19 An insight on farmers' willingness to pay for insurance premium in South India: hindrances and challenges

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SUMMARY

Farmers are vulnerable to substantial weather risks in many parts of the country. In recent years, weather-based crop insurance has been promoted in India for rain-fed crops to provide insurance against risks and losses in crop yields resulting from adverse weather. Farmers, in general, are not aware of the details of weather-based crop insurance policies and the premium calculations. This study focuses on farmers' preferences towards the weather insurance of paddy crop, one of the major irrigated crops in India and highly vulnerable to extreme weather. We analyse the mean willingness to pay for weather-based crop insurance using the double bounded dichotomous model of contingent valuation method. Farmers' willingness to pay was about 2.5 % of gross income with the condition of timely payout for crop losses, creating awareness of the compensation packages and simple documentation. The insurance premium can also be referred to as a risk-adjusted management input in agricultural production.

1. INTRODUCTION

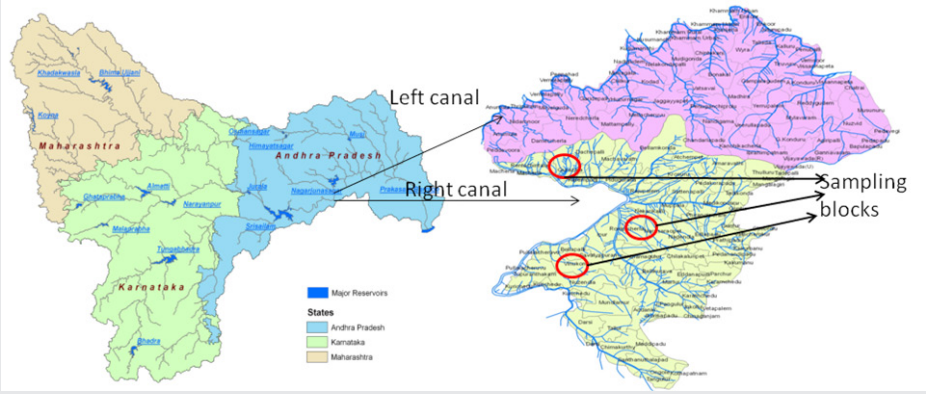
Agriculture is prone to various risks due to production, weather, technological and market uncertainties. Losses arising out of these risks have to be mostly borne by farmers. The majority of Indian farmers operate on a small scale, and often find it difficult to adjust to uncertainties, especially the risks from extreme weather events and variability in climate. Some 65 % of Indian agriculture is heavily dependent on natural factors, particularly rainfall. Studies have reported that rainfall variations account for more than 50 % of variability in crop yields (Agricultural Insurance Company of India Limited, 2005) and a high degree of correlation exists between the rainfall and agricultural production (Gadgil, 2003). Studies on inter-annual and long-term variability of monsoon rainfall have also indicated that variation in rainfall for the subcontinent has a statistically significant (Thapliyal and Kulshrestha, 1991; Srivastava et al., 1992) impact on agricultural production and the national economy.

Farmers in India normally make several adaptations to the changing rainfall pattern, starting from changes in the cropping pattern, delaying sowing time, keeping the land fallow and investment in bore wells. However, government departments also help farmers to cope with risks and weather uncertainties on an ad hoc basis, through subsidies on inputs, waiver of crop loan repayments and crop insurance to compensate the losses. The Government of India has been promoting the crop insurance schemes in association with the state governments since the 1970s. However, due to various institutional constraints, the schemes have not been very popular amongst farmers.

Looking at the overall insurance system, there has been a continuous change in approach for loss assessment and indemnity payments since crop insurance was introduced. The crop insurance business is expanding in terms of the number of crops covered, the number of farmers covered, the premium amounts collected and the premium rates, the amount paid for settling claims, etc. The National Agricultural Insurance Scheme (NAIS) initiated in 1999–2000 was adopted by 23 states and two union territories. The scheme is available for all loanee and non-loanee farmers irrespective of the size of holding. The NAIS covers all the food crops (cereals, millets and pulses) exposed to risks such as drought, excess rainfall, flood, hail, and pest infestation. The NAIS scheme covered more than 110 million farmers and 11.42 million hectares of cropped area in 2008. The scheme is based on the historical yield data of 10 years. Basis risk is high due to the difference between the yield of the area (block) and the individual farmers, high loss assessment costs and delays in processing claims.

