

subsidies and favour limiting support. It is notable that some programs (like the *Afat Vimo* program in Gujarat, see Vaux 2007) does not adjust premiums to award risk-reducing behaviour, which introduces moral hazard in the sense that clients may not take cost-effective preventive measures. Despite the advantages of donor-supported public private partnerships in providing sustainable and affordable insurance, there are thus concerns that excessive public and international support will distort market prices and greatly jeopardize the incentive effects of insurance.

3.2 National insurance programs

Microinsurance programs usually serve only very few clients. Scaling up across regions with uncorrelated risks adds valuable diversification to these schemes (the scaled-up Proshika scheme in Bangladesh appears to include co-variant risks, see ILO 2005), but at the same time diminishes the institutional familiarity and trust that contributes both to their success and expense. This raises the question of how insurance can effectively serve large regions or countries exposed to high systemic risks.

Even in industrialized countries, private insurers have been reluctant to offer region- or nation-wide policies covering flood and other hazards because of the systemic nature of the risks, as well as problems of moral hazard and adverse selection (Kunreuther 1998). Moral hazard occurs when the insured change behaviour after the purchase of the insurance, making them more risky. Adverse selection occurs when those facing higher risks purchase insurance, and those less at risk do not. Especially for large-scale systems, purchasers often have information that is not known to insurers, or costly to obtain. This asymmetric knowledge jeopardizes the insurance pool.

Furthermore, even well capitalized and diversified insurers face insolvency for repeated high-loss events, and demonstrates the importance of public or private arrangements that protect clients against insurer insolvency (Insurance Journal 2005; US Government Accounting Office 2005; StormingMad.com 2006).

In an attempt to exploit the advantages of a national pool for disaster risks, and to avoid the problems that plague systems in high-income countries, the World Bank and Turkish experts designed the Turkish Catastrophe Insurance Pool (TCIP). The purposes of this pool were to reduce the government's fiscal exposure (large post-disaster liabilities) by gradually building up capital in an insurance pool funded by affordable private contributions, and to create incentives for retrofitting apartment buildings and reducing risk. The TCIP would not have been possible without recent advances in catastrophe modelling. In the absence of large sets of historical data, advanced risk modelling simulation techniques have increased the confidence insurers place in risk estimates and greatly enhanced the insurability of catastrophic risks (Kozlowski and Mathewson 1997; Bier *et al.* 1999; Clark 2002; Boyle 2002). Although risk assessments can be very resource intensive, by drawing attention to risk and prevention measures they can be useful beyond the pricing of insurance contracts. This is the case in Turkey, where local universities have worked together with government in assessing risks and drawing up a blueprint for prevention.

4. INSURANCE FOR FARMERS AND HERDERS

In 2001, global annual agricultural and forestry insurance premiums amounted to some US\$6.5 billion compared with the estimated total value of agricultural production of US\$1,400 billion, or 0.5% global cover. This cover is concentrated in developed countries, with only a minor percentage of global premiums paid in the developing world (Roberts 2005). Still, programs exist throughout Asia (e.g., in India, Malaysia and the Philippines), Latin America (e.g., in Argentina and Brazil) and Africa (e.g.

Mauritius). For the most part, they are heavily subsidized, such as the crop insurance program in the Philippines, where farmers are at high risk to cyclones, droughts and pests (Reyes and Domingo 2009).

There is a great deal of controversy surrounding subsidized agricultural insurance. Subsidized programs in North America and Europe are viewed by many economists as failed policy. Commenting on the US farm insurance program, Jerry Skees (2001) has this to say:

What was once a good idea — using crop insurance to share risk in agriculture — has become bad public policy in America. What was touted as a “market-based solution” is now very costly, inefficient, and inequitable...

The system is highly subsidized, from 40 to 60% of premium, which not only keeps farmers in high-risk production but also gives greater financial advantages to those with higher premium, meaning higher risk, practices. Distorting market prices has led to vast inefficiencies and high costs to the government. The authors query whether post-disaster aid – itself very inefficient - would not be preferred to the current market-based insurance solution. Subsidies are a concern for agricultural insurance programs in developing countries, not only because of inefficiencies caused by market distortions, but also because governments cannot afford to facilitate income transfers given the large segments of the population often engaged in farming. Whether these concerns should be transposed to international donors querying their role in supporting pro-poor insurance programs is a subject of debate, which will be taken up in Section 6.4.

