AFRICA AGRICULTURAL MARKETS PROGRAM (AAMP)

Agricultural insurance in Sub-Saharan Africa: can it work?

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Agricultural insurance in Sub-Saharan Africa: can it work?

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1. Introduction

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 note draws on the briefs published in the IFPRI's 2020 Focus "Innovations in Insuring the Poor" and other work, to examine the potential for agricultural insurance, and in particular index insurance, as a risk management tool for rural households in sub-Saharan Africa.

2. The cost of uninsured risk

Many individuals in the developing world have returns characterized by substantial uninsurable risk. Perhaps none more so than farmers engaged in rain-fed crop production that depends on the vagaries of weather. Dercon, Hoddinott and Woldehanna (2005) find that the biggest source of risk to household welfare in rural areas of Ethiopia is drought. Almost half of rural households in Ethiopia were affected by drought in a five year period from 1999 to 2004, and drought had a significant impact on the welfare of these households. The consumption levels of those reporting a serious drought were found to be 16 percent lower than those of the families not affected, and the impact of drought was found to have long-term welfare consequences: those who had suffered the most in the 1984-85 famine were still experiencing lower growth rates in consumption in the 1990s compared to those who had not faced serious problems in the famine.

When households have little access to insurance, weather shocks not only have a direct effect on welfare when they occur, they also impact the decisions poor households make about their livelihood. The expectation that something bad may happen affects household behavior, causing households who are unprotected to avoid expending effort on risky activities, and to avoid putting their money into irreversible investments, keeping liquidable assets instead. In Ethiopia, households more susceptible to weather risk are less likely to invest in fertilizer for crop production. In Tanzania households less able to insure their risk are more likely to grow safer crops (potatoes in this case) and as a result earn a lower return (Dercon 1996). In Uganda, coffee farmers who were more averse to risk are less likely to allocate labour to high-risk but high-return coffee production (Hill 2009). This was particularly the case for poor farmers who were not able to insure themselves against income fluctuations, and highlights the burden of risk on poor farmers. If a risk-averse coffee farmer in Uganda were to increase his wealth from the tenth to the fiftieth wealth percentile, he would increase the share of his household's labour allocated to coffee by 34 days and would increase his yearly household income by $6.80.

Enabling poor households to better deal with shocks is thus essential to both improving their welfare in the short run and improving their opportunities for income growth in the long run.

3. Insurance: one of many risk management tools

There are a number of means by which households can be protected against the income shocks that arise as a result of deficient rainfall. Informal risk-sharing networks, savings and credit markets can provide some protection against smaller shocks that do not affect all households in an area (perhaps untimely rain that affects the yields of a cash crop grown by a few select households). However these tools can prove ineffective in the face of widespread weather shocks or weather shocks that occur in quick succession. Covariate weather shocks require more formalized insurance markets or programs that can pay large numbers of households in a given area. Social protection programs can play a part in this, both by building up the assets of poor households to withstand some shocks, and --if payments can be disbursed in timely and transparent

manner-- by providing income support when widespread shocks occur. However, the traditional tools of social protection—conditional cash transfer schemes and emergency relief—are unlikely to allow households to fully manage the weather risks they face. Insurance markets are also an important means by which households can protect themselves against income risk.

4. Innovations in agricultural insurance

Traditionally crop insurance has been considered too expensive for smallholder farmers who farm small plots of land. Crop insurance products have traditionally been indemnity insurance that covers the farmers against multiple perils, and pays out on the basis of the losses assessed by observing yield at harvest time. The cost of assessing yield losses for each farmer is considerable when farmers are operating on a small scale. Also, this type of insurance products has been particularly subject to moral hazard. Moral hazard is the phenomenon that individuals insured against risk may behave differently from the way they would if they were fully exposed to risk. In this case, having insurance that pays when yields are low reduces the incentive for a farmer to exert all the effort he or she could in order to achieve the highest yield possible.

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. When the index falls below a certain level, farmers automatically get a payment without requiring estimation of their potential yield losses. 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.

These are significant improvements over traditional agricultural insurance products, but there is also one important dimension in which index products are less good than traditional insurance products. With index insurance a farmer is paid based on the

outcome of an independent trigger which may be different to the yields he or she realised in that season. It may be the case that the farmer experienced a loss, but the index did not pay for all of the loss received. This is then the worst case scenario for a farmer: he or she has paid for insurance but has not received the protection needed in time of crises. This problem is known as basis risk. It makes designing the right index product very important, and it means that training farmers clearly on when the insurance will and will not pay crucial to ensuring farmers make informed decisions on whether or not to buy insurance.