The better accessibility to weather data, higher accuracy of weather forecasts and the expansion of meteorological network have recently led to another insurance approach, the Weather-Based Crop Insurance Scheme (WBCIS). The WBCIS operates on the concept of 'Area Approach' (i.e. for the purpose of compensation, a Reference Unit Area (RUA) is deemed to be a homogeneous unit of insurance). The state government notifies all the insured cultivators in a particular RUA of the insured crops before the commencement of the season. Each RUA is linked to a reference weather station. The WBCIS has been implemented in selected states of India on a pilot basis since 2003, providing compensation for adverse conditions of relative humidity, unseasonal rains, and heat. The WBCIS was extended to 20 states at the end of 2009. The WBCIS was implemented for selected crops such as groundnut, maize, cotton, chillies, tomato, brinjal and selected plantation crops, but not irrigated paddy crop.

Figure 1: Krishna River basin and the Nagarjuna Sagar project with left canal and right canal



Nonetheless, a number of these policies or measures are ad hoc and, in most situations, farmers neither get timely information to claim the losses, nor compensation. There are still some difficulties in implementation, linked to premium rates for different crops, farmers' unawareness of the use of WBCIS, etc. These difficulties entail lower insurance interest on the farmers' side. At present, index insurance is deemed to work if there is a sustained demand for it, which depends on farmers' understanding of the true value of insurance.

To this end, the present study was designed to address farmers' willingness to pay for the irrigated paddy crop in the Nagarjuna Sagar Project (NSP) located in the Krishna River basin in Andhra Pradesh. This would help the policymakers and the insurance companies to better understand the insurance of paddy crop under WBCIS and develop the relevant payouts. The study also focuses on the constraints in adapting the crop insurance, the perceptions of farmers to climate change and, particularly, rainfall variability.

2. METHODOLOGY

2.1. Study area

The Nagarjuna Sagar Project (NSP) from Krishna River basin in Andhra Pradesh was selected for the study. This is a multi-purpose project with irrigation, hydropower and flood control components. The major NSP canals, the right and left canals cover five districts, namely Guntur, Prakasam, Nalgonda, Krishna and Khammam, with a 0.82 million hectare command area (Figure 1).

The Guntur District has the highest command area of 0.28 million hectare. Some 240 paddy farmers were randomly interviewed during the 2010 Rabi season from the head, middle and tail ends of Nagarjuna Sagar project right canal area in Guntur District covering six villages from three mandals (blocks). Data related to the household characteristics, their perceptions of the crop insurance and their willingness to pay for weather-based crop insurance for paddy crop was collected. In addition, Agricultural Insurance Company of India Limited (AIC) officials were also interviewed on the constraints of the crop insurance implementation.

2.2. Analytical tools

To elicit farmers' willingness to pay for weather-based crop insurance, the double bounded dichotomous model of contingent valuation (DB-DCV) method was employed as it has been the most popular method for assessing the value of any non-market goods during recent times (Haripriya, 2003; Herriges and Shogren, 1994; Pinuccia and Elisabetta, 2000; World Bank Institute, 2002). The DB-DCV method is superior to an open-ended format as it confronts respondents with a more market-like situation (Bateman et al., 2002) and is statistically more efficient than conventional single bound contingent valuation method in reducing anchoring bias, 'yea-saying' bias, standard error of parameter estimates and confidence interval to willingness to pay estimates (Hanemann et al., 1991).

To obtain realistic willingness to pay estimates in CV studies, the reference (status quo) and target levels of each attribute of interest should be clearly described to the respondents (Bateman et al., 2002). The weather-based crop insurance policy was explained in detail to all farmers, before they were asked whether they would be willing to pay for weather-based crop insurance policy at a certain price level. The exact wording of the question posed to farmers was: 'Suppose new weather-based crop insurance is coming into the market, which is effective in compensating farmer losses based on the cost of cultivation and deviation of pre-fixed weather parameter from its normal level in your locality. There will not be any yield loss estimation survey or crop-cutting experiments for assessing yield loss. In this case, would you like to take the crop insurance? If "Yes", would you pay INR XXX per hectare as a premium for insurance policy which would provide a compensation of INR YYY per hectare if the insured event occurs?'

