IDSJ Working Paper 157

# Managing Risk for Indian Farmers
## *Is Weather Insurance Workable*

Surjit Singh
R. L. Jogi

May 2011

Institute of Development Studies, Jaipur (INDIA)

# IDSJ Working Paper 157

# Managing Risk for Indian Farmers
## *Is Weather Insurance Workable*

**Surjit Singh**
**R. L. Jogi**

**May 2011**

The purpose of the Working Paper is to provide an opportunity to IDSJ faculty, visiting faculty, and research staff to sound out their ideas and research work before publication and to get feedback and comments. They can be cited or quoted only with full acknowledgment and bearing in mind that they are being circulated in preliminary form to encourage discussion and comments before publication.

May 2011

**Institute of Development Studies**
8-B, Jhalana Institutional Area
Jaipur-302 004 (India)
Phone : 91-141-2705726 / 2706457 / 2705348
Fax : : 91-141-2705348
E-mail : idsj@dataone.in
visit us at : www.idsj.org

Printed at : Kumar & Company, Jaipur
Ph. : 2375909

# Managing Risk for Indian Farmers
## *Is Weather Insurance Workable*

**Surjit Singh**
**R. L. Jogi**

*Abstract*

*This paper looks at implementation of weather insurance in India with specific reference to Rajasthan where Agriculture Insurance Company of India (AIC) initially implemented it as a pilot project and later spread it over most districts. The paper finds that weather insurance schemes have not found foothold in Rajasthan in terms of coverage of farmers, where it most desired risk management strategy for the farmers. There are many reasons for this. The foremost reason is the limited knowledge with farmers about how the scheme functions. There is hardly any effort in terms of extension to build awareness. There are different signals given by various players in the field. Payout is a major issue that takes away farmers. Farmers also question the ITC role and thus outsourcing without proper planning appears not to be working. NGOs may be better placed to deliver. The RWS are still located at a distance from the farmer and the area they cover is very large. Farmers do bear basis risk due mainly to the distance between his plots and the reference weather station. Follow-up of crop failure is not prompt. Farmers expects visit from the field staff, which are rare. It has been found that only if there is a chance of major bungling, only then visits are made. Farmers are not made to understand the relation between their crop loans and crop insurance.*

### 1. Introduction

Risk is uncertainty that affects an individual's welfare. It is often associated with adversity and loss. There are numerous sources of risk in agriculture. They range from price and yield risk to the personal risks connected with injury or poor health. It could have repercussions that affect resources like irrigation, credit etc., and other types of events linked to person's welfare. In developing countries, agriculture is prone to risks and governments have played an active role in helping farmers mitigating risks. In some countries farmers are hedged against price risk through price support mechanisms, while in others, national funds have been created to take care of nature-afflicted risk. Farmers have their own ways to mitigate risk. There are certain risks that are exclusive to agriculture. For instance, the risk of bad weather considerably reduces yields within a given year (Singh and Jogi 2008). Then there are risks associated with price or institutions that reflect an added economic cost to the farmer. If the farmer's benefit-cost trade-off favours mitigation, then he will attempt to lower the possibility of adverse effects (Hardaker, Huirne and Anderson 1997; World Bank 2005). These risks are production or yield risk (90% of crop loss is due to drought/low rainfall/excess rainfall/floods in India); price or market risk; institutional risk; human or personal risks; and financial risk. The price and yield risks along with a farmer's attitude toward risk have a major impact on the choice of risk management strategies and tools. In analysing the risk-return trade-offs associated with different approaches, a farmer must con-sider the expected return to different choices and the variance in returns. Economists have used several approaches to capture these trade-offs. Trade-offs depends up on farmer's world-view and their flexibility in specifying risk attitudes. For an individual farmer, risk

management involves finding the ideal combination of activities with uncertain outcomes and varying levels of expected return. Thus, risk management involves choosing among alternatives for reducing the effects of risk on a farm (Hazell 1991). In this process, one is affecting the farm's welfare position. Some risk management strategies like diversification reduce risk within the farm's operation. Some like production contracting transfer risk outside the farm. There are still others like maintaining liquid assets help build the farm's capacity to bear risk. Risk management typically requires the evaluation of tradeoffs between changes in risk, expected returns, entrepreneurial freedom, and other variables (Harwood et al. 1999). To provide risk cover to farmers, weather index insurance is better placed. Advocates of index based insurance argue that it is transparent, inexpensive to administer, enables quick payouts, and minimizes moral hazard and adverse selection problems associated with other risk-coping mechanisms and insurance programmes (Gine, Townsend and Vickery 2007).

Indian agriculture has throughout been affected by vagaries of nature. The diversity of Indian agriculture compounds it. Each agro- climatic region has a different cropping pattern and requires distinct policy regime. Of late the diversification that is taking place in Indian agriculture and external factors like liberalisation and WTO regime are further putting it in a precarious situation. The country has been witnessing suicides by Indian farmers over the last couple of years. Around 70 percent Indian agriculture is at the mercy of vagaries of the monsoon and other factors beyond the control of the farmer (Singh 2009a), the importance of crop insurance is not in doubt and needs no emphasis. Climate change would further demand such risk management interventions (Singh 2009b). This paper looks at implementation of weather insurance in India with specific reference to Rajasthan where Agriculture Insurance Company of India (AIC) initially implemented it as a pilot project and later spread it over m ost districts.

## 2. Weather Insurance: The Experience

### 2.1 The Private Players

Researchers and development agencies have been exploring the potential for using weather index insurance to provide risk management opportunities for rural poor. Weather index insurance pays indemnities based not on actual losses experienced by the policyholder but rather on realizations of a weather index that is highly correlated with actual losses (Barnett and Mahul 2007). Weather insurance is relatively new to India and is still in experimental stages and it is too early to draw conclusions about its long-run sustainability. External agencies like World Bank have been pushing it through but experiences have not been encouraging as would be seen in the subsequent discussions. The first weather insurance pilot scheme in India was set in July 2003 (monsoon-based weather insurance) in Andhra Pradesh state. ICICI Lombard and Basix introduced it[1]. Basix launched this weather insurance programme through its local area bank KSB (Krishna Bhima Samruddhi Local Area Bank) in Maboobnagar. Local area banks are limited to operations in three adjacent districts and therefore face limited natural portfolio diversification, which helped to convince KSB that weather insurance contracts for its borrowers could mitigate the natural default risk inherent in lending in drought prone areas such as Maboobnagar, at the extreme Eastern end of Andhra Pradesh, bordering Karnataka. The district had experienced three consecutive droughts during 2000-2003.

KSB bought a bulk insurance policy from ICICI Lombard and sold around 300 individual farmer policies for three categories of groundnut and castor farmers, small, medium and large[2] (most were with land of less than 2.5 acres). Premium rates were Rs.456 for the small farmers with a liability of Rs.14250, medium farmers paid Rs.600 with a maximum liability of Rs.20000 and large farmers paid Rs.900 for a liability of Rs.20000. At the pilot stage KSB limited the liability per farmer rather than imposing per acre limits in order to manage overall liability. Farmers' uptake was immediate, with around 100 farmers signing up on very first day. KSB and ICICI Lombard opted for a weighted and capped rainfall index, which means that the maximum rainfall counted per sub-period is limited to 200m and more critical periods for the plant growth are more heavily weighted than others[3]. Informal interviews with 15 contracted farmers revealed that they were well aware of the rainfall based index nature of the contracts and the associated basis risk (Hess 2003)[4]. They also understand the two-step payout structure of the policy and the fact that the liability limit is a theoretical number and historical maximum payouts are around 3025 and would have occurred in 2002 and 1997. Thus, the premium rate at that level was around 15 percent. Nevertheless, the farmers appear to value the quick payout of the weather policy, which distinguishes it from the federal crop insurance policy in India. However, farmers preferred claim calculation based on absolute shortfall in millimetres rather than in percentiles (Sinha 2004). They also had problem with the rain gauge station which was located at a district headquarter. They also preferred a simple linear relationship between the rainfall and the claim amount. They were unable to appreciate the trigger points and different slab rates. Farmers like to have phase-wise payouts subject to the maximum limits. Hess (i bid) argues that one way to blend index insurance and rural finance is to integrate weather index insurance into loans taken by the farmers. KSB decided that only borrowing farmers could buy weather insurance policies. Eventually KSB contemplates to lower the interest rate for these farmers due to the reduced default risk. The groundnut rainfall contract for Mahboobnagar is clearly associated with an insurable loss. This has been achieved through the weights used in the construction of the rainfall index and the relationship between the payoffs and the level of the index. The weights have been chosen to maximise the correlation between the rainfall index and groundnut yield in the region. The payoff pattern is supposed to capture the increasing severity of losses with progressive rainfall deficiency. These features tend to increase the complexity of the product and make it difficult for the farmers to understand (Sinha op cit). However, if the weights were removed and the payoff made linear the product would become closer to a derivative. Reinsurance would also be more easily available for this product since solely the rainfall, independent of the area crop yield, determines the payoff. The subsequent products also have been similar. Basix/KSB has introduced policies for Soya farmers in Madhya Pradesh, Ujjain[5] and Uttar Pradesh, Aligarh. One of the top 5 reinsurers in the world had reinsured this entire weather insurance portfolio. During the 2005 kharif season, Basix sold 7685 policies to 6703 customers in six states with sum insured of Rs.201.06 lakh and premium collection of Rs.18.81 lakh (appendix 1). Andhra Pradesh tops with farmer coverage with 46 percent share followed by Maharashtra by 45.1 percent. It is also visible that customers have more than one policy.

It is argued that Basix-ICICI Lombard scheme has three-phase payout that helps farmers reinvest in working capital for a fresh crop in case of a failure (Manuamom 2007). In reality, it does not happen, as claims have never been immediately paid[6]. On paper everything appears to be rosy

as our field report would indicate. ICICI Lombard has a tie-up with ITC to sell weather insurance policies through e-choupals, internet kiosks located about 3 km from farmer's homes[7]. In 2005 kharif, for instance, 329 farmers bought 914 units (1 unit=0.5 acre) of weather insurance policies through e-choupals with Rs.228500 premium and a total sum insured of Rs.2742000. In conjunction with Rajasthan government, ICICI Lombard launched a weather insurance programme for farmers for the 2004 growing seasons, insuring 783 orange farmers from deficient rainfall during kharif 2004 and 1036 coriander farmers in the 2004 rabi season. This was scaled up to include more crops and farmers in 2005 (see Singh and Jogi 2008). It was estimated *(not exact figure)* that ICICI Lombard agricultural weather insurance sales through e-choupals and other partnerships touched 100000 farmers in 2005 (Manuamom op cit : Box 2.3)[8]. The major problem in all reviews, with a few exceptions, is missing of issue of farmers' loyalty[9]. One also does not have information on number of rain gauge stations created[10] and their location, though Cole et al (2008) report that ICICI has network of automatic rain gauges. The other issue is that pilot (product) has been changed immediately, which means product loyalty and product design is a problem. It takes time for farmers to understand and make adjustments. The transaction costs are low with MFI tie-ups, but even this approach fails to provide adequate information to the clients. Payoffs are based on measured rainfall at a tehsil level (mandal) rain gauge station (Cole et al. ibid). They also report that in 2006 ICICI Lombard though used 30 years historical data on rainfall, the distribution of insurance returns were highly skewed and policies produced a positive return in only 11 percent of phases. The estimated expected value of payoffs is on average about 30 percent of the policy premium (Cole et al.ibid). It is also revealed that in 2006 in Andhra Pradesh, 64 percent farmers reported insufficient funds as a reason for not buying the policy, 9.8 percent stated low payout/high premium as a reason, 9.3 percent reported that payouts are not done he incur losses, 6.5 percent stated that they do not trust the policy provider (Cole et al ibid).

