



# Relevance of Weather Insurance in Indian Agriculture

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## Introduction

The importance of agriculture in Indian economy is immense in terms of its contribution to GDP - at around one fourth. It provides livelihood to a vast majority of rural mass consisting about three fifth of its population spreading through length and breadth of the country. Above all, the dream target of 8 per cent growth in medium term by the policy makers depends largely on the agricultural and allied activities. However, the agriculture sector in India continues to be the most vulnerable sector despite the improvement in scientific and technological innovations. Given its inherent link to the vagaries of nature, agricultural production is susceptible to production variability. Let alone the extremes, the agricultural sector even in the normal course is exposed to a

large number of other risk factors. In this backdrop, this paper attempts to highlight the concept of weather insurance and its relevance to Indian agriculture in managing the risk. Also, the paper briefly discusses the risks involved in agriculture and the earlier attempts to mitigate the same which has restricted to crop insurance schemes, the importance of weather insurance and its variants including an attempt on the recent Indian experience besides the cross country experience.

## Risk Elements Faced by Indian Farmers

In a vast and geographically heterogeneous country like India, agriculture has been susceptible to large scale damages due to attacks of pests and diseases. Agricultural risks

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are related to natural disasters and are widespread. Those are neither completely independent nor correlated with any of the discernible events. It is absolutely necessary to manage such risks if impossible to mitigate them. The most prominent risks related to weather are insufficiency of quantum of water/rain, soil quality, pests and diseases having impact on the agricultural performance. Besides, market fluctuations, changes in domestic and international agricultural policies, carrying capacity, extent of subsidies, incentives, tariffs and credit facilities are amenable to the control of human factor.

### *Insurance as Risk Management in Agriculture*

As pointed out earlier, though a number of factors affect the Indian agricultural production as well as productivity, the main risk being its excessive dependency on 'weather' which is beyond the control of human beings. The crop insurance as a risk management tool has been in practice quite for some time in Indian agriculture in different variants. It may be mentioned that information on weather is not free of cost and, therefore, insurance becomes expensive to farmers. Though farmers are perceived to know their risks better than the Government or other institutions, it is surprising that both farmers and decision makers tend to underestimate the risk of agriculture especially due to unpredictability of the nature's adversity.

To provide insurance cover to protect the farmers is not new in Indian agriculture. Since Independence, agriculture sector received greater attention and the Government had always been conscious about the vulnerability of the sector. With the active initiatives and support of the Government, Multi Peril Crop Insurance Schemes had been tried out in various forms in a number of occasions. For instance, with a view to provide coverage to the farmers in the event of failure of crops, the Government took initiatives as early as in 1965 by introducing a 'Crop Insurance Bill' and circulated a model scheme of crop insurance on compulsory basis to constituent State Governments for their views. However, it was only in early seventies some schemes were initiated. A publicly administered insurance program, viz., Pilot Crop Insurance Scheme (PCIS) was introduced in 1979. All-Risk Comprehensive Crop Insurance Scheme (CCIS) for major Crops was introduced coinciding with the introduction of the Seventh Five Year plan and was implemented for 15 years starting from Kharif crop of 1985 to 1999. The scheme have had a positive impact on agricultural production in respect of crops insured and was a popular program particularly in areas where the risk factors in agriculture was relatively higher. This positive and stabilizing influence came, of course, at a large cost. Subsequently, with years of experiments and

trials, on a pilot basis, the National Agricultural Insurance Scheme (NAIS) 1999-2000 was introduced and recently the Farm Income Insurance Scheme (FIIS 2003-04) was introduced. Every scheme has been flawed in some way or the other, yet it is needless to emphasise that the Government has always been striving hard to strengthen the agriculture sector by protecting the farmers' interest from the vagaries of weather.

