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SmartLessons
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Weathering the Risks:

Scalable Weather Index Insurance in East Africa

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Having enough food in East Africa depends largely on the productivity of smallholder farms, which in turn depends on farmers' ability to invest in their farms. Weather insurance can encourage farmers to make these critical investments by improving their access to credit. The Global Index Insurance Facility (GIIF)—an IFC/IBRD collaboration housed under IFC's Access to Finance's Global Retail/Microfinance Cluster—is an innovative program that is expanding access to insurance against weather risks and natural disasters to farmers, livestock herders, and others, particularly in Africa and the Caribbean. This SmartLesson explores two GIIF projects that have provided index insurance to smallholder farmers in East Africa: the Syngenta Foundation for Sustainable Agriculture (SFSA) project in Kenya and Rwanda and the MicroEnsure project in Rwanda.

Background

Access to credit, which can enable farmers to invest in their farms and increase productivity, remains low among smallholder farmers across Africa. Faced with risks related to weather and climate change, many smallholder farmers make only minimal investments in their land to limit their losses in any one year. This lack of adequate investment leads to reduced yields and continued food insecurity. Similarly, banks and other lenders are reluctant to provide farmers the liquidity necessary to buy yield-boosting seeds, fertilizer, or equipment. Therefore, in Kenya and Rwanda, where more than 96 percent of agricultural land is rain-fed and vulnerable to drought and excessive rain, mitigating weather-related risks for smallholder farmers is an important tool for unlocking credit.

Risk reduction, mitigation, and transfer for smallholder farmers encourage financial institutions and agribusinesses to extend farmers the necessary credit, and this in turn gives farmers confidence to invest in their farms. Credit access is a critical need in both project countries, where more than half of farmers are excluded from all financial services or have access to only informal services. With the proper mechanisms to manage basis risk, index-based insurance provided at the portfolio level is a promising risk-management tool. Index insurance pays out benefits on the basis of transparent parameters (such as level of rainfall as measured by selected weather stations during crop germination) without the costly field verification of losses required with traditional indemnity-based insurance.

Since their beginning in 2010, GIIF's projects with SFSA and MicroEnsure have provided index insurance for 332,000 smallholder farmers in Kenya and Rwanda, launched 28 index insurance products tailored to specific crops and perils, and provided training on index insurance to over 137,000 end beneficiaries and 180 microfinance and insurance practitioners.[1] GIIF provided grants for capacity building to both projects—$2.4 million to SFSA and $1.6 million to MicroEnsure—to support product design,

[1] GIIF is funded by the European Union, Japan, and the Netherlands. The EU is the primary donor partner to the GIIF Trust Fund, with a focus on the African, Caribbean, and Pacific Group of States (ACP). The governments of Japan and the Netherlands are providing additional support to different regions/ countries where IFC operates.

Joram Mbita (right), a farmer in Embu province in Kenya, has been insured with SFSA/UAP for three seasons. With him in the picture is Simon Njiru from SFSA. (Photo by Ric Francis, IFC)

development of distribution channels, and stakeholder training. In both cases, IFC contributed just over half of the total project cost. IFC Investment Services also made an equity investment in MicroEnsure Holdings Limited in late 2012.

The projects, which provide insurance for the value of loans to farmers for inputs such as seeds or fertilizer, have shown an initial impact on access to finance among end-beneficiary farmers. For example, 2012 survey data from SFSA showed that insured farmers invested 20 percent more in their farms and made 16 percent more income from their farms than their uninsured neighbors.

In addition, these projects are among the first to demonstrate initial commercial scalability of index insurance that is independent of government premium subsidy. Leading examples of large-scale provision of index insurance—such as India's Weather Based Crop Insurance Scheme and Mexico's Agroasemex—rely on having premiums partly or wholly subsidized by the government. The SFSA and MicroEnsure projects, however, had no government support for the premium cost to cover their 106,700 farmers up to 2013; this stands out as an almost unique example of index insurance that has reached significant numbers without direct government intervention.

As the projects enter the more aggressive scale-up phase, government and other funding support for premium subsidies will be an important strategy for developing the market. Premium subsidies incentivize the necessary increase in index insurance consumers and business volumes. With the resulting increase in competition among reinsurers and decrease in distribution costs, premium rates are expected to decrease, making the products more affordable and eliminating subsidies.

Lesson 1: Providing delivery channel and hybrid delivery channel/portfolio coverage to farmer aggregators improves product quality and develops commercial scalability.

