CHAPTER 4

Adaptive policy case study: weather-indexed insurance for agriculture in India

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CHAPTER 4

Adaptive policy case study: weather-indexed insurance for agriculture in India

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4.1 Introduction

This case study looks at the specific policy instrument of crop insurance, which addresses Government of India's policy objective of protecting farmers from climatic stress, including droughts, floods, cyclones, etc. Other policy instruments that help address the same objective are promotion of crop diversification, long-range weather forecasting, and early warning systems. In the last two years, index-based weather risk insurance contracts have emerged as an alternative to traditional crop insurance in India. Drawing on some pilot schemes being implemented using different delivery models, we study this instrument as an adaptive policy instrument.

This study draws on consultations with several insurance companies operating in India and IRDA (Infrastructure Regulatory and Development Authority of India), as well as a range of published literature, conference presentations, and news coverage.

4.2 Background

In India, the impact of climate variability has traditionally been tackled through government assistance or informal risk sharing at the community level.[2] Rural households respond to the lack of formal financial services by turning to moneylenders, selling assets, reducing input in farming, or diversifying their activities. Another strategy is to send family members to work elsewhere and remit payments. However, such traditional risk management strategies, while reducing vulnerability in the short term, can increase vulnerability over the longer term by promoting sub-optimal asset allocation. For instance, small farmers may opt for multiple cropping to reduce income variability rather than risk

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[2] Some reasons for the abysmally low insurance penetration in India are
- limited buying capacity,
- insurance is viewed as a means of saving, with risk coverage as a secondary objective,
- consumer perceptions, which tend to be myopic or erroneous,
- Large sections of the Indian economy operate outside the formal economy (e.g. small industries, slums, etc.),
- Non-life insurance penetration stagnated under the nationalized model of the Indian insurance industry. However the situation is improving under competition since 2002/03.

growing the most profitable crops. Traditional risk management strategies also break down in case of disasters affecting an entire community or area (Hess, Richter, and Stoppal 2002; Lilleor, Gine, Townsend *et al*. 2005). World Bank (2003a) indicated that the current approach of risk management through government assistance or informal risk sharing at the community level lacks institutional incentives. It underplays the role of risk financing through *ex ante* mechanisms (such as catastrophe re-insurance and contingent credit facilities) that could provide financial liquidity in the aftermath of a natural disaster, and kick-start economic recovery. Clearly, relief is not enough to restore those most affected to their original economic status. Therefore, risk transfer tools like insurance, in the light of India's disaster vulnerability, are very important**.**

However, certain conditions must be met before insurers are willing to offer coverage against an unforeseen event (Kovacs and Kunreuther 2001).

- It should be possible to identify and estimate the chances of the event occurring, and the extent of losses likely to be incurred when providing different levels of coverage.
- The insurer should be able to set premiums, which reflect the customer's risk. This has problems of asymmetric information and moral hazard, resulting in excessively high insurance premiums and in insufficient or no coverage being offered.

Climate change compounds these problems by increasing actuarial uncertainty. Past climate and disaster history will no longer be a good benchmark, and future changes could be non-linear and abrupt. The result could be higher premiums and reduced insurance availability (Mills 2004).

Some of the key challenges that the insurance industry faces in addressing the risk of climate change are summarized below (CRM 2005; Linerooth-Bayer, Mace, and Verheyen 2003).

- There is significant uncertainty about incorporating the projections of climate change into risk assessment models, and isolating its influence from that of other factors like increasing population, insufficient capital, and land use changes.
- A major constraint is the dependent nature of risks in a region, particularly for slow-developing catastrophes like drought and rise in sea level. This is exacerbated by the problem of asymmetric information leading to moral hazard and adverse selection associated with traditional insurance.
- When weather trends change, including climatic variability and occurrence of extreme events, payouts will be made more frequently and hence re-insurers will charge premiums that may be too high for end users in developing countries.
- With two billion people living on less than US $2 a day, making insurance coverage accessible to the poor in developing countries is a mighty challenge. New types of partnerships are needed when up-front premium payment is difficult.

4.3 Policy description: evolution of crop insurance in India

4.3.1 Traditional crop insurance schemes

A beginning in crop insurance was made in 1972 by implementing an experimental scheme for Hybrid-4 cotton in a few districts of Gujarat state. This scheme followed the individual approach and uniform guaranteed yield was offered to selected farmers. This scheme continued till 1979 and was phased out following the assessment that crop insurance schemes based on individual approach are not feasible and economically unviable to implement on a large scale in a large developing country like India.

CCIS (Comprehensive Crop Insurance Scheme) was introduced in 1985. It was based on an area approach, linked to short-term credit, and was implemented only in 19 States and three Union Territories. This scheme linked insurance with credit wherein the amount insured is equal to the crop loan disbursed, subject to a maximum of Rs 10 000 per farmer. The premium was fixed at two per cent of the sum insured for paddy, wheat, millets and one per cent for oilseeds and pulses. 50% of the premiums payable by the small and marginal farmers were subsidized.

