



INTERNATIONAL FOOD
POLICY RESEARCH INSTITUTE
sustainable solutions for ending hunger and poverty
Supported by the CGIAR

2 0 2 0
FOCUS 17

INNOVATIONS IN INSURING THE POOR

EDITED BY
RUTH VARGAS HILL AND MAXIMO TORERO

2020
VISION™

FOR FOOD, AGRICULTURE,
AND THE ENVIRONMENT

Risk and poverty are inextricably linked. Susceptibility to risk is a defining feature of what it means to be poor. Poor people often live in environments characterized by high weather and disease risk, and it is poor households that have the fewest tools to deal with drought, floods, and disease when they occur. Breaking the link between risk and poverty by insuring poor people both lessens the affliction of poverty and allows poor people to participate in income growth.

This set of briefs considers how to increase the tools available to poor households to manage agricultural and health risks. The focus is how to develop insurance markets, along with other financial instruments such as credit, savings, and social protection policies. The series does not document the proven impact of insurance markets for the welfare of poor people; rather, it brings together briefs written by businesspeople, policymakers, and researchers that document innovations, lessons learned, and areas of future work and action.

The International Food Policy Research Institute (IFPRI) approached leading experts around the world to share their experiences with regard to innovations to provide insurance against agricultural and health risks to poor people. Many of the brief authors and other experts in the field met to discuss the briefs, lessons learned, and future challenges in insuring poor people at a workshop held in Washington, D.C., in October 2009.

We are grateful to Ruth Vargas Hill and Maximo Torero for conceptualizing and editing this collection of policy briefs, to the contributors for their analyses and insights, and to the reviewers for their constructive comments. We hope that the findings and recommendations presented here will inform continuing work to protect poor people throughout the world.

Shenggen Fan
Director General

Rajul Pandya-Lorch
Head, 2020 Vision Initiative

The International Food Policy Research Institute (IFPRI) is one of several international research centers supported by the Consultative Group on International Agricultural Research (CGIAR).

"2020 Vision for Food, Agriculture, and the Environment" is an initiative of IFPRI to develop a shared vision and consensus for action on how to meet future world food needs while reducing poverty and protecting the environment.

IFPRI gratefully acknowledges the generous unrestricted funding from Australia, Canada, China, Denmark, Finland, France, Germany, India, Ireland, Italy, Japan, the Netherlands, Norway, South Africa, Sweden, Switzerland, the United Kingdom, the United States, and the World Bank.

Overview

RUTH VARGAS HILL AND MAXIMO TORERO

FOCUS 17 • BRIEF 1 • DECEMBER 2009

Risk characterizes life for many of the world's poorest households. They are more likely to be located in environments where livelihoods are highly susceptible to weather and price variability and where health risks are pervasive. When these risks are uninsured, they not only reduce the current welfare of poor rural households, but also threaten future income growth and thus perpetuate poverty. Reducing the risks faced by poor households, and enabling poor households to better deal with bad events when they do occur, is essential to improving their welfare in the short run and their opportunities for income growth in the long run.

This set of briefs considers how to increase the risk-management mechanisms available to poor households. The focus is how to develop insurance markets, along with other financial instruments such as credit and savings and ex post mechanisms such as social protection policies.

The cost of uninsured risk

When shocks hit, households lose income or the ability to earn income. Households may cut back on consumption, reduce investments in education, or sell productive assets such as land and livestock. Short-term shocks can have long-lasting effects. For example, in a study conducted in villages in Kenya and Madagascar, a health shock affecting an adult household member was the most frequently cited reason for household poverty even many years later. Even the potential of an uninsured shock has welfare costs. Households take action to limit their exposure to risk—they may pass up a profitable but risky opportunity, diversify their economic activities, or keep as many assets as possible in easily disposable forms. These actions reduce their productivity and provide them with lower mean returns, thus perpetuating their poverty. For instance, in Guatemala small farmers were found to forgo market income from higher-value crops in order to have a certain supply of maize from their own production. In Tanzania, a shift into low-risk, low-return crops by poorer households resulted in 20 percent lower incomes per unit of land for households in the lowest quintile compared with the richest quintile. This relationship between risk and poverty is discussed further in the brief by Stefan Dercon.

Risks can be classified based on their level of covariance (the degree to which they occur to a large population at the same time) and on their frequency. Traditional insurance contracts are more difficult to offer when risks are covariate. Many rural households are engaged in farming, the returns to which are strongly affected by weather events that are typically covariate, such as droughts and flood. Health risks include both frequent and infrequent risks, and as Richard Leftley discusses, frequent risks pose additional logistical challenges to the provision of insurance. Therefore insuring the poor for weather and health risks poses challenges beyond the usual information asymmetries (moral hazard and adverse selection).

The role of insurance markets in protecting poor households

The development of insurance markets can help protect poor households against risk. Yet insurance markets, although important, will be only part of a set of tools to manage risk. Government-run schemes that protect the poorest households, financial instruments that make it easier for poor households to save and borrow, and informal networks of assistance all play a role in protecting poor households in both developed and undeveloped insurance markets. Insurance markets complement these tools.

Social protection

The poorest households are those least able to protect themselves against bad events, which reduce these households' long-run growth prospects. There is thus a strong rationale for providing public support to poor households on both equity and efficiency grounds. By increasing access to assets and providing transfers when shocks occur, social protection programs can play an important role in insuring poor households. Social protection programs encompass a wide range of interventions, from publicly provided health and life insurance and safety nets to child nutrition programs and cash transfers. As discussed in the brief on social protection by John Hoddinott, when it is well targeted and reliably distributed, social protection can help insure very poor households for whom market-based solutions are likely to be out of reach or for risks that are so widespread they would be difficult for private financial organizations to manage.

It can, however, be costly and difficult to target social protection schemes to the poorest households and to ensure they deliver timely support when bad events strike. Complementing social protection with market-based forms of insurance can help. Olivier Mahul, Nathan Belete, and Andrew Goodland discuss how public social protection against extreme risk and private market protection against smaller risks can be linked to provide full insurance against a major agricultural risk in Mongolia—livestock death. A similar structure is in place in the Cambodian health insurance scheme discussed by David Levine. In this case the government covers some high-cost chronic health conditions and partially subsidizes healthcare costs, while private health insurance covers the remaining costs. Amado Villarreal describes how Mexican state governments use insurance to help protect farmers against adverse weather conditions.

Public support can sometimes best be mediated through insurance companies, in the form of premium subsidies for poorer households. In countries with private health insurance provision, there are often segments of the population (such as the very old, the very poor, and children) for whom premiums are paid publicly for both ethical and public health reasons. In some cases subsidies may be more universally applied. In nearly all developed weather

insurance markets, insurance is subsidized to some extent. The widespread presence of subsidies raises two important points: (1) voluntary payment of full-cost insurance will likely result in much less than full insurance coverage, and (2) the ethical or moral imperative to protect poor households provides a rationale for state involvement in some aspects of insurance. Improving linkages between public provision of programs to protect the poor and market-based insurance schemes could help ensure that social protection meets its intended goals and insurance coverage is extended to more households.

Saving and borrowing

The use of borrowing and the accumulation and liquidation of assets to smooth consumption over time is common across countries. Richard Hornbeck notes the plethora of financial products currently used by households in many parts of the developing world. When well developed, borrowing and saving can be an efficient way for households to manage the risks they face. Without insurance, however, these financial products are also at risk: it is hard to develop credit markets in contexts of high risk, asset stocks become depleted and ineffective in times of repeated shocks, and both assets and borrowing are challenged by risks that simultaneously affect the incomes of all clients in a geographical area. There is thus a need to develop insurance products that complement financial products, such as the products discussed by Rupalee Ruchismita and Sona Varma in their brief on India and the weather insurance in Malawi described both by Richard Leftley and Xavier Giné.

Similar arguments can be made for informal networks of support. In many countries the giving and receiving of financial gifts are means by which households support each other in times of need. These networks of support have trust and informational advantages over formal insurance markets, but when bad events affect all members of a network at the same time, the network is not able to support its members. Ideally, insurance will support and complement these networks rather than substitute for them. Combining these networks with reinsurance schemes could both strengthen these groups and provide a means to effectively retail insurance. For instance, mutual societies were instrumental in the development of life insurance markets, and farmer unions are an important part of the structure of Spain's crop insurance and the provision of weather insurance in Ethiopia (see the brief by Meherette).

Lessons from recent innovations

In the past 10 years, financial and technological innovations have made insurance more affordable. One innovation is index-based insurance, which allows individual farmers to protect themselves

against agricultural production risk by paying out when an independently observable trigger (such as the level of rainfall at a local weather station or data on output in a given area) shows that an insurable event has occurred. This approach reduces the cost of providing insurance against a number of agricultural risks and thereby allows insurance companies to reach poor households. Because index insurance is based on an independent trigger that cannot be influenced by actions of the farmer, it reduces moral hazard and adverse selection, but because it is based on an independent trigger, it may involve substantial basis risk (that is, the risk that payouts may not always exactly match the losses a farmer experiences), which can be difficult for farmers to understand. The briefs by Ulrich Hess and Peter Hazell; Michael Carter; Richard Leftley; Xavier Giné; and Olivier Mahul, Nathan Belete, and Andrew Goodland discuss recent experiences with index insurance, drawing a number of lessons, including: (1) insurance often needs to also improve access to credit or technology adoption so that it clearly raises expected incomes (Hess and Hazell); (2) much more needs to be done to reduce basis risk in these contracts, a task that may require substantial investments in weather-station infrastructure and data collection (Carter, Leftley); (3) improving people's understanding and trust of insurance is key to increasing demand (Giné); and (4) scaling up insurance schemes in smaller and less-advanced countries will require investing in public goods, such as weather data infrastructure, and piloting and testing new products. It is also essential that providers understand what risks poor people are concerned about and take into account their irregular cash flows when designing the schemes and premiums.

Richard Leftley, David Levine, and Johannes Jütting discuss how technological and institutional innovations have led to the development of health insurance that allows poor households to obtain health services without paying out of pocket. Richard Leftley discusses MicroEnsure's experience in making third-party administration software available to allow cashless health-service provision. Johannes Jütting discusses how community-based health insurance can pool risk within a community to effectively insure healthcare costs. These briefs also highlight the importance of considering insurance provision through groups, both as a cost-effective means of provision (Leftley and Jütting) and as a means of combating the problem of adverse selection (Levine).

Recent innovations, new technologies, and continuing experimentation will make achieving adequate protection of poor households more likely. These new tools to manage risk will need to be complemented with investments that reduce the risks faced by poor households, such as low-cost irrigation schemes, drought-resistant seed varieties, improved sanitation, and better preventative healthcare. ■

Ruth Vargas Hill (r.v.hill@cgiar.org) is a research fellow at the International Food Policy Research Institute (IFPRI). **Maximo Torero** (m.torero@cgiar.org) is director of the Markets, Trade, and Institutions Division at IFPRI. The authors thank Meagan Keefe for excellent research assistance in preparing this brief.



International Food Policy Research Institute

2033 K Street, N.W. • Washington, D.C. 20006-1002 • U.S.A.

Phone: +1-202-862-5600 • Skype: ifprihomeoffice • Fax: +1-202-467-4439 • Email: ifpri@cgiar.org

IFPRI® www.ifpri.org

Risk is a pervasive feature of life in poor rural areas of developing countries. This brief outlines a conceptual framework for understanding the nature of risks faced by poor rural households and their consequences before turning to a more detailed discussion of these risks.

A conceptual framework

The conceptual framework of risks to the rural poor has four components: settings, assets, activities, and outcomes. *Settings* describe a household's environment. It includes the physical setting (such as the level and variability of rainfall, exposure to cataclysmic events such as earthquakes and cyclones, the presence of communicable diseases, and the quality of infrastructure), the social setting (social cohesion and strife and the existence of norms of behavior), the legal setting (the formal "rules of the game" within which exchange takes place), the political setting (the mechanisms by which these rules are set), and the economic setting (policies that affect the level of assets, returns, and variability of returns on assets).

Assets, alone or in conjunction with other assets and household labor, produce a stream of income; some are also a store of value. Assets include the following forms of capital: physical, natural (land), human, financial, and social. The allocation of these assets to income-generating *activities* is conditioned by the settings in which these households find themselves. The *outcome* of these allocations is income, which is a determinant of other outcomes such as consumption, poverty, and vulnerability.

Risks and shocks

A risk is the probability of an event that generates a welfare loss¹; a shock is the realization of that risk. Shocks can be characterized in terms of their spatial and their temporal dimensions.

In rural areas of developing countries, the majority of risks emanate from the setting in which households are situated and involve common or covariant shocks. A few affect individual households and are thus idiosyncratic shocks. Distinctions in the spatial dimensions of shocks—that is, between covariant and idiosyncratic shocks—are not always straightforward. A drought might lead poor, rainfall-dependent households to sell assets to richer, non-rainfall-dependent neighbors. Although the event was common to both, it adversely affected only the poor. Some shocks are sudden and violent (such as flooding or earthquakes). Others develop slowly (such as droughts). Still others may begin quickly or slowly but persist for long periods of time (civil war is one example). Using the settings described earlier, the table in Appendix 2 classifies the temporal dimension of a number of different shocks in terms of those that are rapid onset, slow onset, and prolonged.

Consequences

Shocks can affect any of the components in the conceptual framework. These effects can take place in multiple rounds: a shock taking place in one setting can have impacts on other settings, unleashing additional effects on household assets and the processes by which households generate income and turn that income into consump-

¹ This definition differs from the usual definition in which risk refers to anything that increases the probability of above- or below-average events (while the mean remains constant); this definition focuses solely on the probability of below-average events—that is, the negative consequences of risk.

Table 1—Examples of selected shocks on household assets, activities, and outcomes

Shock	Impact on household assets	Impact on activities and outcomes	
		Availability of and returns to income-earning activities	Availability and real costs of transactions
Floods, earthquakes, hurricanes	<ul style="list-style-type: none"> • Damage to or destruction of productive and other household assets 	<ul style="list-style-type: none"> • Reduction in wage labor and other off-farm opportunities • Reduced access to agricultural inputs; inability to sell agricultural surplus 	<ul style="list-style-type: none"> • Increase in food costs and other goods consumed by the household • Some goods either unavailable or rationed • Difficulty in getting access to publicly provided goods
Drought	<ul style="list-style-type: none"> • Livestock death 	<ul style="list-style-type: none"> • Reduced returns to labor and other inputs in agriculture • Fewer wage labor opportunities 	<ul style="list-style-type: none"> • Increased food costs
Ethnic strife, crime	<ul style="list-style-type: none"> • Confiscation of physical assets • Loss of labor through abduction, conscription, or imprisonment • Forced relocation 	<ul style="list-style-type: none"> • Reduced access to agricultural inputs; difficulty selling agricultural surplus • Reduced returns due to insecurity, lower output prices • Reduced demand for labor 	<ul style="list-style-type: none"> • Increased costs of food and other goods • Some goods unavailable or rationed • Difficulty in getting access to publicly provided goods

tion. At the household level, it is helpful to distinguish between the ex ante consequences of risk and the ex post impact of shocks.

Ex ante, risk shapes the assets that households hold and the activities that they undertake. The threat of shocks discourages innovation and risk taking. Studies undertaken in south India and Tanzania show that because poor households deploy their assets more conservatively than wealthy households, their return on assets is lower. Further, the threat of shocks can make households reluctant to participate in credit markets because they fear the consequences of an inability to repay. A household may decide to grow a mix of crops that embodies differing levels of susceptibility to climatic shocks. Crops may be grown in different locations, may be temporally diverse, or may be intercropped. Similarly, the household might diversify into off-farm activities or casual wage labor. Few households have access to the rich set of financial instruments through which households in developed countries can insure against risk; publicly provided social protection also tends to be limited.

Ex post—when a shock occurs—there are consequences for household assets, activities, and outcomes (Table 1).

These shocks present households with difficult choices. In addition to seeking additional sources of income, households may respond to shocks by reducing human capital formation (by, for example, taking children out of school), selling assets (and thereby risking lower consumption levels in the future), or reducing consumption (and risking the consequences of lowered food intake, such as the irreversible consequences of malnutrition in preschoolers). The magnitude and temporal consequences of these shocks, and households' responses to them, are illustrated in Figures 1 and 2. The outcome, shown on the vertical axis, is some measure of household food security with a threshold level being denoted by a horizontal food security line.

Figure 1 represents a slow-onset shock, shown by the slow decline in household food security. The magnitude of the shock is sufficiently large to imperil life. Although the household does recover from this shock, recovery takes time and household food security never returns to its previous level; this shock has had irreversible consequences. For example, farmers in Ethiopia who suffered livestock and other losses in the droughts of the 1980s found it difficult to recover and experienced considerably slower income growth in the decades that followed.

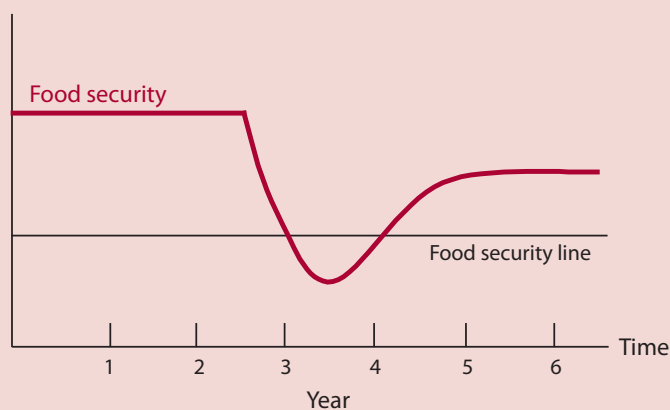
Figure 2 shows the consequences of cascading shocks. The first shock causes food consumption to fall, but not quite to a level that threatens life. This shock is followed by a second one; their combined effect is large enough to push households below the minimum food security line and produce irreversible consequences.

