Introduction and Overview

Nicaragua’s economy is heavily based on agriculture and the performance of this sector strongly influences progress in poverty reduction.\(^1\) Reductions in extreme poverty have been associated with the decline in relative prices of key food staples that constitute approximately one-third of the diet of the extremely poor. Agriculture is responsible for approximately 20 percent of the nation’s GDP; the sector also employs more than 40 percent of the labor force, and contributes to more than 60 percent of the country’s merchandise exports.

The agricultural sector is characterized by a high degree of inequality that reflects the low levels of access to productive assets for the poor.\(^2\) Household surveys show that rural households perceive weather and price as their primary risk exposures. This weather risk exposure and price volatility for agriculture commodities, coupled with high inequality in incomes and assets, has led financial institutions to concentrate their agricultural lending on large farmers that can guarantee credit with sufficient collateral. The absence of ex-ante initiatives to manage weather-related risks has further constrained agricultural lending.

Catastrophic weather events causing large losses in agriculture have led the public sector to adopt, with support from the donor community, a reactive weather risk management strategy to protect the poor. These ad-hoc mechanisms include aid by the National Natural Catastrophe and Emergency Commission to poor rural households that are exposed to weather risk, and support from local NGOs for farmer compensation and emergency projects. These mechanisms supported many households following the 1994 drought in the Northwestern region, Hurricane Mitch in 1998, and Hurricane Felix in 2007. In 2005, local private insurers attempted to develop multi-peril crop insurance. These efforts failed when the regulatory authority refused to approve the contracts due to perceived flaws in their design and lack of an appropriate reinsurance contract.


\(^2\) Davis and Murgai (2001) calculate Gini coefficients of 0.60 for national income, 0.86 for land, and 0.80 for cattle.
Over the past three years, a public-private partnership has sought to develop and test an alternative approach to insuring weather-related risks in Nicaraguan agriculture. The approach, index-based weather risk management, has been previously applied for social safety net programs in Mexico and to ensure farmers and herders in such diverse countries as India, Mongolia, and Malawi. The partnership has sought to raise awareness and understanding about the scope and limitations of indexed-based insurance in Central American agriculture, to design and market-test prototype insurance contracts, and to begin to build local and regional capacities to carry on this work in the future. This note provides a brief summary of the program and experience to date, highlights several emerging lessons, and points to on-going and future initiatives that will enable the mainstreaming of these efforts into other projects and business activities.

**Box 1 - Index-based weather insurance:**

An index-based weather insurance policy links possible insurance payouts with an index calibrated with the weather condition needs of the crop being insured. These needs are summarized in a simple crop model relating higher/lower levels of a weather variable (either rainfall, temperature, wind speed, solar radiation, etc.) to crop growth, and by estimating the probability of occurrence studying past crop losses from weather events. Payouts may be linked with one or more growth periods (e.g. crop establishment, crop flowering, grain filling) of the crop. If too low or high levels of an agreed weather index are registered during any of these periods, a payout is automatically triggered. Drought that occurs in a portion of a growing season, for example, may be linked with a partial insurance payment, and a severe drought or excessive rainfall may be linked with a full payout of the insurance claim.

A main advantage of this index-based approach is the payout is not based on the actual condition of the crop, rather on the indisputable weather record that is available in near real-time so that claims can be automatically triggered to farmers when adverse weather events occur. The benefits of this are: i) a timely and guaranteed payout in time of need, ii) low administrative costs – since insurers do not need to undertake field evaluation of losses, iii) absence of moral hazard because payments are linked to an objective index trigger, measured at an official weather station, and iv) standardized and transparent contract structure, with sufficient reinsurance capacity in international markets. The primary limiting factor to this approach is the requirement that farmers are situated close (e.g. within 20 kilometers (km), depending on topography) to a weather station with reliable communication and good historical data. Additionally, the contracts are based on an index rather than actual losses on a farmer’s field, which means the potential mismatch between payouts and actual losses, also known as basis risk, is possible.