Satpathy (2005) suggests that the CCIS failed in its basic objective of underwriting the farmer's losses. The scheme was criticized for

- being financially non-viable,
- predominantly covering rain-fed crops,
- excluding important commercial and horticultural crops,
- covering only loanee farmers, and
- having deficiencies in the system of crop-cutting experiments and assessment of yield.

Another major argument was that of the total all-India cumulative amount claimed, Gujarat alone received 48.8% for a single crop, groundnut. Table 4.1 shows the cross-subsidization across states and crops, which led to pressure from the states to rationalize the structure of premiums. As the premium of the scheme was not based on actuarial rates, low premium to claim ratio (19.3%) threatened the viability of the scheme. During the implementation of CCIS, from 1985/6 through to 1999, the total premiums collected were Rs 4028.3 million and the total claims paid, Rs 23 050 million with a sum insured of Rs 24 9218.7 million. Lastly, the scheme failed to make any significant impact as only a limited number of farmers were covered.

Due to these weaknesses, NAIS (National Agriculture Insurance Scheme) was introduced in the country from the *rabi* season of 1999–2000. This scheme is available to all states/union territories. It covers food crops, horticultural crops, oilseed crops, and commercial crops. All farmers, loanee and non-loanee, are eligible for insurance. All yield losses occurring due to natural, non-preventable risks are covered. Premium rates vary from 1.5% to 3.5% for food-grain crops and oilseed crops on actuarial basis for annual commercial/ horticultural crops. Small and marginal farmers will be entitled for a premium subsidy of 50%, which is to be phased out over five years. Initially implemented by GIC (General Insurance Corporation), a separate agency specializing in agriculture insurance (the Agriculture Insurance Corporation) was set up to take over all the crop insurance functions of GIC.

Table 4.1 Origin and destination of premiums and claims: 1985/86–1999

(a) By crop

	Premium		*Claims*		
Crop	Rs million	%	Rs million	%	*Loss ratio*
Paddy	2 175.20	54	5 762.60	25	2.65
Wheat	523.60	13	461.00	2	0.88
Groundnut	604.20	15	12 216.80	53	20.22
Jowar	362.50	9	1 844.00	8	5.08
Bajra	241.60	6	1 844.00	8	7.63
Pulses	4.02	1	23.05	1	5.73
Others	8.04	2	69.15	3	8.60

(b) By state

	Premium		*Claims*		
Crop	Rs million	%	Rs million	%	*Loss ratio*
Gujarat	644.5	16	13 369.3	58	20.74
Maharashtra	604.2	15	2 535.5	11	4.19
Andhra Pradesh	1 007.0	25	3 227.0	14	3.20
Others*	1 772.4	44	3 918.6	17	2.21

*Includes 22 states and union territories, excludes Punjab, Haryana, and north-east states
Source Mishra (1996) cited in Parchure (2003)

Table 4.2 Performance of NAIS

Season	*Farmers covered*	*Area* (in million hectare)	*Sum Insured* (Rs million)	*Premium* (Rs million)	*Total claims* (Rs in million)
Rabi 1999/20	579 940	0.72	3 564	54	77
Kharif 2000	8 409 374	13.22	69 034	2067	1 2225
Rabi 2000/01	2 091 733	3.11	16 027	278	595
Kharif 2001	8 695 735	12.89	75 025	2616	4933
Rabi 2001/02	1 955 431	3.15	14 975	301	647
Kharif 2002	9 768 711	15.53	94 317	3255	1 8218
Rabi 2002/03	2 326 660	4.04	18 375	385	1885
Kharif 2003	7 970 830	12.35	81 141	2833	6342
Rabi 2003/04	4 410 151	9.20	30 526	644	4901
Kharif 2004*	12 737 279	27.13	124 646	4392	99
Total	58 945 844	101.34	527 630	1 6825	4 9922

* Provisional

Source GoI (2005)

Thus, NAIS provides greater coverage than CCIS in terms of number of farmers (i.e. non-loanee farmers brought under coverage); crops (annual commercial/ horticultural crops included), and risk (i.e. up to the value of threshold yield). The premiums structure in the scheme has been rationalized to achieve some financial viability. The implementing States will now have greater stake in the financial liabilities. In other words, sharing of financial liabilities between the Central and State Government is 1 : 1 instead of 2 : 1. Farmers, under the new scheme, have the option of coverage of higher risk (in terms of sum insured) by paying a higher premium rate.

The main flaws of NAIS include its mandatory nature, its failure to address adverse selection by non-loanee farmers, arbitrary premiums, and the inefficiency of the area approach (Ifft 2001). Although NAIS premiums are higher than CCIS, they are still not enough to cover claims (Box 4.1). In the first year of operations, 2000, NAIS collected Rs 2110 million in premiums and paid Rs 11 000 million in claims. The figures for 2001/02 indicate total premium collections of Rs 2843.5 million and claims of Rs 5552.7 million. AIC (Agriculture Insurance Corporation) collected premiums of Rs 2.5 billion covering an area of 1.3 million hectares—a negligible fraction of cultivated land in India. Total claims were Rs 4.7 billion, resulting in a claims ratio of almost 200% in a normal year. In recent years, the coverage of NAIS in terms of farmers, crops, and risk commitments has been enlarged and premium structure rationalized. But actuarial rates for food and oilseeds crops are yet to be made applicable. In order to operate the scheme on commercial lines, it is necessary that actuarial rates should be charged.

