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Scaling Up Microinsurance: The Case of Weather Insurance for Smallholders in India

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Executive Summary

In 2003, BASIX formed a partnership with ICICI Lombard General Insurance Company (a joint venture between ICICI Bank and Lombard, Canada) to pilot the sale of rainfall index insurance contracts to small farmers in the Andra Pradesh State of India. The project received technical assistance from the Commodity Risk Management Group (CRMG) of the World Bank and was the first weather insurance initiative launched in India and the first farmer-level weather-indexed insurance offered in the developing world. In only three years, the small pilot program with 230 participants graduated into a large weather insurance operation. During the 2005 monsoon season, BASIX sold 7,685 policies to 6,703 customers in 36 locations in 6 states. This successful experience has sparked much broader interest in weather-indexed insurance in India.

The objective of this paper is to study the experience of BASIX, which, as the intermediary agent between the insurance company and rural customers, has successfully scaled up the rainfall index insurance program in a three-year period. This paper highlights the technical and operational viability of bringing such an innovative microinsurance product to smallholder farmers in remote rural areas and analyzes the conditions that allow BASIX to do so effectively. By examining BASIX's experience, the author aims to draw lessons from the project's implementation that are transferable to other developing countries.

The study identified several factors that are key to BASIX's ability to rapidly expand weather insurance coverage both geographically and in terms of number of beneficiaries. First, the pilot stage was used not only as a feasibility experiment for the new product, but also as a platform for raising customer awareness and improving the product design. During the pilot years (2003–04), BASIX's strategy was to conduct repeated village meetings, speaking in vernacular languages during appropriate times. This strategy directly increased farmer understanding of the product as well as facilitated interactions between customers and BASIX staff. As a result, BASIX was able not only to increase farmer trust in the insurance scheme, but also to immediately channel customer feedback to the insurer. This effective communication allows the insurance company to constantly adjust its product design to suit the weather risk management needs of farmers in different locations.

Second, BASIX's holistic approach to livelihood promotion contributes directly to the program's expansion. With the presence of 1,281 staff in more than 10,026 villages in 7 states across India, BASIX takes advantage of its existing strong delivery channel by adding weather insurance to its comprehensive set of livelihood services. This approach maximizes staff

productivity and cost-effectiveness, and increases the impact insurance can have on farmers' livelihoods by delivering the product in combination with other microfinancial services.

Third, BASIX's rapid scalability is a product of its consistent attention to details. During the pilot stages, implementation details were gathered and subsequently converted into the necessary administrative and technical infrastructure for the scaled-up program. Two key elements are (1) the use of "process charts" that simultaneously serves as a planning, costing, and training tool; and (2) the Insurance Distribution Information and Administration Systems (IDIAS), a program developed in house to serve all the necessary information management functions. Such infrastructure is instrumental to the weather insurance process at BASIX, which targets smallholder farmers and thus requires the capacity to process small but critical details.

1. Introduction

BASIX is a Hyderabad-based group of companies with a mission to "promote a large number of sustainable livelihoods, including for the rural poor and women, through the promotion of financial services and technical assistance in an integrated manner."[1] BASIX provides its rural customers with "the Livelihood Triad," which includes the following: (1) Livelihood Financial Services (credit, insurance, and savings); (2) Agricultural and Business Development Services (productivity enhancement and market links); and (3) Institutional Development Services. With 1,281 staff operating in 7 states across India,[2] BASIX is present in more than 10,026 villages and serves approximately 200,000 customers, of whom 151,862 are active borrowers. On average, BASIX's customers have farm incomes of Indian rupees (Rs) 12,000–30,000 per year, or less than US$1 a day (Hubka and Manuamorn 2005).[3]

BASIX defines itself as a "new generation livelihood promotion institution" and chooses to work in poor and mostly arid and backward districts. As a result, BASIX faces the twin challenge of innovating a cost-effective way to extend credit to low-income farmers, while helping these clients better manage risks that affect rural livelihoods. This challenge is addressed by the integration of microinsurance with microcredit and microsavings. In 2000–01, BASIX began its insurance initiative by forming partnerships with multiple insurance companies to design credit-linked products, and subsequently, retail insurance products. BASIX offers two categories of insurance: life and livelihood. BASIX first worked with ICICI Prudential during the starting year and now works with Aviva Life Insurance Company to provide life insurance. In addition to being a sale agent for credit-bundled group life insurance ("credit plus"), BASIX received its Corporate Agency License from the Insurance Regulatory and Development Authority (IRDA) in 2003 to distribute retail life insurance products from Aviva. To provide livelihood insurance, BASIX formed a partnership with Royal Sundaram General Insurance Company for the delivery of livestock and health insurance products, and with ICICI Lombard for weather insurance products that protect farmers' income from the uncertainty of rainfall.

The introduction of rainfall insurance by BASIX was the first weather insurance initiative launched in India and the first farmer-level weather insurance offered in the developing world.[4] The initiative followed a study that explored the feasibility of offering weather insurance to Indian farmers in the context of extending rural financial outreach by reducing the exposure to weather risk (Hess 2003). The study identified several potential project partners to test the weather insurance concept. In response to this study, BASIX, in collaboration with ICICI Lombard and with technical assistance

from the Commodity Risk Management Group (CRMG) of the World Bank, piloted the sale of weather insurance to 230 farmers in the Mahahbubnagar district of Andhra Pradesh (A.P.) during the 2003 monsoon season. Within only three years, the small pilot program graduated into a large weather insurance operation. During the 2005 monsoon season, BASIX sold 7,685 policies to 6,703 customers in 36 locations in 6 states (see appendix 1). This dramatic scaled-up success in the organization has sparked much broader interest in weather-indexed insurance in India, leading to a host of new players entering the market during 2004–05 (see box 2.3).

This study documents the scaling up of BASIX's weather insurance program for three reasons. First, it expands CRMG's case study on BASIX as an innovative institution in the areas of agricultural finance and risk management. Second, it highlights the technical and operational viability of intermediating weather-indexed insurance to smallholder farmers, and it presents BASIX as a demonstration case of how such a weather insurance program could be piloted and scaled up in a sustainable manner. Third and most important, the study serves as a project implementation guide by shedding light on the conditions for the pilot's scalability, that is, experiences that could be transferred to and replicated by other development projects and institutions.

The second section of this study discusses the development of BASIX's weather insurance program from the pilot stage to the scaling-up stage, focusing on the following: (1) The gradual expansion of geographic coverage. (2) The continuous improvement of product design informed by farmer feedback. The latter element substantially accounts for the growth in product demand. The third section presents the initial results from the development impact assessment of BASIX's weather insurance pilot for smallholder farmers. The fourth section presents the strategic considerations that underline BASIX's decision to scale up the pilot program, and the fifth section identifies the necessary managerial, administrative, and technical conditions that BASIX has established to handle the large weather insurance operation; emphasis is placed on the "process-oriented details" that account for BASIX's operational capacity. The sixth section discusses the conditions for scalability on the part of the insurance company—ICICI Lombard. The concluding section summarizes BASIX's critical success factors, which could inform other weather insurance initiatives in developing countries, and outlines future challenges for BASIX.

2. Development of BASIX Weather Insurance Program, 2003–05

BASIX operates with a clear focus on the agriculture sector, whereas other microfinance institutions avoid work in this sector because of the perception of high risk. Weather risk is the predominant source of income instability for BASIX customers whose agricultural activities depend on rainfall. Like farmers, BASIX is financially vulnerable to weather risk: weather-induced crop failure, primarily resulting from rainfall deficit, often caused overdue crop term loans threatening the institution's portfolio quality. BASIX gained confidence in the insurance approach through its successful experience in livestock insurance. As a result, BASIX applied the insurance solution to the systemic weather risk affecting customers and the institution's portfolio. The main challenge was to design an innovative insurance product to protect farmers' livelihoods from the erratic nature of weather while avoiding the inefficiencies that plague the government's traditional yield-loss insurance scheme. (See Box 2.1 for a description of government-sponsored crop insurance.)

Following an unsatisfactory trial with a multilayered yield-loss insurance structure,[5] BASIX found rainfall-indexed insurance to be a good alternative to insurance products that target these yield losses. (See box 2.2 for an explanation of index-based weather insurance.) Because BASIX operates in mostly nonirrigated areas where agriculture depends on the monsoon, realized rainfall during the monsoon season forms a good proxy of farm income, and therefore provides a simple and objective indicator on which to base insurance payouts for weather-induced losses. (See table 2.1 for the advantages and challenges of index-based insurance.)

Like other innovations that BASIX has introduced, BASIX decided to pilot the new weather insurance product using an approach that emphasized small scale but intensive feedback. The product design resulted from technical discussions with CRMG and ICICI Lombard, guided by BASIX's own principle that "nothing goes without value added in the following year".[6] The pilot program pursues a business model in which the insurance company, along with a reinsurance arrangement, takes on the entire risk, while BASIX and the insurance company jointly incur administrative expenses. Table 2.2 gives an overview of the design evolution of the BASIX–ICICI Lombard weather insurance product from 2003 to 2005.

