Crop Insurance in India: Changes and Challenges

RESHMY NAIR

An evaluation of the crop insurance programme in India through the multi-peril yield-based National Agricultural Insurance Scheme reveals that while it has done well on equity grounds, the coverage and indemnity payments are biased towards a few regions and crops, and there are delays in settlement of claims. And while the emergence of weather-based insurance as an alternative has addressed several limitations of traditional insurance, it is faced by challenges of a different kind. Both these forms of insurance must thus be looked upon as complementary to each other in order to evolve an efficient mechanism for dealing with natural disaster risks in agriculture.

Weather variability and uncertainty of crop yields is a basic risk faced by agriculturalists worldwide. However, the magnitude and intensity of this is particularly high in India owing to extreme dependence of the farm sector on weather conditions and the poor economic condition of the overwhelming majority of farmers who have extremely limited means and resources to cope with the disastrous consequences of a crop failure. Given the importance of the agricultural sector to the growth trajectory of the economy and the inevitability of climatic aberrations playing havoc with crop production, the need for and benefits of crop insurance hardly need elaboration.

The focused approach on crop insurance as a planned mechanism to mitigate the risks of natural perils in farm production has resulted in the evolution and improvement in the crop insurance programme over the years. The pilot projects carried out within the country since 1972-73 gave way to the Comprehensive Crop Insurance Scheme (1985-99) and its vastly improved successor, the National Agricultural Insurance Scheme (NAIS). The last couple of years have seen the entry of private sector in crop insurance with the emergence of weather insurance products, widely touted as the solution to the inherent drawbacks of the yield-based insurance.

Crop insurance, especially insurance of yield, is a very complicated concept to administer. The reasons are many – the systemic nature of agricultural risks going against the working of the “law of large numbers” on which premium and indemnity calculations are based, the tremendous scope for moral hazard that conveys the basic “principle of utmost good faith”, the difficulty of curbing adverse selection and, above all, the twin problems of non-violability and unaffordability that result in a see-saw battle of judgment to continue with the subsidised flat premium rates or to move forward to an actuarial regime. In the case of crop insurance, the pooling concept needs diversification or spread not only over areas but also over time periods. A case for compulsory yield insurance for those availing institutional credit, as in India, is made on the grounds that it eliminates the problem of adverse selection besides taking care of the pooling concept by ensuring the uninterrupted participation of farmers both in good and bad years. The crop insurance programme thus also benefits banks by working as a collateral security. However, less than one-third of the farming community avails of institutional credit in India and for the remaining, insurance continues to be voluntary. Insurance in Indian agriculture is more challenging than in the developed countries due to its inherent nature – a large number of small and scattered landholdings, varying climatic and soil conditions, lack of basic data, and variety of agricultural practices, making it practically impossible to implement the scheme on an “individual basis” on a wide scale. Further, there is widespread lack of knowledge about the nature and functions of crop insurance amongst the farmers, a majority of whom are illiterate and poor.

Evaluating the NAIS

The countrywide crop-yield insurance programme, viz, the NAIS, is nearing a decade of its implementation. Presently, the scheme is being implemented by all the states except Punjab, Arunachal Pradesh, Manipur and Nagaland. Given the above mentioned practical difficulties of implementing the scheme on an individual basis, the NAIS continues to be operated on the “area approach”, whereby homogeneous areas are defined as insurance units (district/taluka/block/mandal/circle/gram panchayat/village, etc) and all the insured farmers in the defined area get the same indemnity (when the season’s average yield per hectare of the insured crop for the defined insurance unit falls below the guaranteed yield) per unit of sum insured.

A disaggregated study of beneficiaries under the NAIS reveals that more than 60% of the farmers, who benefited under food crops and oilseeds, belong to the small and marginal category (having landholdings less than two hectares). Also, while small

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and marginal farmers accounted for only one-third of the total claims (given their smaller landholdings and hence the lower sum insured), this is significantly higher for crops like paddy, wheat and sugar cane, where more than half of the total claims disbursed were for these categories. Despite these encouraging results from the equity point of view, an analysis of the penetration levels across regions and crops does not show very impressive results.

Even after 23 years of its existence, less than one-fifth of the farmers are insured in the country, with only a few notable exceptions like Rajasthan, where about 50% of the farmers/holdings are insured. The scheme has not really proved a significant risk mitigation tool for the farmers in many regions. Cases of agricultural suicides across the country do imply that risk mitigation measures currently in place have major shortcomings. Though farmer suicides can be attributed to a multitude of reasons, one cannot deny that a successful insurance programme would have greatly contributed in ameliorating the suffering of the farmers during crisis years.