CCIS and NAIS protect a farmer's income partially as they cover only production risks and have no mandate to cover market (price) risks. Therefore, FIIS (Farm Income Insurance Scheme) was launched on a pilot basis in 18 districts of 12 states during the *rabi* 2003/04 season to protect a farmer from both types of risks. The farmer's income would be protected by ensuring minimum guaranteed income. During the season, 180 000 farmers were covered over an area of 1 90 000 hectares. The sum insured was Rs 2390 million, with premium of Rs 141 million generated, and claims of Rs 15 million paid. The scheme was also implemented in selected districts of four States, on pilot project basis, during *kharif*[3] 2004 season. During *kharif* 2004, a total of 222 000 farmers were covered over an area

[3] There are two main cropping seasons in India: the kharif season is during the south-west monsoon (July-October), during which agricultural activities are undertaken in both rain-fed and irrigated areas, and the rabi season is during the winter months, during which agricultural activities are undertaken only in irrigated areas.

Box 4.1 Financial performance of traditional crop insurance in India

'Whether it was CCIS or NAIS, the performance of the crop insurance scheme in India can only be judged as disappointing on all counts; financial, economic and administrative. Financially, the scheme has been incurring continuous losses... On the economic front too the performance has been pitiable both in terms of the size of the impact of the scheme and equitability of premium collections and claim payments... On the equitability side too one can witness arbitrary cross subsidization... Some crops and regions pay the premiums, others make the claims... Finally the administrative front. A more complex administrative mechanism for a scheme of so small a financial dimensionality might not have existed in economic history, even in the former Soviet Union.

From 1985/86 through 1999 the total premiums collected were Rs 4020 million (US $80 million) and the total claims paid Rs 23 050 million (US$ 461 million) with a sum insured of Rs 249.2 billion (US$ 5 billion). The loss ratio excluding huge management expenses stands at 5.72. From an economic point of view average per annum claims paid were Rs 2330 million, which if compared to the sum-at-risk, that is the agricultural output of the country worth Rs 6500 billion, is hardly 0.035% and when compared to the total farm loans of Rs 580 billion is only 0.40%.'

Source Parchure (2003)

of 202 000 ha. Premium amounting to Rs 156.8 million was generated against a sum insured of Rs 1775.6 million. Currently, the scheme covers only two crops – wheat and paddy – from which NAIS has been withdrawn. Gradually, the scheme would be expanded to cover all crops by eventually replacing NAIS.

The Task Force on Agriculture, 2001, concluded that all crop insurance schemes in India have failed with payouts being 4–5 times the premium collected. In the last two years, however, the government, through IRDA, has allowed insurance companies to sell index-based weather risk insurance contracts as an alternative to traditional crop insurance[4]. The enabling environment for this was provided by the liberalization of the Indian insurance sector. The evolution of the crop sector in India is depicted in Figure 4.1.

