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Microinsurance NOTE 5

Innovations in Insurance for Weather-related Losses: Index Insurance

The rural poor, economically dependent on agricultural production, face significant risks to their livelihoods from catastrophic weather events that cause widespread crop failure, with implications not only for the affected households, but for the whole rural economy. Index insurance is an innovation that circumvents many of the fundamental problems that hamper the development of insurance for weather risks in lower income countries. Payments are made based upon an objective index, with no need to calculate actual losses for each individual.

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WHAT RISKS FACE AGRICULTURAL PRODUCERS AND RURAL ECONOMIES?

In most low-income countries a majority of the population lives in rural areas. These families rely primarily on earnings from agricultural activities, which underpin the entire rural economy. With the majority of a family's cash flows dependent on just one or two annual harvests, success in these agricultural endeavors is critical. However, agricultural production is among the most risky ventures for low-income people. They face risks from seed, soil, and fertilizer quality; insect infestations; market price fluctuations; and maybe the most fickle of all, the weather.

A prolonged drought, flooding, or other catastrophic weather event can cause widespread crop failure, livestock losses, and food and water shortages. These losses have a very broad impact on the livelihoods of the poor, with implications not only for the affected households, but for the whole rural economy including lenders, commodity processors, exporters, and others along the production chain, as well as retail and wholesale vendors of household and food products. While social networks and reciprocity are important risk-coping mechanisms, these networks can break down when many in a community are negatively impacted by the same event.

Many scholars and practitioners are recognizing the dynamics of poverty whereby major economic shocks such as crop failure create "poverty traps" that deplete assets and strip households of productive capacity. In addition, as the poor live on the margin, they are extremely conservative in the way they organize their limited resources. In the absence of financial markets offering products such as savings, lending and insurance which allow the poor to smooth consumption and protect assets, poor farmers are reluctant to take

risks required to adopt new technology or engage in activities that offer higher earnings. The inability of the poor to take these risks locks individuals into poverty, and slows overall economic growth.

Over the years governments, insurers, donors, and others have tried to protect low-income farmers from the risks of agriculture production. One of those methods has been traditional crop insurance. With traditional crop insurance, farmers purchase a policy to protect themselves from crop losses due to a myriad of causes. When there is a loss, the value of the loss is assessed and there is an effort to link the value of that loss to the claim value. In order to minimize claims losses, there is significant input required from the insurer or some party acting on their behalf before and during the planting and growing seasons to reduce the potential of fraud and moral hazard among those insured. Moral hazard and fraud remain significant with crop insurance even with controls to manage them. Such controls are expensive, and lead to very high administrative costs. Compound these high unit costs with the market of tens of thousands of small farmers over a large and/or remote terrain, and the system becomes untenable. Indeed traditional agriculture insurance is almost universally recognized as having succeeded only with continuing large government subsidies. Thus, providing traditional agricultural insurance against individual

losses is a nearly impossible proposition in lower income countries.

For an insurance product to be appropriate for a developing country context, the product must be low cost and protect against potential losses from the type of extreme weather events that are a particular problem in a given area. Even where insurance is available, traditional insurance is not designed to cover the large losses that can occur from a large weather event such as an extended drought, a hurricane, or torrential rain. Traditional insurance is effective for protecting against losses from independent risks where only a small portion of policyholders may have a claim at any one time. But without access to specific reinsurance to cover the company against a large influx of claims from correlated risks, local insurance markets would likely simply go out of business as they would not have the funds to pay.

Index insurance is an innovation that circumvents many of the fundamental problems that hamper the development of insurance for weather risks in lower income countries. With index insurance, payments are made based upon an objective and independent index that serves as a proxy for significant losses to crops, livestock, or other property. For example, the index can be based upon extreme rainfall measures that create either drought or flooding. Weather stations or even satellite imagery coupled

with computer models can be used to create reliable “indexes” for the basis of payments. Payments are made based on the index alone, with no need to calculate actual losses for each individual.

Unlike traditional insurance, index-based insurance is designed to address correlated risk (when losses from a single event are widespread or pervasive) where reinsurers have a much greater role. Index insurance also has lower administrative costs, and reduces the exposure to moral hazard and fraud. While this type of insurance product is limited in its application, and not appropriate for all environments, it is increasingly being tested and expanded to new contexts. Using index insurance to manage the correlated risk of catastrophic weather events can support rural development by improving financial stability and creating a better environment for investment in the rural sector. Weather index insurance can also be used to improve government and donor response to natural disaster by providing quick access to resources for disaster relief and recovery needs.

HOW DOES INDEX INSURANCE WORK?

The basic structure of an index insurance contract can be quite simple. Each such contract has a defined threshold and a limit that establish the range of values over which payments can be

made. The threshold marks the point at which payments begin. The limit marks the point where 100% of the value of the insurance will be paid.

Once the threshold is reached, the payment structure can take many forms. One of the more straightforward contracts pays proportionally between the threshold and the limit. For example, an index insurance contract designed to protect farmers from losses due to drought would begin making periodic payments if rainfall levels, as measured at an agreed weather station, fall below the threshold over a defined time period, such as a month or a season. Payments would increase proportionately for each millimeter (mm) of rainfall below the threshold until the agreed limit is reached. The maximum indemnity would be paid when rainfall is less than, or equal to, the limit. The payment rate for an index insurance contract is the same for each policyholder who has the same contract, regardless of the actual losses sustained by the policyholder. With this structure, index insurance works best for correlated risks. The amount of payment received will depend upon the amount of liability purchased (the value of the insurance).