An analysis of crop insurance statistics reveals that the coverage and indemnity has been clearly biased towards a few regions and crops. Gujarat accounts for a quarter of the total indemnity amongst the implementing states. Also, more than one-third of the total indemnity is for a single crop, namely, groundnut. State-wise indemnity payouts also reveal a high level of concentration of settlement of claims in certain regions and crops.

The sharp decline in the coverage of annual commercial horticulture crops (despite a large number of crops presently being provided insurance coverage) owing to the seemingly high actuarial rates, the non-coverage of perennial crops, fruits and vegetables, the failure of most of the implementing states to move down to the lower insurance units like village to mini-farms, the unappealing guarantee of indemnity and the inability to dole out timely indemnity payouts at the time of crop failures are the major issues related to the scheme.

The fact that less than one-fifth of the farmers insured voluntarily participate in the scheme implies that they are either not aware or are not convinced of its benefits.

An Emerging Alternative
The reason for the failure of multi-peril crop insurance worldwide is the sheer complexity of risk and lack of adequate risk modelling technology to understand these risks. These complexities have largely been responsible for the non-entry of private insurers in the field of yield insurance in the country.

Crop insurance in India was, till recently, confined to compensating yield loss. The recent years have seen a change in this trend with the emergence and rising popularity of weather-based insurance products. Weather insurance pays indemnities based not on the actual losses experienced by the insured, rather on the realisation of a weather index that is highly correlated with actual losses. The index measures a specific weather variable (e.g., rainfall, temperature, relative humidity, wind speed, etc.) rather than the extent of loss (in crop yield). In other words, the product proxies the loss that farmers face owing to the adverse weather incidence.

The weather insurance product is designed after a critical study of the weather parameters affecting crop growth in its three critical phases – sowing, growth and flowering, and yield formation to harvest. During each period, the “trigger” (level below which weather parameter must fall for a farmer to begin receiving the payouts) and “exit” levels (level below which the weather parameter must drop for a farmer to receive the maximum payout) are defined. No additional indemnity is paid for realised values of the index that exceed the exit level.

Weather insurance has clearly expanded the domain of crop insurance programme in the country as insurance can now also be provided for crops with no historical yield data as also for horticultural crops where age group-wise yield estimates are not available. Index-based insurance is less susceptible to some of the problems intrinsic in traditional multi-peril crop insurance and benefits both the insured and the insurer. For the insured, the most important advantage over the traditional scheme is the prospect of receiving timely indemnity payouts given that payouts for indexed contracts are automatically triggered once the weather parameter reaches the pre-specified level.

The biggest disadvantage of the yield insurance scheme is the delayed claim settlement procedure (that takes at least a year), denying the insured the benefit of insurance when it matters most, and in the process negating the very objective of insurance. The delay is the result of the time taken for the crop cutting experiments (CCEs) data to be collated and the inability of the state and central governments to expeditiously contribute their share towards claim settlements. The popularity of weather index products also owes it to the transparency as the weather data can be uploaded almost immediately so that the insured is aware of weather performance vis-à-vis the given trigger. The product also provides the insured with the incentive to put in additional efforts or cost to save the crop as the claim is payable irrespective of the yield.

Weather insurance products are easier to administer and significantly reduce costs by eliminating the need for yield estimation and field visits. Unlike the traditional scheme, the insured is not likely to have better information than the insurer about the underlying index; neither would he be in a position to influence the realisation of the index. The problems of adverse selection and moral hazard thus stand significantly reduced provided the sales
closing dates are set well in advance. More importantly, the product can be reinsured in the international markets, a prospect that the NAIS finds almost impossible owing to seemingly unsustainable claim ratios.

**Weather Insurance in India**

In India, weather-based insurance was first introduced in 2003 by ICICI Lombard for groundnut and castor farmers of Mahbubnagar district in Andhra Pradesh, followed by the pilot rainfall insurance scheme by IFPFC-Tokio General Insurance (r1g1) in 2004-05 in Andhra Pradesh, Karnataka and Gujarat. The Agricultural Insurance Company of India (AIC), the public sector insurer, also introduced rainfall insurance (Varsha Bima) in 20 rain gauge areas spread over Andhra Pradesh, Karnataka, Rajasthan and Uttar Pradesh in 2004-05, providing five different options suiting varied requirements of the farming community – seasonal rainfall insurance based on aggregate rainfall from June to September, sowing failure insurance, rainfall distribution insurance with the weight assigned to different weeks, agronomic index based on the water requirement of crops at different phenophases, and a catastrophic option, covering extremely adverse deviations in rainfall during the season.