### 2.1.1 IFFCO-Tokio

IFFCO and its associates and Tokio General Insurance Company[11] had tied-up to provide *Barish Bima Yojana* (weather insurance). In March 2005, it launched a weather-derived insurance product that was geared to compensate farmers if rains fall short of normal. It was done after the two collaborators had pilot tested the product in Rajkot and Amreli districts of Gujarat. In April 2004, it covered four states. The company issued a weather-derived cover based on the average rainfall in a particular district i.e., claims are automatically generated and the farmers get compensated if rains fall short of the normal. The company states that farmers would get his claim even if there were no crop damage due to moisture stress. Farmers' cooperatives or individual agriculturists with more than 10 acres of land are eligible to buy the insurance cover[12] thereby excluding marginal and small farmers. In 2008 Rabi, IFFCO-Tokio launched *Mausam Bima Yojana* in Coimbatore, which provides cover for anticipated deficiency in crop yield due to excess rainfall during the specified cover period[13]. It is an index based weather insurance product that caters to the needs of the farmers as well as the state cooperatives. It covers paddy, sugarcane, groundnut and other crops cultivated in the district. Since April 2004, IFFCO-Tokio had covered 200 districts insuring 2.11 lakh farmers and has paid claims to 36300 farmers[14] by October 2008 (only 17.2% farmers)[15] in six states. Till January end 2008 ITGI had paid claims of

Rs.40.55 crore for 6945 claims over all India[16]. The insurer collects rainfall data on a regular basis and informs the insured on event of a claim and computes the claim amount as per the policy terms and conditions. The insured person has to submit a claim form. The company supposedly settles claims within three months of the expiry of the policy.

### 2.1.2 SEWA Experiment

SEWA had initiated rainfall insurance in association with ICICI Lombard General Insurance Company Ltd. The pilot project in collaboration with Centre for Micro-Finance Research (CMFR) was launched in Ahmedabad, Anand and Patan districts for the monsoon season 2006 by selling 1000 policies[17]. The product was similar to Andhra Pradesh contracts. In Anand and Ahmedabad, two district-specific policies were offered: one for crops requiring higher levels of rainfall, such as cotton, and one for crops requiring lower levels of rainfall such as sorghum, which was naturally cheaper. In order to customize indemnity for various stages of a crop cycle, the product was broken into three phases to match the sowing, growing and harvesting stages. Deficit rainfall is covered in the first two phases while excess rainfall is covered in the third phase. Separate triggers have been fixed for each phase to fine-tune the product. Farmers in Ahmedabad and Anand had the option of high as well as low rainfall products, depending upon the water requirement of their crops. The product was available to landless labourers as well, whose livelihoods also depend heavily on monsoon. After experimentation and streamlining on the basis of insurance sales team, SEWA had a rainfall insurance product in 2007 that offered protection against deficit as well as excess rainfall. Claim triggers are based on the observed rainfall index and not actual yield[18], thus ensuring transparency in claim payouts (see appendix 2 for payouts). This also eliminates the problem of moral hazard and adverse selection. Payouts based on actual rainfall ensure timely indemnification. Policy is simpler and tie-up is with IFFCO-TOKIO. This is a single-phase policy. The contract size was small in 2007, each policy, nominally designated for half an acre of farmland[19]. The actual realized rainfall amount led to a limited number of payouts[20].

## 2.2 Agricultural Insurance Company (AIC) Experience

The AIC introduced *Varsha Bhima* as pilot project in about 25 rain gauge stations across four states during kharif 2004 season (summer). The product included insurance based on seasonal rainfall, sowing failure, rainfall distribution index, agronomic optimum index and catastrophe cover. Varsha Bima covers anticipated shortfall in crop yield on account of deficit rainfall. Varsha Bima is voluntary for all classes of cultivators who stand to lose financially upon adverse incidence of rainfall can take insurance under the scheme. Initially, it was meant for cultivators for whom NAIS was voluntary. The insurance operates during June to September for short duration crops; June to October for medium duration crops; and June to November for longer duration crops-these periods are state-specific. In case of sowing failure option, it is from 15th June to 15th August. Cultivator can have Varsha Bima by filling in forms, which are available at all loan disbursing outlets viz., PACs branches of all Cooperative/Commercial/Rural banks. AIC also directly markets/provides insurance; subject to the availability of its network. The network of formal and informal institutions working in the rural areas, such as NGOs, Self Help Groups (SHGs), Farmers Groups could also be utilized for delivery of Varsha Bima. The cultivators are required to have a bank account at the RFI branch, which facilitates his/her insurance

transactions. The coverage options are: Options I: seasonal rainfall insurance- coverage is against negative deviation 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 (with June to September or October for short & medium duration crops). The payout structure correlates the yield to various ranges of adverse deviation in rainfall. The sum insured per hectare is the maximum payout corresponding to the maximum potential loss. The claim payout is on a graded scale (in slabs), corresponding to different degrees of adverse deviation in actual rainfall. Options II: rainfall distribution index- coverage is against adverse deviation 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, for weekly rainfall within the season. The indices vary across IMD stations and crops. The sum insured per hectare is the maximum payout corresponding to the maximum potential loss. The claim payout shall be on a graded scale (in slabs), corresponding to different degrees of adverse deviation in actual rainfall index. Options III: sowing failure- coverage is against adverse deviation in actual rainfall (in mm) from normal rainfall (in mm) beyond 40 percent between 15th June and 15th August. The sum insured per hectare is the maximum input cost incurred by the cultivator till the end of the sowing period, and is pre-specified. The claim payout shall be on a graded scale, corresponding to different degrees of rainfall deviation. The maximum payout of 100 percent of sum insured is available at deviations of 80 percent and above. Sum Insured is pre-specified and normally is between cost of production and value of production. In case of sowing failure option, it is the maximum input cost incurred by the cultivator till the end of the sowing period, which again is pre-specified. Premium may vary from option to option and crop to crop. The premium rates are optimized vis-à-vis benefits, and starts from 1 percent. The claim procedure is automated i.e., there shall be no necessity for submission of loss information or claims intimation by insured cultivator. Normally claims are paid on the basis of actual rainfall data within a month from end of Indemnity period. This scheme now runs in few states with few variants. The AIC itself runs 15 different schemes across the country[21]. In the ensuing section, we present information on the scheme and its variants for last two years in Rajasthan.

Under *Varsha Bima* in 2006, 5839 farmers were covered who had insured 1120.90 hectares of crop area (table 1). Two districts viz., Ajmer and Jhalawar together 43.0 percent of all farmers covered. The other districts of some importance were Dungarpur, Jaipur and Dausa (19.9% of all farmers covered). Thus, five districts had concentration of all farmers covered (63%). Total sum insured comes to Rs.588.62 lakh while 5839 farmers paid a premium of Rs.36.24 lakh. Total claims paid amounted to Rs.22.37 lakh giving a claim premium ratio of 0.62 making the scheme viable. However, claim premium ratio is high in Karauli district at 4.53 followed by Jaipur (2.34), Tonk (2.23) and Bharatpur (2.23) and Bundi (2.04). Per farmer claim ranged between a low of Rs.197 in Ajmer and a high of Rs.1634 in Churu. There were as many as 8 districts of the 26 districts covered where no claim was paid. Per hectare claims paid ranged between Rs.53 in Baran and Rs.1430 in Karauli. Thus, there are wide variations in coverage and compensation paid to affected farmers.

In 2007, *Varsha Bima* scheme was implemented with ITC as partner through its e-choupals. The implementation process involved 11 Hubs and 17 RWS- rain water systems as detailed in table 2.

The crops covered included bajra, mung, guar, groundnut, til, soybean, maize, jowar and paddy grown. 1962 farmers were covered who paid a net premium of Rs.14.97 lakh for sum insured of Rs.226.96 lakh for 5156 hectares of crops. Total claims paid came to Rs.12.38 lakh giving a claim premium ratio of 0.83 making it a viable proposition. However, under 14 RWS no claim was paid. Claim premium ratio exceeded one in 12 RWS and the highest ratio was of 5.14 in Jaipur for groundnut crop. Bajra in Jaipur also had claim premium ratio of 3.50. Maximum claim has been paid for Mung crop in Tonk district. Maize is the other crop that attracted high claim. Per hectare claim paid ranges between Rs.100 and Rs.2160. Per farmer area insured has been small across RWS and Hubs. Thus, there are inter-crop and inter-district variations in claims paid.

### 2.2.1 Soybean Crop: Non-CPK Product

A product for soybean crop was also launched (table 3) in 2007 under Varsha Bima called non-CPK product as it was operated outside choupal. This product had excess, deficient and both as rainfall triggers. A total of 1171 farmers were covered who insured an area of 4611 hectares under soybean under 8 Hubs and sum insured of Rs.234.61 lakh with net premium of Rs.16.59 lakh. However, claims paid were Rs.19.77 lakh giving a claim premium ratio of 11.91. This is very ratio. Soybean is a vulnerable kharif crop. At the district level, the maximum number of farmers insured is in Bundi Hub and Bundi RWS. Nimbahera Hub and RWS follow it. In both the cases trigger was both excess and deficient rainfall. The claim premium ratio is high in case of deficient as well as excess rainfall. In large number of RWS no claims were paid. Despite this claim premium ratio is very high.

### 2.2.2 Soybean Crop: CPK Product

There is another product called CPK product for soybean crop in 6 Hubs and 6 RWS (table 4). Under this product, 240 farmers were covered who insured 240 hectares of crop. The sum insured was Rs.7.2 lakh and the net premium paid was Rs.53400 while the claims paid amounted to Rs.38500 giving a claim premium ratio of 0.72. However, claim premium ratio is very high in Udaipur RWS under Fatehpur Hub at 4.49. The two other RWS also have high claim premium ratio of 2 plus. Claims were not paid in three remaining RWS. Thus, despite high claim premium ratio, overall the product appears to be viable.

### 2.2.3 Varsha Bima: AICL direct business (Field Officers)

Besides, above three products, another product under *Varsha Bima* was piloted in 2007 called AICL direct business through its field officers (table 5). Under the direct business AIC covered 182 farmers who insured an area of 487.25 hectares with net premium of Rs.158170 for sum insured of Rs.22.61 lakh. The claims paid were only Rs.32198 giving a claim premium ratio of mere 0.20. The crops covered were bajra, maize, mung, til, groundnut, jowar, guar and moth. Looking at this information, one finds that the venture has been viable. However, the concentration is only in Jaipur where 59 percent of farmers are covered of the total farmers. Table 7 shows that no claim has been either paid or were payable.

Overall, these four variants of *Varsha Bima* covered 3555 farmers and insured 10494.25 hectares of food and oilseed crops. This meant a total of Rs.491.38 lakh as sum insured with net premium of Rs.33.68 lakh and reported claims paid amounting to Rs.32.85 lakh. This gives a claim premium ratio of 0.98.

### 2.2.4 Wheat Weather Insurance

The AIC has also put in place wheat weather insurance for rabi 2006-07 (table 6). It was implemented in 19 districts of Rajasthan covering 4401 farmers who insured an area of 19345 hectares with total sum insured of Rs.77.83 lakh and paid gross premium of Rs.40.40 lakh (net premium of Rs.35 lakh). Total claims paid were Rs.50.76 lakh giving a claim premium ratio of 1.26. This ratio is as high as 6.06 in Kota, 5.18 in Dungarpur. In few districts like Ajmer, Alwar, Banswara, Baran, Dausa, Jhalawar, Karauli, Ganganagar and Udiapur no claims were either payable or claims paid. It was concentrated in five districts viz., Bundi, Chittorgarh, Karauli, Ganganagar and Tonk (58% farmers). Maximum claims went to Bundi followed by Tonk. Per farmer area insured ranged between a low of 1 hectare and 25.37 hectares.