### *Government versus Private Insurance Schemes*

The subsidised government sponsored 'insurance schemes' in most of the countries were implemented in various forms. However, empirical evidence revealed that, both in developed and developing countries, the subsidized crop insurance schemes were run at huge losses while not delivering an effective result. The inadequacies of such schemes have been well established with the repeated failures. On the other hand, private insurance schemes have improved a lot in situations where it was feasible and no subsidised insurance was offered. The farmers stated to have benefited from private insurance, to the extent, when there were several competitors existed, mainly in the form of quicker settlement of the claims. The Indian government's most recent crop insurance scheme, viz., the National Agricultural Insurance Scheme (NAIS), has been implemented since the Rabi season of 1999-2000. Within five years, the NAIS is supposed to become financially sustainable, by charging farmer's premium based on actuarial rates and administrative costs. The most prominent shortcomings of previous crop insurance schemes were that of 'group insurance schemes' aimed at farmers taking crop-loans from banks and the risk were shared among Central Government, State Governments and the General Insurance Corporation, which has its own limitations. Twenty-two states/union territories participated in the CCIS, while only 16 are participating in the NAIS. The leading agricultural states like Punjab and Haryana have not participated in either CCIS or NAIS. The NAIS is being operated under the area-approach currently and in only a few selected districts the 'individual' approach is also being implemented on an experimental basis. The area approach is operated under the results of crop-cutting experiments. Each year a set number of plots with the insured crops for a certain area are being used as the indicators of an individual farmer's losses within that area. The unit area can be as large as a Block/Taluka or as small as 4-5 villages (Gram Panchayat level).

The main flaws of the NAIS are its failure to address adverse selection, arbitrary premiums, and the area approach. The NAIS offers premiums in the range of 1.5 to 3.5 per cent, varying from crop to crop. Although premiums are higher

than those of previous schemes, based on past experience, they are still not high enough to cover claims. Farmers growing commercial or horticultural crops covered under the NAIS are supposed to pay actuarial rates, which in any case, unaffordable to them. For all crops, the NAIS is supposed to become financially viable within five years, with yearly increases in premiums based on administrative costs and actuarial rates. If the NAIS becomes financially viable, private crop insurers would also be encouraged to find it feasible to enter the field. Experience world over reveals that the private crop insurance schemes have been undertaken for a wide range of agricultural activities in majority of the countries, even though it was pointed out to be 'not always' cost effective. The private crop insurance has tended to cover more specific risks and not cover other incidental risks. Even though these insurance policies stated to be beyond affordability of farmers of all categories, they were perceived as beneficial to the farmers mainly on the grounds of easy and far speedier settlement of the claims. Private insurance programs vary from tropical plantation crops in Latin America to tree crops in the USA (Gudger, 1991).

### Importance of Weather Insurance

'Weather insurance' is nothing but the insurance cover against losses incurred due to uncertainties in climatic conditions. Basically, it is aimed to be used as hedging instrument against any vulnerability of crops or any other damage incurred in agricultural activities due to erratic and irregular weather. It is also denoted as 'weather based index insurance' and 'weather event insurance'. However, weather insurance is not exclusive to the agriculture alone but industry, sports events or any other commercial events that incur loss due to the vagaries of weather. In western countries, most of the sports and entertainment events are being insured against the erratic behaviour of weather. Weather insurance, therefore, has broader connotation. Weather insurance has been in practice in Canada, the US and European countries. There has been regular mapping of the weather risks in these countries. It is likely that as agriculture being one of the largest sectors predominantly dependent on the vagaries of weather conditions, the weather insurance has been more identified with respect to agriculture or farmers. Thus, in a broader sense weather insurance protects any financial loss one may incur due to specific weather perils. 'Rainfall contracts' are an example of weather insurance. Rain fall is relatively simple to monitor and the history of rainfall in most areas is well known and farmers would be compensated if the rainfall in an area would go below a benchmark level, with varying levels of payment depending upon the level of rainfall. However, the

benefits are significant, including reduction of moral hazard, adverse selection and transaction costs (Skees: 2000).

### *Is weather Insurance superior to the Crop Insurance Schemes?*

It is often understood that 'weather insurance' is same as the 'crop insurance' and weather insurance is only based on the 'rain fall index'. However, it needs to be clarified that 'rain fall insurance' is only a part of the weather insurance. Rainfall index is one of the parameters required for measuring the overall weather impact on the agriculture and weather insurance includes other parameters such as temperature, windfall and hail. Just as crop is only one aspect of the agricultural operation, the crop insurance is also much narrower concept compared with the weather insurance. Furthermore, weather insurance also has the following characteristics:

- ❑ The weather based insurance schemes are quite easy to administer as claim payment is triggered by more transparent, objective and scientifically determined weather parameters. It also leads to low cost management.
- ❑ The overall design of weather insurance considers region, locations of agricultural and climatic conditions/properties and the productivity levels
- ❑ It provides greater scope of flexibility in terms of indemnity level and coverage also.
- ❑ It is more transparent and, therefore, gives high level of comforts to clients.