SFSA's original strategy was to sell insurance to individual farmers through agro-dealers—farmers purchased insurance along with seeds to cover the cost of the inputs. However, this strategy reached only 3,500 farmers in 2010. So SFSA implemented delivery channel-based insurance, a more effective distribution model that dramatically increased outreach. Between 2010 and 2011, sales through the individual retail channel increased by less than 30 percent, while the number of farmers covered through delivery channel cover increased by a dramatic 140 percent, from 8,000 to 19,000. Currently, 99 percent of farmers insured by SFSA and MicroEnsure are covered under delivery channel or hybrid policies purchased by microfinance institutions, agribusinesses, and farmer cooperatives. (See Box 1.)

In 2012, SFSA provided delivery channel coverage to two farmer aggregators—a microfinance institution and an input supplier. To decrease the potential for moral hazard, these organizations provide only minimal information to farmers about the insurance coverage by informing them that in some cases of weather problems their loans will be forgiven. Index triggers for western Kenya led to payouts of over $520,000 to these organizations, which they distributed among the farmers.

In addition to implementing the delivery channel model, MicroEnsure developed a new hybrid delivery channel/portfolio cover approach in Rwanda. In 2013, a Rwandan input supplier purchased index insurance for its customers, who received loans from the company to purchase inputs at the start of the season. The input supplier paid the

Box 1: Individual Retail versus Meso-level/Portfolio Index Insurance

Individual Retail: Individuals purchase insurance to cover weather risks. This approach is particularly prone to a key challenge in weather index design known as basis risk: Weather indexes trigger based on the average conditions in the covered area—often a 25 square kilometer grid for indexes based on satellite data. The index does not differentiate between the conditions on specific smallholder plots of 0.02 square kilometers or less, even though the weather event may be worse in the eastern part of the covered area, for example, than in the west. Payouts provided to individuals in this situation will be equal rather than equitable; everyone will receive the same payout, even though the greatest need is among farmers in the east.

Delivery Channel: Institutions such as microfinance institutions or farmer cooperatives purchase insurance to cover weather risks on behalf of their members or clients, passing on the cost of the premiums as well as any payouts to the end beneficiary. The institution receives the payout and distributes it to end beneficiaries based on previously identified criteria, such as on the sum insured by each beneficiary or on the institution's assessment of actual need. If the latter, basis risk is reduced, because the institution evaluates actual conditions on the ground. Payouts that match end-beneficiary expectations are critical to developing trust in the product and the eventual scaling of index insurance.

Portfolio: Financial institutions, agribusinesses, or other aggregators directly buy index insurance to protect against the risk of default to their agriculture portfolio. The institution pays the entire premium and receives all of any payouts, which it can use for a range of purposes, including reducing capital reserves, restructuring or writing off bad loans, or originating new loans. In this case basis risk is further reduced, because payouts are not allocated to individuals, whose actual experience may differ from the index results due to geographical variations.

entire premium, but payouts will benefit individual end beneficiaries by being applied to their loan balances. The payout remains at the level of the institution but actually benefits the covered farmers, rather than being used to write off/restructure bad loans in general or originate new loans. While the claim directly benefits the end beneficiary (as in the delivery channel model), the premium was the responsibility of the input supplier (as in the portfolio model), creating a hybrid approach.

Delivery channel and hybrid coverage linked to loans has also increased access to finance for the participating smallholder farmers. The availability of insurance encouraged financial institutions to extend credit to individuals previously considered too risky. For example, KCB is working with MicroEnsure on an index product for flooding so the bank can offer financing to farmers in the flood-prone Rusizi district for the first time. KCB also no longer requires collateral from individual members for group loans to farmer cooperatives covered by index insurance, greatly increasing the number of groups that can access loans. Of the 206,000 farmers insured by SFSA and MicroEnsure in 2013, 99 percent received coverage linked to loans.

Finally, the delivery channel and hybrid approaches cost significantly less than the individual retail model. For example, delivery channel distribution cost SFSA an extraordinary 0.3 percent of individual retail distribution per farmer. These lower distribution costs allow for lower premiums for the end beneficiaries and improve commercial scalability.

Lesson 2: Including automated weather-station and satellite data sources allows for the design and pricing of the most effective indexes.

The availability of data is key to the design of effective index insurance products, which use data from two main sources: on-the-ground weather stations and satellites. Both data sources have specific strengths and weaknesses. (See Box 2.)