Conclusion

In the pervasively risky environments where the rural poor live, the rich set of financial instruments through which households in wealthier countries can insure against risk and publicly provided social protection are largely absent. This lack of insurance and social protection limits poor households' ability to move out of poverty, creates the potential for transitory events to have irreversible effects, and exposes the poor to life-threatening consequences. ■

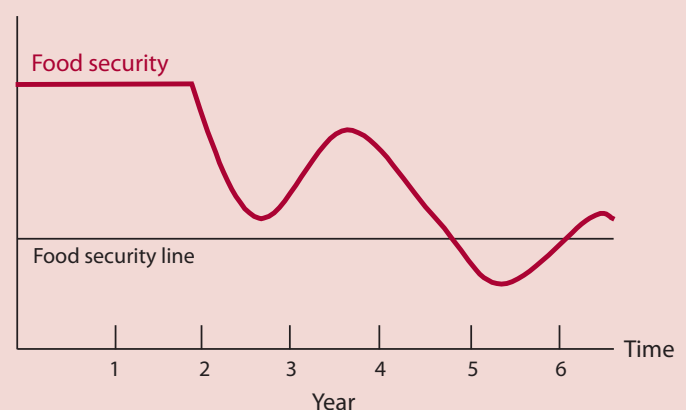
For further reading: J. Hoddinott and A. Quisumbing, "Methods for Microeconomic Risk and Vulnerability Assessment," in R. Fuentes-Nieva and P. Seck, eds., *Risk, Vulnerability, and Human Development* (London: Palgrave Macmillan and United Nations Development Programme, forthcoming), and references therein.

Figure 1—A transitory shock with life-threatening and permanent consequences



Source: Author.

Figure 2—A cascading series of shocks



Source: Author.

John Hoddinott (j.hoddinott@cgiar.org) is a deputy division director at the International Food Policy Research Institute (IFPRI).



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

IFPRI® www.ifpri.org

Risk and the persistence of poverty

Risk is pervasive in developing countries. The standard household risks of sickness, mortality, fire, theft, and unemployment are especially severe for poor families in developing countries. Rural households, most of which derive their livelihoods from the land, face the additional risks of droughts, floods, and pests and diseases affecting their crops and livestock. Insurance provision is still limited, and state-provided social security or more basic social safety nets are often limited or unavailable for particular widespread disasters.

Richer families have reasonable access to insurance alternatives, such as credit and substantial savings. Although these alternatives are generally not options for poorer families, it is well known that such families do employ relatively sophisticated mechanisms to manage and cope with risk. They tend to diversify their crops and income-generating activities, often incorporating nonfarm activities into their income streams and even having family members migrate to reduce the household's overall exposure to risk. Where possible, they build up savings for precautionary purposes, often in the form of livestock or other liquid assets. They also engage in informal mutual support networks in which assistance is provided if a member experiences some form of shock. Nevertheless, given the variety and severity of risks to be dealt with, shocks inevitably have serious welfare consequences.

These consequences are well illustrated by evidence from Ethiopia, where rural households face a considerable risk of drought. For example, about half of the households interviewed in 2004 for a rural panel data survey in 15 communities across the country reported that they faced serious hardship due to drought in the preceding five years, while about a quarter of the sample reported hardship resulting from illness and a similar number reported problems related to illness. Despite increased investment in health services and a relatively widespread, foreign aid-supported safety net to cope with drought, these shocks continue to impose significant welfare costs. The consumption levels of those reporting a serious drought, for example, were found to be 16 percent lower than those of families not affected, and shocks from illness appeared to have similar average impacts. Further, the costs were not just short term: in the sample, it was found that those who had suffered considerably in the 1984–85 famine—the most severe famine in recent history—were still experiencing lower growth rates in consumption in the 1990s, a period of overall recovery, than those who were not seriously affected by the famine. Children born during the famine were found to be up to three centimeters shorter at adulthood than children born before or after the famine, suggesting that famine had serious, persistent health impacts with long-term consequences.

Risk should thus be seen as a cause of persistent poverty, in that shocks cause serious losses of physical assets and human capital. The presence of risk also tends to induce poorer households to become risk averse, even at the expense of otherwise higher

returns: for example, they may choose to grow low-returning but safe crops and to avoid committing resources to more productive capital in order to preserve the liquidity of their asset base. In Ethiopia, efforts to increase farmers' fertilizer use and thereby raise their productivity—a risky undertaking as farmers must still bear the costs of fertilizer even if the harvest fails—are significantly undermined by the lack of protection against poor rainfall.

Evidence from other countries shows similar patterns: risk induces farmers to engage in low-return investment portfolios in rural India and to grow more low-risk, low-return crops such as sweetpotatoes or cassava in Tanzania. Climate and other shocks have been shown to undermine long-term nutrition, educational achievement, and earnings in settings as diverse as India, Indonesia, Tanzania, and Zimbabwe. These studies all show that risk causes poverty to persist.

Is insurance a solution?

Insurance is not necessarily the best policy intervention to deal with many types of risk, especially in contexts of high poverty. First, rather than insurance, risk reduction and management may be the most relevant response for many types of risk—the obvious examples are conflict and crime. Other examples of risk reduction are preventive health measures, water management, and environmental protection. Second, many types of risk are not easily insurable, simply because they cannot be actuarially priced—as is the case with many of the more common risks in developing countries because even basic data on health, longevity, and climate are often incomplete—or because the risks are unknown, as in the case of rare natural disasters or catastrophes. Third, offering insurance does not remove the need to find ways of actually lifting the poor out of poverty: insurance will prevent a worsening of poverty and may allow more risk-taking by the poor, but it is not a substitute for more general policies to promote income growth.

It is, nevertheless, increasingly acknowledged that designing insurance products suitable for the poor has an important role to play in fighting poverty. However, insurance markets suffer from serious informational problems—possibly even greater than those faced by credit markets. Because it is difficult to observe the exact risk profile of each member of the population, insurance may attract those facing relatively higher risk on average, leading to adverse selection problems that will affect the sustainability of a scheme. Further, people may actually start taking more risks once insured (the so-called moral hazard problem). Premium collection costs can be high, as can the cost of verifying that certain insured risks actually occurred.

Different risks have different specific informational or verification problems. For example, health insurance schemes tend to suffer primarily from adverse selection problems, property or fire insurance are strongly affected by moral hazard problems, and insurance against crop failure suffers from both moral hazard and loss verification problems. These risks are often also highly

covariate, requiring a much larger risk pool. Life insurance has fewer of these problems and typically emerges early in new insurance markets.

Health insurance has been available in many developing countries, although often not as a financial product targeted to the poor, but rather as a product linked to specific health facilities. Life insurance products are commonly linked to credit, but they are increasingly becoming freestanding, as in the case of the life insurance offered by the Indian Self-Employed Women's Association (SEWA) to its members. Rainfall index products, whereby holders receive a payout when rainfall falls below predetermined levels, are increasingly offered as alternatives to crop insurance because they can overcome standard moral hazard and costly verification problems.

But selling insurance to the poor is not without its problems. Studies consistently find that the hypothetical demand for insurance is high, but when insurance products are carefully piloted—as was rainfall-index drought insurance in India and Malawi or health insurance for the informal sector in Kenya—uptake is rarely swift or high, and renewal rates are low, even though these products seem rather attractive to the outside observer. In insurance companies, this phenomenon is well known; it is often said that “insurance is always sold and never bought.” Explaining this phenomenon is harder. The upfront cost of the insurance premium may well explain some people's reluctance, but not at this scale. Lack of uptake could also be related to the fact that insurance is a difficult concept to understand, and taking up an insurance product can often itself be seen to increase uncertainty, given its cost and novelty. Furthermore, in environments where people have limited experience with formal insurance, establishing trust in and credibility of insurance products is essential, but difficult. Poor people are asked to pay cash up front to an institution outside their community in order to receive cash when a particular event occurs—an arrangement rather different from, for example, microcredit, where an institution offers money with a request that it be repaid later.

These problems suggest that the institutional delivery mechanisms of insurance products targeted to the poor are crucial. Offering a new, unfamiliar product to suspicious individuals will always be a hard sell. Educating possible clients in the principles of insurance or building trust between the insurance provider and potential poor clients may be important. One starting point may be to build on local institutions or informal arrangements that focus on local risk sharing. In most communities, people have long collaborated to provide mutual support in the event of crises,

forming networks based on well-defined extended families and social groups. In Europe, much of the provision of social security began with health and unemployment insurance initially developed within cooperatives or trade unions. With public intervention, these mechanisms eventually grew to become fully fledged social insurance schemes. In developing countries, there is ample evidence of functioning self-help groups and cooperatives. More traditional but no less sophisticated institutions such as funeral societies provide cash and in-kind funeral benefits for their members and members' families. These schemes tend to be highly inclusive of the poorest segments of the community.

Working with groups to offer insurance products has considerable advantages. First, dealing with groups reduces monitoring and other information costs, because the insurance agency must monitor only the group portfolio, leaving the association to monitor the individuals within the group. Next, if groups that include the poorer segments of society are chosen, the task of targeting can also be devolved to the level of the group. Further, existing groups already have mutual support systems, making it easy to build on existing informal schemes with complementary activities. Finally, groups can be used to help bridge the information or trust gap between the formal providers of insurance and potential poor clients.

Conclusion

Risk remains an important cause of the persistence of poverty in developing countries. Insurance may not be a panacea, but it can offer a useful complement to other microfinance and more general interventions to fight poverty. Designing insurance products is relatively straightforward, but the uptake of these products by the poor is likely to be low at first. Building on existing mutual support institutions may offer a cost-effective, group-based mechanism to spread insurance targeted to the poor. ■

For further reading: D. Clarke and S. Dercon, “Insurance, Credit and Safety Nets for the Poor in a World of Risk,” Working Paper 81 (New York: United Nations, Department of Economics and Social Affairs, 2009); S. Dercon, “Income Risk, Coping Strategies, and Safety Nets,” *World Bank Research Observer* 17, no. 2 (2002): 141–66; S. Dercon, J. de Weerd, T. Bold, and A. Pankhurst, “Group-based Funeral Insurance in Ethiopia and Tanzania,” *World Development* 34, no. 4 (2006): 685–703; J. Morduch, “Between the State and the Market: Can Informal Insurance Patch the Safety Net?” *World Bank Research Observer* 14, no. 2 (2002): 187–207.

Stefan Dercon (stefan.dercon@economics.ox.ac.uk) is professor of development economics at the University of Oxford.



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

IFPRI® www.ifpri.org

Introducing MicroEnsure

In 2002 a group of insurance and reinsurance professionals set out to demonstrate that the low-income market was a viable insurance market. The initial aim was to better understand client needs and the willingness of insurers to provide products to this market. The team worked within Opportunity International, which, as a leading microfinance network, was able to provide the borrowers and seed capital needed to get started. Between 2002 and 2005 the team worked as an internal consultancy that designed products around the needs of Opportunity's clients; designed, discussed, and agreed upon insurance products; and set up a direct bank assurance or "partner-agent" relationship between the bank and insurers.

After three years, about 1.5 million borrowers and family members had access to microinsurance—simple insurance products with low benefits and affordable premiums. Although there had been some success in introducing more complex products such as weather index insurance, the majority of clients had access to simple life and property products. It seemed clear to the team that providing access to higher-impact products such as health insurance would require creating a specialized back-office function. In 2006 the team entered discussions with the Bill & Melinda Gates Foundation, which challenged the team to consider how high-impact products could be introduced through a range of distribution channels. The main output of the discussion was the creation within Opportunity International of the Micro Insurance Agency. Later, as a result of a US\$24.25 million grant, the agency became a separate company, which was renamed MicroEnsure.

Central to MicroEnsure's model is the concept that providing insurance to the poor involves performing three roles: first, carrying the risk; second, acting as the front sales office; and third, carrying out the back-office functions necessary to keep track of who is covered and to ensure a high level of service.

During the first three years of the microinsurance effort within Opportunity, it became clear that the weakest part of the link between microfinance institutions (MFIs) and insurers was the back office. Insurers wanted the MFIs to perform the back-office functions, and this approach worked well when the products were simple, such as credit life. When, however, the MFIs had to capture data on spouses and children, introduce a policy that ran for longer than the loan, or administer a significant volume of claims such as those arising from health insurance, the cracks started to appear. In response, the insurance companies took on the back-office functions, and although they were capable, management expenses rose as high as 40 percent, resulting in a higher cost to the client or a reduction in how fast claims were paid out. It seemed that one of the missing components in a functioning microinsurance market was a specialized back-office provider—a void that MicroEnsure set out to fill.

The MicroEnsure model uses a range of entities to carry the risk. For life and property insurance, there is an ample supply of

local insurance companies in most countries where MicroEnsure works. With more complex products like weather index insurance, MicroEnsure has had to use international reinsurers, such as Swiss Re. To provide health products, MicroEnsure has formed cell captive structures, which are essentially reinsurance pools formed using insurance companies' capital. Although MicroEnsure does not seek to carry risk on its own balance sheet, it does get heavily involved in designing products on behalf of others.

The partnership approach extends to how MicroEnsure reaches out to the poor; by working with a range of front-office partners, it now reaches more than 3.5 million people with a range of life, health, and weather index products. MicroEnsure's partners include MFIs, child-sponsorship organizations, NGOs, retailers (such as mobile phone companies), and individuals who serve as independent sales representatives (following the Avon business model). With average revenues of US\$0.23 per policy, MicroEnsure has no option but to partner with others in order to reach out to the poor. Currently 98 percent of policies are sold to groups.

MicroEnsure also plays a key role in training front-office staff and educating clients, using comic books to ensure that people understand the products they are purchasing.

Weather index products

MicroEnsure, one of the pioneers in weather index insurance, launched its first products in 2004 in Malawi, working with the World Bank. The original motivation for these products was that smallholder farmers in Malawi were excluded from obtaining credit for purchasing inputs such as fertilizer and seeds owing to lenders' concerns over drought. When weather index insurance became available to mitigate the climatic risk, lenders were willing to advance credit to the farmers, who in turn purchased better inputs and increased their yields (in some cases by 300 percent). The experience of MicroEnsure has been that farmers' main motivation for purchasing weather insurance is to unlock rural credit; there has been minimal success in selling weather insurance as stand-alone products.

Over the past few years MicroEnsure has developed index products using a range of triggers, including drought, typhoon, and excess rain, and for a range of crops and countries, including India, the Philippines, Rwanda, and Tanzania, as well as continued work in Malawi. The focus has always been to use weather index insurance to unlock rural credit for groups of farmers rather than to cover whole countries. Insuring a whole country would quickly cover a larger number of people, but it would require government involvement, and, following a disaster, the government may not be a safe conduit of funds to the rural poor. Furthermore, the poor cannot use an insurance policy applied to the whole country to secure loans.

Although MicroEnsure believes that weather index policies can have a significant impact on the rural poor, especially in the face

of changing climatic patterns, it also has a number of concerns regarding these products. In light of these issues, its focus in 2009 has been to prove that these products can be implemented in a range of countries for a range of trigger events and crops. In 2010 the challenge will be to demonstrate that these products can be scaled up to reach a large number of farmers, with action required in a number of areas:

- **Insure weather, not the crop:** MicroEnsure's approach to date has focused on designing contracts around specific crop varieties. This approach limits outreach because many smallholders are engaged in multicropping. It also requires extensive on-the-ground farm input networks, which are not ubiquitous. In 2010 MicroEnsure will experiment with providing index products that are triggered by the date that rains start or the number of days of rain in a specific period. This approach opens the products up to a range of companies such as farm input suppliers, seed manufacturers, and others in the rural community that are not directly involved in farming but that can be affected by a weather event.
- **Reduce basis risk:** In the Philippines MicroEnsure sells a weather index product combined with coverage for pest losses on a yield basis in order to reduce basis risk.
- **Improve affordability:** Currently weather index products are too expensive for farmers. Experience shows that the cost needs to fall to 3–5 percent of the sum insured. This reduction can be achieved either by reducing coverage (but this step increases basis risk significantly), by subsidizing premiums, or by allowing clients to buy coverage for only the months they are concerned about rather than the whole season.
- **Obtain weather data:** Weather stations are lacking, especially in Africa. Without investment in infrastructure, it may prove hard to scale up drought-related insurance products. The Global Humanitarian Forum is building automated weather stations in East Africa using phone masts. It may also be possible to use remote sensing data, especially if the trigger for payout is based on the number of days of rain rather than on the precipitation received.
- **Improve project management:** These complex products require on-the-ground project management to ensure that all stakeholders perform and that clients understand what they are buying.

Health insurance

In thousands of focus groups over the past eight years, the poor have expressed their desire for access to health insurance. This desire makes perfect sense considering the potential frequency of use—people die only once, but they go to the doctor several times a year! Ironically, it is this frequency of use that makes provision of health insurance difficult. Health insurance requires a way to administer a significant volume of low-value transactions combined with a way to control fraud by patients and hospitals. Experience shows that these products need to be on a "cashless" basis for the poor, because cash flow is an issue for them. Cashless products are essential because they enable the poor to gain access to healthcare without having to pay cash.

Cashless service requires a third-party administration (TPA) system to identify clients and preauthorize hospital treatments. TPA infrastructure does not exist in many developing countries. As a result, MicroEnsure has licensed TPA software for use outside of India. Within India, the TPA system has enabled MicroEnsure to sell and service health insurance that costs US\$8 a year for a family of four people.

In addition to a TPA to administer claims and fraud, health insurance requires a risk carrier. Local insurers are reluctant to offer health insurance, in contrast to life and property insurance, because it is a specialty business, underwriting data are scarce, and previous efforts have resulted in failure. To overcome this shortage, MicroEnsure has designed a dedicated cell captive that can underwrite the health risk working through a fronting insurer. In 2010 MicroEnsure will introduce micro-health insurance operations in Africa and Asia using the TPA and cell captive as key infrastructure.

In India, MicroEnsure's health insurance offers comprehensive in-patient coverage, but the cost of providing healthcare in Africa means that a comprehensive in-patient product costs US\$50 a year per family. Market research has demonstrated that the target market can afford around US\$30–\$40 a year per family. MicroEnsure thus intends to offer a product by working out what ailments can be treated at that price point. This approach turns the concept of insurance upside down—instead of covering health events with certain exclusions, the insurance covers nothing except certain specific ailments.

Some question whether the poor can afford US\$30–\$40 a year, but if current out-of-pocket expenditures are taken into account, then this sum is in fact affordable. For the poorest and most vulnerable, subsidies will be required, but at least health insurance can guarantee that the intended recipient is provided care. ■

Richard Leftley (richard.leftley@microensure.com) is president and chief executive officer of MicroEnsure LLC, Cheltenham, United Kingdom.



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

IFPRI® www.ifpri.org

Farmers face a variety of market and production risks that make their incomes volatile from year to year. In many cases, farmers also confront the risk of catastrophe, as, for example, when crops are destroyed by drought or pest outbreaks or when assets and lives are lost to hurricanes and floods. These risks are particularly burdensome to the poor, including many small farmers. Unless adequately managed, they can slow economic development and poverty reduction and contribute to humanitarian crises.