The 2003 pilot

During the 2003 pilot, the insurance contracts were designed to protect farmers from drought during the groundnut and castor-bean-growing season. ICICI Lombard underwrote the products, which Krishna Bhima Samruddhi Local Area Bank (KBS LAB)[7] extension officers marketed and sold to the four

Box 2.1 Features and Drawbacks of the Government-Sponsored Area-Yield Crop Insurance Scheme in India

1. The product attempts to cover a whole range of risks related to crops, making it prone to the widespread problem of moral hazard (the extent of damage to be indemnified can be caused by farmers' own behavior).
2. The product is tied to the crop loans given by the rural public sector banking system.
3. The extent of sum insured is linked to the loan size. Because terms of the insurance policy are sometimes not communicated properly, many borrowing farmers are unaware that they are insured.
4. Claims are assessed by crop-cutting (loss adjustment) experiments which entail a huge expenditure, making the administration of the product costly.
5. The claim settlement process takes a long time (from six months to two years).
6. The financial performance has been unviable, with the claims-to-premium ratio as of the 2002 kharif season (June–September) at about 4.17 to 1.
7. The premium rate is uniform for a crop across the whole country, while the risk certainly is not uniform nationwide.
8. The program's benefit is not distributed equitably: 58 percent of the claim benefit has gone to a state (Gujarat) whose contribution to the premium has been 16 percent.
9. The premium is subsidized. Actuarial rates are not charged.

Note: For an example of a government-sponsored area-yield crop insurance scheme, see Mishra 1996.

Source: A Review of Past Crop insurance Experience in India by BASIX Insurance Unit.

villages in the A.P. district of Mahahbubnagar. Product information was communicated during workshops and village meetings with the BASIX borrowers, who voluntarily decided to borrow and purchase the insurance contracts. In total, 230 farmers bought the insurance for the 2003 kharif monsoon season, which runs from June through September. Of these 230 farmers, 154 were groundnut farmers and 76 were castor-bean farmers, most of whom are smallholder farmers with less than 2.5 acres of landholding. ICICI Lombard reinsured the risk with one of the major reinsurance companies, which was the first time that weather risk from farmer-level weather insurance contracts was transferred from a developing country to international markets.

The 2004 pilot

With good customer response in 2003, a second pilot program was launched during the 2004 kharif season. On the basis of farmers' feedback from the first pilot program, this program introduced significant changes to the 2003 design. CRMG continued to provide technical assistance during this second year. The

Box 2.2 Index-based Weather Insurance

Index-based weather insurance products are contingent claims contracts for which payouts are determined by an objective weather parameter (such as rainfall, temperature, or soil moisture) that is highly correlated with farm-level yields or revenue outcomes. Rainfall-indexed insurance is well suited to agricultural production in regions where widespread crop losses are caused by drought or excess rainfall. In such regions, rainfall can be used as a good proxy for the actual losses incurred by farmers. In other areas, farm incomes can be indexed on temperature indicators for production sensitive to heat or frost, such as horticulture.

The underlying index used for an index insurance product must be correlated with yield or revenue outcomes for farms across a large geographic area. In addition, the index must satisfy a number of additional properties that affect the degree of confidence or trust that market participants have that the index is believable, reliable, and void of human manipulation, meaning that the measurement risk for the index is low. The properties for a suitable index are that the random variable being measured is (1) observable and easily measured, (2) objective, (3) transparent, (4) independently verifiable, (5) able to be reported in a timely manner, and (6) stable and sustainable over time with good historical data. Publicly available measures of weather variables generally satisfy these properties.

Index-based insurance is less susceptible to some of the problems intrinsic in traditional multiperil crop insurance. Because payouts for indexed contracts are automatically triggered once the weather parameter reaches a prespecified level, the insured farmers receive timely payouts. The automatic trigger reduces administrative costs for the insurer by eliminating the need for tedious field-level damage assessment. Because administrative costs are lower, premiums are relatively low and products are more affordable to farmers.[a] The objective and exogenous nature of the weather index prevents "adverse selection" (that is, farmers know more about their risks than the insurer, leading the low-risk farmers to opt out and leaving the insurer with only bad risks) and "moral hazards" (that is, farmers' behaviors can influence the extent of damage that qualifies for insurance payouts). Indexed products also facilitate risk transfer to the international markets, because international reinsurers are likely to provide better terms when the insurance is based on measurable weather events and not farm-level losses.

Note: a. Approximately 10 percent of the sum insured in many cases.

Source: Author.

2004 program was significantly modified in terms of geography, product design, and scope. Geographically, the pilot was expanded to include four new weather stations in two additional A.P. districts: Khammam and Anantapur. To reduce basis risk (that is, the mismatch between insurance payouts and crop losses), the product contained a three-phase payout structure. This new structure reflected the weighted importance of rainfall to crops during different phenological stages (for example, sowing, growth, and harvest). The phase-based payout allows farmers to reinvest in working capital for a fresh crop in case the first crop fails during the sowing stage.

In terms of scope, the 2004 pilot offered contracts to BASIX borrowers and nonborrowers during village meetings and farmer workshops. Feedback

Table 2.1 Advantages and Challenges of Index-Based Insurance

Advantages	Challenges
Reduced moral hazard The indemnity does not depend on the individual producer's realized yield. *Reduced adverse selection* The indemnity is based on widely available information, so there are few informational asymmetries to be exploited. *Lower administrative costs* Index-based insurance does not require underwriting and inspections of individual farms. *Standardized and transparent structure* Insurer could apply uniform structure of contracts. *Availability and negotiability* Standardized and transparent, index-based insurance can be traded in secondary markets. *Reinsurance function* Index insurance can be used to more easily transfer the risk of widespread correlated agricultural production losses. *Versatility* Index products can be easily bundled with other financial services, facilitating basis risk management.	*Basis risk* Without sufficient correlation between the index and actual losses, index-based insurance is not an effective risk management tool. This is mitigated by providing self-insurance of smaller basis risk by the farmer; offering supplemental products underwritten by private insurers; blending index insurance and rural finance; and offering coverage only for extreme events. *Precise actuarial modeling* Insurers must understand the statistical properties of the underlying index. *Education* Lots of information is required by users to assess whether index-based insurance will provide effective risk management. *Market size* The market is still in its infancy in developing countries and has some start-up costs. *Weather cycles* Actuarial soundness of the premium could be undermined by weather cycles that change the probability of the insured events (such as el Niño events). *Microclimates* Rainfall or area-yield index-based contracts are difficult to be used for more frequent and localized events due to microclimates. *Forecasts* Asymmetric information about the likelihood of an event in the near future will create the potential for intertemporal adverse selection.

Source: World Bank 2005.

Table 2.2 Design Evolution of BASIX–ICICI Lombard Weather Insurance Product			
Criteria	**2003**	**2004**	**2005**
Sale locations	The product is sold in only one district (Mahahbubnagar) with only one reference weather station at the district level.	The product is sold in three districts with 10 product variations, linked to five weather stations. Three out of these stations were block-level (Mandal) weather stations. Excess rainfall product was introduced in one location.	The product is made available across BASIX operational areas spread over six states where rainfall data will be available. One product is designed for each agroclimatic region, which covers the minimal risk for all the principal rain-fed crops in the region.
Premium	Premium is charged per farmer based on the size of the land holding and proportionate risk coverage. Thus, there was one rate for farmers with land holdings of fewer than 2 acres, between 2 and 5 acres, and more than 5 acres, respectively.	The premium is charged on a per acre basis, making the product linked to the quantum of agricultural activity rather than loan size and gives the farmer the flexibility to buy multiple units based on affordability.	BASIX retains the per acre system from 2004.
Product structure	The product has one phase of coverage for the entire monsoon season.	The product has three phases with separate coverage for sowing, growth, and harvest windows. Claim payout is made after each of the three stages of the crop season.	BASIX adds two new features to the 2004 design based on farmers' feedback: (1) Minimum rainfall level (2 mm per day) is considered for arriving at the rainfall received during a period. Rainfall of more than 60 mm is excluded from the aggregate. (2) The starting date of the insurance period is determined dynamically based on the minimal accumulative rainfall required to start sowing

Table 2.2 Design Evolution of BASIX–ICICI Lombard Weather Insurance Product (continued)			
Criteria	**2003**	**2004**	**2005**
			activity (50 mm) The coverage will start automatically on July 1, 2005, if accumulative rainfall has not reached the 50 mm mark.
Payout	The loss payout is made as a function of deviation in percentage from the threshold rainfall index.	The loss payout is made a function of per millimeter deviation from the threshold rainfall index. The farmers were able to grasp this payout structure in absolute deviation rather than as a percentage deviation.	BASIX retains the per millimeter deviation system from 2004.
Process	BASIX operates the sale of weather insurance through a manual, paper-based system.	The manual, paper-based system is continued.	The operational processes have been designed to reduce transaction costs, automate information processing, and simplify premium routing process.
Product communication	Product literature is delivered to customers in vernacular, resulting in good awareness and grasp of the product by customers.	Continued vernacular communication regarding product details.	Continued vernacular communication regarding product details.
Subsidy	There was no subsidy. Farmers paid the premiums entirely out of the their own pockets.	There was no subsidy.	There was no subsidy.
Source: Documents from BASIX Insurance Unit.			

Box 2.3 Other weather insurance programs in India

During 2004 and 2005, not only did BASIX scale up its weather insurance program, but also a number of institutions, including the original insurance company ICICI Lombard, expanded the market for weather insurance in India:

- IFCCO-Tokio, a joint venture insurance company, launched weather insurance contracts similar to the 2003 contracts in 2004, selling more than 3,000 policies to farmers throughout India in 2004 and more than 16,000 in 2005.
- Apart from forming a partnership with BASIX, ICICI Lombard in 2004 directly sold weather insurance policies to an additional 320 groundnut farmers, members of the Velugu self-help group organization in the Anantapur district. For wider distribution in 2005, ICICI Lombard also formed a partnership with ITC Ltd. to sell weather insurance policies through ITC's e-Choupals, internet kiosks located about 3 kilometers from farmers' homes. For the 2005 kharif season, 329 farmers bought 914 units (1 unit = 0.5 acre) of weather insurance policies through e-Choupals, with a combined premium of Rs 228,500 and a total sum insured of Rs 2,742,000.