### 2.2.5 Weather Based Crop Insurance Scheme (WBCIS)

Finally, we look at weather based crop insurance scheme for the rabi season 2007-08. It provides protection against adverse deviations in a range of weather parameters like frost, heat, relative humidity, rainfall etc. between December and April. However, the period is different for different parameters and crops. It provides generic insurance product insuring crops like wheat, potato, barley, mustard, gram, masoor, barley and coriander etc. These crops are extremely vulnerable to weather factors, such as excess rainfall, frost, and fluctuation in temperature etc. Maximum liability is linked to cost of cultivation and varies from crop to crop and the scheme allows for speedy settlement of claims, say within 4-6 weeks after the insurance period. Weather insurance (rabi) is a mechanism for providing effective risk management aid to those individuals and institutions likely to be impacted by adverse weather incidences. The most important benefits of Weather index insurance are: (i) trigger events like adverse weather events can be independently verified and measured; (ii) it allows for speedy settlement of indemnities, as early as a fortnight after the indemnity period and; (iii) a growers, be it small/marginal; owners or tenants/sharecroppers can buy it. Agriculture Insurance Company of India Limited (AIC) compensates the insured, against the likelihood of diminished crop output/yield resulting from maximum temperature (degree C) above the trigger level and/or deviation in temperature range from the normal above the trigger value and/or minimum temperature (degree C) below the trigger level and/or minimum temperature below 4 degree C resulting frost and/or rainfall in excess of the trigger levels (calculated on daily/weekly/monthly basis) and/or bright sunshine hour below the trigger level. Claims are automated and settled on the basis of actual maximum and minimum temperature, rainfall and BSH received from the concerned agencies/ institutions as applicable to each crop separately. Claims when become payable, are paid at a uniform rate to all the insured growers in the area (jurisdiction of reference weather station) growing the insured crop.

During this season, 576696 farmers were covered who insured 880907.13 hectares of crops. It covered 10 districts (table 7). These farmers paid premium of Rs.39.23 crore for sum insured of Rs.1522.41 crore. Gross premium without tax stood at Rs.124.65 crore and AIC paid claims of Rs.82.02 crore giving a claim premium ratio of 0.66, which is viable. However, area insured per farmer is not much; a low of 0.68 hectares in Ajmer and a high of 3.01 hectares in Churu. The per hectare sum insured ranges between Rs.15411 in Bikaner and Rs.20232 in Kota. Claim premium ratio is low across districts with no claim paid in Jodhpur. Claim paid per hectare is very low at Rs.34 in Jaisalmer and Rs.2201 in Churu. It is also observed that coverage was concentrated in 6 districts like Ajmer, Barmer, Churu, Jaipur, Jodhpur and Ganganagar, which accounted for 84 percent all farmers covered, but 76.3 percent of area insured (table 8). However, three districts viz., Bikaner, Churu and Ganganagar accounted for 89.2 percent of all claims paid. Of the 162106 farmers benefited, these three districts accounted for 68.95 percent of benefited farmers.

The above discussion shows that significant experimentation has been done in Rajasthan with regard to weather insurance since 2006. However, farmers' loyalty has not been obtained. There are various reasons for it and the most important one is no-payment of claims and delays in claim payments. There is lack of awareness of the various products too. The claim premium ratio is high and there are inter-district and inter-crop variations in this ratio, coverage and benefits. Weather insurance is still in the early days and does not really appear to be taking firm ground and taken of. There is no doubt that farmers are getting benefits, but the awareness level is negligible. If loanee farmers are excluded then progress may not be worth noting. It being compulsory for loanee farmers' options is not there for such farmers. However, there are still miles to go before risk mitigation for Rajasthan farmers become a reality. Lack of detailed data would throw up light on intricacies of crop insurance in Rajasthan. We would like to observe what happens at the farmer household level in the next section. Who benefits most- marginal/ small farmers or big farmers is worth studying?

## 3. Field Experiences[22]

To understand the grassroots level experiences, fieldwork was conducted in Rajasthan of farmers who had adopted weather insurance in the second half of 2008. In Rajasthan, Agriculture Insurance Company (AIC) in tie-up with state government and ITC have been providing weather insurance cover in selected districts for selected crops. Besides, ICICI- Lombard in collaboration with the state government has products for selected farmers in Rajasthan in few districts. IFFCO-Tokio and HDFC Chubb are also now in field. The survey, however, only covered AIC farmers. For the survey two districts Chittorgarh and Bhilwara were chosen after consultation with concerned officials. The selection was based on the fact that most of the crops notified are covered and in this sense the sample is purposive. A list of farmers covered by the scheme in the villages was obtained from ITC officials. From the list all categories of farmers were chosen. The survey covered 187 farmers in two districts: 86 farmers in Chittorgarh district falling in 16 villages in two blocks Kapasan and Nimbahera and 101 farmers in Bhilwara district in 20 villages in three blocks Kotri and Mandalgarh and Jahajpur[23]. This wide coverage of villages was to represent almost all crops in the state.

### 3.1 Who are the Farmers?

The sample marginal farmers are mainly either illiterate or below primary educated in both the districts, though Bhilwara had a lower percentage such farmers. Also, higher the holding size higher is the education level of farmers. The average holding size of 187 farmers is 6.2 hectares; 5.4 hectares in Chittorgarh and 7.0 hectares in Bhilwara. The average age of sample farmers is 40.3 years and it is higher in Chittorgarh (43.4 years) compared to Bhilwara (37.8 years). Across category of farmers, average farmer in Chittorgarh is older than those in Bhilwara. Within the district, age difference across category of farmers is not significant. In Chittorgarh, 46.5 percent are loanee farmers and the rest non-loanee farmers, while in Bhilwara the corresponding percentages are 35.6 and 64.4 percent. Also, in Chittorgarh as the holding size goes up, the proportion of loanee farmers goes up till medium farmer category. Like other schemes, more large farmers (50%) are loanee farmers in Chittorgarh. In Bhilwara, the proportion of loanee farmers in all categories of farmers is lower than that in Chittorgarh (only 35.6%). This means that large proportion of non-loanee farmers have insured their crops in both the districts, with higher proportions in Bhilwara.

As the scheme is new, not many farmers have bought the policy, nine farmers had insured bajra, 5 farmers jowar, 1 farmer guar, 5 farmers moong, 76 farmers maize, 12 farmers groundnut, 44 farmers soybean and 122 farmers wheat during three years (table 9). At the district level, 29 farmers had insured various crops in 2006 in Chittorgarh and this number went up to 81 in 2007 but fell to 31 in 2008. Among these 141 farmers in three years, major crops insured was wheat followed by maize and soybean. In Bhilwara, in three years 135 farmers insured different crops; main crop being wheat followed by maize, soybean and bajra. In 2006 only 12 farmers had insured various crops and this number went up to 107 in 2007 but declined to 16 in 2008. This shows that farmers' loyalty is not being built with weather insurance product.

### 3.2 Farmers' Perceptions

Farmers were asked few questions on awareness, location of weather station, cut-of-dates, and type of crops notified and so. On proper knowledge about the weather insurance scheme, all large farmers in Chittorgarh and Bhilwara are aware of weather station information while relatively lower proportion of small/marginal farmers has awareness. However, a greater proportion of farmers in Bhilwara are better aware. On location of local weather station, majority stated that it should be located at block level, though a significant proportion in Chittorgarh opined let it be as it is- status-quo. This again reflects on the poor knowledge on the role of weather station in the payouts. However, few marginal and small farmers in Chittorgarh opined that gram panchayat is the appropriate place for weather station and they are worst affected by non-payment of payouts on account of crop failure. Are the farmers aware about the cut-of-dates linked to buying the insurance and perils? The answer is mainly in negative; majority of the farmers are not aware of the cut-of-date though farmers in Chittorgarh are better placed than those in Bhilwara and this knowledge is through pamplet. All farmers know that ITC agent collects the premium, but majority reported that ITC agent pays the claim. However, there is a sizeable proportion having no knowledge about who pays the claim. The claims are largely paid through a cheque as reported by overwhelming proportion of farmers by AIC. However, the

proportions are lower in Bhilwara compared to Chittorgarh. Surprisingly, no greater than 14 percent farmers in Chittorgarh and 7 percent farmers in Bhilwara have knowledge that claims are being routed through banks. Do the farmers know about various crops covered (notified) for weather insurance in the district? In Chittorgarh, marginal and small farmers have less knowledge about crops compared to other categories of farmers while in Bhilwara, the awareness is higher across all categories of farmers. Surprisingly, knowledge about weather perils is greater across all farmers groups in both the districts. However, there is hardly any knowledge about the timing and duration of perils in Chittorgarh, though some farmers know about in Bhilwara.

Knowledge about risk period is limited; the proportion of farmers with knowledge of risk period is 17 percent marginal farmers and 50 percent large farmers in Chittorgarh and 26.7 percent small farmers and 56.3 percent marginal farmers in Bhilwara. Thus, knowledge about risk period is greater in Bhilwara and more so among marginal and small farmers, surprisingly. Knowledge about seasonality discipline is marginal, though a greater proportion of farmers in Chittorgarh are aware about it. All farmers know about insurance intermediaries in both the districts. It is also clear that not many farmers know about subsidy involved in the policy on premium, though quite a few in Chittorgarh have knowledge about it. The same is more or less the case with payout-table of the policy; 18 percent medium farmers in Chittorgarh and 19 percent large farmers in Bhilawara reported knowledge about payout-table.

The knowledge about monitoring is also very limited across farmer categories and districts because it is hardly done by the company and its partners. 30 percent farmers reported visit of any official in Chittorgarh, while 33 percent said so in Bhilwara. The response level varies between 19 percent in Chittorgarh (small farmers) and 50 percent (large farmers). In Bhilwara, the percentage is 14 percent (marginal farmers) and 43.6 percent (medium farmers). This response is based on official visiting these farmers. Banks are hardly involved in monitoring in both the districts, though the scheme is implemented through them. Why did the farmers opt for weather insurance? The major reason cited is financial security in both the districts with varying proportion of overwhelming farmers reporting it. There were not many farmers responding in affirmative regarding purchasing the policy on hearing good experience of other farmers, though the percentage of such farmers is much higher in Chittorgarh; 17 percent marginal farmers in Chittorgarh reported that they had no option (being loanee farmers).

About half the farmers in Chittorgarh and 57 percent in Bhilwara are satisfied with weather insurance scheme. This proportion varies between 33 percent among small farmers and 67 percent among marginal farmers in Chittorgarh while the corresponding proportions in Bhilwara are 53 percent small farmers and 71 percent marginal farmers. What are the reasons- few farmers said crop coverage is inadequate, few in Bhilwara felt premium rate is high and documentation is cumbersome. The fact is that most farmers do not understand what goes on. However, the dissatisfaction is due to payout procedure and its delays; payouts are not settled within a month as per the policy articulation. The proportion of farmers reporting these reasons varies between a low of 17 percent marginal farmers and 48 percent semi-medium farmers (overall 41%) in Chittorgarh, while these proportion vary between a low of 27 percent small farmers and 38 percent medium farmers (overall 34%) in Bhilwara. Claim recovery is another

problem with the scheme; large number of marginal and small farmers in both the districts reported so. Large proportion of farmers desired rural agent services at the doorstep and at the village level to speed up payouts. The preference for ITC agents is limited and this could be due to problems farmers have been facing and dissatisfaction with ITC services. It may be pointed out reduction in transaction cost is the root cause: companies think that for Rs.4000 a person would be providing all services- a World Bank promoted fallacy. *In fact farmers, in the selected villages many a time, vented their anger of ITC agents on the field investigators. In one village investigators were made to leave the village.* Majority of farmers across category of farmers and district had no problem with the premium rate, despite the fact that they were not aware of the subsidy involved. However, those reporting high premium vary between 10 and 17 percent in Chittorgarh and nil to 15 percent in Bhilwara. High premium is more of a problem with lower category of farmers. Of those reporting that premium is high in Chittorgarh, desire 20 to 50 percent lower premium, while in Bhilwara all farmers desire 20 percent lower premium. With all the ills, majority opined WBCIS is the best policy.