**Pilot Activities**

In Central America, the Latin American Federation of Insurers (FIDES), motivated by the initial experiences with index insurance in Mexico and India, requested assistance from the Commodity Risk Management Group (CRMG) of the World Bank’s Agriculture and Rural Development (ARD) department to explore the introduction of an index-based agricultural insurance program in the region. In 2005 the World Bank and the Inter-American Development Bank (IADB) initiated a series of activities aimed at familiarizing regional stakeholders with the concepts of index insurance, and to begin building the public-private partnerships needed to initiate pilot programs in the region. In addition, a regional workshop was held in
May 2005 in Guatemala with the participation of representatives from all Central American countries and Mexico, and various reinsurers. As a result, the IADB and the World Bank initiated the preparation of a project to support private insurers in developing the agriculture insurance market. IADB efforts addressed the regulatory/public policy issues and information platform, while CRMG started planning pilot projects.

The development of the pilot in Nicaragua was carried out in stages. After workshops with stakeholders, interviews with farmers’ associations, consultations with the insurance regulator, analysis of the conditions for pilot projects, and various consultations with local insurers, the Instituto Nicaragüense de Seguros (INISER), a public Nicaraguan insurer, committed to lead efforts that would plan and develop pilot projects. In 2005 CRMG and INISER began to lay the groundwork for a pilot program that would insure groundnuts against drought risks in western Nicaragua through:

- Dissemination of the basic concepts of index insurance to stakeholders
- Diagnosis of legal and regulatory requirements with the regulatory authority
- Identification of clients
- Development of an agronomic and meteorological database
- Selection of a location and crop for piloting
- Identification and quantification of farmers’ exposure
- Training on contract design and the prototype contracts
- Consultation with farmers on the prototype contracts

The steps carried out in 2005 were critical in transferring to local insurers the technical capacity in contract design and beginning the business processes needed to carry out the work. In 2006 the work focused on executing the contract and finalizing the regulatory and operational aspects of the program including:

- Policy drafting and regulatory approval
- Defining the institutional delivery channels for insurance
- Reinsurance negotiations

The process of transferring capacity to INISER was iterative. It took more than two years to complete all of the activities needed to conduct a pilot. After two years of preparation in 2007 and 2008, INISER began selling index-based insurance contracts to farmers. While the program development process was relatively slow, it allowed the needed activities to be introduced to INISER and other stakeholders and for capacity to be built within INISER to carry out these activities. Without the local leadership for these activities, it would have been very difficult to transfer capacity to various local stakeholders.
Box 2 - Stakeholders involved in the pilot program

The pilot program involved several stakeholders with varying roles and responsibilities, including:

- **Instituto Nicaragüense de Seguros (INISER)** - INISER is a public insurer. INISER acted as the local insurer and led pilot project activities (i.e., developed work plan, identified and quantified weather risks, designed prototype contracts, sought and received regulatory approval, and signed re-insurance contract).

- **Instituto Nicaraguense de Estudios Territoriales (INETE)** - INETER was responsible for providing the data that would trigger the contract through observations at particular weather stations. It provided this information to the industry and reinsurance market. Inter-American Federation of Insurers (FIDES) - FIDES provided financing, training, and workshops to support the project. They also promoted policy dialogue with the public sector.

- **Superintendencia de Bancos y de Otras Instituciones Financieras (SIBOIF)** - SIBOIF is the insurance regulator in Nicaragua. SIBOIF actively participated in technical discussions regarding the contract model design, drafting formats for policy contracts, and approving the prototype insurance contracts. Though index insurance is presently not covered under existing regulations, contracts have been approved as insurance products based on the wide discretionary power of the Regulator.

- **Reinsurers** - International reinsurers provided technical assistance to INISER in the drafting of the technical note to the regulatory authority, revising the prototype contracts, and offering reinsurance. Re-insurers Partner Re and Paris Re are quoting rates for the contracts and are offering reinsurance capacity.

- **Commodity Risk Management Group (CRMG)** - CRMG provided technical advice and training throughout the pilot projects. It was assisted by the International Research Institute for Climate and Society to train insurers and review prototype contracts.

**Interim Progress**

During the 2007 and 2008 agricultural seasons INISER sold weather insurance contracts to medium and large-size farmers for groundnuts and rice to hedge against drought risks, and will sell contracts for maize, sorghum, beans, and soybeans during the 2009 agricultural season. In the first two years of the program, INISER has experienced modest sales. In 2007, INISER sold two contracts for groundnuts, protecting an area of 181 hectares, with average premiums of 4.9 percent of insured value. The contracts were offered for any combination of three weather risks: (i) humidity at sowing, (ii) drought during growth, and (iii) excess humidity during harvest. The contracts were designed with a flexible starting period to accommodate areas with different planting calendars. The contracts triggered during the contract period and INISER paid indemnity losses equal to approximately 32 percent of the total premiums.