Depending on the response to first bid, the second bid was prsented: for 'Yes' respondents, the second bid was higher and for 'No' respondents, it was lower than the first bid. The amount of the second bid was also assigned randomly across all interview schedules. Farmers were told that weather-based crop insurance pays out only if the concerned weather parameter (rainfall or other) deviates from a pre-fixed trigger level in both directions (i.e. deficient or excess). If the farmer refuses to pay any bid amount, he was asked to mention the reason for non-willingness to pay for weather-based crop insurance or any suggestions or modification they have other than those mentioned in the weather insurance product presented to him.

Relevancy rating was employed to evaluate the importance of different constraints faced in the implementation of an insurance scheme in the study area. The farmers and AIC officials were asked to rate the constraints in a five-point relevancy continuum, namely 'Very highly relevant', 'Most relevant', 'Relevant', 'Less relevant' and 'Not relevant' (Manojkumar et al., 2003).

Furthermore, to evaluate the farmers' perceptions about the climate change, the Henry Garrett Ranking Technique was used (Garrett and Woodworth, 1971). In this method, farmers were asked to assign ranks to seven prominent climate change phenomena depending on their observations. The order of merit given by the farmers was converted into ranks.

3. RESULTS AND DISCUSSION

The sample farmers interviewed were cultivating paddy as a major crop on their farms. Other major crops include chilli and cotton, and tobacco to some extent. All farmers were using canal water as a major source of irrigation for the cultivation of paddy crop. The average age of farmers from the sampled data was 44 years, where most of them (45 %) were primary educated (1–4 standard). The majority of these farmers (59 %) observed considerable variability in the weather over the past 10 years, while 31 % observed little variability in weather. Farmers were very much concerned too about climate change (47 %).

Farmers' perception on climate change shows that 'irregular weather' holds the highest mean score in the first Henry Garrett Ranking which indicates that farmers have frequently observed irregularities in the climatic phenomena over the last 10 years. 'Untimely rains, storms and floods' held second position in the Henry Garrett Ranking and 'persistent drought', third position. The 'temperature fluctuation high or low' was at the bottom of the list bearing lowest mean score. All these ranks indicate that farmers are well aware of the climate changes over the years and the risks from such climate variability or change to crops and their livelihoods. These perceptions, perhaps, would have some bearing on their willingness to take a crop insurance policy. However, there are other constraints that influence farmers' interest in the crop insurance policy as observed in the study.

The constraint bearing highest relevance coefficient (RC) is 'Scheme does not indemnify even if I suffer loss' which bears the highest RC (0.74), followed by 'Payouts are not made in time' (0.71). This raises concern about small farmers because if compensation is not made on time, small farmers are unable to continue production during the next season due to lack of money to purchase inputs. This may affect the total production of paddy in the district as farmers may not take risk in spending more money on inputs such as fertilisers and chemicals during water scarcity periods. On the other hand, AIC officials revealed that frequent relief assistance by the government to farmers in event of natural calamity and high claims to premium ratio reduces the financial viability of the insurance scheme RC (1). Furthermore, loosely laid compensation frameworks, particularly in estimating and confirming the crop losses, makes the payment difficult and time-consuming.

Studies on the factors affecting willingness to pay for the WBCIS are scarcer; such findings would be useful in the development of premium products and policy recommendations. The log-likelihood analysis in the study show that the farmers' age was negatively significant implying farmers' willingness to pay for the WBCIS will decrease with increase in their age. Increase in the farmers' age reduced the log-likelihood of their willingness to pay by – INR 24.48 which was significant at 1 % level (Table 1). Furthermore, old farmers

were comparatively illiterate and had difficulties in understanding the insurance concept. The result was in contrast to Seyed et al. (2010), who stated that farmer's age was positively related to the adoption of crop insurance by Iranian farmers. This may be due to differences in socio-economic features of the farmers of India and Khuzestan Province of Iran.

Farmer's education was found to be positively significant with the willingness to pay. As the farmers' educational level increases, their willingness to pay for WBCIS also increases by INR 39.35, which is significant at 1 % level. This result was in compliance with the result obtained by Seyed et al. (2010) who stated that farmer literacy level was positively related to their adoption of crop insurance. Farm size was found to be positively significant with the willingness to pay. As the farm size increased, farmers' willingness to pay for the WBCIS also increased. The marginal effect of farm size on farmers' willingness to pay was INR 38.78 which was significant at 5 % level of significance.

