levels of the poorest quintile while, in Ethiopia, GR recipients in the two poorest quintiles had higher livestock holdings than nonrecipients. There is some evidence that food aid's role in protecting assets may have persistent effects on food consumption as well. However, aid does not always benefit the poorest of a given population. In Ethiopia, for example, households benefiting the most from EGS participation were in the middle and upper portions of the expenditure distribution.

Suggested negotiating outcomes:

Climate change adaptation measures should include adequate funding and preparation for emergency assistance to respond rapidly to climate-change related disasters. Launching relief efforts as early as possible in an emergency prevents people from using coping mechanisms that harm health or nutritional status (for example, by reducing the number of meals they eat) or compromising their livelihoods (by selling productive assets). Early action requires reliable early warning systems. Also, food aid has greater impact when the schedule of assistance—even if it is brief—is well known and consistent, because this allows recipients to plan consumption and investment.

Relief providers should consider increasing the ration size since food-aid rations, in all cases, amounted to only a small proportion of household consumption. Increasing rations to specific households would mean decreasing the number of aid recipients, therefore targeting would need to be more effective.

Given limited aid resources and the probability that climate change will cause more frequent disasters, existing social protection systems will be increasingly strained. They will need to be redesigned to account for new threats to the livelihoods and well-being of poor households. Thus, funding adaptation that arises from the Copenhagen negotiations should reflect these key findings:

- More education and nutrition ex ante are important. While investment in education and nutrition is part of good development policy in general, it also facilitates adaptation to climate change.
- Ex post targeting by communities, focused on those most severely affected by or least able to cope with disaster, is essential. Easily verifiable indicators of vulnerable groups—including female-headed households, orphaned children, and so forth—will facilitate local targeting. Funding will have to be devolved downward to the extent possible and communities empowered to make decisions on emergency assistance allocations.
- Countries with more experience in managing natural disasters perform better over time, so intergovernmental mechanisms should enable countries to learn from one another's experiences. ■

For Further Reading: D. O. Gilligan et al., *Assessing the Effectiveness of Community-Based Targeting of Emergency Food Aid in Bangladesh, Ethiopia, and Malawi,* IFPRI-WFP Research Action Brief (Washington, D.C., and Rome: International Food Policy Research Institute and World Food Programme, 2005); D. O. Gilligan et al., *Assessing the Longer-Term Impact of Emergency Food Aid in Bangladesh, Ethiopia, and Malawi,* IFPRI-WFP Research Action Brief (Washington, D.C., and Rome: International Food Policy Research Institute and World Food Programme, 2005); F. Yamauchi, Y. Yohannes, and A. Quisumbing, *Risks, Ex-ante Actions and Public Assistance: Impacts of Natural Disasters on Child Schooling in Bangladesh, Ethiopia, and Malawi,* Policy Research Working Paper No. 4909 (Washington, D.C.: World Bank, 2009).

Futoshi Yamauchi *(f.yamauchi@cgiar.org) is a research fellow and* ***Agnes Quisumbing*** *(a.quisumbing@cgiar.org) is a senior research fellow in the Poverty, Health, and Nutrition Division at the International Food Policy Research Institute.*

International Food Policy Research Institute
2033 K Street, NW • Washington, DC 20006-1002 • USA
Phone: +1-202-862-5600 • Skype: ifprihomeoffice • Fax: +1-202-467-4439 • Email: ifpri@cgiar.org
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