### 3.3 Suggestions for Improvement: Farmers Perceptions

How should the weather- indexed insurance policy be improved? 26 percent farmers in Chittorgarh and 14 percent farmers in Bhilwara stated that level of payouts should be increased. This reflects on differing perceptions of farmers in both the districts, which are mainly based on individual experience. A higher proportion of farmers in Bhilwara stated that claim should be paid on time to improve the scheme (43% against 24%). However, surprisingly it is the big farmers who call for this in both the districts. There is a minority view on having a weather station at the tehsil level in both the districts; 26 percent in Bhilwara and 35 percent in Chittorgarh. A sizeable proportion of farmers (22% in Chittorgarh and 25% in Bhilwara) feel that prior knowledge of the policy is must. This reflects on poor extension role played by intermediaries like ITC. It is also found that a large proportion of farmers (one - fifth) desire that to improve the scheme, inquiry regarding the area sown should be made at the beginning. What happens is that farmer do change sowing plan after buying the policy due to weather itself for which he is seeking insurance. This reflects on the time specification of purchase of policy and not proper communication to farmers. Marginal farmers desire that number of notified crops should increase. Claim payment in cash is not a major issue for improving the scheme, though quite a few farmers called for it. This reflects on farmers' cash flow situation. Agent at village leval can help the scheme few farmers opined.

It was also ascertained whether same farmers continue with weather- indexed insurance and also with the crop. Of the farmers in Chittorgarh, 10 farmers repeated maize crop and 2 repeated groundnut while in Bhilwara 9 farmers repeated crops: 5 maize farmers, 1 farmer each of soybean, bajra, jowar and moong. It appears that wheat, as it has become a staple food in Rajasthan, is protected against its failure largely. There are 3 farmers in Chittorgarh who have continued with *Varsha Bima* since 2006 and none in Bhilwara and 1 farmer in Chittorgarh had *Varsha Bima* in 2006 and 2007 and this number was 2 in Bhilwara (table 10). Further, 5 farmers in Chittorgarh had *Varsha Bima* in 2007 and 2008 and another 3 farmers had insurance in 2007 and 2008. The corresponding number of farmers in Bhilwara is 4. This shows that not many farmers have tried to persist with weather- indexed insurance and the major reason is non-

payment of claims. Efforts are required to build loyalty with the scheme. Farmers do not know the nitty - gritty of the schemes. The RWS are at a distance and companies take advantage of these and do not pay claims even when individual farmer's crop has failed. This keeps away the farmers.

## 4. Conclusions

The study reveals that agriculture risks have multiplied over time and so have the efforts to mitigate and manage these risks. India, through state and private agencies, is trying to provide risk cover to large number of risks afflicting at the farm level. Farmers vary in their attitudes toward risk and their ability to address risky situation, risk management cannot be viewed within *one-size fits all* approach. Different farmers confront different situations and structural characteristics, and their preferences toward risk and their risk - return trade-offs have a major effect on decision- making in each given situation. It may be pointed out here that weather insurance schemes have not found foothold in Rajasthan in terms of coverage of farmers, where it most desired risk management strategy for the farmers. There are many reasons for this. The foremost reason is the limited knowledge with farmers about how the scheme functions. There is hardly any effort in terms of extension to build awareness. There are different signals given by various players in the field. Payout is a major issue that takes away farmers. Farmers also question the ITC role and thus outsourcing without proper planning appears not to be working. NGOs may be better placed to deliver. The RWS are still located at a distance from the farmer and the area they cover is very large. Farmers do bear basis risk due mainly to the distance between his plots and the reference weather station. Follow - up of crop failure is not prompt. Farmers expects visit from the field staff, which are rare. It has been found that only if there is a chance of major bungling, only then visits are made. Farmers are not made to understand the relation between their crop loans and crop insurance.

Database is still weak. Weather indexed insurance requires information on temperature and rainfall closer to farmers. Investment in rain gauge stations should of outmost importance. Insurance companies need to understand that farmer's perceptions and expectations may not coincide with the historical data, which as stated is lacking in India. These perceptions should be factored into any product design.

It also needs to be understood that the demand for the formal insurance product will depend on each individual farmer's willingness to pay for insurance against weather risk and on the correlation between actual payouts and economic losses from adverse weather events. There are a large number of factors that determine each farmer's decision to buy insurance. To facilitate this, information asymmetry in information should be removed. Terms and conditions should be explained to each and every farmer, leaflets; brochures are of no help because farmers cannot understand technical language. Confidence building is must of poor farmers and handholding is necessary. There will always be paucity of staff for supervision and visits with outsourcing institutions. Farmers have to have timely information on when to buy a policy. We have seen that deficient rainfall is cause for farmers buying insurance and the product is based on it. Deficient rainfall still drives most farmers into other risky investments like deepening of wells etc. Most of the times, crop insurance is not on the mind of the farmers. Weather indexed

insurance has not helped reduction in the incidence of well - digging/deepening. Knowledge about monitoring is very limited with farmers; AIC/agents should get out of the routine of doing it when there is a problem. Farmers do not have knowledge about timings of perils. Knowledge about risk period is limited and knowledge about seasonality discipline is marginal. There is too much of experimentation happening, rather then consolidation of existing institutions/ products. For instance, NAIS should have been consolidated till companies were ready to provide weather index insurance. Rajasthan still has high claim premium ratio even after 6 years of introduction of NAIS. The issue is welfare versus insurance. The proverbially inaccurate weatherman, faced with the Pandora's Box of climate change, has been no more precise in his forecast than the village elder's prediction based on the flight of birds. A small wonder then, that the bulk of agricultural losses are attributed to weather. So, when insurance companies offer farmers coverage against the vagaries of weather, they present themselves as Good Samaritan. Too much rainfall, the farmer gets paid. Too little rainfall, the farmer gets paid. It is here he gets cheated. The insurance company is his bulwark against freak weather. At least, that's how it sounds on paper by our field experience. In effect, instruments replace people in deciding the validity of insurance claims. And therein lays the flaw: unless the measuring instruments are located close to the areas that suffer freak weather, their records will be normal, even as there is widespread damage to the crops[24]. These schemes have played a limited role in risk aversion of farmers, especially small/marginal farmers, but have helped private players make money[25]. AIC could become farmers rescuer if does not follow what private players has been doing, not a good model to replicate. These models are transaction cost reducers and not risk management tools for farmers as the experience show. State agencies should minimize renting seeking that creates market distortions. Developing countries have a long way to go before real weather markets/instruments are developed and put in place. Also the experience of developed countries is not a good model for developing countries (World Bank 2005). The pre-conditions are many to fulfil before the nail is put in the wood.

*Acknowledgement : This paper is part of larger study conducted for Oxfam, New Delhi.*

**Notes:**

[1]Similar products adapted to the specifics of the local environment and the agricultural characteristics were also developed and sold in northern India, Rajasthan (rainfall insurance citrus) and Ukraine (frost insurance for fruits trees) (see, Lilleor, Gine, Townsend and Vickery 2005).

[2]Small farmers are defined as households farming less than 2 acres of land, medium farm between 2 and 5 acres and large farmers have more than 5 acres.

[3]The second pilot (2004) was extended to 4 new weather stations in Khamman and Anantapur districts of Andhra Pradesh with changed design i.e more weight given to the initial sowing period of groundnut. Cotton farmers were also added in Khamman and excess rainfalls for cotton and ground was part of the new contracts. About 400 farmers bought the contracts from Basix and 320 farmers bought directly from ICICI. There was no reinsurance bought by ICICI as in 2003 (Swiss Re). Third pilot (2005) provided for automatic underwriting and claim settlements and still Basix sold 7685 contracts in 36 locations (Barrieu 2006).

[4]Hess (2003) reviews the 2003 pilot that had World Bank support. It insured farmers against drought risk and allowed for continued borrowing and savings throughout drought years. The weather index insurance is not a self-standing insurance product, but it is embedded in the loan agreement and then combined with a (forced) savings account. It had four components viz., monsoon index insurance, a risk management account, weather risk reinsurance and a smart card. This is agricultural agency lending model. Lending was done through traders or agricultural service providers or local brokers, they were called IASP (integrated agricultural service providers). They were to provide genuine and timely information through extension, misinformed view on them (too much expectations model). ICICI entered into tripartite agreement with the IASP and the output buyer, ICICI provided credit to the farmers on the recommendation of the IASP, the farmer pledges its produce (a serious source of exploitation), and the IASP provided inputs to the farmers (another point of exploitation). IASP charged 1.5 percent as service charge on loan provisioning and recovered loans, which the farmer indirectly paid. Thus, this model made farmer bound for purchase of inputs and sale of his output at prices determined by IASP. All this reduced transaction cost of ICICI but assured nothing to farmers. ICICI got back most of its loans as output bondage was assured by the model. This meant that ICICI did not lend to farmers but to money lenders/traders. This is another weak point in the model at the grassroots. Hess (2003) reported 45 Shubhlabh offices in operation on franchise basis financing 4000 farmers.

[5]A Soya farmer receiving a crop loan of Rs.2000 with embedded weather insurance paid an interest rate of 20.5% instead of 17.5%. The overall rate goes up due to the weather insurance premium, but ICICI Bank envisions being able to lower the base rate at a later date. The insurance kicked in when cumulative weighted rainfall during the critical growing periods fell below 80% of the mean. The farmer received relief on his/her interest payments of Rs.10 per mm of rainfall index deficit. Where the yearly rainfall was 75% of the mean, the farmer would pay Rs.130 in interest instead of Rs.180.

[6]As reported by Manuamom (2007) in table 2.2, there is nothing on how claims are paid and appendix 1 gives no information on claims paid and claim premium ratio.

[7]This cost reducing mechanism does not help the farmers, but the company. Ours and Manuamom (2007) finding show that farmers linked to ICICI Lombard-ITC have very limited basic knowledge about the scheme.

[8]In 2001 total holdings in India were 12 crore and coverage constitute only 0.083% farmers coverage. India has around 65% agriculture under rain-fed situation (Singh 2009).

[9]On page 10, Manuamom (2007) report “several farmers were repeated customers from 2003”. What is the number? Cole et al (2008) report that in Andhra Pradesh percent that purchased in 2004 and 2005 over 2004 buyers was 10.57%, percent that purchased in 2004 and 2006 over 2004 buyers was 24.53%, percent that purchased in 20054 and 2006 over 2004 buyers was 7.58% and percent that purchased in 2004, 2005 and 2006 over 2004 buyers was 8.3%.

[10]It is pointed out “more public and private investment is needed to expand the network of weather stations….” Manuamom (2007: p 27). The issue is where these stations would be located –in villages or blocks. Farmers would be helped if stations are nearer farms.

[11]It is pointed out "more public and private investment is needed to expand the network of weather stations…." Manuamom (2007: p 27). The issue is where these stations would be located –in villages or blocks. Farmers would be helped if stations are nearer farms.