In 2008, INISER sold 12 contracts for groundnuts and four contracts for rain-fed rice, protecting a total area of 1,774 hectares, with premium rates averaging 5.5 percent of the total insured value of US$1.7 million. Both contracts for groundnuts and rice cover any combination of the three risks mentioned above plus rainfall excess, with a flexible starting period. Due to unusually heavy and prolonged rains in the country’s 2008 agricultural season (similar to rainfall produced in 1998 by Hurricane Mitch), INISER had claims equivalent to 86 percent of the total collected premiums for groundnuts. Though insurers’ profits for both years have been small, INISER believes that the contracts have served an excellent demonstrative and
market effect for the next agricultural season when they plan to launch a more aggressive marketing campaign for the products.

The strategy for the program is to build insurers’ capacity in designing weather contracts so that these instruments can then be used to design applications for different market segments including small farmers. In the initial years, because the pilot aimed to operate commercially, large and medium-size farmers were targeted by the insurers. They were primarily selected because of their credit risk on agricultural activities financed by banks. At the same time, capacity building with insurers and stakeholders needed to show that the skills developed designing contracts for medium to large farmers can be used to design insurance contracts for a wider array of applications and clients. As was anticipated, INISER’s initial experiences in the market have drawn the attention of the Fondo de Credito Rural (FCR) and Ministry of Agriculture. In the coming years, FCR and savings and loans associations identified and supported by the Government aim to utilize the capacity and expertise of the public insurer, INISER, to reach some of their small-size farmer clients with similar weather insurance products. Other applications might involve designing standardized contracts for small farmers with or without links to financial intermediaries, and index triggers at the meso-level for sub-regional catastrophic weather insurance programs. Also, there is likely to be a need for public sector programs to protect very poor farmers against catastrophic events, as such events and such clients are unlikely to be insured commercially.

For the 2009 agricultural season, it is expected that INISER and LAFISE (a local financial institution) will, in combination, insure a total value ranging from US$7 to 10 million to protect approximately 16,000 hectares for some 400 farmers. The involvement of the Ministry of Agriculture and its links to a network of informal financial institutions and credit and loan associations will ensure that insurers shift targets toward a wider inclusion of small-holder farmers, building on the interest of publicly owned insurer, INISER. Additionally INETER, with the support of the Ministry of Agriculture, is creating an investment project to: (i) increase the density of weather stations in agricultural areas, (ii) expand the monitoring services necessary for agricultural contracts, and (iii) support the scaling up of operations.

**Lessons Learned**

To date, the pilot projects in Nicaragua have revealed:

**Transferring capacity to local stakeholders requires a steep learning curve.** Introducing the concepts to and getting program commitment from stakeholders, as well as accomplishing the necessary operational steps, required significant time commitment by the insurer and other stakeholders involved in the pilot. The business model applied in Nicaragua for piloting - training various stakeholders under the leadership of a local insurer - was possible because of the long-term commitment of technical assistance by donors (CRMG) and the commitment by a local insurer to laying the foundation for the operation. A multi-year (3-4 years) commitment was needed by CRMG before targeted farmers could start buying
weather contracts. In fact, some reinsurers familiar with the Nicaraguan model predict that it will take well over 5 years for the market growth needed to support the independent development of the local agricultural insurance market.

In retrospect there are some ways in which this process could have been streamlined in Nicaragua including: (i) standardized training for different stakeholders at various technical levels; (ii) investment in the creation of a national weather database; (iii) earlier involvement of the Ministries of Agriculture and Finance to facilitate coordination of public sector stakeholders and commit investment funds in data infrastructure to guarantee contract monitoring and sustainability; and (iv) provision of specialized technical assistance to insurance regulators to ensure proper classification and regulation of new products, rather than applying a pragmatic, yet ad-hoc, regulatory approach.