Covariate risks, especially those that involve catastrophic losses, pose special difficulties and costs. Past attempts by governments and relief agencies to help manage covariate risks have been costly and often ineffective. Today there is much interest in index insurance products that might provide a more effective and market-mediated solution.

Index insurance

Index insurance involves writing contracts against specific perils or events (such as drought, hurricane, or flood) that are defined and recorded at regional levels (usually at a local weather station). Insurance payout depends not on the individual losses of each policyholder, but rather on the regionally recorded index of loss, which serves as a proxy for the losses in a region. Because all buyers in the same region pay the same premium rate per dollar of coverage and receive the same rate of payment, index insurance avoids adverse selection and moral hazard problems. Also, since there are no on-site inspections or individual loss assessments to perform, it can be relatively cheap to administer. It relies only on regional index data, which are already available and generally reliable.

In recent years a plethora of pilot index insurance programs have been launched around the world with the active engagement of a diverse range of players, including governments, donors, multinational agencies, international reinsurers, relief agencies, nongovernmental organizations (NGOs), private insurers, banks, input suppliers, food marketing companies, and farmer organizations.

Emerging lessons

The World Food Programme (WFP) and the International Fund for Agricultural Development (IFAD) recently conducted a review of 37 index insurance ventures in 15 countries and distilled a number of important lessons about the conditions under which index insurance is worthwhile and might be scaled up.

One key lesson that has emerged is the need to distinguish between two fundamentally different objectives affecting the design and delivery of index products. Some schemes are designed to help poor people protect their livelihoods and assets and are primarily an alternative to more traditional relief programs. Other schemes are designed to help households with viable farm businesses manage their risks. These two types of insurance are called *protection* and *promotion* insurance, respectively, in this brief.

Insurance that *protects* the livelihoods and assets of poor people from catastrophic losses inevitably must be subsidized and requires special delivery channels aligned with relief rather than development

interventions (such as NGOs and public relief agencies). On the other hand, insurance that *promotes* agricultural development should be channelled through private intermediaries. It can sell on an unsubsidized basis if it is linked to a value proposition that enables farmers to obtain new productivity-enhancing technologies or to participate in high-value markets that can significantly raise their expected incomes. Mixing these two needs in the same program all too easily leads to insurance products that must be heavily subsidized for all and that serve social rather than development objectives.

The WFP and IFAD analyzed a diverse range of index programs (see Appendix 2 for full details). Within the protection category, schemes vary from international insurance arrangements that directly underwrite government relief costs to programs run by NGOs that provide protection insurance directly to communities or farmers. They also vary with the type of index used. Although most programs use weather indexes, others use indexes based on regional estimates of crop yields or livestock mortality rates and estimates of range productivity based on weather indexes and biophysical models. Within the promotion category, insurance programs range from privately provided and unsubsidized schemes linked to value propositions for farmers to publicly provided and heavily subsidized schemes with weak or no value propositions.

Most of the programs were only recently launched, and it is still too early to judge their success. A small number failed to generate sufficient demand and had to be discontinued (for example, those in the Ukraine). But many others show promise and, while not yet large scale, are providing valuable lessons for the future. Among the promotion programs, India has achieved the greatest success, with three insurance companies reaching 1.25 million farmers in 2009, up from a 350-farmer pilot in 2003. The total sum insured in promotion schemes around the world in 2009—that is, maximum payouts to farmers and herders—is US\$1 billion. Of the protection schemes, the Mexican program has reached a large scale and continues to grow, indirectly benefiting 800,000 households in 2008, up from 600,000 in 2007.

Other key lessons include the following:

- **Focus on a real value proposition for the insured.** For protection insurance, relief agencies and vulnerable households need products that offer timely, credible, and fair relief in times of crisis. For promotion insurance, products that catalyze access to credit, technology, or new markets and help generate significant additional income can be attractive, even without subsidies. Products must also be affordable and cover the most relevant risks with minimal basis risk, and there must be opportunities to finance the premium with credit. An excellent example is the PespsiCo scheme in India. This weather-based index insurance program was designed to cover potato crop losses due to late blight disease, which is associated with weather events that can be indexed. The insurance is part of a technology package that comes with credit and a market contract and offers substantial income gains to participating farmers.

- **Find a champion or leader to overcome initial set-up problems and barriers.** Many set-up constraints with index insurance make spontaneous market-driven development difficult. In nearly all cases, an outside agent or champion has been needed to initiate and catalyze action. These champions have included multinational agencies like the World Bank (in India, Malawi, and Mexico) and the WFP (in China and Ethiopia), NGOs (like Oxfam in Ethiopia), and brokers (such as MicroEnsure in Tanzania). These agents have helped supply missing public goods (such as weather stations and insurance regulations) and establish reinsurance arrangements. They have also helped train local brokers and insurers and have assisted with the agro-meteorological research needed to identify viable insurance products.
- **Develop efficient and trusted delivery channels.** Insurers selling promotion insurance to farmers rarely have their own rural distribution networks and typically must rely on intermediaries to sell and transact the insurance with farmers. These intermediaries need to be efficient, available, and responsive to farmers' needs. They also need to be trusted, as must the insurance company itself. Where the insurance is tied to credit or farm inputs, the credibility of the supply system for the entire package becomes important. The groundbreaking BASIX deal in India in 2003, for example, was possible because this microfinance institution and livelihood supporter was already a trusted partner of farmer groups.
- **Develop weather data infrastructure.** Initial insurance pilots can be established even without historical weather data or real-time weather data services. Serious mass market players (as opposed to local niche market players) in financial markets will not engage, however, unless they can be assured of good data on risk for pricing contracts and reliable and timely data on index values in order to settle contracts in a timely fashion.
- **Transfer risk to international risk markets.** Reinsurance support is the entry ticket for any meaningful index insurance development and a crucial condition for scaling up. For example, INISER Nicaragua entered into a long-term reinsurance deal with Partner RE, and the index insurance products in Malawi are reinsured by French and Swiss reinsurers. Twenty out of the 37 index insurance deals are reinsured, representing 3.5 million cumulative policies, whereas the non-reinsured deals add up to a mere 34,000 policies. Since there are no moral hazard problems with index insurance, reinsurers are often ready to write up to 99 percent of the risk, compared with only 85 for other kinds of insurance.
- **Train all implementation actors.** Index-based insurance programs that include training and capacity development have a

clear advantage over those that do not. Training farmers in how to use index insurance as a risk-reducing investment can give them more realistic expectations about payments and greater familiarity with the nature of the product. In Ethiopia, Nyala Insurance started selling weather index insurance products for agriculture in close cooperation with the Lume Adama Farmers' Cooperative Union, which helps educate farmers in how insurance coverage and payout works.

Conclusions

Evidence shows that weather index insurance can work, but few programs have demonstrated any real capacity to scale up. Spontaneous development by the private sector has been limited, and governments or international agencies like the World Bank have had to initiate activities. This reluctance by the private sector seems related to the high barriers to entry in this market—upfront research and development costs, basis risk associated with too few weather stations, and initial problems in getting access to international reinsurance. Insurers also need to reach farmers through marketing intermediaries and partner with others in the value chain to create solid value propositions for smallholders.

If index insurance is to be scaled up, governments and donors will need to play important enabling and facilitating roles by taking the following steps, among others:

- building weather-station infrastructure and data systems and making that data publicly available on a timely basis;
- providing an enabling legal and regulatory environment;
- financing agro-meteorological research leading to product design and making the results publicly available;
- educating farmers about the value of insurance and the workings of index-based products;
- facilitating initial access to reinsurance;
- supporting the development of sound national rural risk management strategies that do not crowd out privately provided index insurance;
- subsidizing protection insurance where it is more cost-effective than existing types of public relief and using smart subsidies when needed to kick-start promotion insurance markets; and
- supporting impact studies to systematically learn from ongoing index insurance programs and to demonstrate their economic and social benefits. ■

For further reading: www.wfp.org/disaster-risk-reduction.

Ulrich Hess (uhess@worldbank.org) is a senior economist in Multilateral and Innovative Financing—CFPMI at the World Bank CFPMI. **Peter Hazell** (p.hazell@cgiar.org) is former director of the Development Strategy and Governance Division of the International Food Policy Research Institute (IFPRI).



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

IFPRI® www.ifpri.org

Despite their compelling logic, index insurance contracts that transfer risk from smallholder farmers and pastoralists have met with sometimes indifferent demand and low uptake by the intended beneficiaries. Yet the evidence that risk plays an important role in creating and perpetuating rural poverty is mounting and demands further efforts to solve this problem. This brief focuses on ways to solve this demand problem by designing index insurance contracts more intelligently.

Elements of an index insurance contract

An index insurance contract has four elements:

1. a signal with a knowable probability distribution that is related to the assets or income that the contract is meant to insure (rainfall levels or average crop yields in a locality are possible signals);
2. a mapping system that connects the signal to an index whose value will determine indemnity payments under the contract;
3. a payoff structure that defines the relationship between the index and indemnity payments; and,
4. basis risk, which is the risk that an index will not perfectly cover all the losses that any particular individual might experience.

Identifying an acceptable signal (such as rainfall) should be just the first stage in designing an index insurance contract. Too often, however, an untransformed signal is converted into a simple linear insurance index. Predictably, such contracts poorly cover the actual risks and losses faced by small-scale farmers and pastoralists. A poorly designed contract, or one that is disconnected from the losses faced by the putatively insured, can actually reduce average farmer income and increase its variance. The challenge is to more intelligently design contracts from a demand-side perspective so that the index contract offers the best coverage possible for the insured party.

Design contracts using livelihood data

The first step in designing a demand-driven contract is to see if a weather or other signal can be used to predict the individual losses that the contract is designed to insure. For example, designers of an index-based livestock insurance contract for northern Kenyan pastoral households used a range of statistical regression techniques to analyze household and local-level data. They found that a rangeland groundcover signal best explained individual losses of livelihood. This kind of statistical analysis is the best way to ground truth a contract and assure that it provides the best insurance protection possible (that is, it minimizes uncovered basis risk), enhancing the demand-worthiness of the contract.

In addition, regression analysis translates a signal, which may be measured in exotic units unfamiliar to farmers, into the livelihood units that make sense to them. In the northern Kenya example, regression analysis translated readings from an infrared spectrometer into a measure of predicted herd mortality, something already well understood by pastoralists.

Choose index signal using demand-side considerations

Many signals besides weather are available for index contracts. Index insurance should rely on the signal (or signals) that offer the best contract from a demand-side perspective. Livelihood data can be used to design the best contract for each possible signal. The contracts, or hybrid combinations of them, can then be compared to see which one offers the best value to the beneficiary population, taking into account the predictive power of the signal as well as the cost of obtaining it.

Among index insurance contracts for West African grain farmers, the most promising contract proved to be one based on the Normalized Difference Vegetation Index, or NDVI—a remotely sensed, satellite-based measure of vegetation density. Every 10 days NDVI is measured and provided freely at a resolution of 8 kilometers by 8 kilometers (km)—equivalent to having a separate weather station or an area yield survey for each 8-km square. The values for the NDVI were compared with average village grain yields and rainfall. The three measures moved in tandem, but careful analysis showed that the power of the NDVI to predict individual household grain production was equivalent to an area yield contract implemented at a village level and was superior to the village rainfall gauge. Given that village-level area yield contracts would be extremely costly to implement (requiring an annual yield survey for every village where an insured farmer lives), the NDVI signal is the preferred basis for an area yield contract in this context.

This result should not be generalized. A design analysis for cotton farmers in Mali showed that NDVI was inferior in its predictive power to a district area yield index that is freely available from the cotton parastatal. What is generalizable is the need to test the predictive power of candidate insurance indexes against actual livelihood data.

Indemnity structures that mediate between contract price and trustworthiness

The indemnity structure of an index contract defines the payoffs that accrue to farmers based on the realized value of the index. This indemnity structure needs to be designed to protect the insured against the catastrophic losses that create and sustain poverty, but too generous a payout structure results in an unaffordable contract.

Often these two considerations result in a payoff structure like that illustrated by the tiny dashed line in Figure 1. Taken from an actual index insurance product for cotton farmers in Peru, this indemnity structure begins to pay off when yields fall below 32 quintals per hectare and protects the farmer against the catastrophic risk of default and land loss. But this contract would be expected to pay off at most one to two times every 10 years. Adoption of this product would require significant trust on the part of farmers, who would on average have to pay premiums for quite a few years before seeing the payoffs that would generate confidence in the trustworthiness of the contract.

One response to this trust problem would simply be to raise the “strike point,” or payoff point, to, say, a yield of 36 quintals per hectare. This contract would pay off much more frequently, but its price would be unaffordably high—more than double that of the low-strike-point contract. A solution to this trade-off between price and trustworthiness is a nonlinear payoff structure (shown by the solid line in Figure 1). Indemnity payments begin at a high strike point to induce confidence, but to keep the price down, these initial, trust-inducing payments are low. As the yield index falls further, the rate of payment increases so that the catastrophic protection is the same as the original, low-price contract. The cost of this nonlinear, hybrid contract is about US\$5 more per hectare. The contract need appear no more or less complex to the farmer than a conventional linear contract.

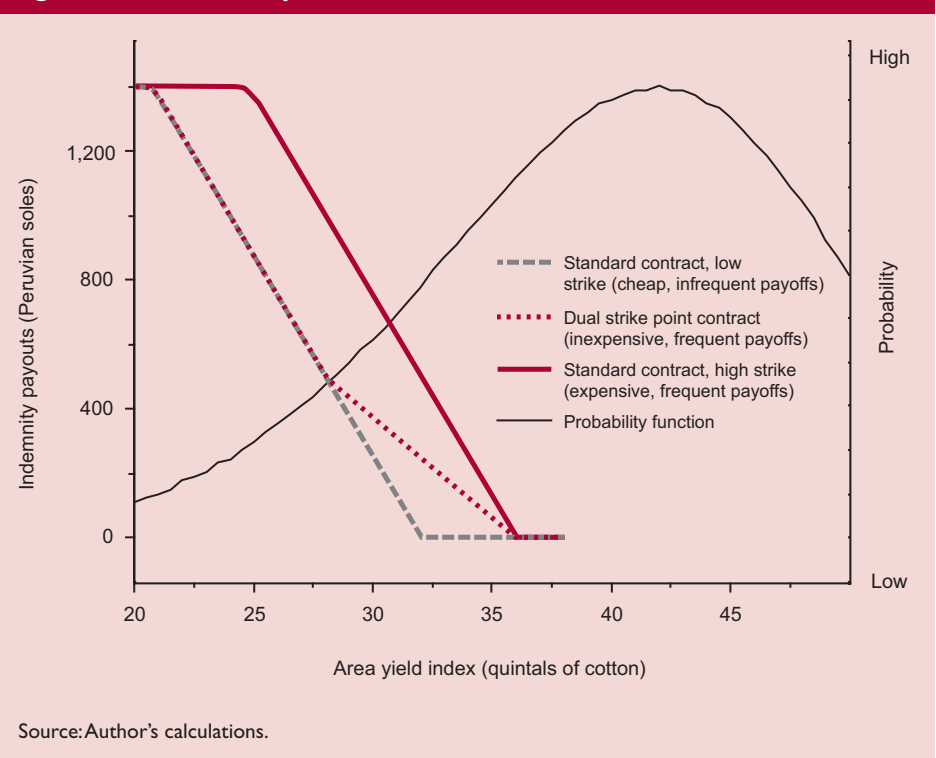
Effective education for the never-before insured

No matter how well designed, index insurance can reduce risk only if there is sustained and informed demand for it. Effective demand for insurance may be weak, however, among a population never before insured. Insurance is an intangible good that offers stochastic benefits: sometimes insurance delivers an indemnity payment and sometimes it does not. If farmers misunderstand or underestimate the value of a well-designed insurance contract, there will be little demand for the contract and little impact on farmer behavior. Conversely, if farmers overestimate the value of the insurance (especially index insurance, which offers only incomplete coverage of losses), then they are likely to be disappointed by the insurance and fail to continue to purchase it over time. Thus, without training for potential buyers in financial literacy, it is unlikely that index insurance contracts will solve the problem of agricultural risk.

Recent advances in teaching financial literacy to populations with modest formal education include comic book-like educational materials. For index insurance in particular, simulation games have been designed to allow farmers to experiment with the actual contract they will have an opportunity to purchase. Although much remains to be learned about how to create the knowledge needed to underwrite demand for these products, initial experience with these games in Ethiopia, Kenya, and Peru is promising.

More generally, insurance providers are still in the early stages of learning how best to design and deliver index insurance. There will surely be additional errors in contractual design and implementation, but the time for additional thought and work is now. ■

Figure 1—Dual strike-point contract



For further reading: For more information on the Kenya project, see www.ilri.org/livestockinsurance; for more on the Peru project, see http://www.basis.wisc.edu/projects_ama/Area_Based_Yield_Insurance_Peru.html; see also A. Pratt, M. R. Carter, U. Hess, P. Suarez, and M. Velez, “Making Index Insurance Attractive to Farmers,” *Mitigation and Adaptation Strategies for Global Change* 14, no. 8 (2009): 737–53; C. B. Barrett, B. J. Barnett, M. R. Carter, S. Chantarat, J. W. Hansen, A. G. Mude, D. Osgood, J. R. Skees, C. G. Turvey, and M. N. Ward, *Poverty Traps and Climate and Weather Risk: Limitations and Opportunities of Index-based Risk Financing*, IRI Technical Report 07-03 (Palisades, N.Y., U.S.A.: International Research Institute for Climate and Society [IRI], 2007); M. R. Carter, C. B. Barrett, S. Boucher, S. Chantarat, F. Galarza, J. McPeak, A. Mude, and C. Trivelli, *Insuring the Never-before Insured: Explaining Index Insurance through Financial Education Games*, BASIS Brief No. 2008-07 (Madison, Wis., U.S.A.: University of Wisconsin, 2008); and T. Lybbert, C. B. Barrett, S. Boucher, M. R. Carter, P. Chantarat, F. Galarza, J. McPeak, and A. Mude, “Dynamic Field Experiments in Development Economics: Risk Valuation in Morocco, Kenya, and Peru,” *Agricultural and Resource Economics Review* (forthcoming).

Michael R. Carter (mrcarter@ucdavis.edu) is professor of agricultural and resource economics at the University of California–Davis and director of the BASIS Collaborative Research Support Program.