[12]Gujarat Heavy Water Chemicals Ltd (GHCL) is the first Indian company to take a weather insurance product, although to cover the exact opposite risk i.e., ICICI Lombard General Insurance would compensate GHCL if rains disrupt salt production in its fields at Nagapattinam in Tamil nadu.

[13]In May 2005, BBY was launched in Madurai district too. It provides insurance cover for farmers against damage to crop due to deficiency in rainfall during June to September (it is index-based reinsurance driven product). It is sold as group policy through the co-operative societies and co-operative banks. NGOs etc. It compares weighted actual rainfall to the weighted normal rainfall.

[14]In 2004-05, BBY covered 3237 farmers and 75 policies and in 2005-06, it covered 16430 farmers and 1231 policies (http:/www.business-standard.com/India/storypage.php?autono=250380) accessed on 30/1/2009.

[15]In its Chattisgarh area of operation, it has paid Rs.1.31 crore claims to 4169 farmers in 7 districts viz., Surguja, Koriya, Jashpurnagar, Raigarh, Mahasamund, Kawardha and Rajnandgaon districts. The scheme was applicable in 12 districts covering 10433 farmers in the state. It was launched during kharif 2007. It has tied up with APEX Bank (http:www.indiaprwire.com/pressrelease/insurance/200803318425.htm) accessed on 30/1/2009.

[16]It launched BBY in Rajasthan in June 2006 in the surrounding areas of 30 weather stations of Jhunjhunu, Sikar, Jaipur, Hanumangarh, Chittorgarh and Ganganagar districts.

[17]The amount of payout was determined as: phase 1, if rainfall is above the strike of 100mm, no payout is made. For each mm of deficit below 100mm, the policy-holder is paid Rs.5 per mm of deficit. If total rainfall is below 10 mm, the policy-holder receives a single payment of Rs.500. In financial terms, the contract may be replicated by buying 5 puts on rainfall at a strike price of 100, selling at a strike price of 10, and buying a digital option that pays Rs.500 if rainfall falls below 10mm.

[18]Policy design specified a notional normal level of rainfall, roughly equal to the historic average of the district. Payout occurred if measured rainfall were 40% below this normal level of rainfall, with the amount of payout increasing (non-linearly) in the size of the rainfall deficit.

[19]The policy size was with a maximum payout of Rs.1000. Households were free to purchase multiple policies.

[20]HDFC Chubb General Insurance Company is another private insurer in field since 2005. They along with Mayhco operate in four districts of Maharashtra namely, Yeotmal, Buldana, Akola and Parbani and during 2005-06 had sold 50000 farmers weather insurance policies through weather risk. Weather risk, agency servicing insurance clients, claims to have sold 100000 farmers in Andhra Pradesh, Maharashtra, Gujarat, Chattisgarh and Madhya Pradesh weather insurance in association with Dupont and ITGI in 2006-07. It also claims to have sold 5000 wheat farmers in select districts across Uttar Pradesh weather insurance in association with ITC and ITGI. It also sold weather insurance to over 1000 farmers in districts of Udaipur and Chittorgarh in association with Sewa Mandir (has been discontinued since then). Also sold weather insurance to over 1000 farmers in Madhya Pradesh, West Bengal and Orissa in association with Pradhan and SHIS (http://www.weather.risk.com/clients.aspx) accessed on Febraury 9, 2009.

[21]They are: National Crop Insurance Scheme, weather based crop insurance scheme, wheat insurance (weather & biomass), rabi weather insurance, mango insurance, poppy insurance, Uttarakhand Seb Bima Yojana, potato insurance, grapes insurance, varsha bima/rainfall insurance, rainfall insurance scheme for coffee growers, bio-fuel tree/ plant insurance, pulpwood tree insurance, coconut insurance and rubber insurance. Private players also have few additional products in the market.

[22]The details of the discussion are available with the authors. Also see, Singh and Jogi (2008).

[23]In Chittorgarh district the sample comprised of marginal farmers 7, small 31, semi-medium 29, medium 23 and large 11, while in Bhilwara, the coverage was: marginal 7, small 14, semi-medium 26, medium 33, and large 24. Thus, the sample had marginal 14, small 45, semi-medium 55, medium 56 and large 35.

[24]The questions is why studies on India are on private insurers and critical of the schemes. This is a political economy issue. Does this mean World Bank has stakes (prior to meltdown). Weather-based insurance for crop damage is a good idea- if, in practice, the weather is measured near the fields.

[25]The websites of all private players do not provide any details on the schemes performance in the age of transparency.

**References**


Barnett, Barry J and Olivier Mahul (2007): "Weather Index Insurance for Agriculture and Rural Areas in Lower-income Countries", **American Journal of Agricultural Economics**, 89 (5): 1241-1247.

Barrieu, Pauline (2006): "Various Comments on the Weather Derivatives Market" London School of Economics, Statistics Department, Nice, May 4 (power point) available at (http://www.er.uqam.ca/nobel/r25314/cours/ECO8071/Articles/BarrieuDerivesclima2006.pdf) Accessed on 12 March, 2009.

Chantarat, Sommarat, Christopher B. Barrett, Andrew G. Mude and Calum G. Turvey (2007): "Using Weather Index Insurance to Improve Drought Response for Famine Prevention", **American Journal of Agricultural Economics**, 89 (5): 1262-1268.

Cole, Shawn, Xavier Gine, Jeremy Tobacman, Petia Topalova, Robert Townsend and James Vickery (2008): **Barriers to Household Risk Management: Evidence from India**, a preliminary draft manuscript September 12 version (http://www.internationalpolicy.umich.edu/pdf/Gine%2009%2018%2008.pdf.) accessed on 9 February, 2009.

Gine, Xavier, Robert Townsend and James Vickery (2007): "Statistical Analysis of Rainfall Insurance Payouts in Southern India", **American Journal of Agricultural Economics**, 89 (5): 1248-1254.

Hardaker, J Brian, Ruud B.M. Huirne and Jock R. Anderson (1997): **Coping with Risk in Agriculture**, New York: CAB International.

Harwood, Joy, Richard Heifner, Keith Coble, Janet Perry and Agapi Somwaru (1999): **Managing Risk in Farming: Concepts**, **Research and Analysis**, Market and Trade Economics Division and Resource Economics Division, Economic Research Service, USDA, Agricultural Economic Report No.774.

Hazell, Peter B.R (1991): "Appropriate Function of Agricultural Insurance in Developing Countries" in **Agricultural Insurance in Asia: Planning and Practices**, Tokyo: APO, pp. 21-34.

Hess, Ulrich (2003): **Innovative Financial Services for Rural India: Monsoon-Indexed Lending and Insurance for Smallholders**, Agriculture and Rural Development Working paper 9, The World Bank (available at: http://www.climate-insurance.org/upload/pdf/hess2003_financial_services_rural_india.pdf) accessed on 12 October, 2008.

Hess, Ulrich (2006): "Weather Risk Markets Change People's Lives: A Weather Index Based Approach to Protecting Livelihoods and Saving Lives" in **Living with Climate Variability and Change**, Helsinki, Finland, 17-21 July.

Lilleor, Helene Bie, Xavier Gine, Robert Townsend, James Vickery (2005): "Weather Insurance in Semi-Arid India" (available at: http://www.siteresources.worldbank.org/DEC/Resources/WeatherInsuranceInSemiAridIndia.pdf) accessed on 19 October, 2008.

Manuamom, Ornsaran Pomme (2007): "Scaling-up Micro-insurance: The Case of Weather Insurance for Smallholders in India", Agriculture and Rural Development Discussion Paper 36, World Bank (available at:http://www.climate-insurance.org/upload/pdf/Manuamorn2007_weather_insurance_india.pdf) accessed on 19 January, 2009.

Singh, Surjit (2008): "Agriculture Risks and Public Policy: Cross-country Experiences" in Sankar Kumar Bhaumik (ed.) **Reforming Indian Agriculture: Towards Employment Guarantee and Poverty Reduction**, Sage New Delhi, chp.7: 161-190.

Singh, Surjit and M.S. Rathore eds. (2010): **Rainfed Agriculture in India: Perspectives and Challenges** Rawat Publications, Jaipur.

Singh, Surjit (2009b): "Climate Change and Gender Concerns" a paper presented in a seminar organized by NORAD to review **Norwegian Gender Action Plan 2007-2009**, Olso, 9 March .

Singh, Surjit and R.L. Jogi (2008): **Weather Insurance in Rajasthan: Some Grassroots Experiences** a report submitted to Oxfam International (CENTAD), New Delhi.

Sinha, Sidharth (2004): "Agriculture Insurance in India: Scope for Participation of Private Insurers", **Economic and Political Weekly**, 19 June, 2605-2612.

Townsend, Robert (1994): "Risk and Insurance in Village India", **Econometrica**, 62: 539-592.

Vyas, V.S and Surjit Singh (2005): **Agriculture Crop Insurance: Performance and Needed Reforms,** a report submitted to Agriculture Insurance Company of India, New Delhi.

Vyas, V.S and Surjit Singh (2006): "Crop Insurance in India: Scope for Improvement" **Economic and Political Weekly**, November 4.

World Bank (2005): **Managing Agricultural Production Risk: Innovations in Developing Countries**, Agriculture and Rural Development Department, report no.32727-GLB, Washington D.C.

**Table 1: Varsha Bima: 2006**

| District | No. of farmers | Area ha. | Sum insured Rs. 000 | Premium Rs. | Claims paid Rs. | Claim/ farmer Rs. | Sum insured per ha. Rs. | Claim paid ha. Rs. | Claim premium ratio | % of of farmers |
|---|---|---|---|---|---|---|---|---|---|---|
| Ajmer | 1253 | 3034.25 | 12653 | 727073 | 246720 | 197 | 4170 | 81 | 0.34 | 21.46 |
| Alwar | 115 | 156.00 | 780 | 47908 | 26100 | 227 | 5000 | 167 | 0.54 | 1.97 |
| Barmer | 29 | 140.50 | 533 | 94154 | | | 3794 | 0 | 0.00 | 0.50 |
| Banswara | 186 | 211.00 | 1401 | 92624 | | | 6637 | 0 | 0.00 | 3.19 |
| Baran | 82 | 329.00 | 1894 | 115061 | 17437 | 213 | 5757 | 53 | 0.15 | 1.40 |
| Bharatpur | 105 | 275.30 | 1269 | 70429 | 157110 | 1496 | 4610 | 571 | 2.23 | 1.80 |
| Bikaner | 14 | 48.00 | 250 | 27415 | 17100 | 1221 | 5208 | 356 | 0.62 | 0.24 |
| Bhilwara | 221 | 298.50 | 1354 | 91614 | | | 4536 | 0 | 0.00 | 3.78 |
| Bundi | 212 | 435.00 | 2158 | 137583 | 281115 | 1326 | 4960 | 646 | 2.04 | 3.63 |
| Chittorgarh | 161 | 177.00 | 1277 | 78481 | | | 7215 | 0 | 0.00 | 2.76 |
| Churu | 60 | 175.50 | 826 | 58128 | 98060 | 1634 | 4707 | 559 | 1.69 | 1.03 |
| Dausa | 391 | 478.00 | 2439 | 131725 | 126740 | 324 | 5103 | 265 | 0.96 | 6.70 |
| Dungurpur | 361 | 293.50 | 1899 | 107130 | | | 6469 | 0 | 0.00 | 6.18 |
| Jaipur | 410 | 665.80 | 3421 | 212642 | 496697 | 1211 | 5138 | 746 | 2.34 | 7.02 |
| Jaisalmer | 1 | 6.30 | 25 | 4751 | | | 3968 | 0 | 0.00 | 0.02 |
| Jhunjhunu | 2 | 10.00 | 40 | 2250 | 1450 | 725 | 4000 | 145 | 0.64 | 0.03 |
| Jhalawar | 1255 | 2939.00 | 18810 | 1047278 | | | 6400 | 0 | 0.00 | 21.49 |
| Jodhpur | 47 | 198.60 | 881 | 71852 | 51529 | 1096 | 4435 | 259 | 0.72 | 0.80 |
| Karauli | 223 | 236.50 | 1237 | 74727 | 338280 | 1517 | 5230 | 1430 | 4.53 | 3.82 |
| Kota | 115 | 198.00 | 1142 | 69131 | 19206 | 167 | 5765 | 97 | 0.28 | 1.97 |
| Nagaur | 46 | 138.80 | 868 | 87064 | 16818 | 366 | 6252 | 121 | 0.19 | 0.79 |
| Sikar | 135 | 171.00 | 1084 | 88435 | 64845 | 480 | 6336 | 379 | 0.73 | 2.31 |
| Sawaimadhopur | 175 | 321.50 | 1420 | 87972 | 135750 | 776 | 4417 | 422 | 1.54 | 3.00 |
| Ganganagar | 1 | 1.00 | 4 | 1040 | 400 | 400 | 4000 | 400 | 0.38 | 0.02 |
| Tonk | 167 | 194.50 | 818 | 63504 | 141417 | 847 | 4206 | 727 | 2.23 | 2.86 |
| Udaipur | 72 | 68.50 | 382 | 33849 | | | 5573 | 0 | 0.00 | 1.23 |
| Total | 5839 | 11200.90 | 58862 | 3623820 | 2236773 | 383 | 5255 | 200 | 0.62 | 100 |

Source: AIC.