  In conjunction with the government of Rajasthan, ICICI Lombard launched a weather insurance program for farmers for the 2004 growing seasons, insuring 783 orange farmers from insufficient rainfall during the 2004 kharif and 1,036 coriander farmers in the 2004 rabi season; this was scaled up to include more crops and farmers in 2005.

  In total, it is estimated that ICICI Lombard agricultural weather insurance sales, through e-Choupals and other partnerships, reached approximately 100,000 farmers in 2005.
- AIC, which is responsible for the government-sponsored area-yield crop insurance scheme, launched a pilot weather insurance scheme for 20 districts throughout the country in 2004, reaching nearly 13,000 farmers. This scheme was included in the government of India's budget for the fiscal year 2004–05. In kharif 2005, AIC expanded its weather insurance scheme by introducing a program (Varsha Bima–2005) in about 125 India Meteorological Department (IMD) station areas spread across 10 states. Approximately 125,543 farmers have bought the Varsha Bima products, covering more than 98,000 hectares of growing crops and a risk of approximately Rs 560 million, and earning a premium of Rs 32 million (see appendix 5).
- New insurance providers, such as HDFC Chubb General Insurance Company Limited, also entered the market in 2005.

With the participation of various players, it is estimated that during the 2005 kharif more than 250,000 farmers throughout India bought weather insurance. Given this strong level of interest and the potential size of the end-user market, agriculture weather risk management in India is set to grow.

Source: Syroka 2005.

sessions were added in the month leading up to the groundnut and castor-bean-growing season. New contracts were offered to cotton farmers in the Khammam district, and an excess rainfall product for harvest was offered to all castor-bean and groundnut farmers. In total, more than 400 farmers bought insurance from BASIX in 2004. Several farmers were repeat customers from 2003. During 2004, BASIX itself also bought a crop-lending portfolio insurance policy based on weather indexes. ICICI Lombard underwrote the retail and institutional rainfall policies, but it did not seek reinsurance as in 2003 (World Bank 2005).

The 2005 Scaled-Up Program

The pilot experience proved to be valuable for BASIX and ICICI Lombard in understanding the crop-rainfall relationships and the product design. In addition, interactions with farmers indicated the potential for commercial expansion and highlighted the necessary factors in offering the right weather insurance products to farmers. In the 2005 scaling-up phase, BASIX and ICICI Lombard further improved the product by adding new features recommended by farmers. These new features included (1) dynamic starting dates, and (2) the exclusion of daily rainfall of less than 2 millimeters (mm) and greater than 60 mm from the cumulative total that determines the payout.[8] Another important change was the contract application. Instead of crop-specific policies, BASIX began to sell area-specific generic weather insurance products that were suitable for all principal rain-fed crops within the same agroclimatic region. These products were sold to farmers in 36 locations in 6 Indian states. BASIX planned to reach a minimum goal of 5,000 policies, with a target of 10,000 policies. By year-end, 7,685 policies were sold.

3. Preliminary Results of the Impact Assessment of the 2004 Weather Insurance Pilot[9]

This section discusses the 2004 farmer survey designed by CRMG and the Development Economics Research Group of the World Bank (DECRG)[10] and implemented by the International Crop Research Institute for Semi-Arid Tropics (ICRISAT) to study the introduction of weather insurance by BASIX. The study used a natural-experiment program evaluation design. This section discusses the preliminary study results on the determinants of rainfall insurance take-up and the effects of its introduction on agricultural production strategies and existing informal insurance mechanisms.

The study took place in the Anantapur and Mahahbubnagar districts. These districts are characterized by low and uncertain rainfall, low levels of irrigation, and shallow and infertile soils. Anantapur has virtually a groundnut monoculture, while Mahahbubnagar's crops include castor bean, groundnut, sorghum, pigeon pea, maize, cotton, paddy, and finger millet. Crop failure is frequent in these districts, mostly triggered by drought. Indeed, 80 percent of farmers considered drought their main risk. In a drought year, farmers can lose about 25 percent of income. Drought affects most villagers at the same time, rendering informal insurance networks useless. Instead, in bad years, farmers sell livestock or their few assets and migrate to urban areas or other states. In addition, they borrow from formal and informal rural financial institutions. The union and state governments offer employment-generation schemes, watershed development programs, and other welfare schemes to stem migration and assuage hardships.

According to the 1991 IndiaStat Census[11], villages in the Mahahbubnagar district have on average 230 farming households out of 320 households, while Anantapur villages have on average 350 farming households out of 540. Thus, with average sales of seven to eight farmers per marketed village, there was still ample scope for marketing in 2004. This low number reflects the fact that the insurance product was still being piloted and that farmers were going through a learning process.

Villages chosen for marketing had to satisfy four main criteria: (1) the presence of BASIX customers residing in the village to ensure some degree of trust in the institution; (2) preferably 200 to 300 acres of groundnut and/or castor bean in the village to ensure a market for the weather insurance; (3) a reasonable number of small- and medium-size farms with 2 to 10 acres of land each; and (4) a village location less than 20 kilometers away from the nearest rainfall reference station, to reduce the basis risk born by the buyer.

Several villages matched these criteria; however, because of the late finalization of the insurance policy's design, the product had to be marketed

in a short time. As a result, not all of the villages that BASIX wanted to reach were actually targeted. BASIX had only 10 days to market and sell the insurance product before the start of the kharif season and thus of the coverage period. Because of this short time span, a number of control villages were selected. These control villages had to comply with the four criteria to qualify as possible marketing villages.

A sample of 1,052 farming households was drawn from Hindupur, Anantapur district, and Narayanpet, Mahahbubnagar district. Within each of the marketed villages, all buyer households were interviewed, as well as a group of nonbuyer households. Among the nonbuyers, some knew about the insurance because they had attended the marketing meeting, but they decided not to buy it. Others did not know about the insurance at the time of sales and therefore did not buy. The sample included 267 buyers, 186 nonbuyers who attended a marketing meeting, and 299 nonattendees in the treatment villages. In addition, 300 farming households were interviewed in control villages. In total, 38 villages were covered, sampling a minimum of 25 households in each.

The product was marketed by first talking to a trusted opinion leader or progressive farmer in the village and explaining the insurance product to him or her. The selected leader or farmer would motivate the village and inform fellow villagers about the product and the upcoming marketing meeting, which would occur a few days later. Most people who heard about the meeting decided to attend; of those, 35 percent attended because they trusted BASIX and another 35 percent because friends and neighbors attended. A list of the attendants was made at the marketing meeting. After a general introduction to the insurance products at the meeting, BASIX representatives would visit interested attendants in their home. Policies were sold at the meeting and during these home visits. However, only 27 percent of the buyers purchased the insurance during the marketing meeting. Apart from the initial meeting with the selected motivator, BASIX agents would spend one day in each village for marketing and sales.

In 2004, the insurance product covered three periods and payouts were decided by the end of each period. Payouts could take two forms: (1) a payout per millimeter of deficient rain or (2) a lump-sum pay out. These two options were provided to tailor the product as carefully as possible to the farmers' situations, but the options required considerable explanation. Meeting participants understood the crop to which the rainfall insurance was linked and the premium and payouts, but they did not understand the trigger levels. In fact, insurance trigger levels are expressed in millimeters of cumulative rainfall, but most farmers do not understand the concept of a millimeter. Most farmers determine when to sow by analyzing the moisture in the ground, and, indeed, only 10 percent were able to estimate in millimeters the minimum accumulated rainfall required to sow.

Determinants of Take-up

The demand for the formal insurance product depends, conceptually, on each individual farmer's willingness to pay for insurance and on the correlation

between actual payouts and economic losses from adverse weather events. In the context of a new product, however, trust in the institution that is selling the product and an actual understanding of the product are also important. If farmers do not believe that BASIX will honor its commitments (paying farmers who are entitled to a payout), then demand will be low irrespective of how well the product is designed. Alternatively, if potential buyers do not fully understand the product, demand may be low. These two competing explanations interact with a range of other potential factors in a way that allows us to test their plausibility.

For example, personal characteristics of the farmer, such as the level of risk aversion, can be an important determinant of take-up. If farmers trust BASIX, then risk-averse and impatient farmers should be more likely to purchase insurance (the trust story). However, if farmers do not believe that BASIX will honor claims, then risk-takers should be more likely to buy it. Analogously, farmers who lack an understanding of insurance may think of the product more in terms of a *gamble* rather than *insurance* (the knowledge story). They pay a price (premium) to bet on a rainfall level, and if the realized rain falls below that level, they win a prize (payout). As such, more risk-takers should purchase the insurance. Conversely, among those who understand the potential of the product as a hedging mechanism, more risk-averse people should purchase it.

The study has three preliminary findings. First, the analysis finds evidence in support of the knowledge story but not of the trust story. In other words, among trusting people, it is not true that more risk-averse people buy insurance. However, among those who have other types of insurance, or can measure rainfall in millimeters (that is, among those who understand insurance), it is the more risk-averse people who are more likely to buy the product.

Second, the insurance policy is priced according to historical rainfall data but the farmer's weather perceptions may not coincide with the historical data. In this case, the farmer may perceive the actuarially fair premium to be too low (if the farmer expects low rainfall) or too high (if the farmer expects high rainfall). By determining when the farmer expects the monsoon to start, those who expect the monsoon to start earlier than historically (and thus think that rainfall will be high) can be compared with those who expect the monsoon to start later than historically. It is precisely those who believe that the monsoon will start later who are more likely to buy the insurance. To them, the premium is set too low (or the gamble has favorable odds) and thus it is worthwhile to purchase the insurance.