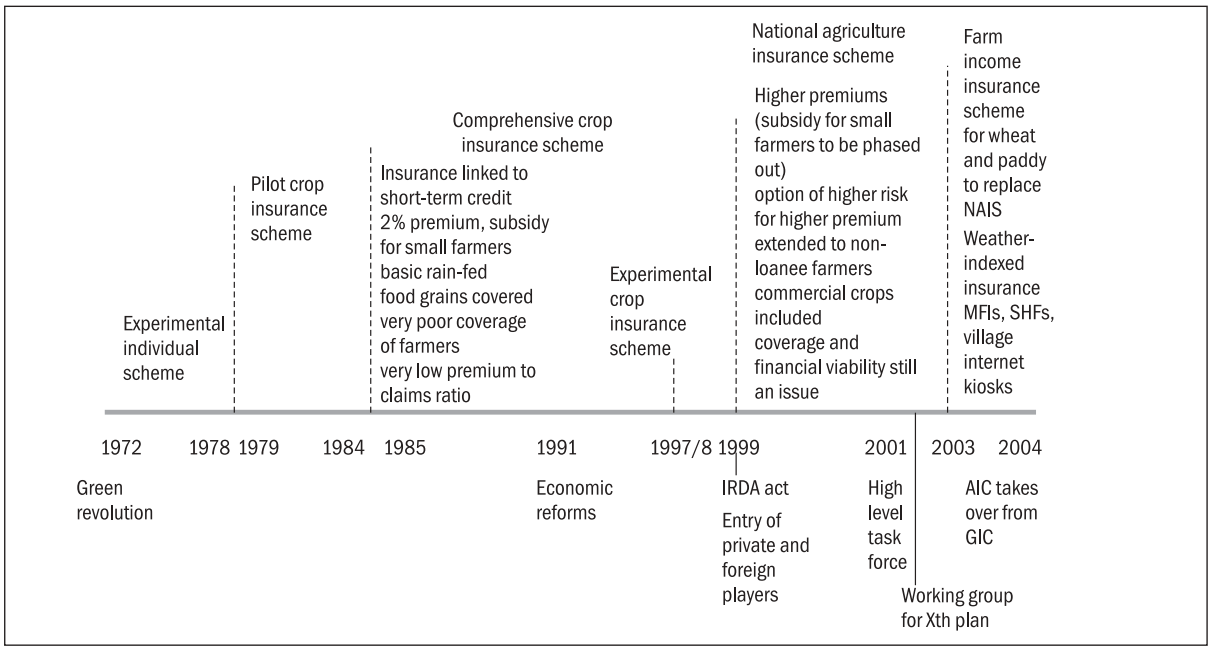

Figure 4.1 Evolution of crop insurance in India

[4] This has happened with the ongoing trend of liberalization of the insurance sector and the entry of foreign companies.

4.3.2 Liberalization of insurance sector

Before deregulation, the Indian insurance industry was characterized by undifferentiated products, fixed premiums set by the Tariff Advisory Committee, and low coverage rates in nearly all business lines. Public monopolies thrived in the absence of competition. IRDA Act 1999 lifted the ban on private players and opened the industry to foreign players in a limited manner. Key international players have entered into partnerships with Indian counterparts (such as ICICI-Lombard, HDFC-Chubb, IFFCO-Tokio, Bajaj-Allianz, and Birla-Sun Life), and are competing to increase their share of the Indian market at the expense of the government-run monopolies – GIC and Life Insurance Corporation. The entry of the private sector has metamorphosed the way the industry functions and this has been critical in improving the penetration levels of insurance[5]. Today, companies have innovated with their product offerings and how it reaches the end user. Taking cue from the limitations of traditional crop insurance, private insurance companies have modified their offerings considerably by way of weather-indexed contracts. Potentially not just agriculture, but a number of industries like airlines, beverages, refrigeration, and tourism could benefit from such contracts, and this represents a huge market.

Another reason for the focus on agriculture is that as per IRDA regulations, all insurers are required to provide some coverage for the rural sector. In addition, each company is obligated to service the social sector, which includes the unorganized sector, the informal sector, and the economically vulnerable or backward classes in rural and urban areas.

4.3.3 Weather-indexed contracts

In index-based weather insurance, an index based on past weather patterns is created. Internationally, index-based weather risk insurance contracts in agriculture have emerged as an alternative to traditional crop insurance. These are linked to the underlying weather risk defined as an index based on historical data (for example, for rainfall, temperature, snow, etc.) rather than the extent of loss (for example, crop yield loss). As the index is objectively measured and is the same for all farmers, the problem of adverse selection is minimized, the need to draw up and monitor individual contracts is avoided, and the administration costs are reduced. Weather-indexed insurance can help farmers protect their overall income rather than the yield of a specific crop, improve their risk profile enhancing access to bank credit, and hence reduce overall vulnerability to climate variability and change. However the disadvantage is that because of the way the index is defined, there can be a mismatch between payoffs and actual farmer losses (CRM 2005, Hess 2003).

Various types of delivery models can be tried out: directly providing insurance to farmers, linking with finance (banks, cooperatives, MFIs [microfinance institutions]), and linking with others in the marketing chain (for example, input suppliers). Unlike traditional crop insurance where claim settlement can take up to a year, quick payouts in private weather insurance contracts can improve recovery times and thus enhance coping capacity.

Various pilot schemes and delivery models being explored in India are discussed next.

4.3.3.1 ICICI Lombard pilot scheme for groundnut in Andhra Pradesh

ICICI Lombard General Insurance Company, with support from the World Bank and International Finance Corporation, conceptualized and launched a pilot rainfall insurance scheme in Mahabubnagar, Andhra Pradesh in July 2003. The district had previously experienced three consecutive droughts. The scheme was implemented through the KBS (Krishi Bima Samruddhi) local area bank of BASIX, one of India's largest MFIs. KBS Bank bought a bulk insurance policy from ICICI Lombard and sold around 250 individual policies to groundnut and castor farmers. The index capped rainfall per sub-period at 200 mm, and weighted critical periods for plant growth more heavily than others. The premium rates are defined in Table 4.3. KSB decided that only borrowing farmers can buy

[5] Both insurance penetration (premium as percentage of GDP) and insurance density (premium per capita) in the country has shown an increasing trend. Even though it is low by international standards, it is growing at rates faster than GDP.

weather insurance policies. Eventually KSB planned to lower the interest rate for these farmers due to the reduced default risk (Hess 2002).

ICICI Lombard also launched a pilot scheme for insurance against excess rainfall for rice farmers in Aligarh, Uttar Pradesh.

4.3.3.2 KBS pilot scheme for soya farmers in Ujjain

BASIX/KBS also designed policies for soya farmers in Ujjain, Madhya Pradesh, which linked insurance to bank loans. In normal conditions, soya farmers taking crop loans of Rs 2000, with embedded weather insurance, would be charged an interest rate of 20.5% instead of 17.5%. However, when cumulative weighted rainfall during the critical growing periods falls below 80% of the mean, farmers receive interest payment relief of Rs 10 per mm of rainfall index deficit. Thus farmers pay a higher interest rate in normal years as the weather insurance premium, but receive much-needed relief in drought years (Hess 2003).