**Table 2 : Varsha Bima 2007 (ITC)**

| HUB/RWS | Crop | Farmers No. | % farmers | Area (ha.) | Sum insured (Rs. 000) | Net premium Rs. | Claim per ha. Rs. | Total claim Rs. | Per farmer area insured | Per ha. sum insured | Claim/ premium ratio |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Ajmer** | | | | | | | | | | | |
| Ajmer | Bajra | 6 | 0.31 | 24 | 96 | 4620 | | | 4.00 | 4000 | |
| Ajmer | Mung | 1 | 0.05 | 5 | 20 | 1557 | 109 | 545 | 5.00 | 4000 | 0.35 |
| **Alwar** | | | | | | | | | | | |
| Rajgarh | Bajra | 18 | 0.92 | 38 | 200 | 11264 | 100 | 3800 | 2.11 | 5263 | 0.34 |
| **Banswara** | | | | | | | | | | | |
| Banswara | Maize | 121 | 6.17 | 126 | 819 | 40931 | 1300 | 163800 | 1.04 | 6500 | 4.00 |
| **Bharatpur** | | | | | | | | | | | |
| Bharatpur | Bajra | 102 | 5.20 | 216 | 1404 | 78975 | 585 | 126360 | 2.12 | 6500 | 1.60 |
| Bharatpur | Paddy | 5 | 0.25 | 5 | 30 | 1900 | 1040 | 5200 | 1.00 | 6000 | 2.74 |
| Bharatpur | Jowar | 13 | 0.66 | 18 | 54 | 2563 | 210 | 3780 | 1.38 | 3000 | 1.47 |
| **Dausa** | | | | | | | | | | | |
| Dausa | Bajra | 29 | 1.48 | 58 | 290 | 14309 | | - | 2.00 | 5000 | |
| Jaipur | Bajra | 2 | 0.10 | 3 | 15 | 900 | 1050 | 3150 | 1.50 | 5000 | 3.50 |
| Rajgarh | Bajra | 2 | 0.10 | 2 | 10 | 600 | 100 | 200 | 1.00 | 5000 | 0.33 |
| S.M.pur | Bajra | 6 | 0.31 | 10 | 40 | 2367 | | - | 1.67 | 4000 | |
| S.M.pur | Guar | 5 | 0.25 | 9 | 36 | 2488 | | - | 1.80 | 4000 | |
| S.M.pur | Til | 3 | 0.15 | 6 | 30 | 2063 | | - | 2.00 | 5000 | |
| **Deoli** | | | | | | | | | | | |
| Deoli | Mung | 222 | 11.31 | 741 | 2964 | 203636 | | - | 3.34 | 4000 | |
| **Fatehpur** | | | | | | | | | | | |
| Chittorgarh | Groundnut | 2 | 0.10 | 2 | 16 | 911 | 640 | 1280 | 1.00 | 8000 | 1.41 |
| Chittorgarh | Jowar | 2 | 0.10 | 8 | 32 | 1445 | 200 | 1600 | 4.00 | 4000 | 1.11 |
| Chittorgarh | Maize | 36 | 1.83 | 62 | 366 | 17284 | 300 | 18600 | 1.72 | 5903 | 1.08 |
| Udaipur | Maize | 2 | 0.10 | 2 | 13 | 1111 | 130 | 260 | 1.00 | 6500 | 0.23 |
| Udaipur | Til | 1 | 0.05 | 1 | 4 | 427 | 150 | 150 | 1.00 | 4000 | 0.35 |
| **Mandalgarh** | | | | | | | | | | | |
| Mandalgarh | Bajra | 1 | 0.05 | 20 | 100 | 5696 | | - | 20.00 | 5000 | |
| Mandalgarh | Jowar | 6 | 0.31 | 9 | 27 | 1538 | | - | 1.50 | 3000 | |
| Mandalgarh | Maize | 141 | 7.19 | 307 | 1996 | 113663 | | - | 2.18 | 6502 | |
| Mandalgarh | Soybean | 9 | 0.46 | 15 | 120 | 9118 | | - | 1.67 | 8000 | |
| **Swai Madhopur** | **(SMpur)** | | | | | | | | | | |
| SMpur | Bajra | 22 | 1.12 | 24 | 96 | 5767 | | - | 1.09 | 4000 | |
| SMpur | Groundnut | 4 | 0.20 | 7 | 56 | 3919 | | - | 1.75 | 8000 | |
| SMpur | Guar | 97 | 4.94 | 821 | 3284 | 223616 | | - | 8.46 | 4000 | |
| SMpur | Til | 2 | 0.10 | 3 | 15 | 1049 | | - | 1.50 | 5000 | |
| Tonk | Mung | 496 | 25.28 | 496 | 1984 | 135013 | 337 | 167152 | 1.00 | 4000 | 1.24 |
| **Sri Madhopur** | | | | | | | | | | | |
| Jaipur | Bajra | 7 | 0.36 | 16 | 80 | 4799 | 1050 | 16800 | 2.29 | 5000 | 3.50 |
| Jaipur | Groundnut | 4 | 0.20 | 4 | 20 | 1680 | 2160 | 8640 | 1.00 | 5000 | 5.14 |
| Sikar | Bajra | 1 | 0.05 | 1 | 7 | 520 | 520 | 520 | 1.00 | 7000 | 1.00 |
| Sikar | Groundnut | 3 | 0.15 | 4 | 28 | 2520 | 560 | 2240 | 1.33 | 7000 | 0.89 |
| Sikar | Guar | 25 | 1.27 | 45 | 135 | 12135 | 240 | 10800 | 1.80 | 3000 | 0.89 |
| **Tonk** | | | | | | | | | | | |
| Tonk | Bajra | 56 | 2.85 | 118 | 590 | 58718 | 447 | 52746 | 2.11 | 5000 | 0.90 |
| Tonk | Mung | 510 | 25.99 | 1930 | 7720 | 528320 | 337 | 650410 | 3.78 | 4000 | 1.23 |
| **Total** | | **1962** | **100** | **5156** | **22696** | **1497422** | **240** | **1238033** | **2.63** | **4402** | **0.83** |

Source: AIC.

**Table 3 : Varsha Bima 2007 (ITC)- Soyabean (Non-CPK Product)**

| HUB/RWS | Crop | Farmers No. | % farmers | Area (ha.) | Sum insured (Rs.000) | Net premium Rs. | Total claim Rs. | Area insrued per farmer ha. | Sum insured per ha. Rs. | Claim paid per ha. (Rs.) | Claim/ pemium ratio |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Banswara** | | | | | | | | | | | |
| Banswara | Deficit | 28 | 2.39 | 44 | 154 | 13933 | | 1.57 | 3500 | 0 | 0 |
| Banswara | Excess | 40 | 3.42 | 103 | 206 | 11929 | 77909 | 2.58 | 2000 | 756 | 6.53 |
| **Bundi** | | | | | | | | | | | |
| Bundi | Deficit | 36 | 3.07 | 155 | 620 | 40877 | | 4.31 | 4000 | 0 | |
| Bundi | Excess | 7 | 0.60 | 31 | 62 | 3596 | 14492 | 4.43 | 2000 | 467 | 4.03 |
| Bundi | Both | 529 | 45.18 | 1924 | 11544 | 731200 | 899470 | 3.64 | 6000 | 468 | 1.23 |
| **Fatehnagar** | | | | | | | | | | | |
| Chittorgarh | Deficit | 5 | 0.43 | 5 | 38 | 2414 | | 1.00 | 7600 | 0 | 0.00 |
| **Kota** | | | | | | | | | | | |
| Kota | Deficit | 23 | 1.96 | 74 | 296 | 19699 | | 3.22 | 4000 | 0 | 0.00 |
| Kota | Excess | 10 | 0.85 | 34 | 68 | 4665 | 4801 | 3.40 | 2000 | 141 | 1.03 |
| Kota | Both | 39 | 3.33 | 77 | 462 | 31152 | 10872 | 1.97 | 6000 | 141 | 0.35 |
| Sultanpur | Deficit | 55 | 4.70 | 326 | 1304 | 86148 | 487794 | 5.93 | 4000 | 1496 | 5.66 |
| Sultanpur | Both | 2 | 0.17 | 2 | 12 | 817 | 2993 | 1.00 | 6000 | 1497 | 3.66 |
| **Keshorai Patan (Kpatan)** | | | | | | | | | | | |
| Kpatan | Deficit | 84 | 7.17 | 402 | 1608 | 103756 | 221100 | 4.79 | 4000 | 550 | 2.13 |
| Kpatan | Excess | 4 | 0.34 | 15 | 30 | 1736 | 5850 | 3.75 | 2000 | 390 | 3.37 |
| Kpatan | Both | 81 | 6.92 | 213 | 1278 | 76620 | 200220 | 2.63 | 6000 | 940 | 2.61 |
| **Mandalgarh** | | | | | | | | | | | |
| Mandalgarh | Excess | 19 | 1.62 | 20 | 40 | 2759 | 1168 | 1.05 | 2000 | 58 | 0.42 |
| **Nimbahera** | | | | | | | | | | | |
| Nimbahera | Deficit | 1 | 0.09 | 2 | 7 | 536 | | 2.00 | 3500 | 0 | 0.00 |
| Nimbahera | Excess | 21 | 1.79 | 343 | 686 | 44569 | 13583 | 16.33 | 2000 | 40 | 0.30 |
| Nimbahera | Both | 187 | 15.97 | 841 | 5046 | 327089 | 33304 | 4.50 | 6000 | 40 | 0.10 |
| Chittorgarh | Both | 48 | 4.10 | 89 | 534 | 34615 | 3294 | 1.85 | 6000 | 37 | 0.10 |
| **Swai Madhopur (SMpur)** | | | | | | | | | | | |
| SMpur | Deficit | 50 | 4.27 | 433 | 1299 | 121246 | | 8.66 | 3000 | 0 | 0.00 |
| **Total** | | **1171** | **100** | **4611** | **23461** | **1659356** | **19767560** | **3.94** | **5088** | **4287** | **11.91** |

Note: Sultanpur- NCMSL Sultanpur.
Source: AIC.