For example, in an area where rainfall levels below 100 mm during a particular period create losses for a wide range of income earning activities, an insurer could set the threshold for payments to begin at 100. They may also decide to stop

Advantages of Index Insurance

- Measurable event is a proxy for losses, e.g., lack of rainfall correlated to a decline in crop yields, therefore reducing transaction costs of verifying individual losses
- Limits opportunities for moral hazard and adverse selection since an individual cannot influence the likelihood of receiving a payment
- Objective triggers and structured rules improve confidence in the system
- Faster claims settlement since individual loss adjustment is not required
- Suitable for correlated risks given the higher likelihood of involvement from a global reinsurer
- Lower administrative costs than traditional insurance
- Can strengthen rural financial services

the payments when rainfall reaches 50 mm (the limit). If the rainfall is 75 mm, a 50 percent payment rate will be made on the value insured. An individual purchasing \$1,000 of insurance would receive a payment of \$500 solely based upon the rainfall measure with no need to estimate actual agricultural losses for the individual.

APPLICATIONS

Index insurance contracts can vary by the risks covered, the delivery systems used, and the target user. The following list provides some examples of the different applications index insurance can have and case examples where index insurance is already being applied.

Individual insurance

Index insurance can be sold directly to individuals to reduce the financial impact of certain correlated risks. In India, a commercial index-based rainfall insurance product for drought and flood risk has been sold to individuals since 2003. In 2005 the state-owned insurance company also began selling this form of insurance. In a pilot project in Mongolia, index-based livestock insurance is being sold to herders to protect against widespread losses that result from severe winter conditions. Using a livestock mortality index, the insurance pays herders if the mortality rate for the area exceeds a predefined threshold.

The major limitation of index insurance sold to individuals is the chance that the losses estimated by the index will not be representative of an individual's loss experience. When the index does not match the losses, this is referred to as basis risk.

Mutual insurance for agricultural groups

Basis risk can be reduced through group coverage. The group receives the indemnity payment and can determine how to allocate payments to individuals based on their individual losses. In many villages and communities informal means of risk sharing are already in place. Index insurance can facilitate even more collaboration as informal mutual insurance groups could form. Index insurance could be used

by agricultural intermediaries such as processors, marketing cooperatives, exporters and others whose revenue is dependent upon agricultural production.

Portfolio insurance for financial institutions

The regulators in Peru approved the use of a unique ENSO (El Niño Southern Oscillation) Insurance that is designed to allow financial institutions to protect against increased loan defaults that follow extreme flooding that is directly correlated to strong El Niño events. The bank could use indemnity payments to offset defaults but also to selectively restructure or cancel debts of clients affected by the event. Index insurance can also help financial institutions to reduce liquidity risk in the event a natural disaster increases demands for credit and withdrawals.

Bundled financial services

Index insurance can also be bundled with other financial services. The insurance premium could be added into a loan amount, protecting both the client and the bank against loan defaults that result from a severe flood or drought. The insurance could also serve as a form of collateral. Lenders are reducing interest rates to insured herders in Mongolia. In India rainfall index insurance is primarily purchased in conjunction with an agricultural loan. In Malawi, the

Opportunity International Bank of Malawi and the Malawi Rural Finance Corporation provide loans to farmers for high-quality seed if the farmers buy a weather index insurance policy.

Disaster relief financing

Index insurance can be used to structure contingent funding or reinsurance for government or donor relief programs. Index insurance allows for rapid access to funds and reduces the financial risk exposure retained by governments. This can be especially useful for lower income countries with limited fiscal resources.

In Mexico, Agroasemex is pilot testing the use of weather index insurance to finance disaster relief at the state level to achieve a more sustainable safety net program. In addition to scaling up this program to all states, the Mexican government also plans to introduce index insurance for individual farmers as part of their comprehensive risk management strategy.

The World Bank and the United Nations World Food Program (WFP) have developed a rainfall index insurance contract to pre-finance a share of the WFP emergency operations in Ethiopia. The index insurance, purchased through a global reinsurer, AxaRe, will provide the WFP with rapid and predictable contingent funding that is expected to improve the timing of emergency response by four months. It should be possible to structure similar

indexes that could be sold to a wide range of donors, NGOs, or local entities that have a need for quick response when events clearly suggest that a food security problem is emerging.

A ROLE FOR DONORS

As with much other microinsurance, the key role for donors comes in the research and development phase of index insurance product development. Common activities here include market research, market education, systems development, and facilitating linkages between insurers and delivery channels. Where the needs are different with index insurance are in the technical requirements of developing the threshold and limits of the index. A quantitative understanding of the link between historical weather patterns and crop production in micro-zones over a long time horizon and throughout a potential market area is critical to developing the threshold and limit. Additionally, it may be necessary to develop the weather tracking infrastructure in defined micro-environments within the intended market areas. Finally, since these indices are marketable instruments, donors may play a key role in creating a market for them.

Index insurance for the low-income market is still rather nascent with pilot tests running in several countries. It seems to have the potential to address one of the crucial groups of

risks farmers in developing countries face – those related to weather. In its mitigation of administrative and control costs, and minimizing claims processing costs as well as allowing for faster claims payments, index insurance very well may provide an important risk management tool for low-income farmers, at a price they can afford.

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