REPORT
ON
IMPACT EVALUATION
OF
PILOT WEATHER BASED CROP INSURANCE STUDY (WBCIS)

Submitted to :

Department of Agriculture and Cooperation
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EXECUTIVE SUMMARY

AGRICULTURAL RISK MANAGEMENT

1. Agriculture is an intrinsically risky economic activity. Given the exposure of crop yields to a multitude of perils, risk management systems are imperative for stabilizing crop incomes through reduction of seasonal and inter-annual variability.
2. The vulnerability of resource-poor farmers and landless agricultural labourers is aggravated by the preponderance of uninsured risks in conditions where opportunities for full-insurance are absent. Agricultural shocks are further amplified in rural areas where the markets for land, labour and credit are inter-locked.
3. Crop insurance is based on the fundamental principle of insurance business, that is, the 'laws of large numbers'. The risk is distributed across space and time. Crop insurance brings in security and stability in farm income. Crop insurance protects farmers' investment in crop production and thus improves their risk bearing capacity. Crop insurance facilitates adoption of improved technologies and, encourages higher investment resulting in higher agricultural production.
4. In India, J S Chakravarti designed, as early as in 1920, a scheme of agricultural insurance based on rainfall for India. According to Chakravarti (1920, referred to in Mishra 1995), agricultural insurance in India should be a package consisting of the following, in increasing order of priority as per conditions prevailing during the times: (i) Insurance of buildings, granaries and agricultural implements (ii) Cattle insurance (iii) Insurance of crops.
5. There are huge coverage gaps in terms of farmers benefitted and crops being covered under the state-sponsored and heavily subsidized National Agricultural Insurance Scheme (NAIS), a multi-peril, area based crop insurance scheme that is mandatory for loanee farmers. The alternative index-based weather insurance products (micro insurance products) that were developed to overcome the defects in the traditional crop insurance schemes could address the problems of moral hazard, high administrative costs, long delays in settlement, low verifiability etc.
6. Crop Insurance is based either on the 'area approach' or 'individual approach'. The area approach is based on 'defined areas' which could be a block / mandal/ hobli/ firka or any other smaller contiguous area. The actual average yield per hectare of the notified crop for the defined area is determined on the basis of Crop Cutting Experiments (CCEs).
7. Public crop insurance programmes have been around for several decades in US, Japan, Brazil, Sri Lanka, Mauritius, and Mexico. There are important similarities in the evolution of crop insurance in the United States, Brazil, and Japan. The three have gone through considerable adjustments, learning from their own experiences. After heavy losses in the beginning years, programme administrators have introduced new rules, including higher premium rates. Subsidies have been essential, and they are provided by the government on the grounds of broad social objectives.

8. In summary, the financial experience with publicly-provided, multiple-peril crop insurance has been disastrous. These programmes were heavily subsidized and governments not only paid part of the premium, but also most of the delivery and service costs, and they covered aggregate losses even when the losses exceed targeted levels over long periods of time. Until now, most agricultural insurance programmes in the world have not been able to fully cover their own indemnity payments (I) and administrative costs (A) with the collected premiums (P).

NATIONAL AGRICULTURAL INSURANCE SCHEME (NAIS) /
RASTRIYA KRISHI BIMA YOJANA (RKBY)

9. The crop insurance scheme currently being implemented in India is the National Agricultural Insurance Scheme (NAIS) which started from Rabi 1999-2000 season. AICIL or the Agriculture Insurance Company of India Ltd. has taken over the implementation of National Agricultural Insurance Scheme which until the financial year of 2002-03 was implemented by the General Insurance Corporation of India.

10. Salient Features of the Scheme: The crops in the following broad groups in respect of which (a) the past yield data based on Crop Cutting Experiments (CCEs) is available for adequate number of years and (b) requisite number of CCEs are conducted for estimating the yield during the proposed season. The Scheme extends to all States and Union Territories. The States / UTs which are opting for the Scheme would be required to take up all the crops identified for coverage in a given year. The States / Union Territories once opting for the Scheme will have to continue for a minimum period of three years. All farmers including sharecroppers and tenant farmers growing the notified crops in the notified areas are eligible for coverage. Comprehensive risk insurance will be provided to cover yield losses due to non-preventable risks.

11. The Scheme would operate on the basis of 'Area Approach' i.e., Defined Areas for each notified crop for widespread calamities and on an individual basis for localized calamities such as hailstorm, landslide, cyclone and flood. The Defined Area (i.e., unit area of insurance) may be a Gram Panchayat, Mandal, Hobli, Circle, Firka, Block, Taluka etc. to be decided by the State / UT Govt. However, each participating State / UT Government is required to reach the level of Gram Panchayat as the unit in a maximum period of three years.

12. The crop yield insurance scheme has been largely unsuccessful with low coverage and high claims to premium ratio. There are problems with both the design and implementation of the schemes. Crop Insurance to be a meaningful policy risk management tool, would have to reach out to a majority of farmers. At present only about 15 percent of farmers and 17 percent of cropped area.

WEATHER INSURANCE IN INDIA

13. Weather risk is the most significant agricultural production risks although risks of other inputs such as soil, seeds, fertilizers, and management practices contribute to yield volatility. Under these circumstances, a financial innovation in the form of weather insurance was introduced in the year 2003 as the 'index-based rainfall insurance'. Since then the weather insurance products have promised to overcome the limitations of the traditional crop insurance scheme and 'weather proof' the income streams of millions of agricultural households.

14. From Kharif 2007 season, a Weather Based Crop Insurance Scheme (WBCIS) has been piloted across India to explore the effectiveness of Weather Based Crop Insurance as an alternative to the National Agricultural Insurance Scheme (NAIS).

15. The Scheme shall operate on the principle of "Area Approach" in selected notified Reference Unit Areas. Area Approach signifies that a "Reference Unit Area" shall be considered as a Unit-Area of Insurance for the purpose of acceptance of risk and assessment of compensation as well. Therefore, all insured-cultivators of a Notified Crop in the notified Reference Unit Area shall be deemed to be on par so far as their terms of insurance coverage and assessment of compensation are concerned.

16. All the cultivators (including sharecroppers and tenant cultivators) growing any Notified Crop in any Reference Unit Area shall be eligible for coverage. Financial Institution, for the purpose of the Scheme, includes all District Central Cooperative Banks and also the PACS affiliated to them, all Commercial Banks and all Regional Rural Banks, as defined in National Agriculture Insurance Scheme (NAIS).

EVALUATION STUDY ON WBCIS

17. The Government of India, Ministry of Agriculture, and Department of Agriculture & Cooperation have felt the need to evaluate the performance of the WBCIS scheme and its impact on the farmers in order to facilitate policy decision in the matter with regard to its continuance or otherwise as a regular on-going plan scheme.

18. The study was conducted in 2 Districts each of 4 States [2 States each from Kharif and Rabi] where the Pilot Weather Based Crop Insurance Scheme (WBCIS) was implemented. For the purpose of meaningful evaluation, comparison & analysis, another 2 States [1 State each from Kharif and Rabi] were selected where the Pilot WBCIS was not implemented, to provide some counterfactuals (though limited given the non-randomized nature of generating these counterfactuals) by serving as a Control Group. In order to capture the situation of states which have WBCIS partially or have witnessed other initiatives in Weather Based Crop Insurance, 2 States were added to the universe of the study.

19. A sample of 1000 farmers who availed Weather Insurance in the implementing states constitutes the beneficiary group for the field survey. Further, 200 non-beneficiary farmers (i.e. those who did not avail of the Weather Insurance Scheme in the both

implementing and non-implementing states) were chosen, to serve as a Control Group for comparative analysis and purposive evaluation. In addition, 75 farmers [from 2 selected states where the Weather Based Crop Insurance Scheme (WBCIS) was not implemented but there have been some pilots related to weather insurance] were selected for detailed interaction to ascertain their views on the scheme and its prospects, if implemented.

20. The sampling procedure ensured the respondent farmers were a representative group comprising of beneficiary and non-beneficiary farmers drawn from various socio-economic categories [SC/ST/OBC/Women/General, Small Farmer/Marginal Farmer/Large Farmer etc.].

21. Other key stakeholders like Banks, Insurance Intermediaries and Technical Agencies were included for obtaining relevant inputs on WBCIS and its comparison with NAIS. These stakeholders included MFIs/NGOs, insurance brokers, subject matter experts, agricultural specialists from state agricultural universities and IARI.

22. The Study was designed to start with preliminary discussions with the officials of Department of Agriculture in the Ministry of Agriculture, GoI and with the Agriculture Ministries in the sampled states. Relevant information from the State Government and implementing insurance companies was obtained on financial and physical performance of the Weather Insurance Scheme (crop-wise, season-wise and year-wise). Besides, the constraints and problems faced in the implementation process were collected and collated through check-lists and interview guides.

23. The field survey was carried out by trained research associates and supervisors under the close guidance of the Core Team. The primary and secondary data collected from the field as well as different stakeholders was collated and analyzed using statistical analytical tools and inferences drawn thereon.

EMERGING SCENARIO AND KEY CONCLUSIONS

24. The multi-pronged and detailed field research for evaluation of WBCIS has thrown up a variety of perceptions, experiences, judgments, projections and perspectives that have enriched the evaluation exercise. Both the supply and demand sides for this product are evolving with the supply side currently being at a higher level of understanding and sophistication compared to the demand side.

Scope of Weather Insurance in terms of Perils Covered

25. Increasing the number of perils in a WBCIS is not a constraint for insurers as they have demonstrated in case of policies for horticultural crops which require risk coverage for more complex weather events and other weather parameters in addition to rainfall and temperature. As is the usual case elsewhere, the quality of coverage under a peril is more important than the number of perils being covered. The issue of

insufficient coverage of perils has not come out as a significant concern during interactions with other key stakeholders.

Scope of Weather Insurance in terms of Basis Risk

26. All stakeholders in weather insurance irrespective of whether they represent the supply side, the demand side, or the non-transactional side, unanimously support the minimization of basis risk through a well-planned network of weather stations. The critical need to minimize basis risk by proper coverage of weather stations is underlined by the fact that more than three-fourth (77%) of respondents from the farmer beneficiary sample are not satisfied with location of the weather station.

27. The location of weather station has the greatest bearing on the basis risk in a weather insurance contract once the key parameters of the contract have been set. The location of weather insurance has the potential of turning weather insurance - basically a loss compensation instrument, into a lottery. On the question of what should be the ideal radius for coverage of rainfall, the responses have been wide-ranging, from 25 km to 5 km. These numbers can be regarded as guesstimates, moderated by the pulls of demand and constrained by the limitations of supply. However there seems to be a growing unison among key stakeholders that coverage under rainfall insurance should not be offered to a farm located at a radial distance of more than 10 km from a weather station. Starting from this heuristic value, there should be efforts to systematically bring this down to 5 km within a couple of years through better planning and guided enforcement. Since both Kharif and Rabi seasons would essentially use the same infrastructure for weather data, the heuristic radial distance for rainfall insurance would, in turn, become the guiding value for weather insurance based on temperature indices.

28. Basis risk in weather insurance is not only inherent in the location of reference weather station but it is also a function of the design of the WBCIS product. The specialized nature of product development, the esoteric terminology used in a term sheet, and the concoction of agro-meteorology, statistics and economics within the underlying parameters have the undesirable effect of turning weather insurance into an incomprehensible device.