4.3.3.3 Rajasthan government insurance for orange crop

ICICI Lombard General Insurance Company entered into a collaboration with the government of Rajasthan in June 2004 to provide rainfall-indexed insurance for orange growers in Jhalawar district and adjoining areas. The scheme covered two types of perils with premiums as defined in Table 4.4.

The policy was made available through branches of the Land Development Bank and Jhalawar Cooperative Bank, rural branches of Commercial Banks in Jhalawar, Jan Mitra kiosks, and direct sales agents of ICICI Lombard. Claim settlement was to be done within 30 days of the expiry of the cover period. The government of Rajasthan has also asked interested insurance companies to send proposals for similar schemes for oranges, cumin, coriander, and other crops (GoR 2005).

4.3.3.4 IFFCO-TOKIO monsoon insurance

In July 2004, IFFCO-TOKIO General Insurance Company Ltd (the Indian insurance arm of the Millea Group) announced its plans to launch an insurance scheme for deficit rainfall during the monsoon months. Named Barish Bima Yojana, the scheme was targeted at four states – Gujarat, Maharashtra, Andhra Pradesh, and Karnataka.

Table 4.3 Premium rates (in Rs) for groundnut farmers in Mahabubnagar pilot scheme

Landholding size	*Premium rate*	*Maximum claim*
Small (less than 2 acres)	400	14 000
Medium (2 to 5 acres)	600	20 000
Large (more than 5 acres)	900	30 000

Table 4.4 Premium (in Rs) for units of Rs 5000 insured for two types of perils

Type of peril	*Premium*	*Premium at 50% discount to small and marginal farmers*
1 Lack of effective shower to initiate flowering	830	415
2 Dry spell during flowering	630	315

4.3.3.5 AIC Varsha Bima Yojana (rainfall insurance scheme)

This provides for compensation for deficit rainfall. It was launched across 10 states in about 140 rain gauge stations of the India Meteorological Department. Premium rates have been optimized between four per cent and 6 per cent by adjusting the benefits. The sum insured ranges between the cost of production and the value of production. Farmers can buy insurance till the onset of the monsoon for (i) sowing failure and (ii) seasonal rainfall insurance/rainfall distribution index.

4.3.3.6 AIC Sookha Suraksha Kavach (drought protection shield)

This is an exclusive insurance product for the state of Rajasthan and provides compensation for deficit rainfall. It was launched in 23 districts and covers all major crops like sorghum, pearl millet, maize, groundnut, soyabean, and cluster bean. Premium rates have been optimized between five per cent and eight per cent by adjusting the benefits. The sum insured again ranges between the cost of production and the value of production, and farmers can buy insurance till the onset of the monsoon.

4.3.3.7 AIC coffee rainfall index and area yield insurance

This scheme was piloted in three major coffee growing districts of Karnataka state, and blends rainfall index and yield parameters. Nearly two-thirds of the payout is decided on the basis of rainfall during the critical stages of coffee crop growth and the residual risk on the basis of coffee yield at harvest time. Premium rates are flexible, with coffee growers allowed to choose benefits on the basis of their premium affordability. AIC announced that it was likely to introduce short period covers insuring coffee against deficit rainfall during 'blossom showers' and 'backing showers' the following year.

4.3.3.8 ICICI Lombard loan portfolio insurance

The World Bank's Commodity Risk Management group tied up with ICICI Lombard to develop weather-based loan portfolio insurance in India. In July 2004, the first weather insurance policy was offered to BSFL (Bharatiya Samraddhi Finance Ltd), the non-banking finance arm of the BASIX group. ICICI Lombard would compensate BSFL for deviations in rainfall below the threshold level, which is fixed as a percentage of the average rainfall in the area. This is the first instance of an agricultural finance institution transferring the systematic risk of its crop-lending portfolio to the international weather risk market.

4.3.3.9 Results update

Through personal communication with ICICI Lombard, it was learnt that the company made profits in two ventures – insurance of rice crop against excess rainfall in Aligarh and insurance of oranges in Rajasthan. However it did not make a profit in insurance of groundnut crop against deficit rain in Mahabubnagar, which was implemented by BASIX. The basic problem was that of high administration costs of selling the insurance to individual farmers. ICICI Lombard found it uneconomical to seek out each farmer, but would instead prefer to sell insurance cover to state governments.

The pilot experience, however, was valuable to better understand risk patterns and the potential for commercial expansion. It was also an opportunity to create awareness among farmers, build trust through timely payouts, and improve the product design in response to customer feedback (Box 4.2). In 2005, the pilot schemes were scaled up by BASIX to reach 6703 farmers in six states, with insured amount of Rs 20 406 000. The premium was not subsidized. As reported in Manuamorn (2005), ICICI Lombard sees a strong profitability potential and expects that 'the weather insurance business, if underwritten properly, is at least as attractive a business proposition as other lines of general insurance'.

The BASIX website provided the following data about the performance of its claims service (Table 4.5).