Above all, the claim settlement is a hassle-free process, which the beneficiary considers as the most important advantage as he is not required to file a claim for losses. The value of crop insurance, private or subsidized, is much debated by academicians and policymakers alike. The concept of index-based contracts for the broad-based 'natural disasters' in place of crop insurance has been recently introduced increasingly in western countries. Farmers would purchase a contract and be compensated when a certain event or natural disaster occurs or with the failure of monsoon, rainfall below or above the required level. It was for these reasons, the Union Budget 2005-06 has also delved on weather insurance as one of three possible tools of risk management, the others being the crop insurance and income insurance for obvious reasons.

### *Cross Country Experience*

Agriculture is prone to more or less typical risks both in the developing and developed countries which are beyond the

control of human being. In the United States, crop insurance is subsidized by the government but administered through the private companies. Similarly, moral hazard is also less of a problem, as hail is a natural occurrence. It is also worthwhile to be pointed out that the Multi-Peril insurance subsidized by the government is considered to be too expensive if offered without subsidies, as pointed out by some studies. A crop insurance agent from Mid-west estimated that over half of the farmers who purchase subsidized Multi-Peril crop insurance also purchase hail insurance, which is non-subsidized insurance. The model used for hail insurance can also be used for other natural catastrophes, such as drought, flood and wild-wind, etc. The current subsidised insurance programme administered through the private companies is relatively new but reasonably successful.

A study by Sakurai and Reardon (1997) indicated that there was a long pending demand for formal and government sponsored drought insurance in Burkina Faso. The demand for drought insurance was found to decrease in households with higher overall incomes and more self-insurance schemes coming into being. The authors suggested that crop insurance alone is not sufficient; that policy and programmes that supports self-insurance, such as micro credit or increase of off-farm employment are also important. In Canada, crop insurance was administered through 'area approach', similar to that of India.

The studies conducted by Turkey and Islam since 1995 indicated that the area approach was not only inequitable but also inefficient. The empirical research covering 537 farms strongly confirmed the belief that individual crop insurance is better in terms of risk reduction, but premiums would be higher. The area approach in Canada was concluded to be inequitable, as benefits were not fairly distributed. The most benefits to be accrued would be by the farmers with yields closest to the average.

Crop insurance in South Africa was started as early as in 1929 when a group of farmers started a pool scheme. Subsidized multi-peril insurance was offered for some time, but no subsidies have been given for the past fifteen years or so. Hail is the major risk covered alongside other hazards. The South African case illustrates how private individuals can offer crop insurance that is beneficial to farmers and how crop insurance can still exist after subsidies are withdrawn.

### *Recent Experience of Weather Insurance in India*

With support from the World Bank and IFC, an Indian insurer, ICICI Lombard have conceptualized and modeled the 'rainfall insurance' policies and sought for reinsurance.

Bharatiya Samrudhi Investment and Consulting Services Ltd (BASIX), one of India's largest microfinance institutions with nearly 60,000 borrowers in nine states, sold around 250 policies to groundnut and castor farmers in the state of Andhra Pradesh alone through KBS Local Area Bank. It has also proposed selling policies to soya farmer in Vidisha, Madhya Pradesh. The district is prone to frequent droughts and had experienced three consecutive droughts in the recent past. KBS Bank has added its own new justification for introducing the rainfall insurance, as the LAB is restricted to function within the jurisdiction of only few adjoining districts. Its exposure to failure is higher and in order to safeguard its own interest against default of borrower farmers in these districts, it offered 'rainfall insurance' to its borrowers as it would mitigate the risk inherent in lending in drought prone areas such as Mahabubnagar, Raichur and Gulbarga districts. KBS Bank bought a bulk insurance policy from ICICI Lombard and sold around 250 individual farmer policies for small, medium and large groundnut and castor farmers. For this purpose, small farmers were defined as households farming less than 2 acres of land; medium-sized farms cover between 2 and 5 acres; and large farmers were those of more than 5 acres. Premium rates for groundnut crop were Rs. 400 for the small farmers with a maximum claim of Rs.14,000. Medium farmers pay Rs. 600 with a maximum claim of Rs. 20,000 and large farmers pay Rs.900 for a maximum claim of Rs. 30,000. As this was a pilot project, KBS Bank resolved to limit the liability per farmer rather than impose per acre limits to manage overall liability. This seems to have made the scheme easy to understand by the farmers. Significantly, KBS Bank and ICICI Lombard opted for a weighted and capped rainfall index, which means that the maximum rainfall counted per sub-period is limited to 200 mm and that more critical periods for plant growth are weighted more heavily than others.