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

IFPRI® www.ifpri.org

Index-based insurance is an innovative financial product that has been introduced in recent years in countries as diverse as India, Malawi, Mongolia, and Thailand. It allows individual smallholder farmers to hedge against agricultural production risks, such as droughts or floods. The product pays out in events that are triggered by a publicly observable index, such as rainfall recorded on a local rain gauge. As a result, advocates argue that payouts can be calculated and disbursed quickly and automatically without the need for households to formally file a claim. This arrangement in turn reduces transaction costs, which would otherwise tend to drive up the price of the insurance. Fast payouts are also likely to be valued by policyholders in an environment where households are poor and often liquidity-constrained. Finally, the insurance product is free of adverse selection and moral hazard problems that often plague insurance markets because payouts are based only on publicly observed data rather than on private information reported by the person filing claims.

Index-based insurance appears, therefore, to hold significant promise for rural households. Weather shocks to agricultural income generate fluctuations in household consumption that are not perfectly insured; at the extreme, they may lead to famine or death. Indeed, plenty of evidence suggests that households in developing countries are only partially insured and may thus avoid more profitable but riskier investments.

Despite the benefits of index-based insurance, there are also some concerns. First, the product pays depending on the realization of an index, not on the actual crop yield or income of the farmer. Crop yields will relate to the index in complex ways that depend on soil moisture, evaporation, soil type, water runoff, and a variety of other factors. A good product will be one that maximizes the correlation between the index and what the client cares about. A variety of factors may discourage participation, such as household credit constraints, limited understanding of the product among potential consumers, limited trust in the insurance provider, or high transaction costs that raise the price of insurance.

In a 2007 study on southern India by Giné, Townsend, and Vickery, the ratio of expected payouts on rainfall index insurance relative to premiums was estimated at only around 30 percent on average, compared with expected payouts equal to 65–76 percent of premiums for automobile and homeowners' insurance in the United States. This relatively low payout rate may reflect a number of factors, including a lack of economies of scale given the small initial market for the product and the fact that the market is still in its infancy. More important in India, however, is the fact that high weather insurance payouts are correlated with poor macroeconomic conditions because of the dependence of the Indian economy on agriculture and the monsoon. These properties of insurance contracts are problematic to an insurer from a risk-management perspective. If rainfall insurance were written at a large scale, underwriters could limit their risk exposure by selling part of their

rainfall risk to a reinsurer or by holding a significant capital buffer against potential losses. But both of these options are likely to be costly because of transaction costs, informational frictions, and tax concerns.

The pros and cons of these types of products raise an important set of interrelated questions: What types of households buy index insurance? What factors prevent the remaining households from participating? And does the purchase of index insurance result in more efficient risk taking?

Evidence on uptake of index insurance in Malawi and India

A recent paper on Malawi and two papers on India try to shed light on the questions raised above. In Malawi, smallholders were offered credit to purchase high-yielding seed varieties. Farmers in some localities were randomly selected to be offered credit only, whereas farmers in other localities were offered a bundle of credit and weather index insurance. In India, smallholders were offered a stand-alone weather index insurance product whose price elasticity was estimated by randomly varying the price of the policy. To understand the role of liquidity constraints, certain households were given a positive liquidity shock. To measure the importance of trust, some households received a product endorsement by a trusted local agent. To understand whether limited financial education about the product impedes adoption, a subset of households received additional information relating the unfamiliar concept of rainfall in millimeters to the familiar concept of soil moisture. Finally, to understand the effect of product framing, information was presented to households in subtly different ways.

In Malawi, uptake of the credit was 33 percent for farmers offered the loan without insurance and only 17.6 percent for farmers offered the loan bundled with rainfall insurance. This result suggests that smallholders did not value insurance, perhaps because the lack of collateral and the lender's inability to sanction defaulting borrowers was already providing implicit insurance. After the pilot, lenders decided to bundle all agricultural loans with insurance. The insurance covers only the loan, however, and anecdotal evidence suggests that borrowers remain largely unaware that the loans are insured. Therefore, although insurance may have increased access to credit, it is less clear that farmers are ultimately insured.

In India, government crop insurance, which has long been available, is mostly compulsory; government bank clients in many states are required to purchase the insurance when borrowing for agricultural purposes. Most borrowers perceive the premium as a fee and remain uninformed about what they are paying for. Thus, the provision of explicit market-based rainfall insurance to Indian households remains a new and relatively untested concept.

Demand for index insurance in India has been sensitive to price and to endorsement from a trusted third party. But uptake has remained low, even when the price of insurance was less

than its expected value. These results are consistent with the view that in addition to price and liquidity, trust and financial literacy significantly influence uptake.

Table 1 presents some basic information about the growth in index rainfall insurance contracts sold by BASIX, a microfinance institution. The number of villages where insurance is available has expanded substantially since the initial 2003 pilot surveys. The number of policies sold per village, however, has remained relatively constant. In 2006 one contract was estimated to be sold for every 13.2 households in villages where rainfall insurance contracts were available. An insurance contract costs between about 100 and 300 Indian rupees (about US\$2–\$7) depending on whether it is linked to a single phase of the monsoon or to all three phases.¹

Table 1—Rainfall insurance sales by BASIX, Andhra Pradesh, India

Year	Number of villages where insurance is sold	Total number of contracts	Average number of contracts per village
2003	17	194	11.4
2004	43	318	7.4
2005	422	3,214	7.6
2006	538	6,039	11.2

Source: BASIX; also cited in S. Cole, X. Giné, J. Tobacman, P. Topalova, R. Townsend, and J. Vickery, "Barriers to Household Risk Management: Evidence from India," Working Paper (World Bank, Washington, D.C., 2009).

In addition, households that buy insurance generally purchase just one or two policies, hedging only a modest fraction of monsoon agricultural income, which suggests that early adopters are still experimenting with the product.

Policy implications

A number of policy implications follow from these findings.

- **The implementation and marketing of index insurance should be carefully designed.** The product must be simple

enough for farmers to understand, and yet it must pay out in the events the smallholder cares about. This payout can be a complicated function of the event being insured against. In addition, it is not clear who should bear the cost of educating potential clients and how detailed the messages should be. More research is needed to shed light on these issues.

- **Trust can be built by designing a product that initially pays fairly often.** It is easier to sell insurance in villages where a positive past insurance payout has occurred. To build trust in the product, insurance providers could modify the contracts, at least in the beginning, to ensure that they pay out a positive return with sufficient frequency. Unless premiums are raised, however, the contracts that pay out frequently will offer less coverage in catastrophic events, making them less valuable to clients.
- **Since liquidity constraints matter, lenders could offer loans to pay for the premiums.** In this case, lenders would have to provide education and financial literacy training to inform borrowers explicitly about the events that trigger a payout so that the culture of repayment is not undermined.
- **The benefit of index insurance to lenders is clear, so the focus of research should be on the demand side.** From a lender's standpoint, weather insurance is an attractive way to mitigate the risk of credit default. It can thus become an effective risk-management tool with the potential to increase access to agricultural credit at lower prices. ■

For further reading: X. Giné, R. M. Townsend, and J. Vickery, "Statistical Analysis of Rainfall Insurance Payouts in Southern India," *American Journal of Agricultural Economics* 89, no. 5 (2007): 1248–54; X. Giné, R. Townsend, and J. Vickery, "Patterns of Rainfall Insurance Participation in Rural India," *World Bank Economic Review* 22, no. 3 (2008): 539–66; X. Giné, and D. Yang, "Insurance, Credit, and Technology Adoption: Field Experimental Evidence from Malawi," *Journal of Development Economics* 89, no. 1 (2009): 1–11; S. Cole, X. Giné, J. Tobacman, P. Topalova, R. Townsend, and J. Vickery, "Barriers to Household Risk Management: Evidence from India," Working Paper (World Bank, Washington, D.C., 2009).

¹ The cropping season was divided into three phases roughly corresponding to the planting, crop maturity, and harvesting periods. Individuals could purchase a contract on a single phase or all three phases together.

Xavier Giné (xgine@worldbank.org) is senior economist in the Research Development Group (DECRG) at the World Bank.



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

www.ifpri.org

Agriculture in Ethiopia is almost entirely rainfed and highly prone to droughts and floods. Given that 85 percent of the population depends on smallholder agriculture, these weather shocks severely affect many Ethiopians. The high covariance of climatic risks, coupled with the lack of property to be attached as collateral, makes it difficult for cooperatives, microfinance organizations, or banks to provide financial services to smallholder farmers unless they have some insurance/reinsurance against this weather risk. These conditions in turn keep farming at a subsistence level, with low use of improved technology, low productivity, and low risk.

Nyala Insurance S.C. is one of the leading private insurance companies in Ethiopia and provides a range of products, including both life insurance and general insurance. To help farmers protect themselves against droughts that significantly reduce crop yields, Nyala recently introduced crop insurance products (see Box 1 for details about Nyala Insurance S.C.).

Different products for different farmers

In recent years Nyala has provided two types of crop insurance: multiple-peril crop insurance (MPCI) and index-based weather insurance, each designed to meet the needs of different farmers.

Nyala's MPCI is a double-trigger scheme that insures farmers against a number of different shocks—both natural and human caused—that affect crop yields, including shortages of rainfall, excess rainfall, fire, and transit risks. Because MPCI insures against a number of perils, it is better suited to farmers who face a number of sources of risk to crop yields than it is to farmers whose predominant source of risk is rainfall variability. Nyala thus targets this product to farmers located in areas with reasonable rainfall. The product uses an innovative double-trigger design to determine when payouts need to be made against insured perils, mainly weather. The first trigger is the recording of unusual rainfall levels at a local weather station. When this happens, Nyala sends a team to assess the yields (through crop cutting) of model farmers who have been preselected as a benchmark based on criteria agreed upon by agricultural experts from Nyala, the Ministry of Agriculture,

cooperative unions, and the insured farmers. This assessment is the second trigger. Based on this assessment result, a payout is made to all farmers who suffered a shortfall from the pre-agreed-upon long-term average yield. Losses from localized risks such as fire and hail are more costly to assess because they involve individual visits at the farm level. Because this product involves farm-level assessments for some risks, it is costly to administer and more suitable for those with larger farms than for smallholders. It therefore tends to be purchased by farmers who are involved in seed multiplication.

In 2008 and 2009, 947 pilot farmers in two cooperative unions (Lume-Adama and Yerer) spanning four *woredas* (districts) were insured for teff, wheat, lentil, haricot beans, and chickpeas under MPCI contracts. Total membership in these unions is 47,000.

Nyala's index-based drought insurance product, on the other hand, is more suitable for smallholder farmers in more drought-prone areas. Index-based insurance products have been introduced in recent years as a way to avoid some of the drawbacks of traditional insurance mechanisms. Rather than paying out as an indemnity when a crop fails—an approach that requires detailed data on an individual farmer's productivity as well as ex post verification of losses—an index-based insurance product simply uses a measure such as rainfall, temperature, or soil moisture to insure against drought or other covariant shocks. This approach reduces transaction costs, making insurance more affordable and accessible for smallholder farmers. The conditions represented in the index may not, however, reflect the farmers' actual crop loss. To keep this remaining risk, known as basis risk, as low as possible, it is important that farmers are located near weather stations—no farther than 20 kilometers, depending on terrain in the area.

The weather index product is designed around particular crops. For each crop, the main growing season is split into three phases: an initial phase corresponding to the germination and vegetative phase, a middle phase corresponding to flowering, and a final phase corresponding to seed formation and ripening. These phases are further split into 10-day periods (*dekads*). The amount of rainfall needed and expected in each *dekad* is estimated. If the rainfall

Box 1—About Nyala Insurance S.C.

When all former private insurance companies in Ethiopia were nationalized by the socialist regime that prevailed from 1974 to 1993, they were taken over by the government-owned insurance corporation. Following the change to a market-led economy in 1994, many private business institutions, including banks and insurance companies, were established. Nyala was the seventh to be licensed in July 1995. Nyala Insurance S.C., or NISCO, was established with 7 million Ethiopian birr in paid-up capital and 25 million birr in authorized capital. Nyala has raised its capital to 35 million birr in paid-up capital and 50 million birr in authorized capital, with an asset value of more than 166,800,000 birr. Nyala operates from more than 30 service centers located in all regions throughout the country.

Nyala's vision is to guarantee care and protection to all its customers and to deliver these faithfully and responsibly. Its mission is to continuously interact with and recognize clients' point of view; to ensure that clients fully understand the terms and conditions of protection policies before commitment; to ensure that Nyala's own staff always follow the company's business principles and practices; and to implement a state-of-the-art information system so that customer services are enhanced through the provision of timely and accurate information. Nyala believes that the foundation of its success is the satisfaction of those it serves nationwide.

is less than this amount, the number of millimeters of deficit is counted and recorded. The total amount of deficit rainfall is then added up, and a payout is made, up to the pre-agreed limit, on the basis of how many millimeters of deficit are recorded. The larger the deficit, the larger the payout (within the pre-agreed limit).

Nyala introduced weather index-based insurance in 2009 specifically to protect smallholder farmers against weather risk. The index-based insurance product was piloted with farmers in the eastern Ethiopian *woreda* of Boset, chosen because of the vulnerability of yields there to drought, the availability of nearby weather stations, and the willingness of cooperatives in the area to purchase the new product (the cooperative union had previously purchased crop insurance from Nyala). The insurance was targeted to smallholder farmers (most with holdings of less than 0.5 hectare) who grow haricot beans, teff, and other cereals. A weather index product was designed in collaboration with the World Food Programme around the rainfall requirements of haricot beans. This product was purchased by 137 haricot bean farmers in the Lume-Adama Farmers' Cooperative Union (LAFUCU), an organization of 22,000 members located in three *woredas*. Similarly, 200 teff farmers in the Kola Tenben *woreda* in northern Ethiopia were insured with a weather index product that was designed around the rainfall requirements of teff. This product was provided in cooperation with Oxfam-America, mainly using satellite data. Nyala has reinsured these products through Swiss Re.

The product has potential for areas where drought is the major risk to crop yields and where it is easy to define a good year and a bad year. It is difficult to price and reinsure unless the index relies on a nearby weather station that has consistently recorded rainfall for decades.

Using cooperatives to reach many farmers

In both the MPCl and weather index insurance contracts, Nyala has found that farmers' unions serve as effective delivery channels for the weather insurance products. By working with cooperative unions, Nyala insures all farmers who belong to the cooperative under the same contract. The cooperative is responsible for both paying the premium and distributing potential payouts (as calculated by Nyala) to each insured farmer, reducing transaction costs for Nyala. Working with cooperatives is an important means of achieving the scale required for insurance products.

Because many of these cooperatives already provide financial services and technical assistance, they are well positioned to support

the provision of insurance coverage to their farmers. For example, in the case of the haricot bean pilot, all farmers were members of LAFUCU. The union was already providing agricultural inputs and allowing farmers to purchase them on credit, given that most farmers have little or no savings to buy agricultural inputs up front. In the pilot project, LAFUCU, the Yerer Farmers' Cooperative, and Dedebit Microfinance served as effective intermediaries for Nyala while also insuring their members' input credit against weather risk. Nyala is continuing to consider ways to provide insurance, taking into account farmers' limited capacity to pay for insurance up front.

Investing in infrastructure

The lack of infrastructure necessary to create the weather indexes makes it difficult to scale up index insurance. Currently, the National Meteorological Agency collects weather data from around 900 weather stations across the country, but only about 140 stations have the many years of historic records required to price index insurance.

In addition, the design of the index-based insurance product depends on a fast and transparent data collection process, but in Ethiopia data collection from existing stations is slow and may be subject to errors. At most weather stations, data are collected manually on a daily basis, recorded on paper, and sent once a month by mail to regional offices and to the central office in Addis Ababa, where they are checked for inconsistencies and entered into a computer.

In the case of the Boset weather index insurance pilot, weather stations in Boset and Sodere provided information on historic rainfall, but the World Food Programme invested in an automated weather station, at a cost of around US\$3,000, to collect data during the insurance contract. This step allowed rainfall data to be collected quickly and reliably, thereby facilitating prompt settlement of the insurance contract.

Summary

Nyala insurance has experienced considerable success in designing innovative weather insurance products that protect a range of farmers. Public investments in institutions such as cooperatives that can retail these products to farmers and automated weather station infrastructure can help scale up these products. ■

For further reading: See more information on Nyala at www.nyalainsurance.com.

Eyob Meherette (eyobm@nyalainsurance.com or theyobs1@yahoo.com) is deputy chief executive officer of Nyala Insurance S.C.



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

IFPRI® www.ifpri.org

The Mongolian rural economy is based on livestock reared by semi-nomadic herders. Agriculture contributes around 20 percent of the country's gross domestic product, and herding accounts for more than 80 percent of agriculture. According to the 2008 livestock census, Mongolia has about 44 million head of livestock, consisting of goats, sheep, cattle, yaks, horses, and camels. Livestock provide sustenance, income, and wealth to nearly half the residents of Mongolia. Shocks to the well-being of livestock therefore have devastating implications for the rural poor and for the overall Mongolian economy. Major shocks are common because Mongolia has a harsh climate where animals are herded with limited shelter. From 2000 to 2002, harsh winters (*dzud*) killed 11 million animals. The Government of Mongolia has struggled with the obvious question of how to address this problem.

Managing risk in the livestock sector requires a combination of risk mitigation and financial approaches. Pastoral risk mitigation, including winter shelters, fodder crop storage, and improved management of winter pastures, can help herders better prepare for moderate weather events. In extreme *dzud* events—that is, sudden-onset winter storms with very low temperatures, high winds, and heavy snow—high levels of livestock mortality are often unavoidable. Pastoral and herd management must therefore be complemented by financial mechanisms that provide herder households with immediate liquidity after a disaster.

In 2001 the Government of Mongolia requested assistance from the World Bank to address the problem of frequent high death rates in the livestock population. Traditional indemnity-based livestock insurance (based on individual losses) has proved ineffective in Mongolia because of the high cost of covering animals spread across vast areas, *ex ante* moral hazard (herders failed to protect their livestock), and *ex post* moral hazard (herders falsely reported animal deaths). The World Bank recommended an index-based insurance program based on livestock mortality rates by species and *soum* (county), as well as a comprehensive risk-financing strategy including self-insurance by herders, market-based insurance, and a social safety net. Index-based insurance can lower administrative costs and reduce moral hazard and adverse selection. Its main disadvantage is the presence of basis risk—that is, the index payout may not exactly match the individual livestock loss.

The Index-based Livestock Insurance Program

In 2005 the government entered into a credit agreement with the World Bank to implement the Index-Based Livestock Insurance Program (IBLIP). The government proposed beginning a three-year pilot program in three provinces of Mongolia, starting with sales in the spring of 2006. The pilot program aimed to provide insurance coverage against catastrophic livestock mortality events to complement household-level risk management strategies for smaller livestock mortality losses.