**Table 4 : Varsha Bima 2007 (ITC)- Soyabean (CPK Product)**

| HUB/RWS | Farmers No. | Area (ha.) | Sum insured Rs. | Net premium Rs. | Total claim Rs. | Sum insured per ha. | Claim paid per ha. | Claim/ premium ratio |
|---|---|---|---|---|---|---|---|---|
| **Mandalgarh** | | | | | | | | |
| Mangalgarh | 62 | 62 | 186000 | 13795 | | 3000 | | |
| **Fatehnagar** | | | | | | | | |
| Chittorgarh | 3 | 3 | 9000 | 667 | 1500 | 3000 | 500 | 2.25 |
| Udaipur | 27 | 27 | 81000 | 6008 | 27000 | 3000 | 1000 | 4.49 |
| **Nimbahera** | | | | | | | | |
| Chittorgarh | 20 | 20 | 6000 | 4450 | 10000 | 3000 | 500 | 2.25 |
| Nimbahera | 68 | 68 | 204000 | 15130 | | 3000 | | |
| **Pratapgarh** | | | | | | | | |
| Pratapgarh | 60 | 60 | 180000 | 13350 | | 3000 | | |
| **TOTAL** | **240** | **240** | **720000** | **53400** | **38500** | **3000** | **160** | **0.72** |

Source: AIC.

**Table 5 : Varsha Bima 2007 AICL Direct Business (Field Officer)**

| HUB/RWS | Crop | Farmers No. | % farmers | Area (ha.) | Sum insured (Rs.000) | Net premium Rs. | Total claim Rs. | Claim paid per ha. (Rs.) | Area insrued per farmer ha. | Sum insured per ha. Rs. | Claim/ pemium ratio |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Ajmer** | | | | | | | | | | | |
| Ajmer | Bajra | 16 | 8.79 | 32.00 | 128000 | 6400 | | | 2.00 | 4000 | |
| Ajmer | Maize | 6 | 3.30 | 14.00 | 70000 | 4200 | | | 2.33 | 5000 | |
| Ajmer | Mung | 4 | 2.20 | 82.00 | 328000 | 26240 | 8938 | 109 | 20.50 | 4000 | 0.34 |
| Ajmer | Til | 1 | 0.55 | 1.00 | 5000 | 350 | 350 | 350 | 1.00 | 5000 | 1.00 |
| ***Churu*** | | | | | | | | | | | |
| Churu | Bajra | 8 | 4.40 | 29.50 | 118000 | 8260 | | | 3.69 | 4000 | |
| Churu | G.nut | 1 | 0.55 | 5.00 | 30000 | 2100 | | | 5.00 | 6000 | |
| Churu | Moth | 6 | 3.30 | 19.50 | 97500 | 6825 | | | 3.25 | 5000 | |
| ***Jaipur*** | | | | | | | | | | | |
| Jaipur | Bajra | 35 | 19.23 | 43.25 | 216250 | 12975 | | | 1.24 | 5000 | |
| Jaipur | G.nut | 34 | 18.68 | 53.50 | 321000 | 22470 | | | 1.57 | 6000 | |
| Jaipur | Guar | 30 | 16.48 | 48.50 | 242500 | 16975 | | | 1.62 | 5000 | |
| Jaipur | Jowar | 6 | 3.30 | 9.00 | 36000 | 2160 | | | 1.50 | 4000 | |
| Jaipur | Maize | 2 | 1.10 | 4.00 | 20000 | 1000 | | | 2.00 | 5000 | |
| Jaipur | Til | 1 | 0.55 | 1.00 | 5000 | 300 | | | 1.00 | 5000 | |
| **Jodhpur** | | | | | | | | | | | |
| Jodhpur | Bajra | 4 | 2.20 | 32.00 | 128000 | 10240 | 6400 | 200 | 8.00 | 4000 | 0.63 |
| Jodhpur | Guar | 4 | 2.20 | 28.00 | 112000 | 8960 | 5600 | 200 | 7.00 | 4000 | 0.63 |
| Jodhpur | Moth | 4 | 2.20 | 61.00 | 305000 | 21350 | 9150 | 150 | 15.25 | 5000 | 0.43 |
| ***Nagaur*** | | | | | | | | | | | |
| Nagaur | Moth | 1 | 0.55 | 1.00 | 5000 | 475 | | | 1.00 | 5000 | |
| ***Sikar*** | | | | | | | | | | | |
| Sikar | Guar | 2 | 1.10 | 3.00 | 13000 | 1040 | 720 | 240 | 1.50 | 4333 | 0.69 |
| Sikar | Bajra | 2 | 1.10 | 2.00 | 9000 | 810 | 1040 | 520 | 1.00 | 4500 | 1.28 |
| **Tonk** | | | | | | | | | | | |
| Deoli | Mung | 15 | 8.24 | 18.00 | 72000 | 5040 | | | 1.20 | 4000 | |
| **Total** | | **182** | **100** | **487.25** | **2261250** | **158170** | **32198** | **66.08** | **2.68** | **4641** | **0.20** |

Source: AIC.

**Table 6 : Wheat Weather Insurance Rabi-2006-07**

| District | No. of farmers | % of farmers | Area ha. | Net premium Rs. | Gross premuim Rs. | Sum isured Rs. 000 | Claim Paid Rs. | Area insured per farmer ha. | Sum insured per ha. Rs. | Claim paid per ha Rs. | Claim net | Premium ratio gross |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ajmer | 3 | 0.1 | 3 | 717 | 805 | 15 | | 1.00 | 5000 | | | |
| Alwar | 57 | 1.3 | 84 | 22951 | 25760 | 588 | | 1.47 | 7000 | | | |
| Banswara | 119 | 2.7 | 315 | 49782 | 55875 | 1185 | | 2.65 | 3762 | | | |
| Baran | 123 | 2.8 | 782 | 138654 | 155625 | 2916 | | 6.36 | 3729 | | | |
| Bharatpur | 133 | 3.0 | 506 | 139576 | 156660 | 3168 | 156600 | 3.80 | 6261 | 309 | 1.12 | 1.00 |
| Bhilwara | 128 | 2.9 | 540 | 73717 | 82740 | 1707 | 294250 | 4.22 | 3161 | 545 | 3.99 | 3.56 |
| Bundi | 457 | 10.4 | 2401 | 410486 | 460730 | 8586 | 1073500 | 5.25 | 3576 | 447 | 2.62 | 2.33 |
| Chittorgarh | 521 | 11.8 | 1704 | 316251 | 354960 | 6723 | 702300 | 3.27 | 3945 | 412 | 2.22 | 1.98 |
| Dausa | 9 | 0.2 | 63 | 8981 | 10080 | 189 | | 7.00 | 3000 | | | |
| Dungarpur | 81 | 1.8 | 99 | 20839 | 23390 | 477 | 121250 | 1.22 | 4818 | 1225 | 5.82 | 5.18 |
| Hanumangarh | 401 | 9.1 | 2457 | 476377 | 534695 | 9744 | 613000 | 6.13 | 3966 | 249 | 1.29 | 1.15 |
| Jaipur | 175 | 3.9 | 718 | 114932 | 129000 | 2721 | 367970 | 4.17 | 3790 | 512 | 3.20 | 2.85 |
| Jhalawar | 273 | 6.2 | 386 | 86377 | 96950 | 1884 | | 1.41 | 4881 | | | |
| Karauli | 612 | 13.9 | 1529 | 284515 | 319340 | 6081 | | 2.50 | 3977 | | | |
| Kota | 50 | 1.1 | 273 | 40133 | 45045 | 819 | 273000 | 5.46 | 3000 | 1000 | 6.80 | 6.06 |
| SwaiMadhopur | 59 | 1.3 | 1497 | 193394 | 217065 | 4491 | 449100 | 25.37 | 3000 | 300 | 2.32 | 2.07 |
| Ganganagar | 485 | 11.0 | 3121 | 709404 | 796535 | 15039 | | 6.44 | 4819 | | | |
| Tonk | 489 | 11.1 | 2056 | 341928 | 383780 | 7584 | 1025000 | 4.20 | 3689 | 499 | 3.00 | 2.67 |
| Udaipur | 229 | 5.2 | 811 | 170572 | 191450 | 3912 | | 3.54 | 4824 | | | |
| Total | 4401 | 100 | 19345 | 3599586 | 4040185 | 77829 | 5075970 | 4.40 | 4023 | 262 | 1.41 | 1.26 |

Source: AIC.

**Table 7 : WBCIS across Districts: Rabi 2007-08 Season**

| District | Farmers No. | Area insured ha. | Sum insured Rs. lakh | Farmers premium without tax Rs. lakh | Subsidy without tax Rs. lakh | Gross premium without tax Rs. lakh | Claims paid Rs. | Farmers benefited No. |
|---|---|---|---|---|---|---|---|---|
| Ajmer | 59209 | 40279 | 7099 | 158.79 | 398.30 | 557.09 | 47.37 | 7317 |
| Barmer | 120335 | 118166 | 21840 | 1093.84 | 1270.59 | 2364.43 | 218.30 | 15333 |
| Bikaner | 33112 | 83876 | 12927 | 253.92 | 678.66 | 932.58 | 921.61 | 19306 |
| Churu | 70658 | 212880 | 32071 | 639.64 | 1927.04 | 2566.67 | 4686.42 | 62239 |
| Jaipur | 67061 | 66058 | 12404 | 210.60 | 720.25 | 930.85 | 186.38 | 8585 |
| Jaisalmer | 20393 | 52290 | 8776 | 292.99 | 442.79 | 735.78 | 17.75 | 3177 |
| Jodhpur | 100135 | 106591 | 18807 | 577.65 | 755.09 | 1332.74 | | |
| Kota | 22094 | 57989 | 11733 | 249.77 | 680.55 | 930.32 | 106.47 | 2696 |
| Ganganagar | 64127 | 127927 | 24230 | 408.82 | 1529.61 | 1938.43 | 1707.12 | 30226 |
| Udaipur | 19572 | 14851 | 2355 | 36.95 | 138.83 | 175.78 | 310.19 | 13227 |
| Total | 576696 | 880907 | 152241 | 3922.96 | 8541.69 | 12464.65 | 8201.62 | 162106 |

Source: AIC.

**Table 8: Some Ratios and Distribution**

| District | Area insured per farmer ha. | Sum insured per ha. Rs. | Claim paid per ha. Rs. | Claim premium ratio | Distribution across districts - percent | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Farmers | Area insured | Sum insured | Premium paid | Claim paid | Farmer benefited |
| Ajmer | 0.68 | 17624 | 118 | 0.09 | 10.27 | 4.57 | 4.66 | 4.05 | 0.58 | 4.51 |
| Barmer | 0.98 | 18482 | 185 | 0.09 | 20.87 | 13.41 | 14.35 | 27.88 | 2.66 | 9.46 |
| Bikaner | 2.53 | 15411 | 1099 | 0.99 | 5.74 | 9.52 | 8.49 | 6.47 | 11.24 | 11.91 |
| Churu | 3.01 | 15065 | 2201 | 1.83 | 12.25 | 24.17 | 21.07 | 16.30 | 57.14 | 38.39 |
| Jaipur | 0.99 | 18777 | 282 | 0.20 | 11.63 | 7.50 | 8.15 | 5.37 | 2.27 | 5.30 |
| Jaisalmer | 2.56 | 16784 | 34 | 0.02 | 3.54 | 5.94 | 5.76 | 7.47 | 0.22 | 1.96 |
| Jodhpur | 1.06 | 17644 | | | 17.36 | 12.10 | 12.35 | 14.72 | | |
| Kota | 2.62 | 20232 | 184 | 0.11 | 3.83 | 6.58 | 7.71 | 6.37 | 1.30 | 1.66 |
| Ganganagar | 1.99 | 18941 | 1334 | 0.88 | 11.12 | 14.52 | 15.92 | 10.42 | 20.81 | 18.65 |
| Udaipur | 0.76 | 15857 | 2089 | 1.76 | 3.39 | 1.69 | 1.55 | 0.94 | 3.78 | 8.16 |
| Total | 1.53 | 17282 | 931 | 0.66 | 100 | 100 | 100 | 100 | 100 | 100 |

Source: computed.