Scope of Weather Insurance in terms of Design of Product

29. The design of weather insurance product is similar to a black box which has weather data as an input and a term-sheet as an output, continues to remain a mystery even for seasoned personnel dealing in sales and marketing of weather insurance. Due to the typical structure of a weather insurance term sheet, farmer customers may not find it easy to unravel the technicalities in the design of weather insurance. The task of appraising and approving the designs of weather insurance products may hence be entrusted to the regulatory agencies, designated expert committees, and entities in the non-transactional space working to ensure a fair transaction between the

supply side and the demand side of weather insurance. Owing to the practically limitless number of designs possible for weather insurance, the task of appraising a diverse portfolio of weather insurance designs and their contextual suitability is a specialized task that unfortunately has not been able to attract the level of attention and technical rigor which it truly deserves. The challenges in comprehensively evaluating weather insurance products are compounded by the fact that weather insurance products lie at a crossover of agriculture, statistics, meteorology, and financial risk management, each of which is a specialized field of knowledge with limited expertise available. Therefore the task of identifying resource persons with good understanding of more than one or two of the above fields is quite challenging and requires substantial efforts to bring such rare expertise on board.

30. For a common man, the simplest evidence of a good weather insurance design is its claim payout during seasons which are devastating on a widespread level. Over the first five seasons of its WBCIS experience, AIC has been able to provide claim benefit to nearly 62% (cumulative across all seasons) of the farmers insured by it. The overall claims ratio of AIC for the six seasons of its WBCIS coverage is nearly 77% which indicates that out of every 100 rupees of premium received by it, it has paid out an average of 77 rupees as claims to the insured farmers. The percentage of farmers benefitted during the first four seasons of WBCIS coverage by ICICI Lombard is 41% while its overall claim ratio during the five seasons of its WBCIS participation has been 60%.

31. One of the common criticisms of weather insurance has been its limitation of insignificantly compensating the insured farmers for even the worst of crop seasons (e.g. Kharif 2009). For the less prudent farmer customers, the time lag to sense this limitation of weather insurance may be slightly higher, 3 to 5 years by a conservative measure. Such a situation for even an apparently well-designed weather insurance contract may be the result of the inadequacy in any or both of following parameters namely, the maximum sum assured, and the maximum probable loss. The term 'total sum assured' in weather insurance contract may be deemed anomalous in the sense that even when a farmer has lost the entire crop during a particular stage, the compensation accruing to that farmer under the policy may not be the maximum sum assured under the weather insurance contract. It will be rather simply the addition of the sum assured of the weather insurance covers operative during that stage. The consequent indemnity may only be a fraction of the maximum sum assured under the weather insurance policy bought by the farmer. The maximum probable loss denotes the highest cumulative payout (sum of payouts of all constituent covers) among all the cumulative payouts simulated historically from a weather insurance contract. The quantitative difference between maximum sum assured and maximum probable loss for a weather insurance contract represents a theoretical gap between the maximum payout committed by that contract and the actual payout that could be expected from that contract even in considerably adverse years.

32. Insurers have expressed commitment for design of weather insurance products which fulfill the expectations of farmers and other key stakeholders. All the insurers are

working with at least one specialized external agency for technical support on product development. AIC and ICICI Lombard both have undertaken efforts in the past to tap the expertise of IARI - India's leading research institution in agriculture. Despite the apparent synergies, the desired outcomes could not be achieved because of mismatch in resource requirements (time, investment in research, manpower etc) required to make a significant breakthrough. The limited size of weather insurance portfolio, reasonable uncertainties regarding its scalability and high claim ratios seem to be the key deterrents for insurers to sustain investments in weather insurance product research and development with a long-term view.

Overall Effectiveness of Weather Insurance vis-à-vis National Agricultural Insurance Scheme (NAIS)

33. Most key stakeholders with a fair understanding of both WBCIS and NAIS have acknowledged the fact that both have some unique advantages and unique limitations. Since neither of these two types of crop insurance can singularly address the diverse production risk management of Indian farmers, it would be better to allow both of them as independent, standalone types or in a complementary manner.
34. NAIS is a crop insurance which could not translate into conceptual appeal and structured design into fair, widespread, and sustainable value for its designated beneficiaries. As the largest crop insurance programme in the world, it has its share of unique advantages like comprehensive coverage, physical assessment and low physical infrastructure requirements.
35. Weather insurance is another type of crop insurance which was borne out of the need for objective, transparent, prompt and administratively-simple claim settlement.
36. The hopes of the stakeholders in the crop insurance space have now shifted to remote-sensing technologies which is witnessing rapid advancement. Till the time remote-sensing technology becomes so reliable and cost-effective that it can be utilized for loss assessment of existing insurance units, the crop insurance sector in India will go through a transitional phase wherein NAIS and WBCIS can play the role of either complements or alternatives, but not substitutes. The application of remote-sensing for crop yield/loss estimation has shown the promise of rectifying the big malaise of NAIS, which is its loss assessment procedure: sub-optimal, unwieldy and error/risk-prone. Therefore the growth curve of remote-sensing applications will determine the future path of crop insurance in India.

Weather Insurance and Weather Station Density in the Context of Minimizing Basis Risk

37. From field research and pilots, the location of the weather station for claim settlement has come out as the most important factor for farmer-clients to believe weather insurance as trustworthy. The location of weather station has the greatest bearing on the basis risk in a weather insurance contract once the key parameters of the

contract have been set. The location of weather insurance has the potential of turning weather insurance - basically a loss compensation instrument, into a lottery.

38. On the question of what should be the ideal radius for coverage of rainfall, the responses have been wide-ranging, from 25 km to 5 km. These numbers can be regarded as guesstimates, moderated by the pulls of demand and constrained by the limitations of supply. However there seems to be a growing unison among key stakeholders that coverage under rainfall insurance should not be offered to a farm located at a radial distance of more than 10 km from a weather station. Starting from this heuristic value, there should be efforts to systematically bring this down to 5 km within a couple of years through better planning and guided enforcement.

39. The density of AWS and IMD observatories holds the key to better pricing of risk products with passage of time and enabling the introduction of weather insurance based on other parameters. Warehouse of daily rainfall data for weather insurance is also very important for disaster management as well as weather advisory service.

40. The requirements for a high-density weather station network are not uniform across the country. These are influenced considerably by the exposure of crop yields to weather-borne risks, presence of microclimates, spatial distribution of landholdings and demand for crop insurance.

41. The growth momentum in demand for weather insurance, triggered by WBCIS, has actuated the quest for achieving international standards in weather data services. IMD, the fountainhead of technical expertise on meteorology, has also responded keenly to the demand for new weather stations which work on state-of-the-art technology. During the period 2008-2010, IMD planned to set up more than 500 new automatic weather stations (including automatic rain gauges). ISRO, the apex institution in India for space research, has collaborated with IMD for installation of another 1000 AWS across India.

42. Timeliness of claim settlement is an inherent strength of WBCIS as weather data is the only external input required for computation of claims under WBCIS. The concern among farmer beneficiaries regarding the timeliness of claim intimation/settlement under WBCIS may be regarded as moderate. This concern is likely to be addressed automatically with the implementation of a proper weather data management system in India as most of the delays arise from non-availability of timely weather data.

Reliability & Accuracy of Weather Data (particularly from Private, Third Party Data Providers)

43. The low level of concern among farmer beneficiaries regarding the reliability of weather stations or manipulation of claim inputs/results lends credence to the transparency and reliability of WBCIS.

44. WBCIS has been successful in galvanizing insurers to look beyond the existing network of weather stations and work out pragmatic ways to meet the weather insurance demand, from wherever it had been emanating. The receptivity and the

problem-solving orientation of insurers has been successful in spawning a whole new business class of third-party, private weather data providers.

45. At the same time, the responsiveness, timeliness and representativeness of both weather data and the service providers have improved substantially enabling insurers, in many cases, to periodically track claim status and to compute interim claims much before the date of completion of risk coverage under WBCIS. The quality of the weather data for claim settlement is no more an issue of concern for the insurers and the insured, even when third-party, private weather data providers come into the picture.

46. Services of Private, Third-Party Weather Data Providers are critical for authentic and timely settlement of claims in many areas and in situations where no other alternative is available. Due to the high flexibility of location, proven reliability and timeliness of data supply by third-party weather stations, they are gaining increasing ground for Weather Insurance pilots. A few farmers, nevertheless, do entertain the suspicion that the data provided by private / third-party data providers may not be accurate.

Scope for Improving Weather Data System, Data Collection and Data Availability

47. The current growth of weather station network in India is largely haphazard and devoid of a coordinated approach and integrated planning. Since most of the ongoing growth is driven by expansion in outreach and penetration of WBCIS, it would be in the interest of concerned agencies to take up this issue and work out ways to address it through the involvement and keen participation of key stakeholders.

48. Weather infrastructure should be enhanced on high priority as any investment towards generation of weather data should be looked upon as an investment in public good with substantial payoffs in terms of ability to design more robust products in medium-long run. In the short term, it will substantially benefit the credibility of WBCIS due to more representative weather stations.

49. Crop loss data are the basis for the development of vulnerability functions to estimate overall risk leading to indemnification. Therefore, crop loss data have to be gathered in a more systematic manner, that losses be recorded by peril and at the highest level of resolution possible. Having high resolution loss data would first improve the robustness of the vulnerability functions as the correlation between weather hazard and crop loss would be more spatially representative. Crop loss information (at individual or at an aggregate level) may be fed in by the afflicted farmer customers through the toll-free phone service which can be stored in the centralized loss database. The validation of such losses may be undertaken both through physical verifications and juxtaposition with the corresponding weather or yield data.

50. Government should promote the development of a centralized data centre for WBCIS and other requirements in agricultural extension, research and development.

Weather data from such centralized data centre should be priced reasonably to give thrust to product development and research in weather insurance.

Weather Insurance as a Substitute for NAIS

51. On the important question of whether doing away with NAIS makes sense, the unanimous response has been in the negative. Comprehensive coverage of losses is the key advantage of NAIS which in case of WBCIS is its faster claim settlement.

52. Right from its successful pilot in 2003, weather insurance was looked upon as a likely successor to NAIS. With the passage of time, the innate limitations of weather insurance have surfaced and have raised serious questions about its ability to replace area yield insurance. Even the naysayers of NAIS have started to realize that weather insurance can be complementary to area-yield insurance, rather than acting as its substitute.