This program pays indemnities whenever the adult mortality rate exceeds a specific threshold for a localized area (for example,

the *soum* in Mongolia). This system provides strong incentives to individual herders to manage their herds to minimize the impacts of major *dzud* events. If a herder has no losses when his or her neighbors have had large losses, the better herder is rewarded for the extra effort by receiving a payment based on the area losses.

The coverage period is from January until May of a given year, when more than 80 percent of the historical livestock losses occur. The sales season is during spring of the previous year. In early June the National Statistical Office conducts a midyear census, which is compared with the previous end-of-the-year census, conducted in December, to determine the livestock mortality rate of adult animals. The program covers sheep, goats, camels, horses, cattle, and yaks.

Layering livestock risk

The insurance program is a combination of self-insurance, market-based insurance, and a social safety net. Herders bear the cost of small losses that do not affect the viability of their business, larger losses are transferred to the private insurance industry, and only the final layer of catastrophic losses is borne by the government.

The Base Insurance Product (BIP) is a commercial risk product, sold and serviced by insurance companies on a voluntary basis. Herders pay a commercial premium rate for this product, which pays out when the *soum* mortality rates exceed the trigger of 6 percent. The maximum payment for the BIP occurs when mortality rates reach a specified "exhaustion point" of 30 percent. The risk-based premium rate depends on the species and the location. It is slightly lower than 3 percent on average.

The Disaster Response Product (DRP) is a social safety net product financed and provided by government, which begins payment when mortality rates exceed the BIP exhaustion point of 30 percent. Herders who purchase the BIP are automatically registered for the DRP at no additional cost. Herders who do not purchase at least the minimum value of BIP must pay a small administrative fee for DRP.

As an example, consider a herder who owns 100 sheep where the value of a sheep is 20,000 Mongolian tugrik (Tg). The herder decides to insure 50 percent of the total value of his herd—that is, 1 million Tg. The premium rate for the BIP, with a strike (deductible) at 6 percent and a cap at 30 percent, is 3 percent in the selected *soum*, so the herder pays a premium of 30,000 Tg. Suppose the mortality rate in the herder's *soum* during a bad *dzud* year equals 40 percent. The payment rate for the BIP is equal to 30 percent – 6 percent = 24 percent. Thus the BIP payment is 24 percent × 1,000,000 Tg = 240,000 Tg. Payment for the DRP equals (40 percent – 30 percent) × 1,000,000 Tg. = 100,000 Tg.

The Livestock Insurance Indemnity Pool (LIIP)

Because mortality rates are highly correlated across regions in Mongolia, significant risks are associated with the commercial BIP product. Given concerns about financing extreme losses, the pilot

design involves a syndicate pooling arrangement for insurance companies—the Livestock Insurance Indemnity Pool (LIIP). Herders' premiums are deposited into the LIIP until the settlement period. Thus, indemnities are fully protected under this scheme. The LIIP also "ring-fences" this line of business and thus protects the domestic insurance market against any financial contagion caused by extreme livestock losses. The Government of Mongolia fully covers insured losses beyond the LIIP reserves through an unlimited stop-loss reinsurance treaty, backed by the World Bank credit. Reinsurance premiums paid by the LIIP to the government are set aside in the reinsurance reserves. The reinsurance reserves pay for the first layer of losses beyond the stop loss. Once the reinsurance reserves are exhausted, the government can draw upon the World Bank contingent credit to pay for any remaining losses.

Pilot performance and challenges

As of September 2009, three insurance cycles had been completed (Table 1). Participation has increased since the first season and reached 14 percent in 2008–09, exceeding expectations thanks to intensive information campaigns. In the last two seasons, however,

Table 1—Performance of the Base Insurance Product (BIP)

Indicator	2006–07 season	2007–08 season	2008–09 season
Number of pilot <i>aimags</i> (provinces)	3	3	3
Number of insurance companies	3	4	4
Number of BIP policies sold	2,222	3,034	3,281
Number of animals insured (thousands)	246	287	309
Total sum insured (thousand US\$)	4,510	5,588	6,272
Premium volume (thousand US\$)	98	141	153
BIP losses (thousand US\$)	1	195	288
Loss ratio (%)	1	138	189

Note: Table shows only BIP results. Premium volume includes risk-based premiums transferred to the LIIP and administrative and operating expenses (mainly delivery costs) kept by the insurance companies. Exchange rate is 1 US\$ = 1,200 Tg. Loss ratio is defined as the ratio of the BIP losses to the premium volume.

Source: IBLIP Project Implementation Unit, 2009.

losses were heavy compared with the premium volume, and insurers faced underwriting losses.

The IBLIP represents an innovative approach to agricultural insurance based on a strong public–private partnership. Unlike other government-sponsored agricultural insurance programs, it offers no direct premium subsidies to herders. Instead, the government covers other costs, such as the livestock census, the management of the LIIP, and the subsidized reinsurance treaty.

Nevertheless, the program faces major challenges, mainly related to its expansion to nationwide coverage over the next three years. These challenges include the following:

- Technical improvements are needed in data collection, and technical capacity building is needed in the insurance industry.
- To reduce the high cost of providing insurance through insurance agents, insurance products should be linked to other financial services, such as loans, offered through bank branches.
- Currently the government serves as reinsurer, but an important next step is to attract international reinsurers who could also supply international expertise.
- The program is currently managed by a dedicated technical support unit set up under the pilot program and financed by the government, but in the long term these costs should be covered by the scheme out of the commercial premium volume.

Conclusion

The pilot program is the first operation supported by the World Bank involving the design and implementation of a full agricultural insurance program in a developing country. Strong public–private partnerships have been implemented in order to (1) offer insurance products that are attractive and affordable to herders, (2) involve the domestic insurance market while protecting it against catastrophic losses, and (3) limit the government's fiscal exposure.

The pilot approach adopted by the Government of Mongolia ensures that the program will be continually adjusted based on experience. The next step is to expand the program to more *aimags* (provinces) and to strengthen its long-term viability. ■

For further reading: O. Mahul and J. Skees, *Managing Agricultural Risk at the Country Level: The Case of Index-based Livestock Insurance in Mongolia*, World Bank Policy Research Working Paper No. 4325 (Washington, D.C.: World Bank, 2007); O. Mahul and C. Stutley, *Public Support to Agricultural Insurance: Challenges and Options for Developing Countries* (Washington, D.C.: World Bank, forthcoming); *Index-based Livestock Insurance Project website*, www.iblip.mn.

Olivier Mahul (omahul@worldbank.org) is program coordinator of the Insurance for the Poor Program, World Bank. **Nathan Belete** (nbelete@worldbank.org) is a senior rural development economist at the World Bank. **Andrew Goodland** (agoodland@worldbank.org) is a senior agricultural economist at the World Bank.



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

IFPRI® www.ifpri.org

A serious injury or illness usually increases medical expenses and often reduces income. Even worse, some short-term health problems can worsen long-term poverty when families sell productive assets such as land or remove their children from school. In theory, health insurance can help reduce asset sales, reduce the need for new loans, increase the quantity and quality of care, and improve health.

Unfortunately, rigorous evidence on the impact of insurance is scarce, particularly in developing countries. It is hard to study the effects of insurance because of adverse selection, which occurs because households that expect high healthcare costs have the strongest incentives to buy health insurance. At the same time, if cautious, well-educated, or wealthy people both engage in safe behaviors and value insurance, then voluntary insurance can enjoy positive selection. Thus, finding that insurance correlates with either poor health or high income would tell us little about the causal effects of insurance on health and economic outcomes.

In spite of the challenges, several rigorous studies (primarily in rich countries) find that health insurance usually increases access to healthcare. The effect of that increased access on health depends on the value of that care. Scattered results from the United States and other wealthy countries suggest that health insurance usually leads to modest improvements in health. It remains an open question to what extent insurance in developing countries will increase healthcare access and use, reduce financial vulnerability, and improve health outcomes.

Selection and financial sustainability

Even if insurance is valuable to the poor, voluntary private insurance may not be financially sustainable if adverse selection is severe, because only the costliest patients would purchase insurance. With strongly adversely selected customers, premiums will not cover the high costs of care.

Most studies find households with chronically sick members are more likely to purchase voluntary insurance. This adverse selection is an important motivation for the link between employers and healthcare in the United States, in spite of the resulting low portability of insurance. At the same time, in the United States wealthier households have more insurance, potentially leading to some positive selection if wealthier people also tend to be healthier.

SKY Health Insurance in Cambodia

This brief examines how these several forces operate at SKY Health Insurance (an acronym for the Khmer name Sokhapseap Krousar Yeung, or "Health for Our Families") in rural Cambodia. SKY sells insurance for a low premium and contracts with the local public health system so that SKY members pay nothing out of pocket to use local clinics and regional and provincial referral hospitals. Because the public health system is subsidized, SKY insurance receives some implicit subsidies relative to private healthcare. The

public health system in Cambodia is often of low quality, but SKY typically enters regions with an above-average public health system and engages in monitoring and other activities to improve the quality of the system.

The evaluation team surveyed potential customers, some of whom purchased SKY insurance and most of whom did not. The survey showed that SKY does a good job of reaching its target audience—the rural poor, for whom high healthcare costs are not infrequent and can be devastating. Most SKY households farm, although many also have other small businesses.

While SKY targets the poor, it also tries to avoid financial losses. Thus, the policy includes several terms that limit adverse selection. For example, it does not cover chronic conditions such as high blood pressure. In addition, SKY does not pay for the delivery of babies within the first few months of joining. Government policy also reduces adverse selection: government programs pay 100 percent of the cost of drugs for very expensive chronic diseases, such as HIV/AIDS and tuberculosis.

SKY would have an easier time being financially sustainable if people who are good risks purchased insurance more often. For example, health insurance is a novel product in this region and the SKY contract is quite complex; thus, SKY might have been more attractive to better-educated consumers. In fact, SKY members and nonmembers have similar education. Similarly, cautious people might value insurance more (and also have lower injury rates). In fact, SKY members and nonmembers have similar levels of risk aversion according to two measures: the survey asked respondents how often they gamble and how much pay they would require to accept a hypothetical riskier job.

Conversely, SKY would have more difficulty being financially sustainable if it suffered from adverse selection. In most of the dimensions studied, however, SKY does not suffer from adverse selection. For example, in Cambodia (as in most of the world), both the very young and the elderly use more health services than others. Yet SKY households do not have a particularly high share of either young children or the elderly. Also, SKY households had similar rates of serious illness (defined as illness that keeps people from their main activity for seven or more days) before the sales meeting when they were first offered SKY insurance. Among those so disabled, SKY members also have similar rates of hospitalization and of very high healthcare costs.

The only exception is that 69 percent of declining households, but 78 percent of SKY households, have at least one member in what the respondent described as "poor health." (The health question was asked a few months after households joined SKY.) Thus, these results will underestimate adverse selection if SKY insurance improves health. The results will overestimate adverse selection if buyers are more aware of their health problems either because of increased healthcare after joining SKY or because SKY attracts consumers who focus more attention on health problems.

Economic theory suggests that this adverse selection should be more severe at higher prices. Intuitively, at low prices, even the healthy would find insurance attractive; in the extreme case of zero price, everyone would be covered and there would be no adverse selection. When some randomly chosen households were offered a coupon to purchase SKY insurance at a steep discount, however, there was no support for the hypothesis of more adverse selection at higher prices. The gap in self-reported poor health was similar for those paying the normal price as for those paying the much lower coupon price.

SKY does, however, face adverse selection in retaining its members. Those who use SKY-funded healthcare are far more likely to remain SKY members than are households that never receive SKY-funded benefits.

Remaining questions

The results reported here are preliminary and based only on the baseline household survey. In the next few years, this evaluation will produce more results on who self-selects into SKY and who remains a member. The evaluation team will use the randomized coupons to create a randomized controlled trial of the effects of health insurance.

These results can help inform policymakers' decisions about the role of private health insurance. If results show that SKY does a good job of protecting health, increasing healthcare use among the ill, and facilitating asset accumulation, then policymakers will have more justification to address obstacles to the spread of health insurance.

Any business serving the rural poor faces many obstacles, ranging from poor infrastructure to low literacy. Voluntary health insurance for the global poor faces the challenges of providing care that consumers value, lowering transaction costs, and minimizing adverse selection. More research is needed to see how well SKY and other innovative voluntary insurance programs are meeting these challenges. Research is also needed to compare voluntary insurance with mandatory insurance programs, universal public care, and other alternatives. In a world where the poor face multiple risks and use multiple means to address those risks, it is also important to understand how health insurance and other modern financial instruments can fit into potential customers' complex financial lives.

Longer-term research is important as well. SKY executives, for example, consider the risk of adverse selection to be a start-up cost. To the extent SKY faces adverse selection, they anticipate that this problem will decline as SKY's market share rises. This trajectory is consistent with economic theory under certain assumptions; it is important to monitor how it plays out in Cambodia.

Any voluntary insurance program faces a tension between financial sustainability and helping those in need. Thus, financially sustainable insurers in the voluntary market will tend to exclude preexisting conditions and care for some high-cost conditions.

Voluntary insurance markets typically work better when the insurance is not expected to cover chronic and very expensive conditions. These are also the conditions most subject to adverse selection. Cambodia's coverage of HIV/AIDS and tuberculosis treatment, for example, is a good complement to SKY's voluntary insurance.

When adverse selection is important, insurers can follow the U.S. pattern and move to insuring groups, as when employers provide health insurance. SKY is expanding its offering of health insurance to large Cambodian employers such as the government and export-oriented factories. This approach is likely to spread, and more insurers in developing countries are likely to bundle health insurance with employment or other naturally occurring groups. Because most rural households have self-employed farmers and small entrepreneurs but not employees, some health insurers will probably work through farmers' groups, trade associations, and similar organizations.

At the same time, employer-provided or occupation-specific health insurance will never reach many of the poor. Employers also face incentives to pay for care for those conditions from which rapid recovery is possible, but not expensive and chronic conditions. Finally, health insurance linked to an employer or occupation does not work well when people change jobs.

Thus, a country interested in using private insurance to achieve universal coverage will eventually need some combination of subsidies for the poor and mandates for health insurance (as many U.S. states require for automobile insurance). Such regulations are appropriate to the extent adverse selection is a market imperfection like pollution and other externalities. At the same time, most developing countries can afford only small subsidies, and many of their poorest citizens cannot afford to pay much for healthcare. This evaluation of SKY health insurance in Cambodia must be coupled with studies of many other innovations as the world learns how to help those most in need. ■

For further reading: See evaluation website at <http://faculty.haas.berkeley.edu/levine/sky/overview.doc> and D. I. Levine, N. Hema, and I. Ramage, *Insuring Health: Testing the Effectiveness of Micro-health Insurance to Promote Economic Wellbeing for the Poor*, BASIS Brief no. 2007-05 (Madison, Wis., U.S.A.: Department of Applied and Agricultural Economics, 2007), <http://www.basis.wisc.edu/live/amabrief07-05.pdf>.

David I. Levine (levine@haas.berkeley.edu) is the Eugene E. and Catherine M. Trefethen Professor at the Haas School of Business, University of California, Berkeley. **Rachel Polimeni** and **Rachel Gardner** of UC Berkeley and **Ian Ramage** of Domrei Research and Consulting contributed to this briefing paper and to the underlying research.



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

IFPRI® www.ifpri.org

Helping households manage the risks they face is important in reducing poverty in developing countries. All households face health risks, and when health shocks occur, they have a severe impact on people's livelihoods. High costs of treatment are often exacerbated by reduced income due to ill health. In some cases, people must also sell productive assets to pay for medical care. An estimated 1.3 billion people lack access to effective and affordable healthcare. Publicly funded healthcare, in its current form, is an inadequate mechanism for reaching the poor in many countries, in part because most states have limited health budgets. In two-thirds of all low-income countries, one-third of total health expenditures come directly from patients. Although developing countries bear 93 percent of the world's disease burden, people in most of these countries still have few options for insuring against health risks. The disease burden is highly concentrated in low-income groups, and most households have little disposable income to spend on healthcare coverage. Institutional innovations in recent years have begun to address issues of coping with health risks and financing healthcare.

Innovations in health insurance

Several developments have helped make private health insurance an increasingly viable option: microfinance institutions (MFIs) have started to expand their financial services to include health and life insurance products; health sector reform and decentralization in many countries have led to policies favorable to private health insurance; and poor people have become more aware of the importance of health security to their economic and social prospects. In spite of the many complicating factors, private insurance companies are beginning to offer innovative solutions for making private health insurance available to the poor.

One innovative model takes advantage of existing MFIs in the low-income market and adds insurance products to their existing credit and savings activities. These insurance products, often called microinsurance, are simple with low benefits and low premiums. In this partner-agent model, the MFI collects information from its clients to create products that best satisfy their clients' needs and then identifies an insurer who can provide these products. The MFIs provide connections to the low-income market, applicable market information on their clients, and a delivery channel for insurance products; the commercial insurers provide expertise and absorb the insurance risk of the products. An estimated 15 million low-income people are currently covered by some insurance product sold through partnerships with MFIs, and this model shows significant potential for expansion.

Community-based health insurance

Another area of innovation has taken place outside the public sector, and the rest of this brief will look at these community-based models. Community-based health insurance (CBHI) has demonstrated promising results for poverty reduction. A CBHI scheme is essentially any program run by a community-based organization that pools risk to cover healthcare costs. Such schemes are well positioned

to monitor behavior and enforce contracts while at the same time reaching clients overlooked by many formal insurance schemes. CBHI schemes have the potential to solve many of the problems associated with insuring the poor. They reduce adverse selection by grouping people together with varying levels of risk and insuring them as a group. Their lower retail costs (compared with schemes that insure individual members) allow insurance to be provided more cheaply. In addition, community-based organizations are better placed to monitor members effectively.

Most CBHI initiatives have been started by health providers themselves, and in addition to mobilizing resources to address health risks, CBHI may also help improve the quality of healthcare services. These insurance schemes can be an important tool for protecting low-income populations from falling into poverty as a result of their health expenditures, effectively reaching poorer households who would otherwise have no way to cope with this risk. CBHI schemes do have some disadvantages compared with traditional insurance mechanisms, however, including their small size, limited technical and managerial skills, and the quality and accessibility of service providers. Their small risk pools and dependence on subsidies also cause some concern for the sustainability of CBHI schemes. In addition, despite being better positioned to reach poor rural households than most market-based insurance mechanisms, they are still often unable to reach the poorest groups because of the costs of premiums.