**Table 9: District-wise Crops Covered**

| Year | Bajra | Jowar | Guar | Moong | Maize | Groundnut | Soybean | Wheat | Total |
|---|---|---|---|---|---|---|---|---|---|
| **Chittorgarh** | | | | | | | | | |
| 2006 | | 2 | | | 17 | 7 | 5 | | 49 |
| 2007 | | 2 | | | 15 | 1 | 19 | 44 | 81 |
| 2008 | | | | | 19 | 3 | 9 | | 31 |
| Total | | 2 | | | 51 | 11 | 33 | 44 | 141 |
| **Bhilwara** | | | | | | | | | |
| 2006 | 6 | 1 | 1 | | 3 | 1 | | | 12 |
| 2007 | 3 | 1 | | 4 | 13 | | 6 | 80 | 107 |
| 2008 | | 1 | | 1 | 9 | | 5 | | 16 |
| Total | 9 | 3 | 1 | 5 | 25 | 1 | 11 | 80 | 135 |
| **G.Total** | **9** | **5** | **1** | **5** | **76** | **12** | **44** | **122** | **276** |

Source: AIC.

**Table 10: Number of Farmers Repeating Weather Insurance**

| Crop | Chittorgarh | Bhilwara | Total |
|---|---|---|---|
| Maize | 10 | 5 | 15 |
| Soybean | | 1 | 1 |
| Groundnut | 2 | | 2 |
| Bajra | | 1 | 1 |
| Jowar | | 1 | 1 |
| Moong | | 1 | 1 |
| **Total** | **12** | **9** | **21** |
| N | 86 | 101 | 187 |
| **Year** | | | |
| 2006 to 2008 | 3 | | 3 |
| 2006 & 2007 | 1 | 2 | 3 |
| 2006 & 2008 | 5 | 3 | 8 |
| 2007 & 2008 | 3 | 4 | 7 |
| Total | 12 | 9 | 21 |
| N | 86 | 101 | 187 |

Source: Field data.

**Appendix 1: ICICI-Lombard Policies**

| State | Customers No. | Polices No. | Sum Insured Rs. 000 | Premium Rs. | Sum insured customer | Premium per customer | Sum Insured per policy | Premium per policy |
|---|---|---|---|---|---|---|---|---|
| Total | 6703 | 7685 | 20406 | 1880961 | 3044 | 281 | 2655 | 245 |
| AP | 3083 | 3602 | 9942 | 932395 | 3225 | 302 | 2760 | 259 |
| Jharkhand | 178 | 185 | 341 | 23240 | 1916 | 131 | 1843 | 126 |
| Karnataka | 139 | 139 | 157 | 15970 | 1129 | 115 | 1129 | 115 |
| MP | 267 | 609 | 1069 | 96590 | 4004 | 362 | 1755 | 159 |
| Maharashtra | 3022 | 3136 | 8845 | 808620 | 2927 | 268 | 2820 | 258 |
| Orissa | 14 | 14 | 52 | 4146 | 3714 | 296 | 3714 | 296 |
| *Percentage* | | | | | | | | |
| Total | 100 | 100 | 100 | 100 | | | | |
| AP | 45.99 | 46.87 | 48.72 | 49.57 | | | | |
| Jharkhand | 2.66 | 2.41 | 1.67 | 1.24 | | | | |
| Karnataka | 2.07 | 1.81 | 0.77 | 0.85 | | | | |
| MP | 3.98 | 7.92 | 5.24 | 5.14 | | | | |
| Maharashtra | 45.08 | 40.81 | 43.35 | 42.99 | | | | |
| Orissa | 0.21 | 0.18 | 0.25 | 0.22 | | | | |

Source: Cole tat al. (2008).

**Appendix 2 : Rainfall Insurance Contract Specification**

| | | | | | Phase I | | Phase II | | Phase III | |
|---|---|---|---|---|---|---|---|---|---|---|
| **ICICI Policies** | | **Premium** | **National** | **Limit** | **Strike** | **Exit** | **Strike** | **Exit** | **Strike** | **Exit** |
| *Andhra Pradesh* | | | | | | | | | | |
| 2006 | Anantpur | 340 | 10 | 1000 | 30 | 5 | 30 | 5 | 500 | 575 |
| 2006 | Atmakur | 280 | 10 | 1000 | 45 | 5 | 55 | 5 | 500 | 570 |
| 2006 | Hindupur | 295 | 10 | 1000 | 25 | 0 | 15 | 0 | 500 | 580 |
| 2006 | Kondagal | 290 | 10 | 1000 | 55 | 5 | 60 | 5 | 330 | 410 |
| 2006 | Mahaboonagar | 270 | 10 | 1000 | 70 | 10 | 80 | 10 | 375 | 450 |
| *Gujarat* | | | | | | | | | | |
| 2006 | Ahmedabad high | | | | | | | | | |
| 2006 | Ahmedabd low | 144 | 5 | 500 | 100 | 10 | 65 | 5 | 550 | 650 |
| 2006 | Ahmedabad high | 197 | 5 | 500 | 150 | 50 | 90 | 10 | 550 | 650 |
| 2006 | Anand low | 155 | 5 | 500 | 100 | 10 | 65 | 5 | 550 | 650 |
| 2006 | Anand high | 204 | 5 | 500 | 120 | 20 | 90 | 10 | 550 | 650 |
| 2006 | Patan | 257 | 5 | 500 | 100 | 10 | 75 | 5 | 550 | 650 |
| | | **Rs. payout as a function of rainfall deficit from normal rain** | | | | | | | | |
| **IFFCO-Tokio Policies** | Premium | Normal | 40% | 50% | 60% | 70% | 80% | 90% | 100% | |
| *Gujarat 2008* | | | | | | | | | | |
| 2007 | Ahmedabad | 43.82 | 607.4 | 100 | 150 | 200 | 300 | 400 | 700 | 1000 |
| 2007 | Anand | 71.91 | 783.6 | 100 | 150 | 200 | 300 | 400 | 700 | 1000 |
| 2007 | Patan | 85.51 | 389.9 | 100 | 150 | 200 | 300 | 400 | 700 | 1000 |

Source: Cole, Gine, Tobacman, Topalova, Townsend and Vickery (2008).

**IDSJ Working Papers Since 2003**

**WP125** Gender Related Educational Development Index at Panchayat Samiti Level in Rajasthan (2000) by Hemlata Joshi, February 2003.

**WP126** Institutional Finance in Rajasthan : Recent Trends and Concerns by Surjit Singh, March 2003.

**WP127** Tourism in Rajasthan : Some Insights by Surjit Singh, March 2003.

**WP128** Food Security Issues in a State of Large Agricultural Instability : Rajasthan by Vidya Sagar, March 2003.

**WP129** The Relationship between Caste and Tribes in a Former Kingdom of Rajasthan Kingship and Tribal Sovereignty (The Case Study of the Minas in the Ancient Princely State of Amber) by GaCl de Graverol, March 2003.

**WP130** Self-goal Choice vs Institutional Choice : A Case of Institutional Renovation for Pastureland Development in a Rajasthan's Village by Sunil Ray, March 2003.

**WP131** Rural Tourism in India : Some Economic Dimensions by Surjit Singh, May 2003.

**WP132** Minimum Support Prices for Agricultural Commodities in India : Some Issues by S.S. Acharya and R.L Jogi, July 2003.

**WP133** Male Literacy Index at Panchayat Samiti Level, Rajasthan : A Geographical Interpretation (2001) by Hemlata Joshi, July 2003.

**WP134** Geographical Appraisal of Literacy Index at Panchayat Samiti Level : Rajasthan (2001) by Hemlata Joshi, August 2003.

**WP135** Bajara Gluts and Medium Term Agricultural Policy for Rajasthan by Vidya Sagar, November 2003.

**WP136** Segregation of Population in Jaipur City : The Past and Present by Surjit Singh, November 2003.

**WP137** Restoration of Degraded Pastureland Ecosystem in Semi Arid Rajasthan : A Study of Two Villages by Sunil Ray and Alka Upadhyay, January 2004.

**WP138** Mainstreaming Gender and Development : Policies, Interventions and Outcomes : A Perspective from Rajasthan by Shobhita Rajagopal, March 2004.

**WP139** Globalization and Cultural Imperialism : Gender Identities by Varsha Joshi, March, 2004.

**WP140** Farm Input Subsidies in Indian Agriculture by S.S. Acharya and R.L. Jogi, April, 2004.

**WP141** Social Capital, Local Institutions and Entitlement. A Case of Pastureland Development in Singhariya Village by Sunil Ray and Jagdish Sharma, July, 2004.

**WP142** Villages of Rajasthan. Glimpses from Village Studies by I.A.S. Officer Trainees by V.S. Vyas and Kamal Swami, August, 2004.

**WP143** Economic Development Regulation and Employment conditions : The Indian Experience by Sarthi Acharya, September 2004.

**WP144** Expenditure Management of Fiscal Adjustment. Subsidies in Rajasthan State Budgets by Kanta Ahuja and Chandrika Gupta, May 2005.

**WP145** Agriculture Credit in the Post-Reform Period : Some Concerns by Surjit Singh, June 2005.

**WP146** Upstream vs Downstream : Groundwater Augmentation through Rainwater Harvesting and its Implications for Agricultural Development by Sunil Ray and Mahendra Bijarnia, September 2005.

**WP147** Growth Poverty Interface in Rajasthan : A Tale of Two World Bank Studies by Vidya Sagar, January 2006.

**WP148** Body as Site, Body as Space. Bodily integrity and Women's Empowerment in India by Kanchan Mathur, June 2007.

**WP149** Agraian Crisis and National Commission for Enterprises in the Unorganized Sector : Recommendation *VERSUS* Reality by Mohanakumar. S., December 2009.

**WP150** Economic Performance of Rajasthan : Status and Constraints by Surjit Singh, January 2010.

**WP151** Identification of the Poor : Errors of Exclusion and Inclusion by Motilal Mahamallik and Gagan Bihari Sahu, Fabruary 2010.

**WP152** Gender Gap in Adult Malnutrition : How Does India Fare ? by Sunny Jose G, March 2010

**WP153** Urban Labour Markets and Returns to Migration : Destination Surat by Gagan Bihari Sahu and Biswaroop Das, April 2010.

**WP154** Depleting Water Resource in Urban Area by K.N. Joshi, July 2010.

**WP155** Impact of Economic Crisis on Workers in the Unorganised Sector in Rajasthan by S. Mohanakumar and Surjit Singh, November, 2010.

**WP156** The Limits to Agriculture Development under Decentralised Governance in a Globalised Market by S. Mohanakumar and R. Vipinkumar, December, 2010.

**WP157** Managing Risk for Indian Farmers is Weather Insurance Workable by Surjit Singh and R. L Jogi, May 2011

**WP158** Plantation Crops under Trade Liberalisation, Analysis in the context of Indo-ASEAN FTA by S. Mohanakumar, August, 2011

For Further information, please contact Mr. M.I. Khan, Librarian at the Institute's address or email : mikhan@idsj.org. List of WP prior to 2003 can be had from the librarian.