Weather Insurance and NAIS as Alternatives

53. On the question of offering NAIS and WBCIS as alternatives for the farmer-client to choose, there was no clear view. Though some experts who trust the discrimination ability of farmers, were in favour of giving farmers the option to choose their crop insurance type, there were an equal number of practitioners who felt that such an option will inevitably engender confusion, dissatisfaction and mistrust among farmers. Since there are bound to be mismatch in payouts for the same location under the two dissimilar crop insurance schemes, farmers may unintentionally or deliberately exploit this mismatch to demand parity with the more beneficial outcome. It would be chaotic for farmers and implementing agencies to deal with both co-existing. The major problems can be:

    (i) Wide variations in premiums by way of the concessional subsidy have already created problems in farmers adopting insurance. While premium subsidy for NAIS is being gradually reduced, WBCIS is being supported by a considerable proportion of subsidy

    (ii) Another important difference between the two schemes making the choice impractical is the difference in the payout frequencies and magnitudes of WBCIS and NAIS

54. In case of unequal payouts from NAIS and WBCIS, either the farmer-clients will press for equal payouts on the pretext of insufficient awareness and understanding or will turn away from crop insurance with dissatisfaction citing discrepancies/contradictions. The political economy of crucial support from farmers may cause a point of contention or rift between the State and the Centre if farmer dissatisfaction gains sufficient magnitude. Even when farmers will find one type of crop insurance better over the other, it will solely be on the narrow-minded basis of benefits received by them during their period of experience, rather than on the inherent strengths of the given insurance type. Therefore for a technically intricate concept like crop insurance,

the aim of achieving a minimum threshold of awareness and understanding among farmers should be held paramount before empowering farmers with the option of choosing between different types of a social good like crop insurance.

Integrating Weather Insurance with NAIS

55. After examining the potential pitfalls in offering farmers the option of choosing between NAIS and WBCIS, the possibility of integrating WBCIS with NAIS appears to make better sense with the inputs from various stakeholder groups. All key stakeholders, other than farmers, have acknowledged the unique advantages of WBCIS and NAIS and have supported the continuation of both types till a more optimal type of crop insurance is found. The viewpoints of the various key stakeholders, particularly those with a direct or indirect stake in the outcomes from crop insurance, have been in favour of the crop insurance scheme which has demonstrated better payout ability (more/bigger/widespread payouts) during their experience. Despite this natural preference, most of these stakeholders have also been realistic enough to admit that any one type of crop insurance, either WBCIS or NAIS, is incapable of meeting the expectations of the farmers and the larger community of stakeholders. Therefore, the possibility of integrating WBCIS with NAIS is more plausible in the current scenario.

56. One of the more workable alternatives could be to break-up the total sum assured under crop insurance into two equal components: the first component (50%) will be settled on the basis of weather-based index whereas the second component (50%) will be settled on the basis of area yields. The component of crop insurance requiring area yields can take estimates of area yield from both CCEs and Remote-Sensing (RS) technology. The dependence on the estimates from RS technology can be gradually increased with improvement in its resolution and accuracy.

Analysis of Weather Insurance Products and Benchmarking Standards

57. The involvement of designated agencies of the State Government in the administration of WBCIS has led to the standardization of WBCIS products, especially after one or two seasons of WBCIS experience in a given state. Though standardization of WBCIS products being offered by various insurers in a particular state is desirable for minimizing information asymmetries and simplifying product communication, it creates disincentives for insurers to undertake improvements in product development for reducing basis risk. Basis risk in weather insurance is not only inherent in the location of reference weather station but it is also a function of the design of the WBCIS product.

58. The specialized nature of product development, the esoteric terminology used in a term sheet, and the concoction of agro-meteorology, statistics and economics within the underlying parameters have the undesirable effect of turning weather insurance into an incomprehensible device.

59. The fundamental designs being employed for capturing production risks arising from adverse weather events can be regarded incongruous with the peril/event being insured through them. A number of glaring contradictions in definition of weather perils abound in the WBCIS products which require a much critical evaluation before being offered under WBCIS.

60. By their very nature, weather insurance products are difficult to comprehend for a typical Indian farmer who is equipped with limited capacities and experience. The multitude of weather insurance products offered by various weather insurance providers necessitates the need for benchmarking the various products to enable the farmer to make an informed choice. Through benchmarking it may be ascertained whether the products offered by the different insurance companies carry at least comparable benefits (Protection vis-à-vis Premium). The complex weather insurance products may be disintegrated into the constituent covers for different perils.

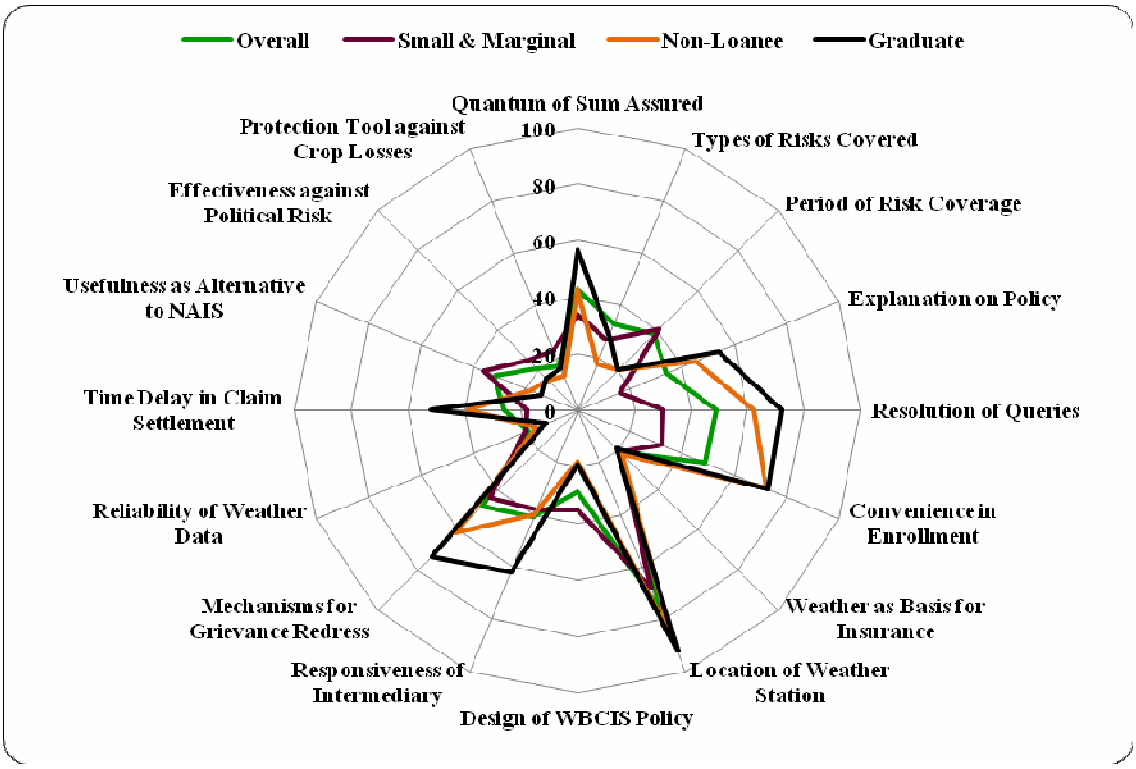
Impact and Usefulness of Private Sector Participation

61. Despite the presence of only three active insurers, the competitive landscape under WBCIS is not placid or less fiercely contested than it would, if there were higher number of competing insurers. With due regards to the inherent strengths of each other, both AIC and ICICI Lombard have indicated loopholes and weakness in the institutional design and process control of WBCIS as an enabling factor behind the quantum leap of their main competitor in terms of key business parameters under WBCIS. Even disregarding the innuendoes of the leading insurers, it is evident that the relatively flexible stipulations related to underwriting and process evaluation under WBCIS, need to be reviewed rigorously and tightened, if required.

62. While AIC has drawn rave reviews from its channel partners (both WBCIS and Non-WBCIS portfolio) by virtue of its open and empowering approach, particularly during weather insurance product development; ICICI Lombard has demonstrated excellent responsiveness and transparency in sharing all vital data, related to its business statistics. This tops up the remarkable initiatives undertaken by ICICI Lombard for reducing inefficiencies due to intermediation and streamlining distribution. Some of the measures introduced by ICICI Lombard for improving customer-centric processes like enrollment, distribution, communication etc. and ensuring better operational control may be relevant for replication under the umbrella programme of WBCIS. Despite business statistics for WBCIS not strongly supporting its cause, IFFCO Tokio displayed admirable clarity on how it intends to scale up its WBCIS coverage and the crucial groundwork necessary for it before its quest for scaling up its weather insurance portfolio. The understanding and commitment of IFFCO Tokio regarding weather insurance could be regarded to be in good harmony with the basic goals and orientation of WBCIS.

Issues in Scaling-up Weather Based Crop Insurance Scheme

63. The key findings from the primary data collected from farmer beneficiaries of WBCIS are summarized with the help of the following spider chart. This chart indicates the corresponding percentage of respondents of a given category who are not satisfied on various aspects (16 in our case) related to WBCIS. The categories of respondents have been taken as overall sample, small and marginal farmers, non-loanee farmers, and graduate farmers. These categories can be expected to represent a judicious balance of preferred farmers, demanding farmers and informed farmers.



Based on the spider chart above, the aspects of WBCIS with the maximum 'not satisfied' respondents are indicated below. The values in parentheses denote the percentage of 'not satisfied' respondents averaged across the four categories:

a) Location of Weather Station (80.8)

b) Mechanisms for Grievance Redress (56.5)

c) Convenience in Enrollment (56.5)

d) Resolution of Queries (53.3)

e) Responsiveness of Intermediary (45.3)

Considering the above five aspects with the highest level of 'not satisfied' respondents, it can be easily seen that the first aspect deals with basis risk while the remaining four aspects deal with service delivery and convenience.

Referring again to above spider chart, the aspects of WBCIS with the minimum 'not satisfied' respondents are indicated below. The values in parentheses denote the percentage of 'not satisfied' respondents averaged across the four categories:

a) Reliability of Weather Data (16.8)
b) Protection Tool against Crop Losses and Climate Change (17.3)
c) Effective against Political Risk and Manipulation (19.3)
d) Weather as Basis for Crop Insurance (20.8)
e) Usefulness as Alternative to NAIS (25.0)

Considering the above five aspects with the lowest level of 'not satisfied' respondents, it can be easily seen that the first and third aspects deal with transparency and reliability of WBCIS, the second and fourth aspect deal with the protection ability of weather insurance while the fifth aspects deals with its usefulness as an alternative to NAIS.

For the sake of completeness, it would be helpful to know the aspects of WBCIS that lie at the middle of the spectrum of 'not satisfied' respondents. Out of the 16 aspects of WBCIS on which satisfaction of farmer beneficiaries are sought, the following six define the mid-range responses. The values in parentheses denote the percentage of 'not satisfied' respondents averaged across the four categories:

a) Quantum of Sum Assured (44.3)
b) Explanation on WBCIS Policy (37.3)
c) Time Delay in Claim Settlement (33.8)
d) Period of Risk Coverage (29.8)
e) Types of Risks Covered (26.8)
f) Design of WBCIS Policy (25.3)

Efficacy & Effectiveness of WBCIS

64. Before the advent of WBCIS, weather insurance was a promising risk management tool that had created enough buzz to remain a talking point in India for many years to come. However the long-term customer appeal of weather insurance was dicey as farmers could not see a sustainable value proposition in regularly buying this useful but costly risk management instrument. It was during the budget of FY 2007-08 that

Hon'ble Union Finance Minister laid the foundations for WBCIS by announcing an annual subsidy of INR 100 Crore. Private sector participation was incorporated into the Pilot WBCIS from Rabi 2007-08 onwards.