Impact of community-based health insurance schemes

Existing impact evaluations have been limited in scope, and few have addressed the effects of CBHI schemes on their members. In Senegal, household survey data were used to determine the impacts of membership in CBHI schemes on both healthcare use and financial protection. The study found that despite limitations in service provision (only hospitalization was included), the mutual organizations did have some impact on their members. Overall, 151 people out of 2,856 surveyed had been in the hospital in the previous two years, and members were 2 percentage points more likely to go to a hospital. The study also found evidence of improved access to healthcare as well as financial protection. In cases of hospitalization, members paid on average less than half the amount paid by nonmembers, showing that the mutual organizations do provide financial protection against hospitalization risk.

More research is needed, however, on the overall impact of CBHI schemes on poverty. Most CBHI schemes seem to have a pro-poor impact on their members, but only on a limited scale. Approximately 70 percent of households in the area were members of one of these mutual organizations, but not all members of each household were insured. Because of the cost of participation, chronically poor households are generally excluded from these CBHI schemes. To reach the poorest segment of the population, the cost of participation would have to be lowered through public subsidies or some other mechanism.

Lessons learned

A 2005 review of case studies on community financing schemes in India, Rwanda, Senegal, and Thailand (see "For further reading") draws the following lessons from their successes and failures:

1. The existence of viable healthcare providers is essential for mobilizing demand. Without high-quality services, people were unwilling to pay premiums. As illustrated in the case of Senegal (see Box 1), it is unlikely that the mutual organizations would have achieved the same level of success without the logistical, administrative, and financial support of the participating hospital.
2. Demand for health insurance is another crucial factor. Socioeconomic and cultural characteristics play an important role in whether people decide to purchase health insurance. Existing perceptions of illness and insurance may determine how effective these schemes are. Education might be necessary, especially when starting an insurance scheme in areas where little is known or negative impressions are held regarding healthcare, government provision of services, or insurance in general.
3. Community financing schemes perform better when they are linked to organizations with experience in financial service provision and social protection, such as microfinance institutions. Microfinance institutions offer connections to community members as well as delivery channels for insurance products.
4. Flexibility in payment options is important. In Rwanda, groups set up a system where households used a savings and loan association to save enough money to join a prepayment insurance scheme. Religious and other charitable organizations in both Rwanda and Senegal also made contributions for people who would otherwise be excluded from participation, while other groups established lotteries and started collective activities to earn money to pay for membership fees.
5. People who are struggling daily for survival are unlikely to pay insurance premiums in advance for possible use in the future. In Senegal, the mutual organizations often excluded the poorest households in communities simply because they cannot afford insurance. If most households in an area are too poor to pay premiums or if accessibility to healthcare services in the area is low to begin with, other social protection measures may be more appropriate.

Conclusion

States can improve social risk management and reduce poverty by promoting institutional innovations like community financing schemes and partner-agent models. Community financing schemes may help overcome some of the challenges facing traditional insurance providers by reducing transaction costs while addressing financing and service provision issues.

Box 1—Case study in Senegal

The Thies region of Senegal is characterized by a high incidence of poverty, malnutrition, poor health conditions, and health services that excluded much of the population. Households facing illness have often had to sell assets and borrow money to pay for treatment. Since 1990, though, the region has been home to CBHI schemes that involve contracts between a nonprofit healthcare provider, a Catholic-run hospital, and mutual health organizations, which developed out of existing self-help groups in rural areas. These CBHI schemes are community based with voluntary membership, and most cover only hospitalization, leaving high-frequency, low-cost events to be covered by the households. Members purchase a membership card and pay monthly premiums to receive their allotted benefits. Because these groups have contracts with one particular hospital, members receive up to a 50 percent discount for treatment, and the arrangement thus reduces overall healthcare costs.

Capacity building is key. Without the necessary skills and knowledge of insurance concepts among both recipients of healthcare services and those managing these insurance schemes, success is unlikely.

In designing insurance products, it can be helpful to take into account existing risk-sharing arrangements. It would be costly to design a product that would pay out for low-cost, high-frequency events, but in many communities, people manage these occurrences through traditional mechanisms. The CBHI schemes in Senegal, for example, focused insurance efforts solely on hospitalization because the existing informal risk management mechanisms (extended family and other social networks) were already in place to deal with these low-cost occurrences.

Partnering with existing organizations—hospitals and healthcare providers or nonprofits and microfinance institutions providing financial services—is also important. These partnerships provide important connections to the community and can facilitate a process that best meets people's needs while including as many people as possible in coverage.

As policymakers decide how best to use their resources to mitigate healthcare risk, they must consider numerous policy challenges. CBHI schemes can be an important first step in ensuring better access to healthcare for the poor, but to reduce poverty, broader coverage and scaling up are essential. The question is how to scale up while maximizing benefits and overcoming the limitations of CBHI schemes. ■

For further reading: J. Jütting, *Health Insurance for the Poor in Developing Countries* (Aldershot, UK: Ashgate, 2005).

Johannes Jütting (johannes.jutting@oecd.org) is the head of the Poverty Reduction and Social Development unit of the Organization for Economic Cooperation and Development (OECD) Development Centre, Paris.



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

IFPRI® www.ifpri.org

Questions in development economics often focus on the poor's limited access to capital and, in particular, on their high interest rate for borrowing. Despite this high price for capital, many poor households borrow substantial amounts for production and consumption. This situation suggests that the poor have access to very productive investment opportunities and face periods when they have a very strong desire to consume more than their current income. This brief explores the role of microfinance in paying for unexpected consumption expenditures.

Motivated by high borrowing costs among the poor, a large number and wide variety of organizations have made efforts to expand the availability of credit and decrease interest rates. Microfinance organizations are one prominent example, and loans are often also provided by banks, moneylenders, family, friends, and other local associations. Households also finance major expenditures using cash savings, funds from rotating savings groups, the sale or pawning of household items, insurance or entitlement programs, or gifts. Indeed, financial diaries show that the poor simultaneously use a large number of formal and informal financial instruments.

It is not clear whether this large number of financial instruments represents an economic success or failure. Assuming that the poor are not simply tricked, each of these instruments is fulfilling some demand that is not met by the other instruments. This reflects a great deal of adaptability in creating and adopting different instruments, but it also reflects the limited capabilities of each particular instrument individually. Even when each source can supply only a limited amount of capital, borrowers often do not use them to the fullest extent possible, despite seemingly substantial overlap in the services provided by each instrument.

Encouraging the creation of new financial instruments to cover unmet demands is a patchwork solution to these problems. It would be useful to understand what underlying rigidities prevent some products from substituting for others. Such an understanding would both help in developing new instruments and potentially allow for more direct corrections to the underlying financing challenges faced by the poor.

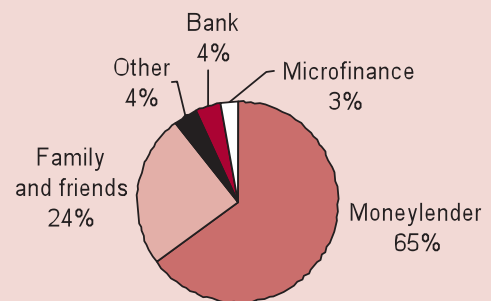
For example, for unexpected consumption expenditures, there is an inherent importance in having fast access to funds. If a household member experiences a sudden illness, accident, or pregnancy complication, receiving immediate hospital care will often require substantial upfront payments. Microfinance clients may be able to obtain funds on a regular schedule for business investments, but not necessarily for immediate health expenditures.

In early 2007 a survey was administered to 5,500 SKS Microfinance client households in rural India (the Bidar and Gulbarga districts) as part of the author's ongoing research with Professors Abhijit Banerjee and Esther Duflo of the Massachusetts Institute of Technology on the bundling of microfinance loans with health insurance. The survey asked about sources of loans used to finance expenditures on: particular major health events; weddings, funerals,

and festivals; tending animals; operating a business; and cultivating land. For each category of expenditure, Figures 1–5 report the fraction of loans coming from banks, microfinance organizations, moneylenders, family and friends, and other sources. When more than one loan source was used, fractions of the loan are allocated based on the proportion of loans from that source.¹

SKS Microfinance clients do not often report using microfinance for health expenditures; rather, they report using moneylenders and family and friends (Figure 1). SKS Microfinance has an emergency health loan program, but most clients report being unaware of this program.

Figure 1—Sources of loans for major health events



Source: SKS Microfinance client survey, 2007.

Note: Total number of loans in this category = 8,007.

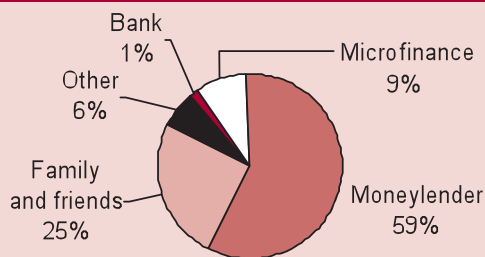
Capital may be fungible and reported sources of funds may not reflect the true long-run source of funds for these expenditures. For example, clients may take a high-interest loan from a moneylender only in the short term and then repay with a microfinance loan, a sale of assets, lower investment, or other sources of funds. Ongoing analysis of the randomized introduction of a health insurance policy will give some insight into how other debts and assets adjust to uninsured major health expenditures.

High interest costs for financing health expenditures, at least in the short run, can blur the traditional distinction between credit and insurance. Credit allows consumers to smooth expenditures over time, but it does not reduce the associated loss in permanent wealth. Insurance, on the other hand, is typically thought to reduce this risk of lost wealth. If credit is very expensive, however, then insurance may derive much of its benefit from effectively providing credit: it pays for health expenditures exactly when the consumer places a high value on capital. Indeed, SKS's health insurance policy offered a cashless network option for obtaining healthcare that was much more popular with clients than upfront payment and reimbursement. Credit and insurance may be much closer substitutes for the poor in developing countries than is typically thought in contexts with developed capital markets.

This relationship between credit, insurance, and unexpected consumption expenditures is intuitive, but additional survey results

¹ Household heads were asked details about each income-generating activity and major health event in the previous year; in each section, these questions included the sources of all funds and, when loans were used, the sources of loans. Loans from family and friends were reported separately from gifts; although these loans may have differed in repayment terms from other loans, they were the reported source of capital.

Figure 2—Sources of loans for weddings, funerals, and festivals

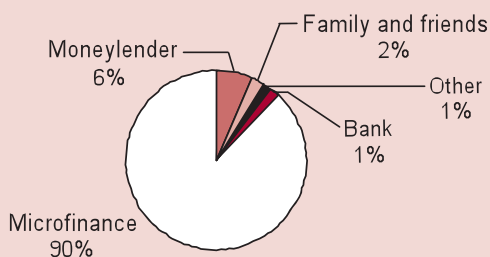


Source: SKS Microfinance client survey, 2007.
Note: Total number of loans in this category = 1,068.

present a more puzzling situation. If microfinance were simply too inflexible to fund unexpected health expenditures, then it might be more commonly used for anticipated consumption expenditures. However, microfinance was only slightly more common among loans used for weddings, funerals, and festivals; loan sources for these uses are similar to those for health expenditures (Figure 2).

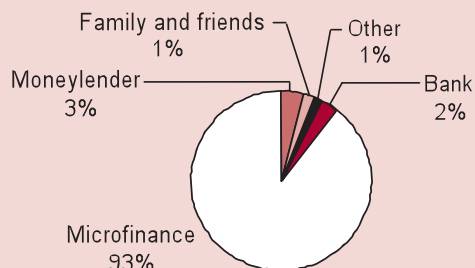
Perhaps microfinance is simply ill suited to financing consumption expenditures. Microfinance organizations often attempt to fund production rather than consumption, even though the two are closely linked through household financial decisions. Production loans may attract people that are lower risk ex ante, and production may be easier to monitor ex post. When clients take out loans to

Figure 3—Sources of loans for buying and tending animals



Source: SKS Microfinance client survey, 2007.
Note: Total number of loans in this category = 839.

Figure 4—Sources of loans for operating own business



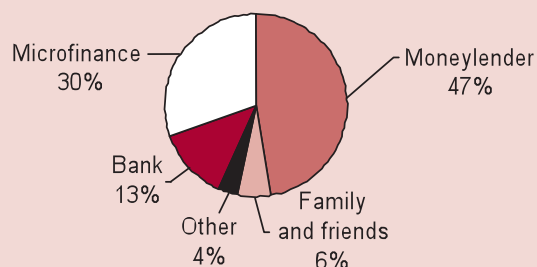
Source: SKS Microfinance client survey, 2007.
Note: Total number of loans in this category = 1,546.

buy and tend animals or support their own businesses, they mostly use microfinance loans (Figures 3 and 4).

The group structure of microfinance loans may prevent their use for consumption expenditures. Whereas production decisions have a natural seasonality, large consumption expenditures are less correlated between households, and it may thus be difficult to coordinate group borrowing. If group liability is not particularly important for maintaining microfinance repayment, as some recent research suggests, changing to individual microfinance loans could encourage their use for consumption.

Although buying and tending animals is somewhat seasonal, operating a business does not have an obvious seasonality. If borrowers tend to use microfinance only for production because of seasonality and group coordination, then one might expect microfinance to be common among loans for cultivating land. Borrowers, however, use moneylenders more often than microfinance loans for cultivating

Figure 5—Sources of loans for cultivating land



Source: SKS Microfinance client survey, 2007.
Note: Total number of loans in this category = 772.

land (Figure 5). They also sometimes use banks, which could reflect the use of land as collateral.

Overall, some aspects of the data suggest that microfinance might be used more for health events or other unexpected consumption expenditures if funds were available quickly and without group liability. Other aspects of the data discourage this interpretation, however, and much remains unknown about what factors influence the poor's access to credit. Introducing new financial products (such as insurance) can potentially fulfill unmet financial demands and, by changing a variety of borrower behaviors, new products also provide an opportunity to learn about what underlying factors influence the availability and use of different credit sources. Understanding the root causes of imperfect credit access would help in the design of future public and private initiatives. ■

For further reading: D. Collins, J. Morduch, S. Rutherford, and O. Ruthven, *Portfolios of the Poor: How the World's Poor Live on \$2 a Day* (Princeton, N.J., U.S.A.: Princeton University Press, 2009); X. Giné and D. S. Karlan, *Group versus Individual Liability: Long-term Evidence from Philippine Microcredit Lending Groups*, (World Bank, Washington, D.C., and Yale University, New Haven, Conn., U.S.A.), <http://karlan.yale.edu/p/GroupversusIndividualLending-May2009.pdf>.

Richard Hornbeck (hornbeck@fas.harvard.edu) is an assistant professor in the Department of Economics at Harvard University.



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

IFPRI® www.ifpri.org

Microinsurance is a powerful tool in helping low-income households transition out of poverty, but it has not achieved substantial scale compared with microcredit. In India, microfinance institutions (MFIs) initially showed great potential in offering microinsurance through in-house provision (the mutual model) or as agents for mainstream microinsurance companies (the partner-agent model). Over time, however, both models revealed significant flaws. The mutual model appeared limited because the community absorbs all the risk, and the partner-agent model experienced severe implementation issues, causing many large MFIs in India to scale back its use.

The microinsurance industry is battling the challenges of an infant industry—challenges made more severe by the difficulty of providing high-quality services at a price that the target population is willing to pay. Yet slow progress and the experiences of a few MFIs offer hope that MFIs can become a suitable delivery channel for microinsurance products.

This brief examines the merits of providing microinsurance through MFIs in light of the challenges faced by the microinsurance industry. The brief highlights the experience of Indian MFIs, though a number of issues are globally relevant.

The role of MFIs in providing microinsurance

The microinsurance industry faces significant supply-side challenges despite the potentially large market for its products across the developing world. These challenges include high transaction costs, high upfront investments to reduce risk so that premiums are affordable, lack of reinsurers' interest in this market, and limited availability of risk capital and technical know-how, all of which make commercial viability a distant dream.

MFIs are well placed to deal with a number of these challenges, given their experience in scaling up microcredit. For example, MFIs can overcome information asymmetry issues given their close links to and superior understanding of the groups they serve. This understanding could reduce the incidence of fraud and adverse selection. With their successful delivery mechanisms and cash management expertise, MFIs are natural aggregators of clients. Moreover, bundling microinsurance with credit reduces overall portfolio risk, allowing MFIs to lower their interest rates on lending. Most important, MFIs need to reduce their credit focus and provide a broader range of financial services to remain relevant in a competitive environment.

Recent experience

The experience of Indian MFIs with microinsurance has not lived up to expectations. Although microinsurance delivery through MFIs is growing, several MFIs limit their microinsurance products to credit insurance, which actually protects the MFIs' portfolios, not their clients' (by covering the repayment of the outstanding microcredit loan in case of a borrower's death). In 2005–06 a number of Indian MFIs began to provide more comprehensive and complex health

insurance products through the partner-agent model, but they are now scaling back or terminating such programs altogether because of implementation difficulties and a high incidence of fraud.

In 2007, SKS, India's largest MFI, introduced mandatory catastrophic health insurance in one of its branches and rolled it out to 600 additional branches in one year. SKS partnered as an agent with a private insurance company to provide the product. By July 2009, the insurance scheme covered 1.7 million members across 1,056 SKS branches. In September 2009, SKS withdrew the product because of a high incidence of fraud and is now significantly redesigning it. KAS Foundation, an MFI that operates in northeastern India and covers about 700,000 households, experimented with offering insurance with a simple critical illness benefit payout. After substantial client servicing issues, where aggrieved clients refused to repay credit, as well as operational challenges in claims processing, it moved from a partner-agent model to a mutual model before ending its health insurance program. The Village Welfare Society, an MFI operating in the state of West Bengal, provided 260,000 individuals with mandatory health insurance through a bundled partner-agent group policy. After substantial operational problems, it is exploring mutual models of offering insurance.

Notable exceptions to these discouraging experiences include the partnership between the SKDRDP Trust and Grameen Koota. The SKDRDP Trust offers a voluntary health microinsurance program for its members and their families. The scheme enrolled 186,000 members at its inception in 2004 and presently reaches 1.3 million individuals. Since 2007 SKDRDP has offered insurance to Grameen Koota, another MFI. The comprehensive product covers cashless medical benefits, maternity benefits, personal accident coverage, death allowance, and coverage for damage to dwellings. The program combines features of the partner-agent and mutual models, with SKDRDP retaining part of the risk and undertaking a major part of the insurance servicing. It acts as an in-house third-party administrator (TPA) for managing both hospitalization and special claims.