Third, current risk management strategies are likely to influence the decision to purchase formal insurance. If the farmer has an array of *ex post* strategies available, such as buffer stocks, credit access, and asset holdings, his or her ability to smooth consumption and absorb even aggregate shocks might be such that he or she has little interest in purchasing a formal insurance policy. However, if his or her *ex post* risk-coping strategies are more limited and he or she relies more on informal insurance networks with fellow villagers, then a

formal insurance against aggregate weather shocks might be a relatively attractive solution to ensure consumption smoothing in such adverse events.

Interestingly, the analysis finds that those farmers who have purchased other forms of formal insurance, such as livestock or life insurance, are less likely to buy weather insurance. In addition, farmers who report having suffered the consequences of drought, a proxy for their ability to cope with drought risk, are more likely to purchase the insurance.

Fourth, the marketing strategy followed may be partly responsible for the considerable variation found in the take-up, for which the number of policies sold ranged between 0 and 45 per village. According to BASIX and confirmed in the data, the choice of motivator, the farmer's understanding and interest in the insurance product, and the respect from fellow villagers were important for take-up. Typically, the production strategies of progressive farmers are viewed by others as examples to follow. Furthermore, there is widespread membership in self-help groups, both for men and women. These groups function primarily as sources of information, especially among farmers, and the women's groups function as sources of credit through chit funds. Both the progressive farmers (the motivators) and the self-help groups were important entry points for the introduction of new technologies, including weather insurance.

Finally, such other external factors as cash availability on the day of sales, basis risk as measured by distance to the rain gauge, and the farmer's ability to irrigate plots could affect the demand for the insurance. The analysis finds, however, that none of these variables significantly affect the decision to purchase the insurance.

To summarize thus far, the data suggest that, because it is a new product, some buyers do not fully understand the benefits of insurance and thus perceive it to be a gamble rather than a means to protect against drought. DECRG and ICRISAT planned to interview the farmers again in the 2006 kharif (the main monsoon) to see whether these perceptions have changed and whether farmers now understand the potential of weather insurance as a hedging product.

Impact

Because the product is newly introduced and buyers may not fully understand its potential, its impact is unlikely to be instantaneous. Therefore, future rounds of data collection will be necessary to determine how the availability of a formal insurance affects risk-coping strategies and the informal insurance mechanisms of the households.

In theory, with the introduction of formal insurance, the crop mix should change because cash crops, which were profitable but risky, will now be safer. For those who understand the potential for hedging risk, a shift in the cropping patterns toward the insured crops is expected. By reducing the degree of risk in agricultural production, farmers will be less apt to resort to *ex ante* risk-coping mechanisms. Increased specialization and higher profits are also expected, because farmers will focus on maximizing the output of the insured crop,

rather than on diversifying the weather risk through the cropping system. The analysis finds some evidence in this regard, especially among those who have purchased other forms of insurance and thus understand their benefits. But overall, the results are rather weak.

The best evidence that the product is attractive comes from the fact that most farmers in treatment villages reported that they would like to purchase the insurance for the next kharif season in June 2006. Once the benefits of the product are fully understood, farmers will be able to alter their production strategies toward maximizing output, rather than diversifying risk, and to shift their demand for credit from consumption loans to investment loans. This shift is likely to result in increased specialization and investment, and to contribute to increased profits and the well-being of the rural population.

4. Strategic Considerations in Scaling up the Weather Insurance Pilot program

According to Mr. D. Sattaiah, BASIX associate vice president for operations and human resources, "it is a deliberate strategic decision to scale up the weather insurance service in an aggressive way"[12]. Planning for weather insurance is not done in isolation at BASIX. Rather, it is part of the overall corporate business plan, which envisions the company's growth in all of the microinsurance lines of business. By 2007, BASIX expects that "6 out of 13 insurance companies operating in India will partner with BASIX in selling the weather insurance product aggressively"[13] Three key considerations motivate this vision of expansion: staff productivity, the demonstration effect of the pilot, and cost recovery and profitability.

Staff Productivity

BASIX's estimate of staff productivity determines the scale of expansion mainly through customer services agents (CSAs) who handle day-to-day services with rural customers. Because BASIX's distribution channel is involved in the delivery of multiple credit and noncredit services, the selling effort on weather policies has to be integrated into the rest of the work schedule of CSAs. Therefore, the criterion used by management to determine the scale of weather insurance expansion is how many credit accounts and insurance policies a CSA can handle per day. BASIX established a minimum goal of selling 5,000 weather insurance policies during the 2005 monsoon season, based on the level of information technology (IT) and the incentive system in place (Hubka and Manuamorn 2005). Potentially, the establishment of an upper target of 10,000 policies could be achieved because of the following: (1) the ease in using BASIX's existing rural outreach in distributing the rainfall product, and (2) the 25 percent incentive payment that expected to boost the productivity in sale.[14] At the end, 7,685 policies were sold in the 2005 Kharif season.

The Demonstration Effect of the Pilots

BASIX decided to scale up dramatically to take advantage of the demonstration effect of the pilots. The feasibility of weather insurance demonstrated by BASIX and ICICI Lombard created new enthusiasm for weather products in the Indian insurance market. In turn, this broadened the choice of partner insurance companies for BASIX.[15] On the demand side, as discussed in the last section, individual farmers and self-help groups articulated product satisfaction in all of the pilot areas. In 2004, farmers in a few villages received claim payouts for the first crop stage, even before the regular harvest period was complete. Such prompt claim settlements earned the appreciation of the farmers who expressed their willingness to become repeat customers in 2005.

Cost Recovery and Profitability

BASIX needs to sell a large number of insurance policies to recover the capacity building costs that the company invested in insurance services. The main components of the cost come from training CSAs and automating the insurance administration system. Although BASIX used revenue surpluses from group life insurance to finance the experiment with weather insurance during 2003–04, ultimately, the product needs to generate independent income to sustain itself and to contribute to the overall cost recovery and profitability of the insurance business. BASIX estimates that reaching at least 10 percent of the households in each village in which BASIX operates will be a good start.

A scaled-up weather insurance program will significantly enhance BASIX's financial performance. Currently, all of the premium collected is remitted to the insurance company. After underwriting the policies, the insurance company pays out a commission to BASIX up to a maximum of 15 percent of the premium collected on each policy. Given an average weather insurance premium of Rs 300, the sale of 5,000 to 10,000 policies in the 2005 kharif would have generated a collected premium of Rs 1.5 to Rs 3 million. Of this total, BASIX could generate up to 15 percent or approximately Rs 220,000 to Rs 440,000 as income.[16] This projected revenue elevates the financial contribution of weather insurance to the company to approximately the same level as its retail life and livestock insurance products in 2004. Table 4.1 gives an overview of the comparative business performance of BASIX's insurance products, and table 4.2 provides an overview of the comparative service performance of BASIX insurance products.

Table 4.1 Comparative Business Performance of BASIX's Insurance Products, April 2003–March 2005

Product	Policies		Premium (Rs)		Average Sum Insured (Rs)
	April 04–March 05	April 03–March 04	April 04–March 05	April 03–March 04	
Group life insurance under Credit Plus	86,540 (As of March 31, 2004)	48,024 (As of March 31, 2004)	6,139,000	28,000	12,500
Retail life insurance	6,038	369	1,581,000	123,000	22,000
Livestock	5,040	4,430	1,637,000	1,623,000	7,500
Rainfall insurance (customers/ acres)	427/ 670	230/ 450	150,000	100,000	6,000

Source: Documents from BASIX Insurance Unit.

Table 4.2 Comparative Service Performance of BASIX Insurance Products, April 2003–March 2005

	Claims Reported	Claims Settled	Claims Rejected	Claims in Process	Settled Amount (Rs)
Life	208	195	0	13	2,260,000
Livestock	257	233	14	10	1,732,000
Rainfall	305	305	0	0	450,000
Total	770	733	14	23	4,442,000

Source: Documents from BASIX Insurance Unit.

The comparison between tables 4.1 and 4.2 shows that BASIX settled 305 rainfall insurance claims out of the 657 rainfall insurance policies sold during the first two years, or approximately 47 percent. Such a relatively high claim ratio likely enhanced farmer demand for the product in 2005. At the same time, the ratio also reflects inadequate geographic diversification of the scheme, which is among the major reasons for scaling up the scheme in the third year.

5. Conditions for the Scalability of the BASIX Weather Insurance Pilot

The following subsections detail the key managerial, administrative, and technical conditions that underline the expansion of BASIX weather insurance service throughout the country following only two years of the pilot experience.

Critical Mass of Insurance-Trained Staff

BASIX has a large number of qualified insurance advisors who were trained and licensed by the IRDA to sell retail life insurance. Some 120 executives in the company took the IRDA-prescribed online insurance training and qualified in the course. This level of training is equivalent to that of business team leaders in private insurance companies. Because these advisors are already knowledgeable in insurance products, BASIX could extend their responsibility to include the sale of the rainfall product within a short period of time, without the need for significant additional training.

Existing Extensive Rural Outreach

Operating in more than 10,000 villages in 46 districts in 7 states, BASIX takes advantage of the existing farmer outreach. BASIX markets its rainfall insurance product together with loans and other agricultural development services. For every 10 to 15 villages, BASIX deploys one CSA who visits customers on a weekly basis. According to P. Sai Gunaranjan, BASIX insurance executive, "creating a network just for the delivery of weather insurance will be too expensive"[17]. From a development perspective, it is important to distribute weather insurance as part of a whole package of livelihood enhancement products. This reduces the operational cost of the distributor and maximizes development impact. Relying on the existing distribution channel has allowed BASIX to maintain low administrative expenses.