4.1 Index-based crop insurance

Traditionally, insurers have paid claims based on actual losses (indemnity-based insurance), which requires extensive networks of claims adjusters who assess individual losses following an event. It also means investing in marketing to individual farms and controlling moral hazard. Moreover, insurers in low-income countries have far less access to global crop reinsurance markets than do those in developed countries. The low volume of business and large fixed transactions costs means that reinsurers can service these markets only at high cost. Traditional indemnity-based crop insurance programs are thus costly, which is a reason why many such programs have failed in developing countries (World Bank 2005).

To avoid the high transaction costs of indemnity-based insurance systems, index-based or parametric schemes make payouts contingent on a physical trigger, such as rainfall measured at a regional weather station, thus circumventing expensive claims settling. In the case of weather derivatives, farmers collect an insurance payment if the index reaches a certain measure or “trigger” regardless of actual losses. These schemes may offer a less costly and thus more viable alternative to traditional indemnity-based crop insurance.

Because of the physical trigger, there is no moral hazard; to the contrary, farmers will have an incentive to reduce potential losses, for instance, by diversifying their crops. Because they can access higher yield and higher risk crops, the insurance will promote cost effective higher-risk activities (in contrast to moral hazard). In the words of one of the designers of the Malawi program:

We want farmers to adopt high return technologies that allow them finally to make the leap and accumulate earnings over time. Systemic risk is THE factor impeding this and so far banks cannot handle the risk and the high transaction costs in rural areas. This Malawi transaction shows that there is a sustainable way to take the big rocks out of the way - drought risk – and clear the path to development! (Hess 2005)

Although direct premium subsidies are not necessary, the program received assistance from the World Bank for starting up operations. It should be kept in mind, however, that the Malawi program provides only very limited coverage. By reducing loan repayments in the case of drought, the insurance only

indirectly protects farmers from loss of livelihood and food insecurity. Providing higher coverage to reduce food insecurity would likely render the system unaffordable to the subsistence farmers.

This is not the case with a similar pilot scheme, BASIX, launched by a rural microfinance organization in the Indian state of Andhra Pradesh, which provides cash payouts – albeit to middle-income farmers - who insure their cash crops (Hess and Syroka 2005; Mechler *et al.* 2006).

Comparing the two schemes in Malawi and India, neither of which has public assistance from taxpayers, the question arises whether more extensive outside assistance for microinsurance schemes of this type is necessary. Can the private market fulfil the insurance needs of the poor? The answer, of course, depends on the ability of clients to afford the requisite cover. Middle-income farmers in Andhra Pradesh can afford the premiums for insurance that significantly reduces their insecurity; this would not be the case for very low-income farmers in Malawi, who cannot afford such extensive coverage. Unless supported by technical assistance, national subsidies or international donors, these schemes are out of reach for very low-income smallholder farmers facing high risks.

This explains why international insurers have been reluctant to commit significant capital and underwriting expertise to developing market based micro-insurance programs. Support from international donors can change this. As a recent case in point, Swiss Re has insured about 150,000 smallholder farmers in Kenya, Mali and Ethiopia against drought through a parametric product. The insurance is purchased by the internationally backed NGO, and other partners are being solicited to provide further financial support.

4.2 Index-based livestock insurance⁵

In Mongolia, where domestic animals provide subsistence income, and wealth to protect nearly half the residents, a harsh winter (dzud) can have devastating effects even for experienced herders. To protect herders against livelihood losses from extreme weather, an innovative livestock insurance program has recently been developed by the World Bank. It stands in contrast to Mongolia's traditional indemnity-based livestock insurance, which was ineffective for several reasons: the high costs of settling claims across vast areas, the disincentives to reduce losses and the incentives to falsely report animal deaths. The goal of the new public-private system according to its founders (see Mahul and Skees 2006) is to (i) offer insurance coverage that is attractive to herders, (ii) involve the domestic insurance market while protecting it against catastrophic losses, and (iii) limit the fiscal exposure of the government.

As with other index-based systems, the Mongolian scheme minimizes moral hazard, but since the claim payment is triggered by the event (the dzud) rather than individual losses, basis risk is a concern. Insurance claims depend on overall mortality, which means the index-based livestock insurance (IBLI) provides strong incentives to individual herders to manage their herds so as to minimize the impact of major dzud events. But, the imperfect match between index payouts and individual livestock losses can be a significant issue for extreme winters with large losses, in which case the designers hope that other informal risk sharing measures will be enhanced.

Like in Malawi (Suarez *et al.* 2007), lack of understanding of the index system may present a problem, and focus groups with herders have already been conducted to help shape educational material. Finally, the potential for fraud in the distribution of the product, and elsewhere in the system, is not negligible despite certification of sales persons, the use of unique identification numbers and redundant accounting systems.

⁵This section is based on Mahul and Skees 2006.