AIC could draw on its established network to sell insurance to more than 125 000 farmers growing crops over 98 000 hectares, covering a risk of approximately Rs 560 million, earning a premium of Rs 32 million (Table 4.6). Claims were processed in a month from the close of indemnity period. Compensation of Rs 1.2 million was paid to nearly 300 farmers in two stations in Uttar Pradesh.

Table 4.5 Rainfall insurance business and claims service performance

	April 2004 – December 2004	*April 2003 – March 2004*
Customers	427	300
Area insured (acres)	670	450
Premium (Rs)	150 000	100 000
Average sum insured (Rs)	6000	
Claims reported	305	
Claims settled	305	
Settled amount (Rs)	450 000	

Source BASIX (2005), Manuamorn (2005)

Table 4.6 Sale performance of Varsha Bima – 2005

Option	*Sowing failure*	*Seasonal rainfall insurance/ distribution index*
Cultivators insured	17 476.00	107 977.00
Area insured (hectares)	19 945.00	77 693.00
Risk value insured (Rs million)	37.53	520.86
Premium (Rs million)	3.41	28.32

Source Manuamorn (2005)

Box 4.2 **Farmer response to weather indexed insurance**

Informal interviews with farmers who bought the policies revealed that they are very aware of the rainfall-based index nature of the contracts and the associated risks. They also understand the two-step payout structure, that the liability limit is a theoretical number, and that historical maximum payouts are around Rs 3025 and would have occurred in 2002 and 1997. Thus the premium rate at that level is around 15%. Nevertheless, the farmers seem to value the quick payout of the rainfall policy, which distinguishes it from the existing crop insurance policy in India, where claims take at least one year to settle. Farmers also said they understand and appreciate the structure of the insurance policy as it directly reflects their experience that the distribution of rain throughout the season matters a lot for the yield.

Source World Bank (2003b)

In securing access to the large rural population in the country, MFIs consequently have an important role to play by identifying end users, understanding their requirements, and employing appropriate methods to extend the products being designed by insurance companies (Sattiah and Gunaranjan 2005).

4.4 Adaptive policy analysis

In this section we analyse the weather-indexed insurance policy in terms of its ability to adapt to anticipated and unanticipated conditions.

4.4.1 Ability to adapt to a range of anticipated conditions

Insurance can be a powerful tool for reducing vulnerability to climate change by transferring or sharing risk, particularly with recent initiatives like weather derivatives and micro-insurance. By design, crop insurance can help farmers deal with a range of weather conditions. By the same measure, weather-indexed insurance is more effective than traditional crop insurance, as it protects the farmer's overall income rather than the yield of a specific crop. Moreover, traditional crop insurance fails to provide the right incentives to farmers, as crops yields are insured irrespective of efforts, while both moral hazard and claims manipulation are eliminated in objectively-measured weather-indexed contracts.

More important, however, is the difference in the implementation of the two approaches. The way contracts are drawn up and losses are assessed in traditional crop insurance leads to high administrative costs and consequently long delays (of up to a year) in making claim settlements. This tends to benefit large and commercial farmers who can afford to wait, and defeats the purpose of insuring small and marginal farmers who remain indebted. Subsidized premiums, coupled with massive relief transfers demanded by the states from the centre, failed to provide the right signals for risk mitigation to insured farmers. Despite experimenting with different schemes over three decades, public crop insurance policy in India has failed in terms of coverage of farmers and financial sustainability, and is hence not adaptive.

On the other hand, new weather-indexed insurance schemes are able to function effectively under a range of anticipated conditions due to the following two mechanisms.

- Quick payouts in private weather insurance contracts
- Triggering of payouts by independently monitored weather indices and not farm loss sampling

Together, the above two mechanisms can improve recovery times and thus enhance coping capacity. Figure 4.2 shows the results of a pilot scheme implemented in Morocco, where rainfall-indexed insurance protected the revenues of wheat farmers in rainfall deficit years. The difference for the year 1995 stands out, but revenues with insurance do not fall below 3000 in any year, assuring farmers of a basic consumption level. Although the experience informing their implementation is limited, the pilot schemes launched by ICICI Lombard and BASIX were scaled up in 2005 to reach 6703 farmers in six states, with a sum insured of Rs 20 406 000. Premiums were not subsidized, and farmers were reported to be satisfied with the transparent nature of index instruments and timely payouts. ICICI Lombard sees a strong profitability potential in such initiatives and expects that 'the weather insurance business, if underwritten properly, is at least as attractive a business proposition as other lines of general insurance' (Manuamorn 2005).