Product Simplification

The insurance team made a conscious decision to sell a generic, instead of crop-specific, rainfall insurance product during the 2005 monsoon season. Designing such a simplified product reduces cost, time, and complexity for BASIX and ICICI Lombard during the preparation stage. It facilitates the product's sale to a large number of customers, because BASIX's staff have to understand and explain only one product during sale sessions. Simplifying the product also reduces the amount of instruction required from the headquarters to unit offices, which are responsible for sales, thus simplifying the monitoring task of the insurance team at the headquarters. According to Gunaranjan, "a trade-off between product specification and outreach has to be made"[18].

Product Management System: The Use of Process Charts

In addition to standardizing the product, BASIX also standardizes the insurance administration process. The objective is to ensure that every person involved in insurance operations understands the procedures in a unified and complementary manner. Applying a common approach in manufacturing to service provision, BASIX achieves this objective by creating "process charts" (see appendix 3), which perform the following functions: (1) outline all the elementary steps of the entire process, giving both a micro- and macroview of the process; (2) assign responsibilities to specific individuals for various stages in the process, providing role clarity; (3) determine the amount of time involved in each of the processes; (4) determine the costs involved in the various steps; (5) provide relevant references, such as check lists or formats that are needed at various stages of the process; and (6) classify each of the elementary steps into four kinds of activity (and inactivity in some cases). The entire process may be viewed as a combination of the following four kinds of activities:

1. Execution (E): specific work accomplished by an individual
2. Screening (S): cross-checking or verification completed before passing a job to the next stage, for example, checking a customer profile before drafting an insurance proposal
3. Transit (T): travel or transit time involved
4. Idle (I): inactive stage in the process, causing delayed movement to the next stage

The purpose of this classification is to identify those stages in the process that may not be adding reasonable value to the overall work being done. It is broadly accepted that the execution (E) and screening (S) stages are the only ones that add value to the whole process. Once identified, BASIX attempts to reduce those stages that deliver the least value by combining these events, automating them, or eliminating those that may be redundant.

The product management system is fundamental to BASIX's ability to scale up its weather insurance operation. First, the process charts serve as a template for the insurance team to effectively estimate time and cost for each stage, thus obtaining the accurate estimates needed to plan for the scaling up. Second, the charts work as a training tool that reduces to one page the amount of instruction provided by the headquarters for field staff who are new to the delivery of the rainfall product. Third, the charts allow BASIX to closely monitor the performance of each unit office throughout the process and to identify points of inefficiencies in different activities to take early actions for improvement.

Information Management System Tailored to Suit Insurance Operations

BASIX always implements robust IT requirements before functional expansion. For insurance, the team has dedicated substantial effort to develop Insurance Distribution Information and Administration Systems (IDIAS)—a

Figure 5.1 IDIAS Functions

Source: BASIX Insurance Unit.

program that translates functional requirements of all lines of the insurance business (life, health, livestock, and weather) into a database language that is shared across the entire organization. Figure 5.1 shows what the IDIAS screen looks like. Serving more than 10,000 credit and noncredit insurance customers, this program has been instrumental in smoothing the ability to process insurance policies across various product categories and states. Automation through IDIAS contributes directly to the product management system by reducing the transit (T) and idle (I) stages in the insurance process.

A one-and-a-half-year-old program, IDIAS is central to the operation and scaling up of weather insurance by supporting the following functions: advanced database, insurance process administration, and information verification.

Advanced database

Staff in unit offices can enter into IDIAS all of the information on weather insurance sales (customer profile, location, premiums paid, policy number, detail of coverage, and so on). After the data are entered in IDIAS by field-based transactions assistants (TAs), BASIX headquarters and the insurance company can instantaneously access the data, resulting in complete documentation of the whole process in a standardized and real-time format. Recording customer profiles in IDIAS is equivalent to eliminating the screening activity (S) listed in process charts. The system can generate customer and insurance policy proposal reports using a specific customer ID and the current status of the policy.

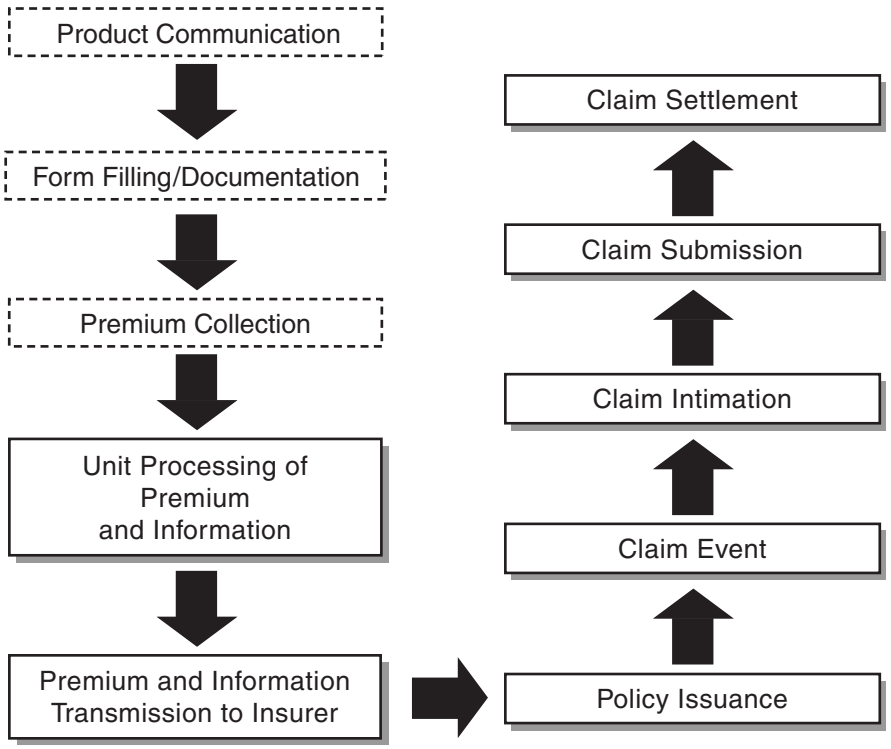
Insurance process administration

IDIAS allows BASIX to automate most of the steps (as shown in figure 5.2) required to deliver weather insurance service to farmers, such as the following: information and premium processing, information transmission to the insurance company, policy issuance, and claim processing.

In the past, when a customer purchased a rainfall contract, BASIX field staff would manually draft a policy proposal. The proposal was returned to the responsible unit office, forwarded to ICICI Lombard via the BASIX headquarters, and returned to the customer as an insurance policy after one month. With IDIAS, the system instantaneously generates two copies of the policy, giving one to the customer on the spot and another to the responsible unit office. The policy proposal and issuance information is subsequently entered into IDIAS's off-line data entry platform. It is then transported to the central IDIAS platform when staff connects to the central server. This allows the BASIX headquarters and the insurance company to access the information online, while shrinking the policy proposal and issuance process from approximately one month to one week.

After a weather event has triggered payouts for farmers with coverage, BASIX uses IDIAS to handle 95 percent of the claim processes on behalf of the insurance company. Once notified by ICICI Lombard of the forthcoming

Figure 5.2 BASIX Insurance Process (automated steps in shadowed boxes)



Source: BASIX, Insurance Unit.

payout, a claim event is registered in IDIAS and instantly processed. More than 750 claims from weather and other insurance products have been processed by IDIAS to date.

This automation of the insurance process has reduced the actions needed on the part of ICICI Lombard. At the same time, it enables BASIX to handle a larger number of insurance customers and further scale up its efforts at its own pace, while reducing manpower, time, and money required. In addition to the time saving, other indications of efficiency created by IDIAS include the following: (1) an 80 percent reduction in courier cost for BASIX, and (2) a sizable cost savings in underwriting on the part of ICICI Lombard.

Information verification

IDIAS automatically corrects staff errors in premiums or payouts. The system is built to reject the processing of an insurance contract that has incorrect information. As a result, IDIAS allows BASIX to offer a large number of policies for a variety of insurance products without confusion and informational mistakes.

IDIAS provides an example of how "process-oriented details make a difference in improving operational efficiency at BASIX".[19] According to Mr. D. Sattaiah, "BASIX chooses to place more emphasis on process than product. While product can be updated from time to time, process needs strength from the beginning. And strengthening the internal insurance process can be done independently without relying on the insurance company"[20].

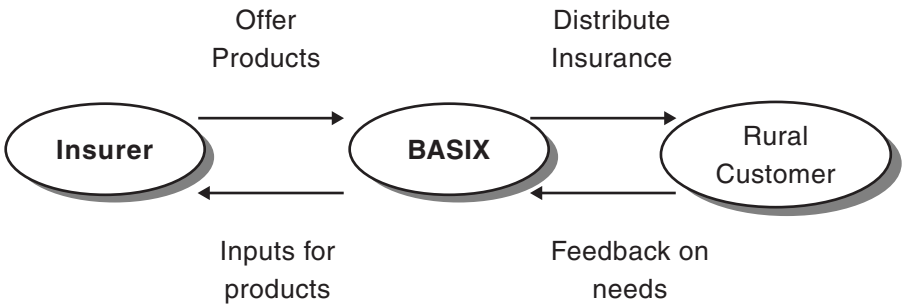
In addition to the importance of process, IDIAS demonstrates the need for an organization to accumulate a culture of paying attention to details and using it to guide the design of the IT infrastructure. BASIX is willing to make the IDIAS package available to other organizations that need an IT system to support microinsurance operations. However, the use of such a ready-made package could only be enhanced by "the fine-tuning of its functions to suit each organization's details"[21].

Emphasis on Communication

Effective communication among BASIX, the insurer, and rural customers lies at the heart of BASIX insurance business model (as seen in figure 5.3). Effective communication also plays a key role in scaling up the sale of weather insurance.