It is even more interesting and startling to note that a survey on the farmers' opinion revealed that the farmers were stated to have well aware of the rainfall-based index, nature of the contracts and the associated basis risk. Nevertheless, the farmers seem to value the quick payout of the rainfall policy, more than other aspects such as premium being little on higher side as also the existing crop insurance policy in India, where claims take at least one year to settle. Now that weather insurance has taken off the ground, the real challenge before us is to scale up the distribution and ensure fast claims settlement (Agrawal and Mahajan: 2004).

Weather insurance is not only relevant for big farmers in rich countries, but also relevant to small farmers because they are more vulnerable for the risk of failure or erratic monsoon. In India, hundreds of small holders stated to be showing interests in buying insurance policies that protect them

against extreme changes in weather patterns. It is significant to underscore that one of the top five global insurers has agreed to reinsure this rainfall insurance portfolio of one of the private insurance company. Successfully coming out with such schemes based on the reliable models which is acceptable to strike a deal in international reinsurance markets, in itself doubtlessly speaks volume on the potential for weather insurance around the world.

### *Varsha Bima 2005*

The latest in the series of Government sponsored insurance program is called as Varsha Bima 2005 which came into effect on June 1, 2005. For the first time, the Government had come out with weather insurance in the form of rainfall insurance. Compared with the previous crop insurance schemes as outlined above, this is a broad based scheme and based on more scientific lines. The scheme offers farmers quick compensation and it aims to be a buffer against 'erratic rainfall and crop failures'. This scheme has compensated Indian farmers for crop failures or low yields due to unpredictable monsoons. Varsha Bima 2005 aimed to insure the kharif crop against rainfall inadequacies in 142 rain gauge districts in 10 Indian states - Andhra Pradesh, Karnataka, Chhattisgarh, Gujarat, Madhya Pradesh, Maharashtra, Orissa, Tamil Nadu, Uttaranchal and Uttar Pradesh. It would cover more crops across the rest of the country. According to the scheme, the lower the rainfall, the higher will be the pay-out to farmers. A recent survey highlights that farmers 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.

### *Sookha Suraksha Kawach (SSK)*

The annual rainfall in Rajasthan varies drastically across east and west of the State. Furthermore, there is high spatial and temporal variation in rainfall across the State. The average rainfall ranges from less than 10 cm in northwest part of Jaisalmer to 40 cm along the western periphery of the Aravalli range. The Government of Rajasthan has introduced SSK in 2005 exclusively for the state and it is a unique insurance product designed solely for the requirements of drought stricken farmers of the State. It has been designed for widely grown crops like Guar, Bajra, Maize, Jowar, Soya and groundnut, which are conducive for cultivation in the semi-arid climate of the state of Rajasthan.

### **Concluding Observations**

The adverse selection is observed when a group of farmers

is offered crop insurance at the same premium as is often in the case of Government administered crop insurance. This can be avoided in the case of weather insurance. While the government could continue to administer its crop insurance program, private companies over a period of time phase out the subsidy in a gradual. The subsidizing premium rates for crop insurance offered through private companies would not only give the private sector insurers more business incentive to enter the agricultural sector, it will not create a vacuum of sudden withdrawal of subsidies, which will also guard against the political repercussion for some times.

As the insurance sector is opened up for private sector, it would be more appropriate to allow the insurance companies take active participation by taking a lead role at the earliest within the effective regulation and supervision of Insurance Regulatory and Development Authority (IRDA). If the farmers have the capability of risk management with different tools, they should not be compelled to purchase crop insurance even if they avail credit from banks and financial institutions. The performance and successful story of the KSB in the select districts of Andhra Pradesh and Karnataka can be replicated in other parts of the country. In any case weather insurance seems to be superior, transparent broad based and easy to operate in India.

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