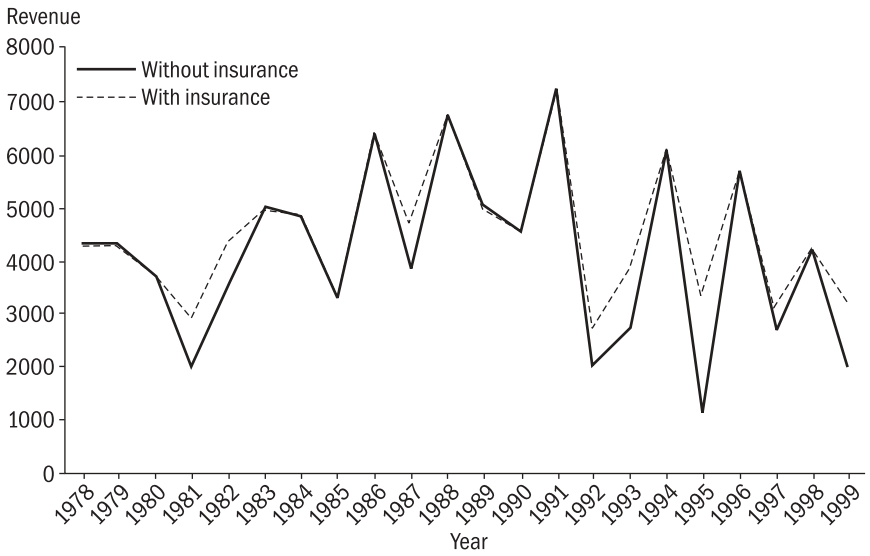

Figure 4.2 Wheat revenues with and without rainfall insurance (index threshold 275 mm)
Source Hess (2003)

4.4.2 Ability to adapt to unanticipated conditions

4.4.2.1 Built-in mechanisms for learning and improvement

One of the features of an adaptive policy is that it is open to review and modification by built-in formal mechanisms. As the previous sections have shown, the crop insurance policy of the Indian government has been constantly evolving and each successive scheme has tried to improve upon the previous one. In 2000, a High Level Task Force on agriculture was set up, whose terms of reference included making recommendations for effective risk management in agriculture including in production systems, insurance, price mechanisms, and future trading. Again the Working Group for the formulation of the Tenth Five Year Plan (2002–2007) on Agricultural Credit, Cooperation, and Crop Insurance was meant to review the present status of the NAIS and suggest measures for making the scheme more cost effective and beneficial to the farming community. However, given the backdrop of policy failure against which these reviews were carried out, this cannot be seen as a measure of adaptability. The broader policy environment fostered learning and change as a result of the liberalization of the insurance industry, which allowed private players to enter and compete with innovative products for untapped markets.

4.4.2.2 Learning from pilot schemes

Weather-indexed insurance was implemented on a pilot basis for various crops and locations by trying out different types of delivery models. The use of pilots has been suggested as a feature of an adaptive, learning-oriented policy system. ICICI Lombard and BASIX have reported that this pilot experience was valuable to better understand risk patterns and the potential for commercial expansion. It was also an opportunity to create awareness among farmers, build trust through timely payouts, and improve the product design in response to customer feedback. Moreover, the early pilot schemes offered by the private sector were followed by the entry of the public sector AIC into this market. In fact, in 2005, AIC with its established country-wide network, was able to offer weather insurance in 125 locations in 10 states. It sold insurance to more than 125 000 farmers growing crops over 98 000 hectares, covering a risk of approximately Rs 560 million, earning a premium of Rs 32 million. Claims were processed in a month from the close of indemnity period. Compensation of Rs 1.2 million was reportedly paid to nearly 300 farmers in two stations in Uttar Pradesh.

4.4.2.3 Learning from engagement of local institutions

Another element of adaptability in the implementation of weather-indexed insurance stems from the engagement of local MFIs that have already established a presence and working relationships with agricultural communities. The experiences of MFIs in delivering insurance to the rural poor have revealed the critical importance of product design, communication, and marketing approach. Self-help groups and e-choupals (village internet kiosks) have been innovatively used to create awareness about and trust in insurance, along with providing information about prices, cropping practices and products, and providing loans or agricultural input.

4.4.2.4 Degree of self-adjustment to unanticipated circumstances

However, if we consider adaptability as the ability to respond to unanticipated circumstances, then there is a question mark on weather-indexed insurance. The use of climatic history as a benchmark will automatically clash with increasing climatic variability and occurrence of extreme events. Payouts will be triggered more frequently and hence re-insurers will charge premiums that may be too high for end users in developing countries. However, the objective indexing of insurance rates to climate trends by using rolling averages is a simple and transparent mechanism that can capture changing risks and allow a farmer to recognize signals (in the form of actuarially determined premiums) and adapt accordingly.[6]

[6] Anticipatory adaptation rather than recovery.

Table 4.6 summarizes the above discussion by identifying features of adaptive policies in traditional and weather-indexed crop insurance.