To sell more policies, BASIX needs to educate a larger number of customers. For a new product like weather insurance, that means allocating a significant amount of time to repeat information and to hold question-and-answer sessions with farmers (a lot of the farmers are illiterate). All verbal communication and product literature must be provided in the vernacular language to facilitate customer understanding. Sessions must be conducted at appropriate times, such as in the early morning before farmers go out to the field or late in the evening after they have returned. These times encourage farmer participation, which allows them to ask questions and give feedback on the product directly to BASIX staff. The feedback is channeled to the

Figure 5.3 BASIX Insurance Business Model



Source: BASIX Insurance Unit.

insurer, providing input that can improve the product design to better match demand. Not only does this strategy pay off by creating close relationships and instilling trust between BASIX and farmers, it also directly enlarges the customer base for weather insurance. The first group of educated farmers further expands demand within the village through peer communications. According to BASIX, as much as 90 percent of new customers come from "word of mouth" (Sattaiah 2005).

6. The Role of ICICI Lombard

ICICI Lombard is the first insurance company to offer weather-indexed insurance in India by underwriting for BASIX during the 2003–04 pilot programs.[22] The company continues to play a major role in the 2005 scaling-up phase by underwriting rainfall-deficit contracts for BASIX to sell in 35 locations in 5 states[23]. From an insurance company's perspective, several advantages (see table 6.1) make weather-indexed insurance a more viable business than traditional multiperil crop insurance, which is financially unsustainable (see appendix 6).

Because BASIX is responsible for marketing and distribution, most of the preparation undertaken by ICICI Lombard concentrates on two activities. First, the insurance company is responsible for designing the rainfall product. The main tasks involved are analyzing historical weather data and converting the data into product values that include premium rates, unit exposure, and trigger and exit points of the insurance contract. The source of historical data is the India Meteorological Department. For the 2005 season, such a conceptual process took place over a period of approximately two and a half years, but it has intensified since February 2005, three months before the sale period commenced in May 2005. The long period of intellectual work reflects the intensity of human capital, which, according to ICICI, forms the biggest part of the company's cost in underwriting weather contracts.

Second, ICICI Lombard is responsible for training BASIX staff and bears the cost of the training. The company also supplies product literature (policy term sheets) and product information posters to BASIX.

Despite the cost of human capital and training, ICICI Lombard sees a strong profitability potential for weather insurance. The key factors in the company's market assessment are as follows: (1) the large market size (60 percent of India's agriculture is rain fed); (2) the high satisfaction of farmers with the transparent nature of index instruments and timely payouts; and (3) the low administrative cost of index insurance because field loss adjustments are not needed. According to Virat Divyakirti, ICICI's weather product specialist, "an investment of Rs 30–50 million, a reasonable amount to make business sustainable, can be recouped within 2–3 years from the growing Indian weather risk market"[24].

To date, weather insurance has been performing well compared with other products offered by ICICI Lombard. Although product-specific figures have not been established for weather insurance, the company estimates that the business ratios for weather insurance following two years of operation are not very different from other product lines. This indicates that the weather insurance business, if underwritten properly, is at least as attractive a business proposition as other lines of general insurance (see table 6.2). In the near

Table 6.1 Comparison of Indicative Expected Cost Levels Involved in Underwriting and Administration Functions of Traditional and Index Insurance

Function	Traditional	Index	Comment
Establishing insured yield	Key function: Insurers must establish farm- or district-level yield.	Not required: Use an index as an agreed basis for payout.	Individual farmer yield setting is not feasible in small farming.
	Cost: High	Cost: Low	
Underwriting	Needs assessment of individual risk or localized district risk in order to underwrite the risks.	Not required, but insurers need to screen clients to check for insurable interest in order to meet regulatory requirement for insurance	Product must be adapted to local weather situations to reduce basis risk.
	Cost: High	Cost: Low	
Policy sales	Sales process requires high skills because it involves underwriting decisions.	Sales process requires good product knowledge. No major underwriting decisions in sales process.	Education and extension remains important for any crop or index product.
	Cost: High	Cost: Medium	
Paperwork/IT	Documentation required for traditional insurance underwriting is generally extensive and complex.	Simplified certificates or coupons are adequate for index insurance.	A key to cost reduction is effective IT in head offices and districts.
	Cost: High	Cost: Medium	
Field inspection	Check for crop emergence.	Not required.	The insurer should monitor crop-growing conditions in all cases.
	Cost: High	Cost: Low	
Loss adjustment	Needs inspection of crop damage and claim adjustment.	Not required: Payment is according to measured index.	This category is one of the most important differences between traditional and index products.
	Cost: High	Cost: Low	

Table 6.1 (continued)

Function	Traditional	Index	Comment
Claims payment	Settlement of claim.	Settlement of claim.	Once claims are finalized, similar payment costs are incurred.
	Cost: Low	Cost: Low	

Source: Dick 2005.

Table 6.2 Overall Business Ratios for all ICICI Lombard Insurance Products including Weather Insurance

Business Ratios	Percent
Expense[a] on Gross Written Premium (GWP)	22
Expense on Net Written Premium (NWP)[b]	35
Net Claim on Net Earned Premium (NEP)[c]	70
Gross Loss Ratio (Gross Claims on GWP)	37

Source: Figures provided by ICICI Lombard.

Note:
a. Only management expenses, not including any commission.
b. Net Written Premium = Gross Written Premium – Reinsurance Ceding Commission.
c. Net Earned Premium = Gross Written Premium – Reinsurance Ceding Commission – Net Unexpired Risk Reserve.

future, the company expects the underwriting expenses for weather insurance to go down significantly. This will make the weather insurance business even more attractive, given the growing demand.[25]

To further expand the underwriting of weather insurance, ICICI Lombard identified three significant factors. First, the primary insurer-reinsurer relationship must move beyond a case-by-case system, whereby ICICI Lombard must receive approval from the reinsurance company before underwriting each portfolio to a reinsurance treaty system. In the latter case, ICICI Lombard is granted automatic capacity to underwrite weather risk on behalf of the reinsurance company. It is estimated that a reinsurance automatic capacity of US$1 million in premium, or US$25 million in sum insured, is needed in the short term for ICICI Lombard to expand fully in the Indian weather market.[26] The treaty system is not imminent, however, and the reliance on the inflexible case-by-case system still forms a major constraint for ICICI Lombard. The same constraint is likely to apply to other Indian insurance companies.

Second, more public and private investment is needed to expand the network of automatic weather stations throughout the country. More geographically dispersed automatic stations reduce basis risk and increase the speed and accuracy of weather data. Both lead to a higher rate of acceptance of weather-indexed contracts by reinsurers, translating into improved reinsurance rates.

To this end, ICICI Lombard has started to form partnerships with National Collateral Management Services Limited, a private Delhi-based company, to install automatic weather stations throughout India. More than 87 new automated stations were installed in 2005, covering 9 states and more than 50 districts. These new stations have provided data on which many BASIX contracts were underwritten during the scale-up phase and will provide data for ICICI Lombard as well as other insurance companies to underwrite future weather insurance contracts. This private investment to improve weather infrastructure, combined with the increasing need of the government-owned AIC for weather data, might prompt comparable investment in weather stations from the public sector.

Finally, ICICI Lombard believes that the government should revise subsidy policy to be more conducive to weather-indexed products relative to traditional yield insurance products.[27] Currently, the government only subsidizes yield insurance, which distorts farmers' incentives to purchase weather insurance. With the appropriate policy support from the government (such as removing subsidy from other products or giving equal subsidy to rainfall-indexed insurance), index instruments can become a cheaper and more effective production risk management option for smallholder farmers because of low administration costs and lack of moral hazards.

7. Conclusion

Like the pilot program launched in 2003, BASIX sets a precedent for other rural development institutions by mainstreaming weather insurance within its operations. Several factors account for BASIX's ability to dramatically scale up its weather insurance business. First, the pilot stage was used not only as a feasibility experiment but also as a platform to raise customer awareness and improve the product. As a result of the pilot program, BASIX was able to achieve the following: (1) design an economical product that suits the weather risk management needs in different rural areas; (2) devise an effective product communication strategy that sustains and boosts customer demand; and (3) make the necessary trade-off between product specialization and scalability.

Second, BASIX's holistic approach to livelihood promotion contributes directly to the capacity to deliver a large number of weather insurance policies to rural customers. BASIX takes advantage of its existing strong delivery channel by adding weather insurance to a comprehensive set of livelihood services. This maximizes staff productivity and cost-effectiveness while increasing the impact of microinsurance in improving farmer livelihoods.

Third, scalability is a product of BASIX's consistent attention to details and of the effort to convert the product details into the necessary administrative and technical infrastructure. Such infrastructure is instrumental to the weather insurance process, which targets smallholder farmers, requiring the capacity to process small but critical details.

BASIX identifies the following issues as major challenges in further expanding the weather insurance business. First, BASIX and partner insurance companies must work together to formalize a multiyear continuity plan to ensure common speed and matching energy in the business expansion. Second, as customer demand increases, BASIX must seek to build partnership with multiple insurance companies to overcome the underwriting limitations naturally incurred by reliance on one company. Third, there is a need for more investment in the network of weather stations throughout the country, especially in distant rural areas. The Indian government, private companies, and insurance companies should invest in the weather data infrastructure to facilitate the growth of the domestic weather risk market and the placement ability of domestically underwritten weather contracts in the international markets.