65. The interest of farmers in weather insurance got reinvigorated as a result of the affordable pricing of policies offered under WBCIS. Ever since then, weather insurance has been going from strength to strength in India. WBCIS has transformed the domain of agricultural risk management in India. The total coverage of weather insurance which was languishing at less than 4 lakh acres before 2007-08 suddenly received a boost from WBCIS enabling it to exceed 25 lakh acres in 2007-08. During the 2009-10 marketing year, cumulative weather insurance coverage for AICIL and ICICI Lombard has crossed 85 lakh acres, which is more than six (6) times the total coverage of slightly less than 15 lakh acres during 2008-09.

Legal and Regulatory Environment for Index Insurance

66. Agriculture insurance is specialty insurance, and different from traditional general insurance in many respects. As an illustration, agriculture insurance, particularly crop insurance programme is conceived as a 'multiple-agency' approach in which Rural Financial Institutions (RFIs), State government, Central government etc. are actively involved, with the government providing significant financial support. Moreover the programme is compulsory for loanee farmers. The programme, thus is seen more as a social instrument of the government rather than a commercial instrument. A programme of this nature and magnitude is unlikely to be effectively administered unless backed by a statute or law. It may be worthwhile to note that the countries like United States of America, Canada, Spain, Japan, Philippines etc. where crop insurance is being used as an integral part of 'agriculture risk management' a separate act / enactment is in force, and facilitating smooth implementation of the programme.

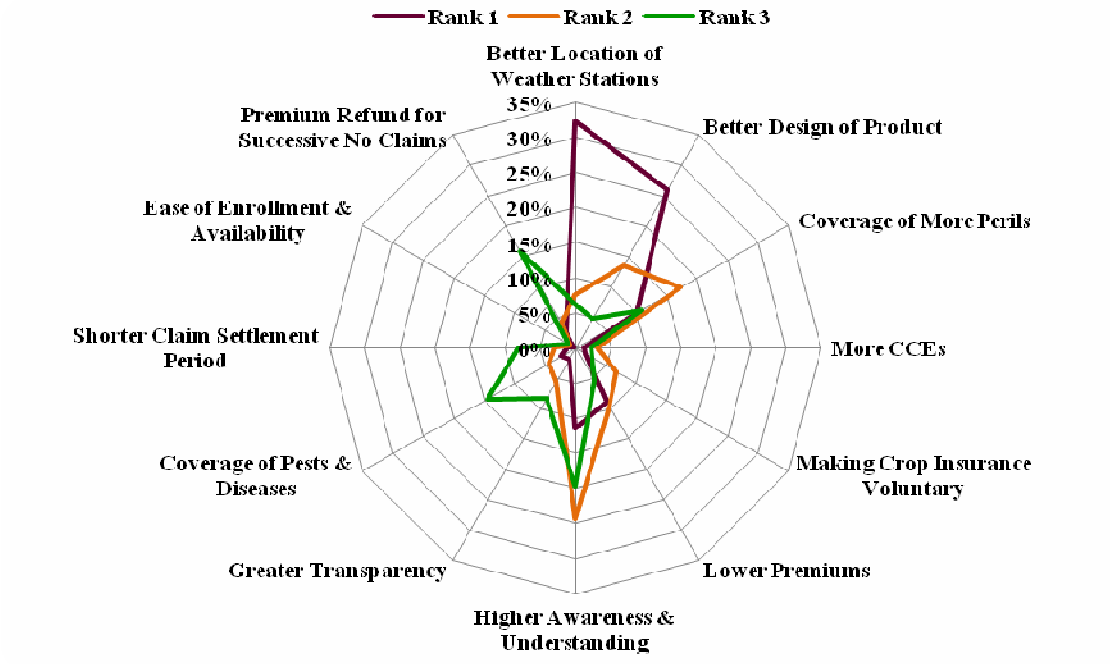
67. Premium subsidy from government payable to ICICI Lombard under WBCIS is routed through AIC. This circuitous route through a competing insurance company can be obviated to streamline the funds flow and minimize transaction costs for concerned parties. Timely receipt of premium subsidy is not only necessary for timely claim settlement but also for meeting the regulatory requirements under Section 64 VB of the Insurance Act, 1938.

68. Government support in the form of premium subsidy is indispensable for WBCIS to attain widespread penetration in India. The caps on actuarial premiums and premium subsidy have to be hiked up for providing satisfactory coverage to cultivators in areas prone to high and frequent risk exposure.

69. In order to further bring down the cost of crop insurance for farmers, WBCIS policies should be exempted from service tax. Government has already waived service tax for many policies focused at rural and poor segments of the society.

KEY SUGGESTIONS AND AGENDA FOR ACTION

70. The key suggestions for improvement of crop insurance as given by the farmer beneficiaries of WBCIS are summarized with the help of the following spider chart. During the questionnaire survey, the beneficiary farmers were asked to indicate their three most important suggestions for improvement of crop insurance. The ranking of the suggestions should help in prioritizing the efforts for dovetailing crop insurance with the expectations of the farmers.



The preceding spider chart indicates the corresponding percentage of farmer beneficiaries who have rooted for a particularly suggestion and placed it among their top 3 suggestions for improvement of crop insurance in India. The respondents have not been segregated on the basis of any characteristic variable. The percentages on the spider chart represent the percentage of respondents from the entire sample of beneficiary farmers of WBCIS from participating states. The aggregate percentage of respondents who have rooted for each suggestion, irrespective of its position within the top 3 ranks, can also be taken as a representative measure of its significance within the wide list of suggestions put forth by farmer beneficiaries of WBCIS.

From the spider chart above, the 3 suggestions that gained the highest share of responses for the first rank are:

a) Better Location of Weather Station (32%)

b) Better Design of WBCIS Products (26%)

c) Greater Awareness & Understanding of Crop Insurance Working (11%)

Similarly the 3 suggestions that gained the highest share of responses for the second rank are:

a) Greater Awareness & Understanding of Crop Insurance Working (24%)
b) Coverage of More Weather Parameters or More Perils (17%)
c) Better Design of WBCIS Products (11%)

The 3 suggestions that received the highest share of responses for the third rank are:

a) Greater Awareness & Understanding of Crop Insurance Working (20%)
b) Premium Refund for Successive No Claims (16%)
c) Coverage of Pest & Disease Risks in Weather-based Crop Insurance (15%)

The suggestions that received the highest aggregate (cumulative out of a maximum of 300%) percentage of responses among the top 3 ranks, irrespective of their position within the top 3 ranks, are as following:

a) Greater Awareness & Understanding of Crop Insurance Working (55%)
b) Better Location of Weather Station (46%)
c) Better Design of WBCIS Products (45%)

The above suggestions define the agenda for further work towards bringing crop insurance, particularly WBCIS, in alignment with the expectations of the farmers.

71. Gaps and weaknesses in the Indian agricultural extension system coupled with the low level of educational attainment and awareness among farmers negate the benefits of a competitive market in terms of the variety of weather insurance products offered by different insurers. In such a setting, the aim should be to offer a competitive market in terms of client (farmer) services. The existing level of client (farmer) services has been decried by almost all stakeholders during primary research. This calls for a crop insurance model in which a single well-evaluated and fine-tuned standardized crop insurance policy is sold across an entire location with emphasis on differentiation based on client services and product communication. The three leading insurers participating in WBCIS have also supported the idea of a crop insurance model in which the main emphasis is on distribution and service delivery, rather than the product per se. The Spanish model and the USA model are the two models of crop insurance that have been indicated to be the most relevant to the Indian context.
72. For the Indian context, the role of AGROSEGURO or RMA can be played by a consortium of insurers participating in WBCIS. The representation of various insurers in the apex-level administrative or technical agency can be based on a mix of

indicators that may include business size, experience in crop insurance, technical expertise, process excellence, investment (time, effort and funds) etc. This apex-level agency can be given the responsibility of setting the detailed conditions for all insurance products, in particular the product design and differentiated premium rates which vary according to risk exposure. Subsidies from government can be channelized through this apex-level agency to the participating insurers. Reinsurance arrangements for the entire portfolio can be negotiated centrally to attract better business terms and to reduce transaction costs. At the field-level, crop insurance policies may be distributed and serviced by insurers and their marketing agencies. Insurers who intend to participate only in distribution and service delivery of WBCIS may be allowed, entitling them only to marketing commissions or operating subsidies. The insurers participating at the apex-level can contribute as co-insurers or share-holders in the entire crop insurance portfolio. The exact structural configuration of the crop insurance model appropriate for India may be developed through detailed consultations with insurers, subject matter experts and technical agencies.

73. Universal coverage of farmers under crop insurance should be pursued aggressively alongside the goal of financial inclusion. Non-loanee farmers account for more than 50% of the total farmer base in India in the context of formal sources of credit. Such a huge segment of farmers comprising the non-loanee farmers, who are already devoid of cheaper institutional credit, virtually pays double penalty as they are largely left out of a majority of governmental programs including the crop insurance programme. At present, there are provisions to provide relief to such farmers in case of catastrophic weather events or crop disasters, but the quantum of such relief is largely ad-hoc and limited. In order to protect the non-borrowing farmers from extreme financial distress and provide basic economic security, the government can introduce 'Catastrophe Protection' or 'Non Insured Crop Loss Assistance' for farmers, drawing inputs from a similar program in the USA. Such protection can also become an effective conduit for channelizing calamity and disaster relief funds from central and state governments. By linking relief funds to Catastrophe Protection or Crop Disaster Assistance, the benefit of such relief can be passed on to the targeted groups with greater efficiencies and transparency.

74. By developing taluka level weather indices for catastrophic insurance, the move towards more robust systems to mitigate climate change impacts is also ascertained. Catastrophic risks being low probability and high severity events have in principle a lower actuarially fair premium compared to more frequent and moderately severe crop loss events. This topping-up of plain vanilla crop insurance products with low premium catastrophic covers would ensure an excellent risk mitigation alternative to farmers at a higher level of granularity (e.g. at taluka level). As the weather database improves with time, and cheaper channels to deliver WBCIS or weather insurance evolve, the sophistication of climatological modeling could be harnessed to develop even village based covers, which could be envisioned as the ultimate challenge for the frontiers of weather based crop insurance over the medium to long term horizon.

Problems of microclimates and basis risk could also be tackled under these layered-risk transfer provisions for a large section of farmers.

75. Till the time remote-sensing based crop loss estimation evolves to reasonable perfection, an interim solution would be to blend the features of the area yield index and weather index. Such blended products, may appeal more to farmers and other stakeholders, as these would incorporate the respective strengths of both NAIS and WBCIS while limiting the undue dependence on any one of them. It would be expedient to promote such blended products, with ideally an equal contribution to the total sum assured. Such blended products could be continued with almost an equal emphasis on area yield index and weather index till an integration of remote-sensing index becomes possible. The area yield index may then be systematically phased out with improvement in reliability and granularity of remote-sensing index.

76. Coverage of further perils under WBCIS, with the predominant goal of meeting the expectations of farmers and other key stakeholders, must be resisted to the best extent possible. Multiple validation exercises in real-life conditions should be a prerequisite for inclusion of any new peril in a WBCIS policy. Experimental coverage of a peril should be discriminated unequivocally from the coverage of standard perils, through proper representation in WBCIS policy. Rationalization of perils must be undertaken ab initio to gauge the effectiveness of the coverage of a peril under a given policy. Only perils which can be insured with reasonable representativeness and verifiability must be included under WBCIS.