Weather insurance in the country received a big boost when the finance minister in his 2007-08 budget speech termed it as a “promising risk mitigation scheme” and earmarked Rs 100 crore for its implementation on a pilot basis in a few states as an alternative to NAIS. Weather-Based Crop Insurance Scheme (wbCIS) was piloted by the AIC in Karnataka in kharif 2007. Presently, these products are being offered in selected regions for different crops by AIC and private insurers ICICI Lombard General Insurance Company and r1g1.

wbCIS also operates on the concept of “area approach”, whereby each reference unit area (rUA) is linked to a reference weather station (rWS) and all farmers in a given rUA are deemed to have suffered the same level of adverse weather incidence. wbCIS is based on actuarial rates of premium (with a cap at 8-10% for food crops and oilseeds and 12% for commercial crops) but to make the scheme attractive, premium actually charged from farmers has been restricted to “at par” with the NAIS. The difference between flat premium rates and the actuarial premium rates are borne by the central and the implementing state government on a 50:50 basis. The private companies are extended the same level of financial support by the government. Unlike NAIS, the entire claim under the scheme is borne by the insurers.

Weather insurance is already being treated as an “alternative” to NAIS (at least in the pilot areas) as the latter is not available to the farmers in areas where the former is notified. Table 1 shows the coverage experience under wbCIS implemented by the dominant insurer AIC.

**Table 1: Weather-Based Crop Insurance Scheme: Season-wise Business and Claims Experience**

<table>
<thead>
<tr>
<th>Season</th>
<th>Implementing States</th>
<th>FC (Rs Lakh)</th>
<th>SI (Rs Lakh)</th>
<th>FP (Rs Lakh)</th>
<th>TP (Rs Lakh)</th>
<th>TC (Rs Lakh)</th>
<th>FB (Rs Lakh)</th>
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<tbody>
<tr>
<td>Kharif 2007</td>
<td>Karnataka</td>
<td>0.44</td>
<td>5,301</td>
<td>142</td>
<td>703</td>
<td>524</td>
<td>0.35</td>
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<tr>
<td>Rabi 2007-08</td>
<td>Rajasthan, Bihar,</td>
<td>6.27</td>
<td>1,70,495</td>
<td>4,300</td>
<td>13,845</td>
<td>10,072</td>
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<td></td>
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<td>Rabi 2008-09</td>
<td>MP, Haryana, Punjab,</td>
<td>1.65</td>
<td>31,313</td>
<td>831</td>
<td>31,68</td>
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<td></td>
<td>Himachal Pradesh</td>
<td>1.69</td>
<td>42,623</td>
<td>874</td>
<td>3,590</td>
<td>2,651</td>
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<td>Tamil Nadu, Kerala,</td>
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<td>Chhattisgarh, West Bengal,</td>
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<tr>
<td>Total</td>
<td></td>
<td>10.05</td>
<td>2,49,732</td>
<td>6,147</td>
<td>21,306</td>
<td>14,687</td>
<td>4.39</td>
</tr>
</tbody>
</table>

FC = Farmers Covered, SI = Sum Insured, FP = Farmers Premium, TP = Total Premium, TC = Total Claims, FB = Farmers Benefited

Loss cost percentage is the total indemnity payouts as a percentage of the total liability. Total claim ratio is the total claims divided by the total gross premium. Farmers’ claim ratio is total claims divided by the farmers’ premium (premium paid by the farmers).

Source: Agriculture Insurance Company of India.

Around 10 lakh farmers have been insured for a sum of Rs 2,497 crore, and claims amounting to Rs 147 crore have been disbursed to 4.4 lakh beneficiaries in the four seasons since the inception of the scheme in kharif 2007. Like NAIS, the claims experience is favourable to the farmers (claims disbursed is 2.4 times the premium paid by farmers), though in terms of the total premium (inclusive of the premium subsidy by the government), the same is favourable to the insurer. The volume of business under wbCIS is marginal as it is still being tested on a pilot basis. An analysis of the performance of wbCIS would hence be more apt after a few more years, after it has been implemented on a wider scale.

**Major Constraints**

Despite the euphoria surrounding weather insurance, there are major constraints associated with these products. The spatial variations in weather parameters are high in a country like India and (like the area based NAIS) basis risk can only be minimised if claims structures for these products are worked out at smaller units. Presently, weather data is often recorded at the taluka level (while the Risk Retention Groups providing rainfall data do exist for lower insurance units) which may result in the actual impact of adverse weather condition at the farm location being significantly different from that recorded by the rWS. The poor density of weather stations (and the consequent high basis risk) and the paucity of weather data in certain regions has been a major handicap in the
farm-yield losses are with the weather index. A poor construction of the index while benefiting the insurer would result in a mismatch between payoffs and actual farmer losses. Also, unless the index is based on a weather variable that is the dominant cause of loss in the region, basis risk will be unacceptably high.