Appendix 1. Sale Performance of Rainfall Insurance Product by BASIX from the 2005 Monsoon Season

Weather Station Location	State	No. of Customers	No. of Units	Sum Insured (Rs)	Premium (Rs)
ADILABAD	ANDHRA PRADESH	80	83	249,000	19,090
ADONI	ANDHRA PRADESH	10	10	10,000	900
ATMAKUR	ANDHRA PRADESH	38	85	255,000	23,800
BHADRACHALAM	ANDHRA PRADESH	231	231	692,000	69,300
HINDUPUR	ANDHRA PRADESH	68	81	98,000	10,510
KADAPA	ANDHRA PRADESH	18	23	69,000	7,130
KALINGAPATNAM	ANDHRA PRADESH	76	121	363,000	39,930
KHAMMAM	ANDHRA PRADESH	303	305	904,000	87,270
KODANGAL	ANDHRA PRADESH	108	143	429,000	38,610
KURNOOL	ANDHRA PRADESH	73	73	213,000	24,040
MADIRA	ANDHRA PRADESH	184	184	244,000	22,530
MAHABUBNAGAR	ANDHRA PRADESH	272	366	1,039,000	79,840
NALGONDA	ANDHRA PRADESH	19	19	33,000	3,270
NANDYAL	ANDHRA PRADESH	9	9	22,000	2,340
NARAYANPET	ANDHRA PRADESH	392	651	1,912,000	165,980
NIRMAL	ANDHRA PRADESH	156	159	477,000	49,290
NIZAMABAD	ANDHRA PRADESH	161	164	492,000	49,200
PRODDATUR	ANDHRA PRADESH	22	23	25,000	2,290
RAMAYAMPET	ANDHRA PRADESH	314	316	918,000	91,920
SADASIVPET	ANDHRA PRADESH	48	48	141,000	16,040
SIDDIPET	ANDHRA PRADESH	182	182	546,000	56,420
SURYAPET	ANDHRA PRADESH	115	117	210,000	22,650
VIKARABAD	ANDHRA PRADESH	204	209	601,000	50,045
DEOGARH	JHARKHAND	171	178	320,000	21,280
RANCHI	JHARKHAND	7	7	21,000	1,960
BELLARY	KARNATAKA	139	139	157,000	15,970
INDORE	MADHYA PRADESH	79	417	493,000	44,750
JABALPUR	MADHYA PRADESH	81	85	255,000	22,950

Weather Station Location	State	No. of Customers	No. of Units	Sum Insured (Rs)	Premium (Rs)
SHAJAPUR	MADHYA PRADESH	107	107	321,000	28,890
CHANDRAPUR	MAHARASHTRA	231	272	816,000	68,000
GONDIA	MAHARASHTRA	145	158	474,000	39,500
NANDED	MAHARASHTRA	812	813	1,967,000	202,730
PARBHANI	MAHARASHTRA	718	718	2,063,000	199,120
WARDHA	MAHARASHTRA	605	623	1,869,000	155,750
YAVATMAL	MAHARASHTRA	511	552	1,656,000	143,520
GOPALPUR	ORISSA	14	14	52,000	4,146
Total		**6,703**	**7,685**	**20,406,000**	**1,880,961**

Source: Figures provided by BASIX.

Appendix 2. Monthly Average Rainfall and Standard Deviation of Selected Reference Weather Stations during the 2005 Monsoon Season

Table A2-1 Maharashtra State

Nanded	June	July	August	Sept.
Avg	152.1583	256.56	235.3294	166.9417
Std dev	90.17374	147.9472	157.8134	133.4314
Wardha				
Avg	186.5727	258.9818	275.7176	150.6794
Std dev	109.6983	123.6097	150.7792	99.81999
Yeotmal				
Avg	197.6823	282.3294	284.5303	153.6935
Std dev	126.8077	117.5780	116.1387	103.1611
Parbhani				
Avg	160.6289	241.5077	233.4000	169.8575
Std dev	97.59838	142.0485	132.3782	108.3510
Chandrapur				
Avg	170.0000	383.3432	343.5676	186.8838
Std dev	81.67693	161.1967	141.4699	98.43328

Source: Figures provided by ICICI Lombard.

Table A2-2 Andra Pradesh State

Khammam	June	July	August	Sept.
Avg	127.2829	245.5000	244.4886	163.4971
Std dev	75.39972	109.3907	109.2148	113.2121
Kurnool				
Avg	90.73415	122.6659	145.3878	151.9171
Std dev	48.02585	74.21995	86.43313	100.1891
Mahboobnagar				
Avg	110.2590	176.3231	186.9949	163.7513
Std dev	52.77617	94.02602	96.91274	88.24492
Anantapur				
Avg	52.78000	63.08250	77.78250	134.4150
Std dev	42.20577	66.07561	74.40317	88.82238
Adilabad				
Avg	74.93294	118.9105	127.7022	125.5061
Std dev	31.65681	63.18975	60.70200	32.09162
Begumpet				
Avg	103.9525	162.4243	164.0573	126.6450
Std dev	49.53066	87.84097	79.96373	37.72334

Source: figures provided by ICICI Lombard.

Appendix 3. Example Process Chart from Livestock Insurance Business at BASIX

Process Code	**P-LI-RS**
Process Description	**Proposal to Policy-Livestock Insurance**
Present Method	***
Date (effective)	**27-Nov-03**
Proposed Method	
Date	

S No	*Person*	*Description*	*E*	*S*	*T*	*I*	*Time(days)*	*Mat Req/Ref*
1	CSA/FX	Screen animal for eligibility		1			D	**Check List 1**
2	CSA/FX	Communicate product to customer	1					**Check List 2**
3	CSA/FX	Tag animal	1					Tag, Applicator
4	CSA/FX	Fill policy certificate	1					Certificates
5	CSA/FX	Policies in field				1	D+1	
6	CSA/FX	Policies sent to UO			1			
7	TA	Entry made in MIS	1				D+2	
8	TA	MIS report print taken	1					
9	TA	Tally report and policy certificates		1				
10	UH	UH screens and signs policies		1				
11	TA	Policies at UO				1	D+3	
12	TA	Policies sent to HO			1		D+4	
13	IX	Policy summary data entered in MIS	1					
14	IX	Policy at HO				1	D+5	
15	IX	Policy sent to RS			1			
16	RS	Policy screened and signed by RS		1				
17	RS	Data entry at RS	1					
18	RS	Policy at RS				1		

S No	*Person*	*Description*	*E*	*S*	*T*	*I*	*Time(days)*	*Mat Req/Ref*
19	RS	Policy sent to HO			1		D+8	
20	IX	Policy sent to UO			1		D+9	
21	TA	Policy at UO				1	D+12	
22	CSA	Policy sent to customer				1	D+13	
Present (expected)			**7**	**4**	**5**	**6**	**14**	
Proposed								
Saving								

Notes: CSA = Customer Service Agent; FX = Field Executive; HO = Headquarters Office; IX = Insurance Executive; MIS = Management Information System; RS = Royal Sundaram Insurance Company; TA = Transaction Assistant; UH = Unit Head; UO = Unit Office.
*** This process chart represents the method used by BASIX during a particular period of time. The process chart is constantly modified by the Insurance Unit to improve operations.

Appendix 4. Term Sheet of an ICICI Lombard–BASIX Rainfall Insurance Product

TERMSHEET FOR WEATHER INDEX INSURANCE

Corps	Any crop in the district
Reference Weather Station	Bhadrachalam
Index	Aggregate rainfall during the cover phases in mm. If rainfall on a day is <2 mm it is not counted in the aggregate rainfall If rainfall on a day >60 mm then the rainfall in excess of 60 mm will not be counted in the aggregate rainfall.
Definition of Day 1	Calendar day in the month of June 2005 when cumulative rainfall for the month of June at reference station is observed $>=50$ mm. If above condition is not met in June, Policy invariably starts on July 1
Policy Duration	105 days

Cover phase	I	II	III
Duration	35 days	35 days	35 days
Strike (mm) <	**95**	**110**	**95**
Exit (mm) <	**10**	**10**	**10**
Notional (Rs/mm)	10.00	10.00	10.00
Policy Limit (Rs)	1,000	1,000	1,000
Phase premium (Rs)	90	130	90

Combined Premium (Rs)	**300**
Combined policy limit (Rs)	3,000
Data Source	Indian Meteorological Department
Settlement Date	Thirty days after the data release by IMD and verified by Insurer.

– The quantity of rainfall received on Day 1 is divided into two parts: Policy Activation Rainfall and Index Rainfall. Policy Activation Rainfall is the quantity of rainfall that contributes towards the requirement of first 50 mm rainfall condition and Index Rainfall is the balance rainfall of the day. Index rainfall is included in calculating the policy index.

– This term sheet is tentative and subject to verification of weather data by a professional data cleaning agencies.

– Premium inclusive of service tax

Explanations for the Terms Used	
Term	**Explanation**
Reference Weather Station	The meteorological station where the observations for the purpose of claim settlement of the policy is made.
Index	Mathematical construct on the basis of which a policy is operationalized. It is the total rainfall received at the reference weather station in the policy period.
Policy Duration	Defines the time period for which the policy is active.
Cover Phase	These are the independent subperiods of the policy for which independent Strike, Exit, Notional, and Policy Limit are set. Each cover phase has a different index calculation.
Strike	The level of index below which the insured is compensated.
Notional	The amount of compensation that the insured receives when the index is below strike in rupees.
Phase Premium	Premium that the insured is required to pay for every unit of policy of respective phases, if he/she does not choose to take combined cover for all the phases.
Combined Premium	Premium that the insured is required to pay for one unit of coverage across all the four phases.
Policy Limit	The maximum compensation that the insured would be eligible for across each cover phase and jointly for a combined policy of all phases.
Data Source	The identity of the authority that will certify the weather data.
Source: Product term sheet provided by BASIX.	