77. It is recommended that in the future, crop loss data be gathered in a more systematic manner, that losses be recorded by peril and at the highest level of resolution possible. Crop loss information (at individual or at an aggregate level) may be fed in by the afflicted farmer customers through the toll-free phone service which can be stored in the centralized loss database. The validation of such losses may be undertaken both through physical verifications and juxtaposition with the corresponding weather or yield data. Development of a centralized loss database for collection of agricultural loss experience of farmers and hazard impact should be initiated. This information is a critical input in the product development process for weather insurance and has considerable bearing on how the product payouts correlate with the actual loss experience. Maintenance and update of centralized loss database can be subsequently managed by a suitable professional agency which would be responsible for collecting and processing information from the farmers and other agencies.

78. Improving weather data system for insurers and research community working on agricultural production risk management is the need of the hour. This calls for greater responsiveness from public agencies like IMD to leverage their contribution towards an integrated weather data system for India. In order to materialize the goal of an integrated data system, concerted efforts are required to tap the synergy in weather station installation by various public/private agencies. The current growth of weather station network in India is largely haphazard and devoid of a coordinated approach

and integrated planning. In order to attain the objective of an integrated data system for India, Public- Private Partnerships (PPP) and integrated planning at the national level should be promoted. These centralized efforts have to be followed by decentralized implementation in identified locations across the country. Taking into account the existing automatic weather stations, the immediate demand of new weather stations for the approximately 300 high-priority districts (from the standpoint of weather insurance) is around 4000 weather stations. This translates into an investment requirement of nearly INR 40 Crore, presuming the cost of a reliable, basic, automatic weather station to be INR 1 lakh.

79. By their very nature, weather insurance products are difficult to comprehend for a typical Indian farmer who is equipped with limited capacities and experience. The multitude of weather insurance products offered by various weather insurance providers necessitates the need for benchmarking the various products to enable the farmer to make an informed choice. Through benchmarking it may be ascertained whether the products offered by the different insurance companies carry at least comparable benefits (Protection vis-à-vis Premium). The complex weather insurance products may be disintegrated into the constituent covers for different perils. As crop insurance built on a scientific platform is being increasingly used as important welfare mechanism with substantial financial support from the government, it makes sense to create a 'Technical Advisory Body' (TAB) by the government within the Ministry of Agriculture and Cooperation (GoI) to review the progress of crop insurance schemes on continuous basis and to provide policy directions.

80. The fundamental mandate of the 'Technical Advisory Body' (TAB) would be to approve roll-out of only those weather insurance products under WBCIS which can ensure balance between the expectations of the demand side and the deliverability of the supply side. The TAB may also take the role of agriculture insurance development agency with technical functions and can work closely with IRDA. The suggestions of insurers and premier research institutions can be invited for identifying such subject matters experts from India who can objectively assess weather insurance products and provide inputs for improving them. Since weather-based crop insurance is a relatively new financial instrument even globally, the possibility of involving international experts (like actuaries, crop-weather simulation experts etc) in such a body may also be considered.

81. To complement the process for improving weather insurance products, medium-term research projects may be commissioned by the Government. As part of these projects, high quality weather data from IMD may be analyzed through inter-disciplinary research exercises involving research institutions, agricultural universities, industry think-tanks which can take up region and crop specific correlation and calibration exercises. The public good nature of these research outcomes could go a long way in making partial insurance products like index-based weather insurance more popular and gradually affordable.

82. One aspect of WBCIS and weather insurance schemes in India that frequently came out from our focus group discussions (FGDs), field surveys and interaction with intermediaries and experts is the need for improvement in service delivery. Both pre and post policy sales period service holds the key to customer satisfaction as in any other product. If the farmers believe that they are valued by the insurers as well as by the intermediaries, their trust in the weather insurance being marketed also goes up.

83. Value added services like periodic dissemination of weather index data and claims situation could go a long way in improving the popularity of the products marketed. Use of SMS based weather data dissemination to progressive farmers or influential farming groups in the social network of the farming community or complimentary services like pre sowing weather forecasts could be provided at extremely low costs while the corresponding returns from these minimal investments by the suppliers could more than proportionately increase the returns over the long run. Input dealers and field extension agents could be incentivized to hand hold the clients in the early days of being introduced to weather insurance policies which would create a conducive environment for a fast and educated growth of an important risk management strategy like weather based crop insurance. Discount schemes on premium discounts for next season or lottery draws with modest gifts could be used as a marketing strategy to influence farmers to purchase multiple policies of rainfall insurance (based on their risk appetite and ability to pay) as most of the voluntary purchased are confined to single unit purchases.

84. Considering the substantial financial outlay on providing crop insurance to farmers, the expenditure on its dissemination and promotion through mass media should, at best, be considered marginal vis-à-vis the annual revenue expenditure on operations and financial support. The awareness-building campaign for crop insurance may be modeled on the lines of the remarkably effective communication and promotional campaign employed for Mahatma Gandhi Rural Employment Guarantee Scheme (alternatively NREGS). The network of institutions falling in the framework of Local Self Governance should also be more effectively utilized for promotion of crop insurance. In order to address the queries and grievances of potential and existing farmer-clients in a personalized manner, the mass-level awareness building efforts could be complemented by toll-free helplines. It may be useful to avail the existing set-up of toll-free facility made available by Agricultural Universities and other extension agencies. Interactive media sensitive to local conditions like street-plays or insurance games should be employed in areas of more focused sales activity in order to simplify the insurance mechanism and to make the potential adopters more comfortable with complex insurance products.

85. With the outreach and penetration of self-help groups (SHGs) and other interest-based collectives spreading deep into the rural hinterlands of India, there are enormous opportunities to leverage these SHGs and other interest-based collectives for increasing the patronage and reach of crop insurance in India. The utilization of SHGs and other interest-based collectives as a vehicle for sales, distribution and post-sales service delivery is going to be a win-win proposition as it can reduce the

typical insurance problems of moral hazard, high administrative and transaction costs, lack of customer feedback and poor post sales service delivery. All such advantages associated with merit focused pilot projects to assess the effectiveness of SHGs and other interest-based collectives in crop insurance promotion, administration and service delivery. The selection of the SHGs and other interest-based collectives or the location for such pilot projects should take due consideration of the wide differences in the institutional strengths and operational efficiencies across SHGs and other interest-based collectives.

86. It is a known fact that the economic exposure to uncontrollable risks is significantly higher for a farmer participating in contract farming initiative than his peers on account of the higher investments by the former for crop inputs, technology and quality control. In order to safeguard the interest of farmers participating in contract farming and to promote trials/adoption by other farmers through demonstration effect, crop insurance needs to be given the status of a mandatory input under contract farming initiatives

87. The continued imposition of service tax on weather insurance policies is startling considering that other forms of insurance targeted at similar socio-economic segments have been exempted from service tax. Service tax on weather insurance policies sold to farmers must be waived reinforcing its utility as a social good.

88. The definition of insurable interest must be widened by AIC to include agricultural labourers in its service net. The income of these workers depends considerably on rainfall. Initially such coverage of agricultural labourers under WBCIS may be channelized through reliable intermediaries and can be scaled up after successful trials

89. Due to the structure of WBCIS, it becomes difficult for insurers to meet the stipulated regulatory provision under Section 64 VB of the Insurance Act, 1938. Either the structure of WBCIS or the concerned regulatory provision has to be modified suitably to ensure proper compliance by insurers.

90. The ceilings on actuarial premiums and premium subsidy have to be hiked up for providing satisfactory coverage to cultivators in areas prone to high and frequent risk exposure. In order to incentivize the insurance intermediaries for serving their farmer-clients better, their commission may be computed on a value much higher than the subsidized premium being paid by a farmer insured under WBCIS. According to some key intermediaries, the commissions for a WBCIS policy are relatively small to demand substantial efforts in marketing and service delivery.

91. The maximum probable loss denotes the highest cumulative payout (sum of payouts of all constituent covers) among all the cumulative payouts simulated historically from a weather insurance contract. The quantitative difference between maximum sum assured and maximum probable loss for a weather insurance contract represents a theoretical gap between the maximum payout committed by that contract and the actual payout that could be expected from that contract even in considerably adverse years. In order to improve the representativeness and verifiability of WBCIS products,

the quantum of maximum sum assured should be made equal to the maximum probable loss under that policy. In order to facilitate farmer-clients and other key stakeholders to choose their WBCIS policy more effectively and enhance transparency, insurers should provide historical payout distribution table/chart for the given weather insurance contract for all years considered for structuring that contract.

92. NAIS presently provides for individual assessment of losses in case of localized risks, viz. hailstorm, landslide and flooding, on an experimental basis. Farmers feel the experiment is not adequate, and it should be implemented on a full scale, covering all areas. Earlier government reviews have supported the view that the localized calamities should be assessed on an 'individual' basis in all the areas. The practice of physical individual/area assessment of losses from non-indexable/localized perils (Hail/Frost/Wind) must be extended to the entire coverage of NAIS and WBCIS.

93. 'Welfare effects' of WBCIS payouts should be studied to estimate the impact of the differences in income and asset positions of those who got payouts as against those who did not, at times of droughts or village level catastrophes. The question whether the payouts are substantial enough to shield household consumption from weather shocks also needs thorough evaluation.

Chapter 1

AGRICULTURAL RISK MANAGEMENT

Agriculture is an intrinsically risky economic activity. Variations in crop yields due to adverse shocks like unmitigated moisture stress in the growing season, drought, natural calamities, pest infestation, outbreak of diseases and input risks like non-availability of inputs at the right time frequently affect the agricultural households[1] in India. Price risks arising from fluctuations in input and output prices also induce variability in the agricultural incomes. Yield risk becomes the most important agricultural risk given the fact that crop losses arising from production shortfalls or complete crop output failure wipe out farm profits and trigger a condition of distress where the cultivation costs are irrecoverable, triggering a high default probability of the indebted farmers or inducing asset-depletion and poor investment potential in future agricultural seasons. For a monsoon dependent agricultural economy like India unmitigated yield risks become even more pronounced as it can be generalized that around sixty percent of the variations in crop yield are induced by fluctuations in critical weather parameters like rainfall (Jodha 1972, 1978, 1981a, 1981b; Anderson and Hazell 1989, Walker and Ryan 1990, Hardaker et al 1994). Given the exposure of crop yields to a multitude of perils[2], it becomes imperative to design risk management systems to stabilize crop incomes by attenuating seasonal and inter-annual variability.

1.1Need for Stabilizing Farm Incomes

Given the multiple risks embedded in the livelihood of vulnerable communities, the stimuli and corresponding response to stimuli is of immense significance. It may be noted that the preponderant small and marginal farmers are naturally the most vulnerable groups as they have a low asset base, are resource poor and predominantly operate under rainfed conditions. With low investment potential and poor coping ability these households are the greatest risk of falling into debt and poverty traps in the eventuality adverse weather shocks.

The vulnerability of resource poor farmers and landless agricultural labourers is aggravated by the multitude of uninsured risks in conditions where the full-insurance opportunities are absent (Moscardi and De Janvry 1977, Feder 1980, Rosenzweig 1988, Walker and Ryan 1990, Townsend 1994, Ravallion and Chaudhuri 1997, Kurosaki 1998). Farmers in India have been observed to be risk-averse and that they seek to avoid risk through various managerial and institutional mechanisms (Binswanger, 1980 and Hazell, 1982). Studies have shown the limitations and adverse consequences of consumption and income

[1] As per the NSS 59th Round 2002-03, around 60 percent of the 148 million rural households in India being cultivator households and 78 percent of the operational land holdings are marginal and small holdings (less than 2 hectares). The average land holding size for marginal farmers is as low as 0.4 hectares; about 13 percent of the holdings are of 2-4 hectares while 7.1 percent are of 4-10 hectares size (medium and semi-medium).