**Leadership of a local insurer is a key to successful piloting.** Capacity building for private and public sectors was particularly valuable because private sector actors saw incentives to develop innovative products. The leadership of local insurers, motivated to open a new line of business in agriculture, served as a catalyst to discussions on the conditions needed for successful piloting and for scaling up agricultural insurance. Farmers, banks, regulatory authorities, and public agencies shared technical knowledge under the leadership of the insurer. From the pilot it became clear that early creation of institutional working partnerships between insurers, agricultural universities, weather institutes, banks, and the reinsurance market are critical to efficient operations. The pilot also showed that an external development agency could have a catalytic effect in establishing the necessary public-private partnerships, particularly in providing the technical assistance to coordinate public agencies at early stages when confidence building is very important.

**There is a need for an early involvement of banks that have business incentives to reduce the weather risks.** In Nicaragua, the initial pilots were aimed at commercial farmers with financial links to the banking sector. Financial intermediaries (financial cooperatives, rural credit associations, microfinance intermediaries, and public credit programs) share farmers’ goal in reducing credit risks and insurers’ goal in increasing their penetration in rural areas by offering financial services to agriculture.

**Weather data is an important prerequisite for any program to become successful.** In Central America, Nicaragua has progressed faster than the other Central American countries in introducing index-based agricultural insurance due, in great part, to the availability of reliable and accessible weather data. The decisive role played by the Weather Service (INETER) in supporting market development of

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3 Similar to one already designed and tested in Mexico. The construction of the grid is based on a blend of existing station data and remote sensing and/or other existing gridded data products (e.g. NOAA’s Climate Prediction Centre datasets).
agricultural insurance helps provide confidence to the local industry, reinsurers, and regulatory authorities. There is however, much investment needed to create enough density of historic weather data in agricultural areas, and to ensure availability of data for contract monitoring. Developing pilot projects alone is not enough to ensure market sustainability since public sector programs and policies have an impact on commercial incentives. Public sector intervention is important to ensure that conditions exist for private insurers to go beyond conducting pilot projects and start scaling up the business. Investing in information (weather data and agricultural statistics) and ensuring a proper formal regulatory environment are activities that should be supported by the public sector in the early stages.

**Scaling-up Weather Risk Management Programs**

Given the increasing interest by the financial sector, donor community, and public sector, FIDES, with assistance from the World Bank, has programmed the following activities for the next two years to help overcome several current constraints toward market development for agricultural insurance in Nicaragua related to data availability and access, as well as simplifying contract design.4

The program will work with the Insurance Regulatory Authority (SIBOIF) to design an appropriate regulatory framework for index products. In Nicaragua, the regulatory framework is still reactive and discretionary. It is based primarily on a pragmatic approach rather than on formalized regulation. Though it has been appropriate for pilot projects, it may constrain the scaling up of operations. Technical assistance will be given to SIBOIF in drafting and approving an index-based agricultural insurance regulation, moving away from discretionary approval. This regulation will send clearer signals of regulatory stability to market participants, and it will help simplify the complex wordings in current policy contracts.

In addition, weather data and its geographic density could constrain further market growth. There may be the opportunity to use innovative data estimations (i.e., remote sensing satellite) for obtaining a sufficient historic weather grid with higher density, which would be suitable for designing and pricing weather contracts. But even in light of obtaining historic weather data estimations, program expansion will require additional investment in weather infrastructure to ensure the monitoring of index-based weather contracts. This activity should be administered by the Nicaraguan Weather Service (INETER). Technical assistance will also be provided to INETER to create a national historic weather data grid, similar to one already designed and tested in Mexico and being tested in Guatemala by CRMG.

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4 The funding of these activities will be made in the context of the regional program sponsored by the World Bank, IADB, and CABEI. Though FIDES support is for Guatemala, Honduras, and Nicaragua, this note refers only to Nicaragua.
INISER and LAFISE in Nicaragua have the basic capacity to replicate insurance contracts for other crops and in other regions of Nicaragua. At the same time these companies still require some technical assistance for designing insurance contracts for other applications and/or in other regions. In some cases reinsurers may be willing to provide technical assistance to Nicaragua for the contract design process, particularly when there are clear signals of the possibilities for larger market development in the Central American region. As part of these next steps, technical assistance will be provided to public insurer INISER in designing, simplifying, and standardizing weather insurance products to suit the characteristics of small farmers. Challenges are expected in identifying agricultural areas with homogenous weather conditions, high density of small farmers with identifiable climate risks, and working out the institutional hurdles of designing the distribution channels.