Appendix 5. Varsha Bima–2005

The Agriculture Insurance Company of India Limited (AIC) introduced Varsha Bima–2005 in about 125 India Meteorological Department (IMD) station areas spread across 10 states. Under each IMD rain gauge station area, two or three blocks adjoining the station were chosen to implement major crops in that area. Varsha Bima–2005 shall compensate the insured against the likelihood of financial loss on account of anticipated loss in crop yield resulting from any adverse rainfall incidence. The product is available for nonborrowing farmers and provides for at least two options: one covering the limited sowing period and the other covering the complete season. The farmers can choose any one coverage option—either "sowing failure" or the full season option ("seasonal rainfall" or "rainfall index"). Below are the brief details of Varsha Bima–2005 Coverage Options.

Option I: Seasonal Rainfall Insurance

Coverage is against adverse deviations of 20 percent and beyond in "Actual Rainfall" (in mm) from "Normal Rainfall" (in mm) for the entire season. "Actual Rainfall" is the monthly cumulative rainfall from June to November (or from June to September or October for short- and medium-duration crops). The payout structure is designed on the basis of yield output elasticity. The claim payout shall be on a graded scale (in slabs), corresponding to different degrees of adverse deviation in Actual Rainfall. The full sum insured is given paid out once the adverse deviation (shortfall) in actual rainfall reaches 80 percent.

Option II: Rainfall Distribution Index

Coverage is against deviations of 20 percent and beyond in "Actual Rainfall Index" from "Normal Rainfall Index" for the entire season. The index is constructed to maximize the correlation, by assigning "Key Factor Weights" for weekly rainfall within the "season-span." Key Factor Weights are determined on the basis of (1) Yield Response Factors (per the research conducted by the Food and Agriculture Organization (FAO), and (2) the Crop Weather Calendar issued by the IMD. The claim payout shall be on a graded scale (in slabs), corresponding to different degrees of adverse deviation in Actual Rainfall Index. The full sum insured is paid out once the adverse deviation (shortfall) in actual rainfall index reaches 90 percent.

For any given area and crop, only either option I or option II was made available, depending on suitability and affordability of premium rates.

Option III: Sowing Failure

Coverage is against adverse deviations of 40 percent and beyond in "Actual Rainfall" (in mm) from "Normal Rainfall" (in mm) between June 15 and

August 15. The sum insured per hectare is the maximum input cost incurred by the cultivator until the end of the sowing period and is prespecified. The claim payout shall be on a graded scale, corresponding to different degrees of rainfall deviation. The maximum payout of 100 percent of the sum insured is available at deviations of 80 percent and above.

The sum insured is prespecified and normally is between the cost of production and the value of production. In the case of the "Sowing Failure" option, it is the maximum input cost incurred by the cultivator until the end of the sowing period, which again is prespecified, and may be up to 50 percent of the full season's sum insured.

Varsha Bima–2005, despite limited time available for marketing, could be sold to more than 125,000 cultivators growing crops over 98,000 hectares, covering a risk of approximately Rs 560 million, earning a premium of Rs 32 million. The details of option-wise coverage are as follows:

Table A5-1 Sale Performance of Varsha Bima–2005

Option	Sowing Failure	Seasonal Rainfall Insurance/ Distribution Index
Cultivators insured	17,476	107,977
Acreage insured (hectares)	19,945	77,693
Risk value insured (Rs million)	37.53	520.86
Premium (Rs million)	3.41	28.32

Source: Documents provided by AIC.

"Sowing failure" option claims have been processed within a month from the close of the indemnity period. According to the actual rainfall data made available by IMD, two station areas in the state of Uttar Pradesh suffered deficit in rainfall beyond 40 percent, and hence compensation of approximately Rs 1.20 million has been paid to nearly 300 insured cultivators. The full season option claims would be processed in the coming four to eight weeks, depending on the duration of the indemnity period.

Appendix 6. Experience with Public Crop Insurance

Peter Hazell (Skees, Hazell, and Miranda 1999) quantifies the condition for sustainable insurance as follows:

$$(A + I)/P < 1$$

Where

A = Average Administrative Costs

I = Average Indemnities Paid

P = Average Premiums Paid

The basic formula above suggests that, for an insurance program to be financially sustainable, premiums collected by the insurer must exceed indemnities paid plus administrative cost. In other words, the insurance program must be profitable. However, in most cases the loss ratio exceeds one. Table A6-1 shows the financial performance of public crop insurance in six countries in which all the programs incurred financial losses.

The above examples demonstrate some of the least-viable (or failed) public sector crop insurance programs. These traditional programs had high administration costs, which was a major contributory factor to these programs' lack of viability. However, some crop insurance programs have achieved more manageable administrative cost structures. At its simplest, private sector hail insurance is typically practiced with loss adjustment costs of 5 percent of the premium, internal administration costs of 7.5 percent to 10 percent of the premium, and acquisition costs (costs of commission to those selling the policies) of 10 to 15 percent. Similarly, specialist crop insurance programs, such as Windward Islands Crop Insurance and Mauritius Sugar Insurance Fund Board, have achieved economies of scale by offering automatic insurance of the whole of the banana and sugar industries on those islands, respectively, in spite of the large numbers of smallholder farmers. In all of these relatively more successful cases, relatively low administration costs contribute to the program's manageability.

Table A6-1 Financial Performance of Crop Insurance Program in Six Countries

Country	Program Period	(A+I)/P
Brazil	75–81	4.57
Costa Rica	70–89	2.80
Japan	85–89	2.60
Mexico	80–89	3.65
Philippines	81–89	5.74
United States	80–89	2.42

Source: Skees, Hazell, and Miranda 1999.

Notes

[1] Refer to the BASIX Web site (www.basixindia.com) for more information.

[2] The seven states are Andhra Pradesh, Karnataka, Tamil Nadu, Maharashtra, Madhya Pradesh, Orissa, and Jharkhand.

[3] A detailed study on BASIX's innovations in risk management and cost reduction is written as a separate case study paper.

[4] Mexico was the first developing country to pilot weather-indexed insurance at the macro level. In 2002, the Mexican government formed a partnership with Agroasemex, a private insurance company, to design and implement a weather-indexed insurance scheme that would provide coverage for the National Fund for Natural Disasters (FONDEN) and Specialized Natural Disaster Fund for Agriculture (FAPRACC) weather-contingent liabilities. The program did not evolve to provide micro level coverage to farmers until after 2003. However, the micro level weather insurance coverage under FONDEN is different from that of the BASIX-ICICI Lombard scheme, because the insurance contract does not directly cover the farmers but instead covers the government, which later distributes payouts to individual farmers. As for the BASIX scheme, farmers bought the retail contracts and are directly insured.

[5] During 1998, which coincided with the gradual opening up of the insurance sector, BASIX developed the concept of an insurance-like product that had the following features: (1) three-layered coverage at the village, district, and state levels; (2) three-layered division of premiums: 50 percent kept by the village fund, 25 percent by the insurance company, and 25 percent by BASIX, which functions as a reinsurer; (3) three-layered claim process in which the first claims are against the village fund, while exceeding claims are paid by the district then BASIX, respectively. BASIX tested the concept in three villages with the target of insuring 10,000 farmers over the coming years. However, the product didn't offer a good risk management tool because of its unsuitability to the crop cycle the costly premium of 20 percent.

[6] Sattaiah, D., personal communication, May 24, 2005. BASIX Headquarters, Hyderabad.

[7] A BASIX subsidiary that is a Reserve Bank of India licensed bank, providing microcredit and savings services in three districts.

[8] According to farmers, rainfall below and above the mentioned levels does not help crop growth.

[9] This section draws on the preliminary findings by Xavier Giné, DECRG, working in collaboration with Don Larson, DECRG, World Bank, Robert Townsend, professor at the University of Chicago; and James Vickery, economist at the Federal Reserve Bank of New York.

[10] The survey was financed by the Swiss Trade Commission, SECO.

[11] www.indiastat.com

[12] Sattaiah, D., Personal Communication, May 24, 2005. BASIX Headquarters, Hyderabad.

[13] Ibid.

[14] BASIX gives 25 percent of the 15 percent commission to CSAs who sold the policies as an incentive payment.

[15] In 2005, BASIX started a new partnership with the government-owned AIC, which underwrites weather insurance policies for BASIX's customers in Orissa.

[16] As of September 19, 2005, the latest estimate of income was close to Rs 275,000.

[17] P. Sai Gunaranjan., Personal Communication, May 24, 2005. BASIX Headquarters, Hyderabad

[18] Ibid.

[19] P. Sai Gunaranjan., Personal Communication, May 24, 2005. BASIX Headquarters, Hyderabad

[20] Sattaiah, D., Personal Communication, May 24, 2005. BASIX Headquarters, Hyderabad.

[21] P. Sai Gunaranjan., Personal Communication, May 24, 2005. BASIX Headquarters, Hyderabad.

[22] ICICI Lombard was involved in another project in the 2003 kharif season in Aligarh, Uttar Pradesh, where 1,500 soya farmers bought protection against excessive rainfall. ICICI Lombard filed all the necessary forms and terms of insurance with the IRDA, registering their products before the programs were launched.

[23] ICICI Lombard underwrote contracts for BASIX to sell in 35 branches in 5 states. However, the contract that was sold in one location and one state (Orissa) was underwritten by another company –AIC. Therefore, the two companies together underwrote for BASIX in 36 locations in 6 states in 2005.

[24] Divyakirti, Virat, Interview with author, May 30, 2005, ICICI Lombard, Mumbai.

[25] Ibid.

[26] Ibid.

[27] Ibid.

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