MicroEnsure and SFSA have learned that the best solution is to introduce products based on data from multiple sources, depending on the specific context of the region and the crop being covered. In Rwanda, MicroEnsure initially designed weather index products to cover drought and excess rain using data from existing weather stations. These data had several limitations, including gaps in historical data and large areas with insufficient coverage. As a result, pricing from the international reinsurer included large data-uncertainty loadings and was prohibitively expensive. In 2012, MicroEnsure worked with a satellite data provider to develop a new product using satellite data on evapotranspiration. In addition to producing important basis risk issues, the product proved extremely difficult to explain to local partners and end beneficiaries, making it unsuitable for commercial use. MicroEnsure subsequently

Box 2: Weather Stations versus Satellites

Weather stations, automated or manual, physically measure weather metrics such as rainfall, wind speed, and temperature. Weather station networks are generally seen as trustworthy sources of information among local farmers but rarely cover a country's entire agricultural area. In addition, index design requires about three decades of historical weather data to produce accurate models, but weather station data often have gaps due to problems with the collection or storage of data.

Satellites remotely estimate factors such as rainfall, evapotranspiration (transfer of water from land surface to the atmosphere through evaporation and plant transpiration), vegetation cover, and wind speed. Historical data from satellites are much more consistent than data from weather stations, and ongoing data are also reliably available. But significant drawbacks to their use include lack of understanding of the technology among end beneficiaries and the basis risk caused by the extent of the areas covered.

invested in new automatic weather stations for project areas and based new index products on these data.

SFSA's experience in Kenya also demonstrates the advantage of incorporating multiple data sources into product portfolios and design. Beginning in 2013, SFSA also enabled clients to combine two covers: a weather-station-based weather index cover and an area yield cover based on county-level annual production data supplied by the Ministry of Agriculture. The area yield cover compensates clients when farmers' harvests fall below the five-year average for the county. Combining area yield with weather index cover provides additional protection from geographical basis risk. In 2013, SFSA insured 56,200 farmers with the combined weather index and area yield covers.

Lesson 3: Risk transfer to the international market protects the financial solvency of local partners, particularly during the capacity-building phase.

Unlike traditional insurance, weather index insurance involves very high covariate risk (affecting many farms in a particular area), so risk transfer to the international market is essential for the sustainable provision of weather index insurance. A fundamental element of the workings of traditional insurance is that a claim from one client—whether for a health event or property theft—is unlikely to directly coincide with that from a large number of other clients. In most cases, such claims are independent, are unrelated, and occur at different times. As a result the insurance company is not faced with an unmanageable level of claims to pay at once.

By its very nature, index insurance presents an almost opposite situation, one of high covariate risk. When a weather index triggers for a given district, it implies a payout for all clients in that district. Given the characteristics of weather perils such as drought and excess rain, an index can conceivably trigger for several districts, an entire country, or even an entire region. An insurance company that carries all of that risk—and the responsibility to provide payouts for each claim—could quickly find itself financially insolvent. Therefore, reinsurance is a key component of the provision of index insurance, as it transfers the risks assumed by local insurers to the next level—that is, diversified international reinsurance companies. For reinsurance companies with large, well-diversified portfolios, a high level of claims for beneficiaries from one country or region will be balanced by a low level of claims from other areas and product lines.

The SFSA and MicroEnsure projects both rely on reinsurance to ensure the financial sustainability of their value chains. International and regional reinsurers provide reinsurance for both SFSA's and MicroEnsure's products in Rwanda and Kenya. For both projects, the local insurance company partners transfer the majority of the risk from weather index products to their reinsurance partners and retain only 10 percent of the premiums.

The high degree of risk transfer from local insurance companies to reinsurers not only is indicative of the nature of index insurance but also reflects the ongoing need to develop local insurance and actuarial capacity for product development and management. With additional capacity building at the level of local insurers, GIIF anticipates that its partners—and later market entrants—will gradually retain more risk locally, in line with their capital strength.

Conclusion

The lessons learned from GIIF's SFSA and MicroEnsure projects are critical for the development of sustainable markets for weather index insurance in Sub-Saharan Africa. GIIF is continuing its partnership with both grantees and applying these learnings to efforts in other regions. These lessons are also important for GIIF's ongoing work with other partners. For example, GIIF partner MiCRO in Haiti is in the process of shifting its satellite-based hurricane index product from individual-level to portfolio-level cover for microfinance institution Fonkoze. In addition, GIIF is exploring work with an Indonesian insurance company on an earthquake index insurance product based on ground-motion and shaking-intensity data. Well-structured reinsurance arrangements will also be crucial for both of these projects, given the extreme covariability of weather catastrophes such as typhoons/hurricanes and earthquakes.