[2] Inter-temporal and spatial vagaries in the quantum and distribution of rainfall which assume significance in inducing yield uncertainty.

smoothing by risk-averse poor households (Rosenzweig and Wolpin 1985, Deaton 1992, Paxson 1992, Rosenzweig and Binswanger 1993, Morduch 1995). Traditional coping mechanisms and adaptation strategies like drought proofing by mixed cropping, changing varieties, crops and sowing time, matching crop phenology with weather and water availability and diversifying income sources are not always efficient and effective against aggregate climatic shocks and disasters. Indian farmers generally rely on informal arrangements like diversification of crops and agricultural plots, off-farm activities, self-insurance. Such traditional risk management systems are sub-optimal and informal risk management strategies are inefficient as they fail to protect the households in the eventuality of covariate adverse shocks and catastrophic idiosyncratic shocks. Agricultural shocks are further amplified in rural areas where financial markets are incomplete and the imperfect land, labour and credit markets are inter-locked. These preconditions dictate the need for formal risk transfer mechanisms like insurance in Indian agriculture and crop insurance has evolved as one of the most important means of indemnifying the losses in crop yields, and hence crop incomes.

1.2Evolution of Agricultural Insurance: Trends and Problems

Agriculture insurance, in its most popular avatar, crop insurance, has existed in many countries as an institutional response to agricultural risk. Agricultural production is susceptible to vagaries of weather and large-scale damages due to attack of pests and diseases making crop insurance a vital instrument in the stabilizing the crop incomes and hence secure the livelihoods of the agricultural community. Crop insurance is based on the fundamental principle of insurance business, that is, the 'laws of large numbers'. The risk is distributed across space and time. The losses suffered by farmers in a particular affected area are shared by farmers in unaffected areas or premium accumulations over good years can be used for indemnification of losses in bad years. Thus, a good crop insurance programme combines both self as well as mutual help principle. Crop insurance brings in security and stability in farm income. Crop insurance protects farmers' investment in crop production and thus improves their risk bearing capacity. Crop insurance facilitates adoption of improved technologies and, encourages higher investment resulting in higher agricultural production

In the early 20th century some private companies in the US introduced crop insurance covering multiple risks, while protection against specific perils like hail insurance had been introduced in Europe, the US and Canada, over a century ago. In India, J S Chakravarti[3]

[3] The scheme is outlined and discussed in his book 'Agricultural Insurance: A Practical Scheme Suited to Indian Conditions' published in 1920', printed at the Government Press, Bangalore. This piece of work, is one of the earliest monographs on the subject, but surprisingly does not appear to have been accounted for in the analytical literature on agricultural insurance. The book was published in 1920; Chakravarti had been working on the subject since a number of years prior to that. As he mentions in the preface to the book, the first seven chapters were published in the Mysore Economic Journal during the years 1915 through 1917. He presented a paper on Agricultural Insurance in 1917 at a conference of the Indian Science Congress at Bangalore. In 1920 he already [3] The scheme is outlined and discussed in his book 'Agricultural Insurance: A Practical Scheme Suited to Indian

designed, as early as in 1920, a scheme of agricultural insurance based on rainfall for India which is a path breaking work in the space of agriculture insurance. His approach has an all-India perspective, though data relating to the then Mysore state (in Karnataka now) are used for the purpose of giving the scheme a concrete shape and for analyzing its operational and financial implications. Chakravarti's insightful model was an innovative application of the fundamental principles of insurance to the subject of agricultural insurance.

According to Chakravarti (1920, referred to in Mishra 1995), agricultural insurance in India should be a package consisting of the following, in increasing order of priority as per conditions prevailing during the times: (i) Insurance of buildings, granaries and agricultural implements (ii) Cattle insurance (iii) Insurance of crops. He identified that the most important element of a system of agriculture insurance is the assumption of the risk of loss or deficiency in respect of crop production, which forms the core of his scheme of agricultural insurance because of its importance and complexity. By grouping insurance of houses, implements, cattle, etc, can with other types of property insurance, it left the system of agricultural insurance to grapple with crop insurance.

The detailed scheme of agricultural insurance laid down by Chakravarti was sensitive to the issues of basis of insurance i.e. whether the basis of insurance payout should be on the basis of value of the crop or on its quantity, with his preference for value rather than quantity as the basis given the inverse relationship between quantity and price of produce and eventualities in bad crop seasons. He took due consideration of indemnification level, role of the state within an 'area approach' analogous to Dandekar's (1976) homogenous area approach. He emphasized the problems of 'human elements' i.e. moral hazard in crop insurance and suggested a scheme of drought insurance. According to him, the usual remedy applied in other types of insurance to overcome the problem of moral hazard is 'partial insurance or under- insurance or deductible'. Chakravarti rightly argued that this remedy may not be effective in case of crop insurance, because the crop to be insured is yet to exist and the state of its existence thereof would depend on the actions of the insured farmer which an insurer would not be able to monitor easily. This, according to him was likely to reduce the benefit of insurance and hence its demand. In addition to information asymmetry problems, he identified other constraints like illiteracy of most cultivators, inadequate village statistics and general backwardness among the population.

The fundamental terms in the innovative rainfall insurance contract envisaged by Chakravarty were harbinger of the structure of insurance contracts to be introduced eight

Conditions' published in 1920', printed at the Government Press, Bangalore. This piece of work, is one of the earliest monographs on the subject, but surprisingly does not appear to have been accounted for in the analytical literature on agricultural insurance. The book was published in 1920; Chakravarti had been working on the subject since a number of years prior to that. As he mentions in the preface to the book, the first seven chapters were published in the Mysore Economic Journal during the years 1915 through 1917. He presented a paper on Agricultural Insurance in 1917 at a conference of the Indian Science Congress at Bangalore. In 1920 he already had eleven years' experience with the Mysore State Life insurance Scheme - first as secretary and then as president of the State Insurance Committee; see Mishra (1995)

decades later. As per his model, the aggregate rainfall from the beginning of the agricultural year as measured at the rain-gauge at the taluka headquarters up to a certain date is less than a certain amount, then a certain sum of money will be paid in respect of the insured field as compensation. The above contract has three critical elements: a specified date, a specified degree of deficiency in rainfall and a prescribed amount of compensation. Box 1 highlights the salient features of the 'Chakravarti Model of Agriculture Insurance'. It may be noted that this scheme is very similar to that suggested in World Bank (1992). Its architecture is based on empirical data and the details lay sound foundations for designing insurance schemes in agriculture. The World Bank scheme aims to cover all rural households by selling insurance in the form of 'rainfall lotteries' while Chakravarti's scheme favoured coverage of only crop producers. The interesting framework suggested by Chakravarti has definitely not received the visibility it deserves.

Salient Features of the Chakravarti Model

Some important features of the scheme are as follows:

i) The scheme is area-based and rain-gauge station specific.

ii) A year is divided into two seasons.

iii) Indemnity is payable if the total rainfall during a season is less than 65 per cent of the normal rainfall. The percentage criterion can be varied depending on the agro-climatic features of the area. Indemnity is determined with a view to stabilizing a farmer's net income. Assuming that a farmer can get one-third of his net income even in a bad year, the scheme aims at an indemnity equivalent to two-thirds of his income.

iv) Premium is calculated on the basis of the likelihood of a drought occurring and the size of indemnity indicated above.

v) The scheme is designed to be self- financing. Coincidentally, the amount of premium turns out to be equal to the land tax for a unit of land. This makes the premium rate simple to determine, and variable with land quality and hence a farmer's net income.

vi) Though the scheme was designed primarily for annual contracts, quinquennial or decennial contracts were recommended with a view to enhancing the economic benefits to farmers.

vii) Land owners and tenants are eligible for insurance coverage.

viii) The scheme also envisages insurance policies for co- operative societies and groups of farmers.

In the 1930s Japan and the US formalized public crop insurance schemes. Developing countries of Asia, Africa and Latin America saw crop insurance schemes much later. In the 1960s and the 1970s there was a lot of optimism for the success of crop insurance schemes, even for those in the public sector (Mishra 1995). Some studies in the 1980s and early 1990s [e g, Hazell et al 1986, Hazell 1992] argued that all-risk crop insurance programmes performed dismally and highlighted the need for governments to be cautious in introducing large crop insurance schemes. Some common findings are that crop insurance schemes are costly, financially unsustainable and not in a position to produce welfare gains as envisaged.

Some studies [e.g. Ahsan 1985; Dandekar 1985; Ray 1985; Miranda 1991; Roberts et al 1991; Williams et al] 1993; Mishra 1994 provided evidence on why crop insurance would work and made sense for protecting agricultural incomes of millions of farmers in the developing world. Agricultural insurance schemes have been argued to be a form of 'crop credit insurance' as most of the crop insurance schemes have been credit-linked. This reduces the default risk to the lending institutions and probability of repayment remains higher at times of crop failure as the compensation received from crop insurance enables the farmers to repay their debts and stay avoid indebtedness to high cost informal credit sources like moneylenders (Hazell *et al* 1986; Pomareda 1986).

There are some idiosyncrasies in the case of agricultural insurance making the above mentioned problems standard attendant problems. The cost of information is much higher, because the required data related to farms and even plots of land spread over a vast geographical area. Collection of data is costly as well as time consuming. There is wide agro-climatic variation which results in the problem of adverse selection. A crop insurance scheme can be based either on the 'individual approach' or the 'area approach'. In case of the former, assessment of indemnity is made separately for each insured farmer based on the crop yield of his or her farm and the premium may be determined separately for individual farmers or for a group of farmers. In case of the area approach both the premium rate and the indemnity are determined not separately for each farmer but for a group of farmers. Most crop insurance schemes in the world are based on the individual approach. Area- yield crop insurance schemes based on the area approach have attained popularity recently.

Though much of the debate around the efficiency of agriculture insurance hovers around the sustainability of state-sponsored agricultural insurance schemes, private agricultural insurance has also not been successful due to market failure and state failures owing to the following reasons. First, private insurers have not been able to cope with systemic, non-diversifiable risks in assessing crop yields stemming from say, natural disasters affecting a large number of farms over a widespread region. Even with the possibility of reinsurance, it is hard to calculate fair premium in order to develop sufficient reserves for low probability but high loss events. Second, problems of information asymmetry like adverse selection and moral hazard problems raise the cost and risks of introducing crop insurance products more so than other types of general insurance (Wenner and Arias 2003).

Adverse selection in insurance markets refers to the situation where insurers find it impossible or very expensive to distinguish between high-risk and low-risk insurance applicants and thus, price or yield insurance contracts at the average premium for all individuals, which is inappropriate and non-sustainable. This results in undercharging high-risk customers and overcharging low-risk customers for identical contracts. Over time, the low-risk - clients drop out of the market and the insurance company is left with a very high-risk pool of clients with higher expected indemnities that negatively affects insurer's profitability. Moral hazard refers to the situation where the granting of an insurance contract can lead to a reduction in the application of good husbandry practices or the complete

altering of production practices on the part of the client, resulting in higher loss claims (Mishra 1995).