Table 4.6 Elements of adaptive policies in traditional crop insurance and weather-indexed insurance

	Ability to adapt to anticipated conditions		*Ability to adapt to unanticipated conditions*	
	Design	*Implementation*	*Design*	*Implementation*
Traditional crop insurance	Low ▪ Can help farmers deal with a range of weather conditions but fails to provide the right incentives as yields are insured irrespective of efforts	Low ▪ High administrative costs and long delays in claim settlements ▪ Failed in terms of coverage of farmers and financial sustainability	Low ▪ Poor understanding of interaction with natural, built, or social environments	Low ▪ No formal or informal mechanisms for learning and adjustment
Weather-indexed crop insurance	High ▪ Protects the farmer's overall income rather than the yield of a specific crop ▪ Moral hazard and claims manipulation eliminated by use of objectively calculated index	High ▪ Quick payouts triggered by independently monitored weather indices can improve recovery times and enhance coping capacity	High ▪ Use of rolling means to calculate precipitation thresholds allows for automatic response to unpredictable climate change while maintaining simplicity and transparency	High ▪ Implemented on a pilot basis by trying out different types of delivery models - formal process of monitoring, learning and improvement ▪ Feedback from engagement of local institutions like MFIs

References

BASIX. 2005
Insurance
Details available at < http://www.basixindia.com/insurance1.asp>, last accessed on 9 May 2006

CRM. 2005
Lessons learnt: changing weather patterns
Details available at website of the international task force on commodity risk management in developing countries <http://www.itf-commrisk.org>, last accessed on 20 April 2006

GoI (Government of India) 2005
Ecosurvey 2004/05
New Delhi: Ministry of Finance, GoI

GoR (Government of Rajasthan). 2005
Weather insurance scheme for oranges
Details available at <http://www.rajamb.com/WEATHER_ORANGE.htm>, last accessed on 17 September 2005

Hess U. 2003
Innovative Financial Services for Rural India: monsoon-indexed lending and insurance for smallholders
[Agriculture & Rural Development Working Paper 9, 32 pp.]
Washington, DC: World Bank

Hess U, Richter K, and Stoppa A. 2002
Weather risk management for agriculture and agri-business in developing countries
In *Climate Risk and the Weather Market: financial risk management with weather hedges,*
edited by R S Dischel
London: Risk Books

Ifft J. 2001
Government vs Weather: the true story of crop insurance in India
New Delhi: Centre for Civil Society

Kovacs P and Kunreuther H. 2001
Managing catastrophic risk: lessons from Canada
[Paper presented at the ICLR/IBC Earthquake Conference on 23 March 2001 at Simon Fraser University, Vancouver, Canada. 28 pp.]
Details available at <http://www.iclr.org/pdf/managing%20catastrophic%20risk%20-%20march%202001.pdf >, last accessed on 17 September 2005

Lilleor H B, Gine X, Townsend R M, and Vickery J. 2005
Weather insurance in semi-arid India
[Paper presented in Securing Development in an Unstable World: Annual Bank Conference on Development Economics 2005, held on 23–24 May 2005, in Amsterdam, The Netherlands. 20 pp.]
Details available at <http://siteresources.worldbank.org/INTAMSTERDAM/Resources/GinePaper.pdf>, last accessed on 17 September 2005

Linnerooth-Bayer J, Mace M J, and Verheyen R. 2003
Insurance-related actions and risk assessment in the context of the UNFCCC
[Background paper for UNFCCC workshop on insurance and risk assessment in the context of climate change and extreme weather events, 12–13 May 2003, Bonn, Germany. 49 pp.]
Details available at <http://unfccc.int/files/meetings/workshops/other_meetings/application/pdf/background.pdf>, last accessed on 17 September 2005

Manuamorn O P. 2005
Scaling up micro-insurance: the case of weather insurance for smallholders in India
[Paper presented at BASIX Quarterly Review and Insurance Meet, 21 October 2005, Hyderabad.] Washington, DC: Agriculture and Rural Development, World Bank
Details available at <http://www.basixindia.com/BASIX%20Scale%20up%20Paper_Conference%20Edition%20Final.doc>, last accessed on 9 May 2006

Mills E. 2004
Insurance as an adaptation strategy for extreme weather events in developing countries and economies in transition: new opportunities for public-private partnerships
[LBNL Report No. 52220. Berkely: Lawrence Berkeley National Laboratory. 128 pp.]
Details available at <http://eetd.lbl.gov/emills/PUBS/Insurance_Emerging_Markets.html>, last accessed on 17 September 2005

Mishra P K. 1996
Agricultural Risk, Insurance, and Income
Arabury, Vermont: Ashgate Publishing Company
Cited in Parchure. 2003
Varsha bonds and options: capital market solutions for crop insurance problems

Parchure. 2003
Varsha Bonds and Options: capital market solutions for crop insurance problems
Pune: National Insurance Academy

Satpathy A. 2005
Managing risks of informal workers: role of micro and public insurance programmes
Details available at <http://www.digitalopportunity.org/article/view/113528/1/8062>, last accessed on 20 April 2006

World Bank. 2003a
Financing Rapid Onset Natural Disaster Losses in India: a risk management approach
[Report no. 26844-IN.]
Washington, DC: World Bank
Details available at <http://www-wds.worldbank.org/servlet/WDSContentServer/WDSP/IB/2003/11/10/000090341_20031110134554/Rendered/PDF/268440IN.pdf>, last accessed on 17 September 2005

World Bank. 2003b
Piloting weather insurance in India
Details available at < http://web.worldbank.org/WBSITE/EXTERNAL/NEWS0,,contentMDK:20125678~menuPK:34457~pagePK:64003015~piPK:64003012~theSitePK:4607,00.html> last accessed on 20 April 2006