Another successful example is BASIX, a livelihood promotion institution set up in 1996 and headquartered in the southern state of Andhra Pradesh. In 2002 BASIX rolled out a credit life insurance scheme for its borrowers that provided insurance for 1.5 times the value of the loan, thus protecting BASIX and providing borrowers' families with some liquidity in the event of borrower death. BASIX now offers a wide range of products, including life, health, livestock, and weather insurance. A centralized in-house TPA receives claims, records client data, checks standardized claims adjudication processes, engages with the insurance company, and services the claims.

From the experience of Indian MFIs, it appears that a major constraint to providing microinsurance is effective servicing capacity. To service insurance schemes, MFIs have two choices: (1) build capacity internally through a true partner-agent model, where risk as well as servicing is shared; or (2) engage the services of a professional external TPA. SKDRP Trust and BASIX opted for

the former model. SHARE Microfin, another large Indian MFI, opted for the latter and engaged the services of MicroEnsure, an external TPA. A nascent industry of TPAs is emerging in India that can work with both MFIs and other delivery channels for microinsurance. One growing TPA, for example, is Family Health and Planning Limited (FHPL), which works with Yeshaswini Trust in Karnataka (see Appendix 2).

Lessons on MFI provision of insurance

The experiences of MFIs so far offer a number of lessons for product design and service delivery:

- **Leverage trust.** Recent studies undertaken by the Centre for Microfinance in Chennai with members of the MFI the Self-Employed Women's Association show that households' willingness to reenroll in a commercial insurance program depends largely on trust and the program's perceived stability and longevity. The risk and trust relationships are reversed from microlending to microinsurance, making formal investment in client education a critical first step for insurance sales.
- **Consider partial solutions.** Although comprehensive products are ideal, partial solutions are a good first step. Despite the advantages of comprehensive risk-hedging solutions, most organizations can offer such solutions only at a high cost, allowing limited opportunities for replication and scale.
- **Bundled solutions.** The bulk of MFIs offer credit life insurance and are beginning to offer life and personal accident products, but some MFIs have created servicing capabilities and are attempting to play the role of full financial intermediaries by offering a range of financial and nonfinancial services to their clients. Bundling financial and nonfinancial solutions can work to create an ecosystem that allows comprehensive risk management solutions. Insurance is commonly bundled with credit or savings. BASIX, for example, bundles agricultural and livestock credit with mandatory weather and livestock insurance schemes. Although the bundling of nonfinancial products with microinsurance is rare, one experiment in reducing risk aims to provide agricultural advisory services from Weather Risk Management Services with weather insurance through a range of intermediaries.
- **Avoid going solo.** Frustrated by the difficulties in dealing with mainstream insurance companies, some MFIs are providing in-house insurance products using the mutual model. This arrangement makes the MFI the final insurer as well as the agent to its clients. Although this model may allow for more customer-responsive products, it exposes the client and the MFI to high levels of risk because of the MFI's limited risk management capacities and its inability to pool risks among a larger population.

A more prudent strategy may be to iron out the issues related to service delivery and negotiate with mainstream insurers to get products that are appropriate for an MFI's clientele.

- **Leverage technology and soft infrastructure.** Information technology could help significantly reduce costs and improve the viability of microinsurance, as it has for microfinance. In the Philippines, for example, insurance companies minimize the cost of collecting many small premium installments by allowing payment through mobile phones. In Malawi and Uganda, insurance providers issue smart cards to poor policyholders to confirm identity and provide instant access to information on coverage and payment of premiums. In India, Internet kiosks can be used to deliver insurance products to the rural population or provide back-end servicing, reducing the transaction cost for the insurer and the MFI. The Government of India, under its National e-Governance Plan, has introduced common service centers in rural areas, and agencies like BASIX have initiated efforts to use these channels to service insurance clients. Finally, agencies like Palmyrah Workers Development Society and Bharati AXA general insurance are collaborating to develop models using mobile phone technology to reduce fraud and transaction costs. Appendix 2 details a recent example of technology innovation in providing livestock insurance.

Conclusion

Microinsurance is a relatively new industry. Learning how to reduce transaction costs was a big part of microfinance successes, and a similar learning experience needs to take place in microinsurance, which is very different from and more complex than credit. Nevertheless, MFIs can be effective delivery channels for providing microinsurance, especially in India, where they have established a reputation for reaching the financially excluded. Given the poor's need for safety nets, insurance is perhaps a more valuable product than credit, and MFIs could well increase their penetration into unbanked areas by first offering appropriate insurance products.

Government has an important role to play in developing public-private partnerships for delivering ambitious state-funded insurance programs, and MFIs can be partners for these government-funded insurance schemes. Insurance regulators (and other government entities) can help create an enabling environment that facilitates the commercial viability of microinsurance by, for example, investing in financial literacy and consumer education about insurance, mitigating risk through preventative measures, creating data to enable actuarial analyses, and exploring new technologies that can reduce costs. ■

Rupalee Ruchishmita (rupalee@ifmr.ac.in) is executive director of the Centre for Insurance and Risk Management, Institute for Financial Management and Research (IFMR), Chennai, India. **Sona Varma** (sonavarma1@yahoo.co.in) is senior adviser, IFMR Trust, Chennai, India.



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

IFPRI® www.ifpri.org

Elements of social protection date back several millennia. Free food distribution was a feature of Egypt in the time of the Pharaohs and of Rome during its Imperial age. England had a succession of “Poor Laws” dating from the 16th century that provided assistance to those unable to work, and Germany inaugurated components of the modern welfare state in the late 19th century. The past 15 years have seen an upsurge in interest in implementing social protection in developing countries. This brief outlines the principal components of social protection, explains how they help households cope with risk, and notes critical design features.

Social protection

As shown in Figure 1, social protection encompasses three broad sets of public action. One is social safety nets. These are targeted noncontributory programs that transfer resources to poor households. Examples include transfers of cash through welfare payments, child allowances, or pensions; in-kind transfers such as food aid; vouchers and food stamps; school feeding programs; subsidies on goods purchased by the poor; and public works or workfare schemes. Recent innovations in safety nets include improvements in targeting; explicit links to asset formation (as in conditional cash transfer [CCT] schemes tied to schooling attendance); and improved delivery mechanisms such as the use of bank cards in Brazil’s Bolsa Familia program.

A second component is publicly provided state-contingent insurance. Here, financial assistance is triggered by the realization of an event such as illness, disability, or unemployment. Eligibility and

benefit levels are typically based on employment and contribution history rather than, say, current poverty status.

The third component consists of elements of social sector policies. For example, fee waivers for the use of primary healthcare facilities, interventions to prevent malnutrition in preschool children living in poor households, and free primary education not only serve as health and education policies, but also complement social safety-net interventions. Weather insurance products share characteristics of both safety nets (for example, when they are targeted to poor localities or when they are subsidized) and state-contingent insurance, with low rainfall levels acting as the trigger for payment.

Social protection and risk

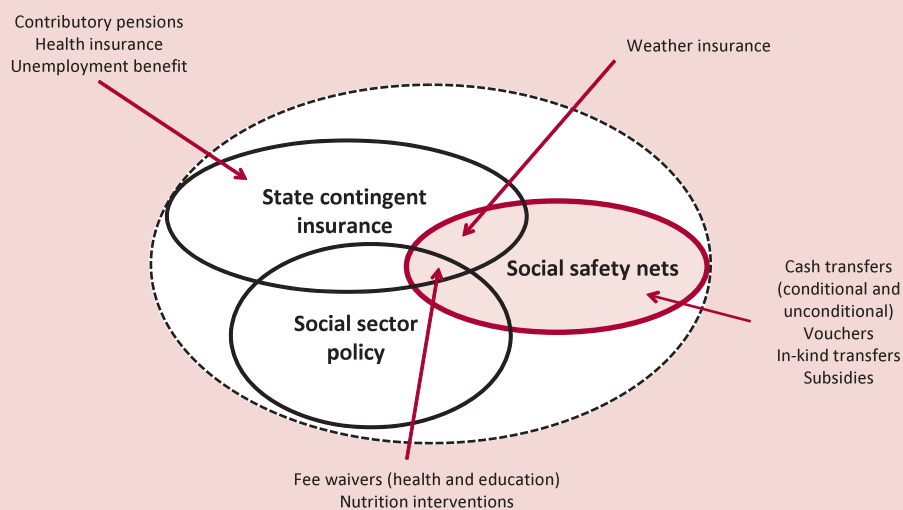
In addition to their intrinsic value in creating a fairer society, social protection programs have an instrumental function in reducing ex ante exposure to risk and the ex post consequences of shocks—and thus promoting economic growth—through several channels.

Most risks—potential events that generate welfare losses—emanate from the environment or setting (physical, social, political, legal, and economic) within which individuals reside. The physical setting refers to natural phenomena such as the level and variability of rainfall, exposure to cataclysmic events such as earthquakes and cyclones, the presence of communicable diseases, and the quality of infrastructure. The social setting captures such factors as social cohesion and strife and the existence of certain norms of behavior. The legal setting consists of the formal “rules of the game” that govern exchange, as well as their enforcement. This legal setting is in turn partly a function of the political setting, which includes the mechanisms by which these rules are set.

Finally, there is an economic setting that captures policies that affect the level of assets, returns to assets, and the variability of those returns. Households’ ability to cope with the realization of risks—that is, shocks—depends on the resources available to them and their ability to allocate, and reallocate, these resources (see also Brief 3, “Risk and the Rural Poor,” for more on risk).

Ex ante, social protection may reduce the likelihood of political or social strife brought about by rapid but narrow growth or significant structural economic changes. This motivation drove China’s recent expansion of social protection in order to promote a “harmonious society.” Reductions in such tensions may increase the security of property rights by reducing the likelihood of confiscation by state actors (as a consequence, say, of a coup) or

Figure 1—Sources of loans for major health events



Source: SKS Microfinance client survey, 2007.

Note: Total number of loans in this category = 8,007.

private actors (where low social cohesion leads to increased crime). Reducing political tensions also reduces the likelihood of radical, unexpected changes in economic policy, which is itself another form of risk faced by households.

Holding assets is a key *ex ante* risk management mechanism. Social safety nets can facilitate the creation of assets at the individual, household, and community level. In theory, households could borrow money to finance these investments, but many poor households lack access to credit, which would allow them to acquire assets, invest in their children's human capital, or build up the capital needed to enter more profitable activities. Certain types of safety nets create assets of value to the local economy; public works programs that rehabilitate roads, refurbish canal and irrigation facilities, or build structures—such as schools and health clinics—are examples. In addition, local communities are increasingly involved in decisionmaking on the choice of assets to be built, the management of their construction, and the oversight of the finances being used. This community participation not only increases the likelihood that communities will value the assets constructed, but also helps build up social capital and governance capacity in these communities.

Even if shocks do not occur, the threat of shocks discourages innovation and risk taking. Studies from south India and Tanzania show that because poor households deploy their assets more conservatively than wealthy households, they earn lower returns on their assets. Further, the threat of shocks can make households reluctant to participate in credit markets because they fear the consequences of an inability to repay. With the right design and implementation features, social protection can create space for innovation, which, by increasing incomes and assets, reduces vulnerability to future shocks.

Ex post, social protection provides two functions. As a source of income, it replaces the income lost as a result of the shock and thus enables households to maintain consumption levels. It also releases households from having to choose between maintaining consumption but depleting assets on the one hand and preserving assets (and thus future income streams) by reducing consumption on the other. Shocks, even if temporary, can reduce investment in human capital, with long-lasting consequences. In Zimbabwe, children exposed to the civil war preceding independence and the droughts that occurred in the early 1980s were more likely to be stunted as preschoolers, have reduced stature by late adolescence, and complete less formal schooling.

Critical design issues

The mere existence of social protection programs is by no means sufficient to ensure pro-poor growth. Poorly designed or implemented social protection programs, or those with only token funding, are unlikely to meet the intrinsic or instrumental objectives described here. Much depends on correct design. Effective

social protection and effective social safety nets have six key characteristics: a clear objective; a feasible means of identifying intended beneficiaries; a means of transferring resources on a timely and reliable basis; a means of scaling up and back in response to transitory events; ongoing monitoring of operations and rigorous evaluation of effectiveness; and transparency in operation to encourage learning, minimize corruption, and ensure that beneficiaries, and the wider population, understand how the program functions.

Transparency, timeliness, and reliability are especially critical. Absent these, social protection can veer dangerously close to being just another source of random income shock. Ethiopia's Productive Safety Nets Programme has led to sizable increases in beneficiary asset holdings, but where payments have been unpredictable, the likelihood of distress sales of assets actually increased.

Social protection can induce moral hazard or disincentives (for example, in terms of risk taking or labor supply); although these risks are worth keeping in mind, the preponderance of evidence suggests that in most cases the magnitudes of such adverse behavioral responses are small or negligible. As the coverage of social protection expands, program designers also need to be mindful of the cumulative effects of these interventions and the extent to which individual components complement or substitute for each other. For example, there is relatively little understanding of the extent to which innovations in social protection, such as weather insurance, intersect with longstanding programs like emergency drought relief. Does it make sense to support both? Or should governments focus on providing a minimum safety net for those in greatest need of assistance while creating space for private market mechanisms to provide additional insurance for those who would like to purchase it or who are unlikely to receive publicly provided assistance?

Caveats and conclusions

Shocks are pervasive in developing countries. Social protection can reduce the likelihood of certain shocks occurring and facilitate asset formation. It can replace lost income and prevent transitory shocks from having permanent consequences. Such outcomes have both intrinsic and instrumental value. But this potential is realized only when social protection is timely, reliable, and transparent. ■

For further reading: M. Grosh, C. del Ninno, E. Tesliuc, and A. Ouerghi, *From Protection to Promotion: The Design and Implementation of Effective Safety Nets* (Washington, D.C.: World Bank, 2009); U. Gentilini and S.W. Omamo, *Unveiling Social Safety Nets* (Rome: World Food Programme, 2009); and H. Alderman and J. Hoddinott, "Growth-Promoting Social Safety Nets," in J. von Braun, R. Vargas-Hill, and R. Pandya-Lorch, eds., *The Poorest and Hungry: Assessments, Analyses, and Actions* (Washington, D.C.: International Food Policy Research Institute, 2009).

John Hoddinott (j.hoddinott@cgiar.org) is a deputy division director at the International Food Policy Research Institute (IFPRI).



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

IFPRI® www.ifpri.org

Uncertainty and risk are characteristics inherent in agricultural activities, and one of the main sources of risk is weather. Because agriculture depends heavily on rainfall, it is sensitive to weather changes. Agriculture is also vulnerable to extreme weather events; floods, droughts, and frosts cause both production and capital losses. Approximately 98 percent of the catastrophic risk to agriculture in Mexico stems from two types of weather events: droughts (accounting for 80 percent) and cyclones (accounting for 18 percent). Low-income rural populations are highly vulnerable to the harmful effects of weather, yet their access to insurance programs is almost nonexistent.

The private and public insurance sectors

The private sector's limited participation in agricultural insurance in Mexico has been oriented toward large or very well organized producers. Low-income agricultural producers do not have access to insurance, but rather rely on monetary transfers from the government in the wake of extreme weather events.

The systemic risk present in agriculture discourages private sector insurers from entering this market. The risk is catastrophic in nature, and insurers face high financial costs in building up sufficient reserves to cover sustained losses. In addition, much of the rural agricultural sector is characterized by low profitability and highly fragmented possession of land that is subject to extreme weather risks. Operating costs for insurers are also high because of the sociodemographic and geographic characteristics of Mexican agriculture.

Given this environment, the Mexican government has generated mechanisms to help low-income producers who have no public or private insurance reduce the risk of catastrophic losses from weather. In 1995, it established the National Fund for Natural Disasters (FONDEN), a federal program that provides ad hoc funds following natural disasters to local governments and public dependencies for infrastructure rebuilding and for restoration of natural resources, natural protected areas, coastal areas, and riverbeds. In 2003 the Fund to Assist Rural Populations Affected by Weather Contingencies (PACC) was created to target assistance to small farmers in the event of weather-related shocks, including frost and wind damage. Costs are shared between the federal government (70 percent) and state governments (30 percent). These fiscal resources have covered the rural population's urgent needs related to catastrophic weather events, but uncertainty about the occurrence of such events has meant that in some years these resources have been assigned to other programs.

Catastrophic Agricultural Insurance (CAI)

In response to this situation, AGROASEMEX¹ has developed Catastrophic Agricultural Insurance (CAI)—an index hedge designed to protect small producers affected exclusively by drought events. Federal and state governments buy the insurance to manage the risk they face from making weather-contingent payments to rural residents. The insurance allows the federal and state governments to increase payments to those affected by drought without increasing the budget. A region's access to this insurance is limited by three requirements: extensive and consistent historical climate data, infrastructure to measure weather changes in real time, and the agroclimatic conditions to allow crops to develop adequately. In contrast to FONDEN and PACC, AGROASEMEX does not rely exclusively on fiscal resources; rather, it is a development agency and a specialized reinsurance institute oriented to risk management for federal and local governments.

With CAI, AGROASEMEX ensures feasibility through two central hypotheses:

1. there is a functional relationship between rainfall and the level of agricultural production during certain periods of a plant's growth cycle; and
2. this relationship can be represented satisfactorily by means of a simulation model of the agricultural process which includes plants, soil, and weather.

Methodology and theoretical framework

Some agricultural risks may not be commercially insurable because of these specific industry characteristics:

1. the presence of correlated or systemic risks, particularly those related to extreme weather phenomena;
2. the probability of extreme events with large expected losses that are difficult to quantify; and
3. agriculture's high costs of operation.

One viable solution to these problems is index insurance. Index insurance offers operating and technical elements that permit it to handle adverse weather phenomena more efficiently by correlating crop types to risks. It can also reduce the cost of offering insurance by analyzing regional, not individual, risk and vulnerability; establishing thresholds or critical levels for weather variables that serve as indicators of impact; reducing the need for individual contracts, field inspections, or adjustments of individual losses; and

¹ AGROASEMEX (Agro-Aseguradora Mexicana) is a national insurance institution whose mission is to protect the heritage and production capabilities of the rural sector. The Mexican federal government is the majority program sponsor. AGROASEMEX is a public policy instrument contributing to the creation of a national risk management system for the comprehensive protection of the rural agricultural sector. As a national insurance institution, AGROASEMEX provides reinsurance services to Mexican insurance institutions, mutual societies, and insurance funds. As a development agency, it drives the participation of private and social agents in the farming market. AGROASEMEX replaced the previous monopolistic public institution ANAGSA (National Agricultural Insurance). With the formation of AGROASEMEX, the agricultural insurance market was opened to the private sector.

reducing insurance market problems such as adverse selection and moral hazard.