Information asymmetry problems affect all insurance markets but are more pronounced in agricultural risk markets because of costly verification of farmer behaviour and difficulties in obtaining information. The administrative costs of physical monitoring of farmer effort and segregating bad risk and good risk farmers can be prohibitive in rural India geographical spread and heterogeneous production conditions. On the other hand, setting the indemnification of loss at lower levels to discourage 'hidden action' and 'hidden information' problems, can render the market very thin whereby advantages gained by pooling risk types, the very essence of insurance intermediation, is lost. Private insurers do not have the incentive to supply agriculture insurance in developing countries precisely for the aforementioned reasons, and if it is available, it is not affordable to the high risk farmers as the premiums are high given high probability of claims even if actuarial pricing of insurance products is undertaken.

Historically, private crop insurance in developed countries has been limited to single peril products, like hail insurance, for which it is possible to set actuarially sound premiums and damage verification or loss assessment, is easier. Lack of appropriate time-series data of yield as well as risk exposures creates disadvantages for the insurer. The adverse selection problem is aggravated by high premium rates discourage participation of a large section of the farming community and mostly high risk farmers participate. Moreover, in crop insurance, the insured farmers do not have any control over the insurable event, but depending on terms of the contract, they individuals can affect the indemnity values. The insured farmers might refrain from taking evasive action to reduce farm risks to prevent the loss than an uninsured counterpart would possibly take, when expected indemnity payments exceed the value of efforts. This problem of incomplete information discourages participation of private insurers in agricultural insurance. Another problem that contributes to undersupply of agriculture insurance by the private sector is the non-independence of aggregate shocks like natural disasters might create disincentives for insurers to come forward with insurance schemes in the absence of affordable reinsurance arrangements.

The huge coverage gaps caused by the inability of private insurers to offer affordable insurance products, especially in the multiple peril and catastrophic loss insurance market segments has been attempted to be filled up by Government agricultural insurance programmes, which goes beyond the default responsibility of welfare states to have systems in place that ensures protection of income of agricultural households. This is also a valid justification for creating an environment conducive to development of both market based risk management instruments and state sponsored public agricultural insurance schemes. The global experience of state-sponsored (Government -backed) agricultural insurance programmes has not been satisfactory in general if financial viability and coverage of farmers are the criteria. Other agricultural risk-related interventions by governments like price supports, input subsidies (fertilizer, irrigation, electricity) and credit market interventions can also be very expensive and ineffective in terms of their net welfare-effects, and crop

insurance is not an exception. The heavily subsidized public crop insurance programmes have been characterized by high claims ratio and actuarial losses. The unifying theme in the administration of public crop insurance schemes is that financial performance of most of the public crop insurance schemes has been disastrous in both developed and developing countries and the multi-peril crop insurance like the National Agricultural Insurance Scheme (NAIS) in vogue in India today are very expensive and has to be heavily subsidized.

The models of crop insurance existing in some developed countries, such as US, Spain[4], France and Italy are characterized by a certain commonality by way of the central Government providing the following:

(i) subsidies on premiums to farmers;

(ii) operational subsidies to private insurers to cover some of the high administrative costs associated with agricultural insurance contract underwriting; and

(iii) subsidized reinsurance.

In the presence of public insurance programmes, private insurers have been argued to be crowded-out given difficulties in innovating and introducing new risk management products. In spite of the lack of conclusive evidence on the hypothesis of public crop insurance schemes driving out private insurers, public agricultural insurance schemes have come to play a critical role in the near past. This is in reference to these schemes substituting means of transferring payments to farmers and maintaining farm income levels in the post-Uruguay Round of trade negotiations regime wherein all signatories to the agreement are supposed to reduce and phase out direct support to farmers (Wenner and Arias 2003). It would be imprudent to simply replicate the existing model of crop insurance found in developed countries in a developing country context characterized by limiting fiscal and monetary constraints. Without quantifying the cross-subsidization effects of agricultural insurance in the presence of distortionary input and price subsidies would also render successful models elsewhere ineffective in India. Nevertheless, many of the agricultural risks insured under public insurance programme are essentially uninsurable in nature and are generally costly given the frequent occurrence of the loss events. In sum, traditional agricultural insurance programmes are financial failures because of high administrative costs and unresolved, adverse selection and moral hazard problems.

1.3Alternatives to Crop Insurance: Index-based Weather Insurance

The idea of crop insurance which emerged in India during the early part of the twentieth century was fiercely debated post-independence (Hazell et al 1986) and significantly operational only in the nineties (Mishra 1996, Skees et al 1999). It is still evolving in terms of scope, spread and structure. There are huge coverage gaps in terms of farmers benefited and crops being covered under the state-sponsored and heavily subsidized National

[4] Discussed at length later in this chapter

Agricultural Insurance Scheme (NAIS), a multi-peril, area based crop insurance scheme that is mandatory for loanee farmers. Gross regional disparities in terms of farmers covered, premium collected, claims reported and claims settled. A financial innovation that promised to overcome the problems with the existing crop insurance scheme was 'index-based weather insurance'.

The alternative index-based weather insurance products (micro insurance products) that were developed to overcome the defects in the traditional crop insurance schemes could address the problems of moral hazard, adverse selection, high administrative costs, inadequate indemnification levels and large units of insurance. In addition, it brought in a paradigm shift by reducing the high turnaround times and poor servicing and claims management of the traditional crop insurance products (Manuamorn 2007). The first index-based weather insurance was a rainfall insurance contract underwritten by ICICI-Lombard General Insurance Company for groundnut and castor farmers of BASIX's water user associations in Mahabubnagar district of Andhra Pradesh in the year 2003.

Index-based products are contingent claims contracts for which payouts are determined by an objective weather parameter (such as rainfall, temperature, or soil moisture) that is highly correlated with farm level yields or revenue outcomes. The weather parameters can be used as a good proxy for the actual losses incurred by farmers. The underlying index used for an index insurance product must be correlated with yield or revenue outcomes for farms across a large geographic area. In addition, the index must satisfy a number of additional properties that affect the degree of confidence or trust that market participants have in that index; some of these properties are accuracy, reliability, and low susceptibility to measurement errors.

These protect the farmers against covariate weather shocks and not idiosyncratic household specific weather risks. Because claims for indexed contracts are automatically triggered once the weather parameter reaches a pre-specified level, the insured farmers receive timely payouts. The automatic trigger reduces administrative costs for the insurer by eliminating the need for tedious field-level damage assessment i.e. the field crop cutting experiments (CCEs). Because administrative costs are lower, premiums are relatively low (given low risk loadings for reinsurance arrangements) and products are more affordable to farmers, in principle. The transparent, objective, and exogenous nature of the weather index does away with adverse selection and reduces moral hazard. Indexed products also facilitate risk transfer to the international markets, because international re-insurers are likely to provide better terms when the insurance is based on measurable weather events and not farm-level losses. However, it should be borne in mind that the index-based alternatives provide partial cover by protecting against specific perils like deficit rainfall or excess rainfall.

In view of the problems faced by crop insurance schemes in many countries, alternative risk transfer instruments like rainfall insurance has received attention (Anderson et al 1989, Walker et al 1990, World Bank 1992, Manuamorn 2007). Rainfall insurance, i.e., insurance against both deficit and excess rainfall, and drought insurance, i.e. insurance against

prolonged rain deficiency only have become two of the most popular alternatives to crop insurance.

A fundamental difference of rainfall insurance from conventional crop insurance is that it is against the occurrence of a particular natural event as distinguished from loss in crop output resulting from that event. It is more observable and easier to measure than yield. Consequently, it can solve the problem of moral hazard - provided reliable and accurate rainfall data are available - and reduce the cost of administration substantially because loss assessment and inspection of fields would not be necessary. It is possible to have rainfall insurance across a larger geographical area than yield insurance for specific crops which are grown in particular regions. This can reduce the problem of covariate risk.

But one limitation of such a scheme could be lack of correspondence between rainfall recorded by a designated rain gauge station and crop yield income outcomes of the insured farmers. In addition, factors other than rainfall may affect crop production. One remedy may be to allow farmers to take insurance associated with more than one recording stations. However, it may not be necessary in areas with relatively lower and more variable rainfall and dry-land agriculture. In such regions rainfall affects both area and crop income. Cropped area declines if rainfall is much less than the normal. In such situations, farmers plant less profitable crops. Consequently, deviation in rainfall explains, through its effects on both area and yield, more of variation in the crop income than the yield variable of particular crops (Walker et al 1990, p 259).

Rainfall insurance is yet to be introduced in a big way. This was suggested in the Australian context (Lloyd et al 1986,) and some experiments were conducted (Anderson et al 1989) Private insurers offer drought insurance in some countries, but these are available only to large-scale farmers (World Bank 1992). However, the need of such a scheme is much more for small farmers. World Bank (1992) suggests a scheme for all rural households. It envisages drought insurance which would be weather-station specific and open to all households - small and large farmers, landless labourers, shopkeepers, artisans and so on. All those insured against rainfall at a particular station would pay the same premium and receive the same indemnity per unit of the sum insured. Drought insurance tickets could be sold like lottery tickets. A person would be free to purchase tickets for any weather station, and even more than one stations. It is also envisaged that tickets to poor people, who often might not be able to afford the premium, may be subsidized. Thus rainfall insurance is being suggested in the recent literature as a response to unsatisfactory experiences with crop insurance during the last four or five decades.

1.4 Agriculture Insurance Schemes in India

Crop Insurance is based either on the ‘area approach’ or ‘individual approach’. The area approach is based on ‘defined areas’ which could be a block / mandal/ hobli/ firka or any other smaller contiguous area. The indemnity limit originally was 60 per cent, 80 per cent and 90 per cent corresponding to high, medium and low risks areas. The actual average

yield per hectare of the notified crop for the defined area is determined on the basis of Crop Cutting Experiments (CCEs). In India, governmental efforts began in early seventies to compensate losses due to the reduction in crop yields arising out of natural calamities. The experiences on crop insurance schemes in India by both Government and private sectors are discussed here.

The question of introduction of a crop insurance scheme was taken up for examination soon after the Indian independence in 1947. Following an assurance given in this regard by the Ministry of Food and Agriculture in the Central Legislature to introduce crop and cattle insurance in the country, a special study was commissioned in 1947-48. The first aspect regarding the modalities of crop insurance considered was whether the same should be on an 'individual approach' or on a 'homogenous area' approach. The former seeks to indemnify the farmer to the full extent of the losses and the premium to be paid by him is determined with reference to his own past yield and loss experience. The 'individual approach' basis necessitates reliable and accurate data of crop yields of individual farmers for a sufficiently long period, for fixation of premium on actuarially sound basis. The 'homogenous area' approach envisages that in the absence of reliable data of individual farmers and in view of the moral hazards involved in the 'individual approach', a homogenous area comprising villages that are homogenous from the point of view of crop production and whose annual variability of crop production would be similar, would form the basic unit, instead of an individual farmer.

The study reported in favour of a 'homogenous area' approach even as various agro-climatically homogenous areas treated as a single unit and the individual farmers in such cases pay the same rate of premium and receive the same benefits, irrespective of their individual fortunes. The Ministry of Agriculture circulated the scheme, for adoption by the State governments, but the States did not accept.