The claim payout as per the structure of Mahabubnagar started only with 30% adverse deviation in the rainfall index, with the farmers receiving 50% of sum insured only when the deviation in rainfall index touched 80%. Similarly, the sum insured for the crops under wacs is divided into various covers say excess rainfall, temperature, high relative humidity, pest disease congenial climate, etc, and the event of the insured getting a substantial proportion of sum insured appears less likely. The insured is likely to benefit only if the sum insured and the triggers are accurately set so as to reflect the extent of crop damage due to these parameters. Needless to state, the utility of the product would be highly compromised and the very concept of insurance fails if the products are designed in such a way that payouts start only at high deviation levels (in the weather parameter) or if the payouts are meagre at the initial levels, (despite the low trigger levels) as the end result of both would be compensation not commensurate with the extent of crop loss.

The capping of premium rates under the wacs also does not augur well for the usefulness of the product from the farmers’ point of view since it is most likely to come at the expense of payouts. Thus, both basis risk and poor design of the weather index may result in “no claims” despite crop losses at the individual farmer’s level.

Also, for the increase in penetration levels, the farmers need to be made aware of the claim structures, which at present are highly technical and complicated. It is seen that even the insured farmers seldom have any knowledge of the various covers as also the extent of weather deviation that would result in claims. The insurers have to ensure that the same is publicised as also the extent of weather deviation involved and the likelihood of the insurers shying away from such high investments, while continuing to implement the scheme with high basis risk. Also, for the index weather insurance to be successful, the insured must be instilled with confidence that the index is being measured accurately and the data is secure from tampering. The element of trust would definitely be higher with the government owned weather stations. The capping of the premium rates may also be made flexible depending on the claim experience of the crop.

**Complements, Not Substitutes**

The experience with weather index insurance in India is both limited and too recent to draw broad conclusions. The actual experience of settlement of indemnity reveals that though these products fare better than the traditional scheme, the data gaps and timely non-receipt of weather data do result in significant delays. Apart from the technical challenges discussed above, it needs to be understood that weather insurance has the limitation of covering only the parametric weather events and thereby do not provide protection to all risks. Thus, it would be too early to over-promote the index-based weather insurance as the solution to the problems of the yield insurance scheme.

In any case, index insurance and traditional insurance are certainly not mutually exclusive, and these different forms of insurance, each having its own merits and demerits should ideally blend and complement and not replace one another. For all its inherent drawbacks, the traditional yield guarantee scheme is a multi-peril scheme covering a wide variety of crops on a national scale, and achieving such substantial coverage does not seem possible under single peril covers. An analysis of the indemnity payouts also reveals significant benefits accrued by the small and marginal farmers implying the satisfactory performance of the programme from the equity point of view.

The committees set up by the government to suggest measures to reform the scheme have put forth comprehensive recommendations broadly including steps like lowering the insurance unit to village panchayat, provision for mid-season on account payment of claims, coverage to perennial crops, covers for pre-sowing and post-harvest losses, more appealing guaranteed yields, transition to actuarial regime with varying levels of premium subsidy, etc. A restructuring of the yield insurance scheme on these lines is likely to improve its prospects and meet the reasonable aspirations of the farmers.

The need of the hour is to address the challenges faced by both the area yield and weather insurance schemes so that they can emerge as effective and efficient mechanisms for transferring natural disaster risks that have a negative impact on the livelihood of our farming community.

**NOTES**

1. Though Mizoram has been notified during kharif 2009, statistics reveal that there has been no business from the state so far. These four states have not joined NAIS and have extended different provisions for the same. While north-eastern states were interested in covering perennial horticultural crops under NAIS, Punjab was not interested in the multi-peril crop insurance based on area approach.

2. The penetration of the scheme has been the highest in Rajasthan where more than 50% of the farmers, (holdings) are covered under the scheme. In states like AP, Gujarat, Karnataka, MP and Orissa, about one-fourth of the farmers are insured under NAIS.

3. NAIS deploys a three year moving average for rice and wheat and a five-year average for all other crops multiplied by the indemnity level (90%, 80% and 60% depending on the variability in yield of the crop) to arrive at the guaranteed yield, thus failing to provide protection to the farmers in states/areas where there has been consecutive adverse seasonal conditions.

4. More than 80% of farmers insured are borrowing farmers, for whom the scheme is compulsory.

5. In areas where WBCIS is implemented, loanee farmers would be compulsorily covered under the scheme. Since NAIS is not implemented in these areas, the farmers do not have the option of choosing amongst the two.

**REFERENCES**