To effectively operate CAI, AGROASEMEX implemented the following key actions:

1. **Isolate the effect of climatic events from the other factors of production.** AGROASEMEX developed a specific model (Simulation Model for Agricultural Insurance) in which it is possible to represent the effect of a weather variable on production levels and therefore to calculate the threshold values of this variable.
2. **Determine the periods of protection.** AGROASEMEX decided on the term of the insurance in light of the timing of water requirements for sowing and crop growth.
3. **Create agroclimatic zones of homogeneous response.** AGROASEMEX identified groups of weather stations with similar characteristics to determine climatologically homogeneous regions. The existence of microclimates in the zones where AGROASEMEX intends to operate, however, does reduce the efficiency of the weather indexes.
4. **Determine the threshold values of the weather variable.** AGROASEMEX determined threshold values for rainfall during each cropping phase; when actual rainfall is lower than the threshold value during any phase, it is considered an insurable adverse event.
5. **Establish weather stations and weather databases.** To make index insurance viable, a long-term, reliable, and homogeneous database of weather information is needed, as are weather stations that report weather data quickly.
6. **Derive an actuarial valuation of risk.** AGROASEMEX used a method of actuarial valuation of risk that must be adjusted to the volatility that is inherent in rainfall patterns.

Evaluating CAI's concepts and methods

In 2002, after addressing the methodological and conceptual issues related to CAI, AGROASEMEX carried out an experimental test of the insurance scheme to identify strengths and weaknesses as well as to identify areas for technical and operating improvement. The test carried out field trials to evaluate the strength of the threshold values for rainfall by assessing the correlation of the threshold values, crop growth, and production levels. During the sowing phase, observed rainfall levels in all cases exceeded the threshold values and thus no adverse events were registered. To evaluate the strength of the threshold values established for this phase, a level of soil moisture was identified to determine the date when the soil reached its maximum moisture capacity at each of the climate stations considered in the test. The results showed that for all stations, the maximum moisture capacity was reached in the dates pre-established in the insurance contract for both sorghum and

corn. During the flowering and crop growth phases, AGROASEMEX found that the linear models used, and consequently the threshold rainfall values, were well correlated with field conditions for crops.

The results of this test of CAI support the feasibility of the methodology and concepts developed by AGROASEMEX. This form of insurance was well suited for commercialization under the assumptions and conditions established in the test and in the regions tested. One additional task was to establish an efficient procedure for choosing the weather stations to be used in the insurance scheme, through coordination between CONAGUA (National Water Commission) and AGROASEMEX, to guarantee a rapid flow of rainfall data.

Between 2003 and 2005, AGROASEMEX insured an area of 1.5 million hectares containing 186 weather stations. The total sum insured was US\$88.1 million, premiums were US\$13.3 million, and indemnities totaled US\$10.5 million. A transfer of risk to the international market starting in 2004, through Partner Re, helps AGROASEMEX to insure the most vulnerable sectors of the rural population.

In 2006 CAI was estimated to cover 2.3 million hectares containing 297 weather stations, with a total insured sum of US\$131.9 million and premiums of US\$17.3 million. According to AGROASEMEX estimates, CAI covered 3 million hectares in 18 states in 2009. The growth of this form of insurance is limited by the availability of weather databases that comply with quality standards. Alternatives for improving analysis and data collection are being explored.

Conclusions

For the Mexican case, index insurance applied to the agricultural sector represents a viable method of coping with catastrophic events with regional or multiple impact related to extreme weather in a low-cost and efficient way. The associated risk is transferable to the international reinsurance market through index schemes when they meet two conditions: (1) the climatic databases comply with standards of quality established by the risk taker, and (2) measurement infrastructure is available to guarantee efficient data collection and transmission of values. ■

For further reading: AGROASEMEX, "La Experiencia Mexicana en el Desarrollo y Operación de Seguros Paramétricos Orientados a la Agricultura," Working Paper (Mexico City, 2006); J. Skees, P. Hazell, and M. Miranda, "New Approaches to Crop Yield Insurance in Developing Countries," Environment and Production Technology Division Discussion Paper 55 (Washington, D.C.: International Food Policy Research Institute, 1999); J. Skees, P. Varangis, D. Larson, and P. Siegel, "Can Financial Markets Be Tapped to Help Poor People Cope with Weather Risks?" Policy Research Working Paper 2812 (Washington, D.C.: World Bank, 2002).

Amado Villarreal González (amado.villarreal@itesm.mx) is a professor at Tecnológico de Monterrey, Mexico.



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

IFPRI® www.ifpri.org

APPENDIX I: Glossary of Terms

Adverse selection: A situation in which an individual's demand for insurance is positively correlated with his or her risk of loss (for example, people with a higher-than-average chance of loss may be more likely to seek insurance), and the insurer is unable to allow for this correlation in the price of insurance.

Area-based insurance: Insurance contracts that pay out according to losses recorded in a specific geographic area (recorded either by measuring all losses in the area or by sampling sites at which to assess losses) rather than the actual losses an individual experiences (in contrast to indemnity insurance).

Basis risk: The risk an individual faces that is not covered by an insurance product; it refers to the fact that an insurance product may not perfectly cover all the losses that any particular individual might experience from a given event.

Cell-captive: A cell-captive insurer divides its insurance license into largely self-contained cells and then "rents" or sells these cells to companies who want to self-insure or provide insurance but are not themselves registered insurers. The cell-captive company (often a microfinance institution or other such organization) then becomes an insurer in its own right through the insurer's license.

Ex ante: Latin for "before the fact." In this context it refers to what happens before the event being insured against occurs.

Ex post: Latin for "after the fact." In this context it refers to what happens after the event being insured against occurs.

Indemnity insurance: Insurance contracts that pay out according to the actual losses an individual experiences (in contrast to index insurance).

Index insurance: Insurance contracts that pay out on the according to the performance of an index rather than the actual losses an individual experiences (in contrast to indemnity insurance). For example, a weather index insurance product will pay out when a weather index (perhaps rainfall recorded at a nearby weather station) is below a certain value stipulated in the contract rather than for losses experienced as a consequence of bad weather, such as crop failure. Area-based insurance is a special case of index insurance in which the index is the loss in a given area.

Microinsurance: Simple insurance products for small amounts and affordable premiums.

Moral hazard: The phenomenon that individuals insured against risk may behave differently from the way they would if they were fully exposed to risk. For example, people may start taking more risks once insured.

Safety nets: Targeted noncontributory programs that transfer resources to poor households. Examples include transfers of cash through welfare payments, child allowances, or pensions; in-kind transfers such as food aid; vouchers and food stamps; school feeding programs; subsidies on goods purchased by the poor; and public works or workfare schemes.

Social protection: Social protection encompasses three broad sets of public action: social safety nets, publicly provided state contingent insurance, and some elements of social sector policies (such as fee waivers for the use of primary health care facilities, interventions to prevent malnutrition in preschool children living in poor households, and free primary education).

APPENDIX 2: Supplementary Material

Brief 2, “Risk and the Rural Poor,” by John Hoddinott

Shocks, their speed of onset, and their duration

Setting in which the shock takes place	Speed of onset/duration of the shock		
	Rapid onset	Slow onset	Prolonged
Physical	<ul style="list-style-type: none"> • Heavy rains; flooding • Landslides • Volcanic eruptions • Earthquakes • Hurricanes, cyclones • Tsunamis • Insect infestations 	<ul style="list-style-type: none"> • Droughts • Epidemics 	
Social	<ul style="list-style-type: none"> • Sudden forced relocation or resettlement 	<ul style="list-style-type: none"> • Breakdown in traditional commitments of trust and reciprocity 	<ul style="list-style-type: none"> • Ethnic strife • Civil war
Political	<ul style="list-style-type: none"> • Riots • Coups d'état 		<ul style="list-style-type: none"> • Collapse of governance
Legal		<ul style="list-style-type: none"> • Changes in legal environment eroding or eliminating tenure security or title to property 	
Economic	<ul style="list-style-type: none"> • Inflation or stock market or exchange rate collapse leading to loss of value of financial assets 	<ul style="list-style-type: none"> • Loss of export markets • Collapse in prices of internationally traded agricultural commodities 	<ul style="list-style-type: none"> • Changes in fundamental structure of the economy (for example, transition from centrally planned to market economy)

APPENDIX 2: Supplementary Material

Brief 5, “Sustainability and Scalability of Index-based Insurance for Agriculture and Rural Livelihoods,” by Ulrich Hess and Peter Hazell

A review of promotion index-insurance schemes offered from 2004 to 2009

Country	Champion	Type of risk covered	No. of beneficiaries	Year	Total insured ('000 US\$)	Was the insurance ...?			
						Reinsured	Subsidized	Tied to credit	Tied to inputs
Sub-Saharan Africa									
Ethiopia	Nyala Insurance, World Bank, and WFP	Drought	139	2009	44	No	No	No	Yes
Ethiopia	Adi-Ha Oxfam/IFRC	Index based on satellite	200	2009	9	No	Yes	No	No
Kenya	Syngenta	Drought	200	2009	7	No	No	No	Yes
Malawi	World Bank and Opportunity International	Excess rainfall and drought	1,710	2006	150	No	No	Yes	Yes
Malawi	World Bank and MicroEnsure	Drought	2,587	2008	300	Yes	No	Yes	Yes
Rwanda	MicroEnsure	Excess rainfall and drought	500	2009	32	No			
South Africa	Investec	Frost				Yes	No	No	Yes
Tanzania	MicroEnsure	Excess rainfall and drought	339	2009	101	Yes			
South Asia									
India	BT Cotton Seed		29,000	2007		Yes	No	No	Yes
India	MicroEnsure and Kolhapur District Central Cooperative Bank	Excess rainfall and drought	4,770	2009		Yes		Yes	Yes
India	ICICI Lombard	Rainfall	65,000	2009	21,150	Yes	No	No	Yes
India	NBFC agricultural loan portfolios	Rainfall	5,000	2008	n/a	Yes	No	Yes	Yes
India	IFFCO Tokyo	Weather index	70,000	2009	n/a	Yes	No	No	Yes
India	PepsiCo	Late blight disease	4,575	2008	3,812	Yes	No	Yes	Yes
India	BASIX	Rainfall	5,000	2008	n/a	Yes	No	No	No
India	ERGO-HDFC	Rainfall	10,000	2009		Yes	Yes	No	No
India	Agriculture Insurance Company of India (AIC)	Excess and deficit rainfall, humidity, and frost	1,088,313	2009	371,000	Yes	Yes	Yes	No
East Asia and the Pacific									
China	Guoyuan Insurance Company, WFP, and IFAD	Drought	482	2009	56	No	Yes	No	No
Indonesia	Munich Re, Tata, and GTZ	Flooding	500	2009	13	Yes	No	Yes	No
Philippines	MicroEnsure	Typhoon	500	2009	n/a	Yes	No	Yes	No
Thailand	BAAC	Drought	388	2008	300	No	Yes	Yes	Yes
Thailand	Government	Price insurance	n/a	2009	n/a	No	Yes	No	Yes
Latin America and the Caribbean									
Brazil	Programa Seguro Agricola Basico - AgroBrasil	Risk that decreases average municipal yield	14,893	2007	11,914	Yes	Yes	No	No
Jamaica	JP Foods	Hurricanes	1,050	2008	1,080	Yes	No	No	No
Nicaragua	World Bank	Drought and humidity	9	2009	2,211	Yes	No	Yes	Yes
Peru	La Positiva	Area yield index	51	2008	67	No	No	Yes	Yes
Eastern Europe and Central Asia									
Mongolia	World Bank	Livestock mortality	3,281	2009	5,000	No	Yes	No	No
Ukraine	Credo-Classic	Multi-peril crop insurance	2	2004	n/a	No	No	No	No
OECD									
Canada	Government	Adverse weather conditions (rainfall)	1,945	2008	46,302	No	Yes	No	No
USA	Government	Rainfall	12,685	2009	455,314	Yes	Yes	No	No
USA	Government	Rainfall (vegetation index)	3,015	2009	78,795	Yes	Yes	No	No

Note: n/a = not available; WFP = World Food Programme; IFRC = International Federation of Red Cross and Red Crescent Societies; NBFC = Non-bank Financial Company; IFFCO = Indian Farmers Fertilisers Cooperative Limited; IFAD = International Fund for Agricultural Development; GTZ = Deutsche Gesellschaft für Technische Zusammenarbeit; BAAC = Bank for Agriculture and Agricultural Cooperatives.

APPENDIX 2: Supplementary Material

Brief 13, “Providing Insurance through Microfinance Institutions: The Indian Experience,” by Rupalee Ruchismita and Sona Varma

Part 1: Alternative Delivery Channels for Microinsurance

The bulk of microinsurance in India is provided not by MFIs, but by the central and state governments. In April 2008, the central government launched Rashtriya Swasthya Bima Yojana (RSBY), a national health insurance scheme for which all families below the poverty line (BPL) are eligible for a registration fee of 30 Indian rupees (Rs. 30), or about US\$0.70. This program entitles them to hospital coverage worth up to Rs. 30,000 (about US\$700). Premiums are paid by the government. The program has progressive features, such as use of biometric identification, portability (useful for migrants), and cashless benefits. RSBY leaders envision using MFIs as intermediaries to facilitate outreach, thus creating a potential role for MFIs to act as delivery channels in this large-scale national program.

Among the state government–supported schemes, Yeshaswini, a healthcare program in the state of Karnataka, is a notable example of an insurance program for rural farmers and their dependents. The program is managed by a trust with contributions from the state government and the members of state cooperatives. Yeshaswini is the world's largest self-funded healthcare program, covering more than 2.6 million people for more than 1,600 surgical procedures at a low premium.

Another large-scale channel for microinsurance delivery is the state-led Self-Help Group (SHG) Bank Linkage model of microfinance outreach. The SHG Bank Linkage model is mostly used to provide life insurance. Its relatively weak mechanisms for accessibility and monitoring make it a fragile channel for delivering more complex products like agriculture, livestock, or health insurance, even though these products would address the livelihood-related risks to which the poor are heavily exposed.

The central and state governments have funded more than 14 “poorest-of-the-poor” insurance and safety net pilot schemes in recent years. With greater focus and more streamlined implementation plans, such schemes have achieved remarkable scale, although it is still to be seen whether the servicing capabilities are in place for such massive schemes. Also, since these schemes focus exclusively on the poorest of the poor, they do not cater to the large number of working poor. Because some of these schemes are funded through specific state governments, they are not always available in poorer states, and with increasing global prices, states have struggled to sustain these safety nets. These schemes are also exposed to political risks. Therefore, none of these channels offer sustainable and scalable opportunities for delivering insurance to the working poor. In contrast, MFIs—relatively stable channels with demonstrated commercial viability—are likely a more feasible option for insurance for the working poor.

Part 2: Innovations in Product Design: Livestock Insurance

Livestock insurance is among the most important productive risk management products in rural India. Because of high adverse selection and moral hazard risk, however, insurers need to charge very high premiums. Given the great need for livestock insurance and its mission to maximize the financial well-being of rural households, the IFMR Trust Holding Company Private Ltd, together with the insurance company Housing Development Finance Corporation (HDFC) Ergo, recently launched an innovative structure for livestock insurance in a small Indian village. IFMR Trust, a private trust based in Chennai, was set up with a mission of ensuring that individuals and enterprises in India have complete access to financial services. As a part of that mission, the trust established the IFMR Trust Holding Company, which in turn is rolling out a network of rural financial service companies, known as Kshetriya Grameen Financial Services. These entities offer a range of financial services to meet the huge unmet demand in remote rural locations in India.

It is often difficult to determine if a livestock insurance claim is for the animal that was actually insured. The use of radio frequency identification technology to identify the animal in the event of a claim significantly reduces false claims, thereby reducing premiums substantially. The IFMR Trust product also uses Herdsman software, which maintains each animal's health records, including deworming and vaccination records, to help track each animal's health and productivity. In conventional livestock insurance, normal copper or metal tags are used for tagging, a cover note is issued that is matched against the tag number, and then the policy is issued. The entire process often takes five days, if not longer, and involves large-scale manual intervention, data entry, and wastage of paper. For the new product rolled out by IFMR Trust, livestock details are sent from branches to HDFC Ergo on a real-time basis, and the policy certificate is issued in real time. For the first time, Indian farmers can get their policy certificates over the counter at the time they pay the premium. In addition, this system reduces paperwork and manual intervention, leading to further cost reductions and lower premiums. By leveraging technology and focusing on rural customers' needs, the new livestock insurance product piloted by IFMR Trust promises to be a useful product for productive risk mitigation in rural markets.

INNOVATIONS IN INSURING THE POOR

Edited by Ruth Vargas Hill and Maximo Torero

Introduction • Rajul Pandya-Lorch and Shenggen Fan

1. Overview • Ruth Vargas Hill and Maximo Torero

2. Risk and the Rural Poor • John Hoddinott

3. Risk, Poverty, and Insurance • Stefan Dercon

4. Microinsurance for Health and Agricultural Risks • Richard Leftley

5. Sustainability and Scalability of Index-Based Insurance for Agriculture and Rural Livelihoods • Ulrich Hess and Peter Hazell

6. Intelligent Design of Index Insurance for Smallholder Farmers and Pastoralists
Michael R. Carter

7. Experience with Weather Index-based Insurance in India and Malawi
Xavier Giné

8. Providing Weather Index and Indemnity Insurance in Ethiopia
Eyob Meherette

9. Index-based Livestock Insurance in Mongolia
Olivier Mahul, Nathan Belete, and Andrew Goodland

10. Health Insurance for the Rural Poor: Evidence from Cambodia
David I. Levine

11. Innovations in Health Insurance: Community-based Models
Johannes Jütting

12. Microfinance and Unexpected Consumption Expenditures
Richard Hornbeck

**13. Providing Insurance through Microfinance Institutions:
The Indian Experience** • Rupalee Ruchismita and Sona Varma

14. Social Protection and Risk
John Hoddinott

15. Index Insurance Applied to Agriculture: The Mexican Case
Amado Villarreal González



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

IFPRI® www.ifpri.org

Copyright © 2009 International Food Policy Research Institute.
All rights reserved. For permission to republish, contact
ifpri-copyright@cgiar.org.