Table 1: Results of the log-likelihood model for DB-DCV

Variables	Coefficient (Std. Error)	Z value	P > | z |
Farmer age (years)	– 24.48** (8.15)	– 2.64	0.008
Farmer education (years)	39.35** (15.12)	2.60	0.009
Farm size (ha)	38.78* (17.21)	2.25	0.024
Farming experience (years)	11.28 (8.35)	1.85	0.052
Annual income (INR)	0.0013* (0.0005)	2.23	0.026
Awareness about crop insurance (Yes/No)	77.97* (31.7)	2.46	0.014
Institutional credit access (Yes/No)	2.77 (132.62)	0.02	0.98
Constant	716.48* (293.12)	2.44	0.015
ln σ	6.27 (0.11)	56.92	0.00
σ	528.15 (58.17)	—	—
Log-likelihood	– 202.30	—	—
Chi-square (χ^2)	53.99	—	—
Estimated mean willingness to pay (INR ha^{-1})	1 421	—	—

The other important factor playing key role in the farmers' willingness to pay was the awareness programme on the WBCIS. The marginal effect of the awareness programme on farmers' willingness to pay was INR 77, and significant at 5 %. The mean willingness to pay for paddy WBCIS was INR 1 421/ha, which is about 4.7 % of the maximum compensation offered (INR 30 000/ha). In other words, the farmers are willing to pay up to INR 4.7 for compensation of INR 100 during the critical climatic conditions.

It is worth mentioning that the mean willingness to pay for the WBCIS is comparatively higher than the premium rate of NAIS (2.5 %) for paddy crop. The farmers are also willing to pay on the conditions of timely payout for crop losses, sufficient awareness about the compensation packages, and of ease of documentation and the compensation process. The estimated mean willingness to pay for the WBCIS is about 2.5 % of the gross income (INR 56 840/ha), 0.6 times of seed cost (INR 950/ha) and about 0.5 times of the irrigation cost INR 650/ha). Hence, insurance premiums can also be considered a small portion of the input cost and can also be viewed as a risk adjustment management input instead of a separate cost of cultivation. As the insurance premium is comparatively less, it can be encouraged to be adopted by all farmers.

4. CONCLUSIONS

Compared to conventional crop insurance, weather-based crop insurance schemes are expected to provide significant weather risk reduction in the agricultural sector. The latter is currently being tested in most of the states in India on various crops and through subsidies by the state and central governments. Hence, it is important to create more awareness of the farmers of the insurance schemes in order to ensure their financial security in the event of heavy loss due to unmanageable adverse weather events such as floods, droughts, etc.

The major factor which may increase the farmers' willingness to pay for the WBCIS is the large-scale awareness programme: it was also found to be significantly influencing the farmers' willingness to pay. The AIC could run intensive awareness campaigns for farmers through different programmes such as Rachabanda and Polambadi, or displaying pictorial flexies showing the benefits of the WBCIS at Grampanchayat offices, farmers' meeting places, village libraries and temples, and through different mass media such as agricultural periodicals, newspapers and television. AIC representatives should visit villages to provide in-depth awareness about the WBCIS. Bankers can quote numerical facts to farmers about similar schemes, if any, which are being implemented in any other region. The AIC could ask for help from the local agriculture extension officers to arrange awareness programmes.

The state governments have decided to use mandal (block)wise automatic weather stations for the forecast and the WBCIS. The private services can also emerge in the market for providing weather data for forecasting and scale-up weather-indexed insurance. The private insurance companies such as BASIX and ICICI Lombard, which are already in the field of indexed insurance can intensify the awareness programmes by providing forecast information to the farmers and developing the new insurance products according to the local climatic conditions.

The forecast information would have a large impact on weather-indexed insurance for irrigated crops (like paddy) and, already in some states, automatic weather station networks are being set up. Researchers can also play a key role in bringing out the socio-economic issues and farmers' perceptions on the insurance index. Further research can focus on the development of payouts for the RUA based on their cost of cultivation and weather parameters. Working out different premium and compensation packages will provide more opportunities to accept the World Bank Institute as a viable risk-bearing strategy. The premium can also be considered as an input (management) cost, thus making it justifiable for its inclusion in future crop production programmes.

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