Recent experiences of index-insurance in India and sub-Saharan Africa, have shown that—whilst indexed products offer huge potential for helping managing agricultural risk—there is still work to be done in perfecting their design. In particular, in reducing basis risk, and improving farmers understanding of the products. As such, whilst provision of index insurance on a small scale has been observed in a number of countries including Ethiopia (Gine and Yang 2007, Cole et al 2009, Hess and Hazell 2009, Meherette 2009), it is not yet been brought to scale.

The following section discusses some of the lessons learned from these and other pilots. The final section discusses the role of government in developing and supporting agricultural insurance markets.

5. Learning from index-insurance pilots

Box 1 summarizes index insurance pilots in sub-Saharan Africa. In this section some lessons from these and other experiences are drawn.

(1) Further work and innovation is needed to reduce basis risk. As described in Box 1, reducing basis risk may require substantial investments in weather-station infrastructure (Leftley 2009) and data collection and analysis (Carter 2009). The Kenya livestock insurance experience shows how careful data collection and analysis can help design a product with low basis risk. However there is a trade-off between designing complex contracts for a stylized farmer (the farmer that plants at the usual time using the usual inputs) and contracts that are simple for farmers to understand and choose between to suit their specific circumstances (for the time

they chose to plant and the production practices they chose to use). Further innovations on products that reduce basis risk in other ways, may be needed. For example IFPRI is working with Oxford University to examine how to reduce basis risk by providing formal insurance to groups and allowing groups to make transfers among their members, based on their members needs. Other innovations could involve combing index insurance with access to savings or credit that can be used in times of crisis when the index does not pay. It may also be the case that focusing index insurance products on the extreme events will reduce basis risk. Indices seem to be much better at capturing very bad catastrophes (one in ten year droughts or floods) than they are at identifying a year that is just below average.

(2) Improving people's understanding and trust of insurance is key to increasing demand. Insurance is a complex product. When farmers do not understand the product being sold, they are less likely to be willing to pay for it (Hill, Kumar and Hoddinott 2010). If basis risk is not understood, individuals may buy more insurance than they should at first and may reduce insurance purchases over time as was found to be the case for groundnut insurance in India (Gine 2009)

(3) Insurance tied to credit access and/ or technology adoption provides farmers with a good income proposition and makes the purchase of insurance attractive. However, the purchase of insurance may need to be mandated in loan disbursements (as in the case of India). When insurance is tied to credit, it acts to insure the loan. This helps ensures that the credit markets work (by encouraging banks to lend), and that farmers do not remain indebted in a time of crisis. However, it does not provide a payout to farmers to help them cover their consumption requirements in the time of need.

(4) It is 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. In the US agricultural insurance is not paid for up front, but rather at the end of the season. Subsidies for agricultural insurance may also be needed. Nearly all agricultural insurance markets throughout the world are subsidized (see Mahul

and Stutley (2010) for an excellent and thorough review). This is discussed further in the next section.

6. The role of government in supporting agricultural insurance

Governments and other public institutions play a role in ensuring insurance markets develop in a way that provides high quality products to poor households. Getting regulations right for agricultural microinsurance is important, as are the following:

- *Supporting research into the right products.* There is still much to be learned about the right way to design insurance products for rural households. Optimal product design will vary depending on the context, and institutions that can support design, adaptation, and development of indexed insurance products is important. These investments are too large, and with too many externalities, for one private insurance company to make them.

- *Investment in infrastructure to provide timely and credible indices.* In the case of weather indices this requires investment in weather stations that can provide timely and accurate information. In the case of area-yield index insurance this requires substantial investments in the personnel and procedures to conduct independent and accurate crop cutting experiments at harvest time.

- *Investments in training to build capacity in the insurance industry and to develop an understanding of products among rural households.* Indexed insurance products are different from insurance products that are usually on offer in domestic insurance markets in sub-Saharan Africa. Additionally, selling insurance products to a rural clientele requires different retail structure than most domestic insurance companies which mainly cater to urban markets. It is thus important to build capacity among domestic insurance companies by conducting training on the design of index products, risk-financing for agricultural insurance and rural retailing strategies. Increasingly there are lessons to learn from other countries in terms of what has and has not worked. Training for rural clientele is also crucial. Insurance products are complicated and the amount and type of training needed

by an individual to know how much insurance to buy, and whether they should prioritize investing in savings above insurance, is very different from the type of training an insurance company can be expected to provide to sell a product.

- *Incentives to serve rural markets.* Governments can provide incentives to private companies to develop products that serve rural households by mandating a certain percentage of sales comes from sales to rural households, or by mandating that insurance coverage is purchased in certain situations. In India, for example, insurance must be purchased for all agricultural loans.

In nearly all developed weather insurance markets, insurance is subsidized to some extent. Whilst the level and type of subsidies in developed weather insurance markets should be questioned, there are efficiency arguments that would justify some government subsidization of insurance (uninsured individuals do not optimally invest in risky production activities—for example they may not purchase as much fertilizer as is optimal for agricultural production). The fact that we observe such 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.

Social protection programs are one way to provide protection to poor households. When 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 (Hoddinott 2009). 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. Mahul, Belete, and Goodland (2009) 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.

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 extend insurance coverage to more households. Subsidizing insurance may be another way. What is important is that subsidies are provided in a way that ensures private insurance companies still compete to provide insurance at lowest marginal cost. This could perhaps be by subsidizing reinsurance (which is currently very expensive), or by combining privately provided insurance with publicly funded catastrophe insurance, such as in the case of Mongolia described above.

7. Conclusion

Enabling poor households to better deal with bad events when they occur is essential to improving their welfare in the short run and their opportunities for income growth in the long run. The development of insurance markets can help protect poor households against risk. In the past 10 years, financial and technological innovations in index-insurance, insurance-administration software and mobile banking, have made insurance more affordable, and provide new opportunities to develop insurance products and services for poor households. Further innovation is needed to design indexed products that improve the welfare of poor households. Insurance markets, although important, are only part of a set of tools to manage risk; and it is important that innovations are designed to complement and support government-run safety-nets that protect the poorest households, financial instruments that make it easier for poor households to save and borrow, and informal networks of assistance.

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Box 1: Experiences from sub-Saharan Africa

This box draws on excerpts from "Innovations in Insuring the Poor" to describe index-insurance schemes in Ethiopia, Kenya, Malawi and Mali

Ethiopia

"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 (LAFCU), 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 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."

Eyob Meherete, Deputy CEO, Nyala Insurance Company

This year IFPRI worked with Nyala Insurance S.C. to design and pilot simple weather insurance products that farmers could combine to insure the weather risks that were particularly relevant for the crops they were growing and the production practices they used. Each contract is very simple, insuring farmers against deficit rainfall in a particular month , and paying a fixed payout if rainfall falls lower than the cut-off. Contracts were designed for three months, with a high coverage and low coverage option available for each month. These policies were piloted in Hosanna, Meskan and Silte woredas in SNNPR. Take-up was high with more than 20% of trained farmers demanding insurance.

Kenya

"Over the past year, ILRI in collaboration with various partners has pursued a comprehensive research agenda aimed at designing, developing and implementing market mediated index-based insurance products to protect livestock keepers from drought related asset losses they face, particularly those in the drought prone Arid and Semi Arid Lands(ASAL). For pastoralists whose livelihoods rely solely or partly on livestock, the resulting high livestock mortality rate has devastating effects on asset levels, rendering them amongst vulnerable populations in Kenya.

Much of the initial phase of the project, which included an extensive program of field work and stakeholder consultation, is now complete. The research has generated useful insights that have been used in the design of index-based livestock insurance(IBLI) products that is better targeted to the various needs of the expected clientele. Currently, an IBLI contract has been modelled, priced, tested among the target clientele and is now ready for implementation. ILRI in collaboration with partners from the public, private and non-profit sectors now plans to pilot IBLI contracts for the long rain/long dry season scanning March 2010 to September 2010 in Marsabit district."

http://www.ilri.org/indexbasedlivestockinsurance

Malawi

"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."

Richard Leftley, CEO of MicroEnsure

"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. ... 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."

Xavier Gine, Senior Economist, World Bank

Mali

"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."

Michael Carter, Professor of Economics, University of California at Davis