In 1965, the Government introduced a Crop Insurance Bill and circulated a model scheme of crop insurance on compulsory basis to constituent State governments for their views. The bill provided for the Central Government framing a reinsurance scheme to cover indemnity obligations of the States. However, none of the States was in favour of the scheme because of very high financial obligations. On receiving the reactions of the State governments, the subject was considered in detail by an Expert Committee headed by the then Chairman, Agricultural Price Commission in July, 1970 for full examination of the economic, administrative, financial and actuarial implications of the subject.

The major initiatives in the space of crop insurance in India are described below:

i. Individual Approach Scheme

Different experiments on crop insurance on a limited, ad-hoc and scattered scale started from 1972-73. In 1972-73, the General Insurance Department of Life Insurance Corporation of India introduced a Crop Insurance Scheme on H-4 cotton. Later in 1972, general

insurance business was nationalized and, by an Act of Parliament, the General Insurance Corporation of India (GIC) was set up. The new Corporation took over the experimental scheme in respect of H-4 cotton. This Scheme was based on “Individual Approach" and later included Groundnut, Wheat and Potato and implemented in the states of Gujarat, Maharashtra, Tamil Nadu, Andhra Pradesh, Karnataka and West Bengal. It continued up to 1978-79 and covered only 3110 farmers for a premium of Rs. 4.54 lakhs against claims of Rs. 37.88 lakhs.

ii. Pilot Crop Insurance Scheme (PCIS) – 1979

In the background and experience of the aforesaid experimental schemes for crop insurance, a study was commissioned by GIC and entrusted to eminent agricultural economist, Prof. V.M. Dandekar. Based on the recommendations of Prof. Dandekar, a Pilot Crop Insurance scheme was introduced by GIC from 1979.

The important features of the scheme were:

- The scheme was based on "Area Approach"
- The scheme covered Cereals, Millets, Oilseeds, Cotton, Potato and Gram.
- It was confined to loanee farmers only and on voluntary basis.
- The risk was shared between General Insurance Corporation of India and State Governments in the ratio of 2:1
- The maximum sum insured was 100% of the crop loan, which was later increased to 150%
- 50% subsidy was provided for insurance charges payable by Small / Marginal farmers by the State Government & the Government of India on 50:50 basis.

PCIS-1979 was implemented in 13 States till 1984-85 and covered 6.27 lakh farmers for premium of Rs. 196.95 lakh against claims of 157.05 lakh.

iii. Comprehensive Crop Insurance Scheme (CCIS)

The Comprehensive Crop Insurance Scheme (CCIS) was introduced with effect from 1st April 1985 by the Government of India with the active participation of State Governments. The Scheme was optional for the State Governments. The Scheme was linked to short term crop credit and implemented on Homogeneous Area approach. 15 States and 2 UTs implemented the Scheme until Kharif 1999. These were Andhra Pradesh, Assam, Bihar, Goa, Gujarat, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Meghalaya, Orissa, Tamil Nadu, Tripura, West Bengal, Andaman & Nicobar Islands and Pondicherry.

The States of Rajasthan, Uttar Pradesh, Jammu & Kashmir, Manipur and Delhi had initially joined the Scheme but subsequently opted out after few years.

The important features of the scheme were:

- It covered farmers availing crop loans from Financial Institutions for growing food crops & oilseeds on compulsory basis. The coverage was restricted to 100% of crop loan subject to a maximum of Rs. 10,000/- per farmer.
- The premium rates were 2% for Cereals and Millets and 1% for Pulses and Oil seeds. 50% of the premium payable by Small and Marginal farmers was subsidized equally by Central and State Governments.
- Premium & Claims were shared by Central & State Government in 2:1 ratio.
- The Scheme was optional to State Governments.
- The maximum sum insured was 100% of the crop loan, which was later increased to 150%
- The scheme was a multi agency effort, involving Government of India, Departments of State Governments, Banking Institutions and GIC.

The scheme covered 7,62,65,438 farmers, area covered was 12,75,70,282 hectares, total sum-insured was Rs.2949 crore, total insurance charges were Rs.403.56 crore, total claims was to the tune of Rs.2303.45 crore and the claims ratio was high figure of 1:5.71. Majority of the claims under the CCIS were paid in the States of Gujarat - Rs. 1086 Crores (47%), Andhra Pradesh (21%), Maharashtra (9%) and Orissa (8%).

iv. Experimental Crop Insurance Scheme (ECIS)

While, CCIS was still being implemented, attempts were made to modify the existing CCIS from time to time as demanded by the States. During 1997, a new scheme, viz. Experimental Crop Insurance Scheme (ECIS) was introduced during Rabi 1997-98 seasons which was implemented in 14 districts of five States. The Scheme was similar to CCIS, except that it was meant only for all small / marginal farmers with 100% subsidy in premium. The Central and State Governments in 4:1 ratio shared the premium subsidy and claims. The Scheme was discontinued after one season due to its many administrative and financial difficulties.

The Scheme covered 4,54,555 farmers for a sum insured of Rs. 168.11 Crores and the claims paid were Rs. 37.80 Crores against a premium of Rs. 2.84 crores.

v. Pilot Scheme on Seed Crop Insurance (PSSCI)

The scheme was launched with effect from Rabi 1999-2000. In the initial stage, it was for the IXth Plan. During 1999-2000 and 2000-01, the financial assistance was provided to the identified states i.e. Andhra Pradesh, Orissa, Gujarat, Haryana, Karnataka, Madhya Pradesh, Punjab, Rajasthan, U.P and Maharashtra for the implementation of the Pilot Scheme on Seed Crop Insurance scheme. The salient feature of the insurance scheme was to cover the risk involved in seed production at field stage, loss in expected raw seed yield,

loss of seed crop after harvest so that more number of the breeder/ institutions/ organizations/ seed growers would take up and come forward in seed production.

The main objectives of the Pilot Scheme on Seed Crop Insurance were:

- To provide financial security & income stability to the Seed Growers in the event of failure of seed crop.
- To build confidence in the existing seed growers & stimulate participation of new growers to undertake seed production programme of newly released hybrid/ improved varieties.
- To provide stability to the infrastructure established by the State owned Seed Corporations/ State Farms.
- To give a boost to the Modern Seed Industry to bring it under Scientific Principles.

All seed growers in public and private sectors of major seed producing states willing to participate were eligible to be covered under the scheme. Table 1 shows the 'breeder', 'foundation' & 'certified' seeds of the crops and the states covered. The identified states opted for the crops covered are as shown in the list.

Table 1: PSSCI Scheme Coverage

State	Crops
Andhra Pradesh	Paddy, Maize, Jowar, Bajra, Sunflower, Cotton, Groundnut, Red Gram
Gujarat	Bajra, Wheat, Gram, Cotton, Groundnut, Maize, Red Gram, Castor
Haryana	Paddy, Wheat, Gram, Red Gram, Cotton
Karnataka	Paddy, Maize, Jowar, Bajra, Sunflower, Cotton, Groundnut, Red Gram, Bengal Gram, Black Gram, Green Gram, Ragi.
Madhya Pradesh	Paddy, Wheat, Gram, Soyabean, Sunflower, Cotton, Red Gram, Mustard.
Maharashtra	Paddy, Jowar, Bajra, Wheat, Gram, Soyabean, Sunflower, Cotton, Groundnut, Red Gram, Green Gram, Black Gram.
Orissa	Paddy, Groundnut, Red Gram , Cotton
Punjab	Paddy, Wheat, Gram, Red Gram, Soyabean, Cotton.
Rajasthan	Wheat, Gram, Soyabean, Groundnut, Red Gram, Cotton, Bajra, Castor, Mustard.
Uttar Pradesh	Paddy, Wheat, Gram, Soyabean, Sunflower, Red Gram, Cotton, Potato, Pea, Mustard.

Source: AICIL

Only the ‘foundation’ & ‘certified’ seed produce that is offered to State Seed Certification Agency (SSCA) for Certification was eligible for coverage. In case of Breeder Seed, the coverage was subject to the production being carried out under the supervision of the concerned Monitoring Committee. For the purpose of insurance coverage, seed areas under jurisdiction of a sub-office/ area-office of SSCA were identified as a unit for determination of Average Yield and Sum Insured in respect of that unit area.

i) Risks Covered

The proposed Scheme sought to provide protection against those risks, which are beyond control of the farmers. The following types of losses were covered:

A: At Field Stage:

A1. Failure of seed crop field either in full or in part due to the perils indicated below:

Natural Fire, lightning, storm, hailstorm, cyclone, typhoon, tempest, hurricane, tornado, flood, inundation, landslides, drought, dry spells, excessive rain, large scale incidence of pests and diseases. Damages due to Frost were also covered under the Scheme.

The cover commenced from the sowing / transplanting and continued until the crop is harvested. In a particular field, if only a portion of the field was affected by any of the above mentioned perils resulting in rejection of such affected portion of the field, the growers were compensated corresponding to the proportion of the area rejected.

The compensation payable was on the basis of the graded scale as described below:

- Failure of seed crop within one and half months of sowing, the compensation was 40% of the sum insured corresponding to the rejected area.
- Failure of seed crop after one and half month of sowing and until the crop is harvested, the compensation was 80% of the sum insured corresponding to the rejected area.
- However, to be eligible for compensation, failure/ damage (and subsequent rejection thereby) should take place on a contiguous area of minimum "half an acre" in any individual grower's farm. In other words, failure/ rejection confined to less than "half an acre" were not considered as a loss for the purpose of the Scheme.

A2. Loss in Expected Raw Seed Yield:

Following perils in addition to the perils mentioned under Para A1 above were covered:

- Prevalence of excessive rain, blowing of hot and/ or cold wind, excessive hot weather during flowering or seed setting stage:
- Loss in expected raw seed yield due to the above perils was compensated if and when the same loss has occurred in general over a large contiguous area.

A3. Loss of Seed Crop after harvest:

Damage to the harvested seed crop due to operation of the above-mentioned perils whilst lying on the field until the crop is removed from the field for transportation to the processing Plant was covered under the Scheme.

B. At Seed Certification Stage:

Losses due to seed lots having failed in 'Germination Test' due to operation of any of the insured perils mentioned in Para A1 & A2 above is compensated. Failure in germination test due to any factor/ reason other than the insured ones was not covered.

ii) Exclusions under Seed Crop Insurance

Physical damage / losses / rejection of field / seed on account of following reasons were excluded from the coverage:

a) Poor crop stand due to either defective planting material or unfavourable conditions prevailing during sowing period.
b) Non-maintenance of prescribed isolation distance.
c) Non-rouging at appropriate times and non-conformity of prescribed standards or non-compliance of any of the instructions of the Certification Agency.
d) When seed crop production has not been taken up in ideal conditions with proper cultural practices.
e) Non-acceptance of crop due to non-synchronization of male and female plants.
f) Lodging of seed crop and resulting loss in yield except for the insured perils.
g) Loss or damage to seed crop affected by pests and/or diseases, which otherwise, would have been controlled by adopting adequate plant protection measures.
h) Losses on account of Physical Purity, Genetic Purity, and admixtures of Other Distinguishable Varieties (ODV) or due to 'other' reasons not covered under the Scheme.
i) Loss of seed crop / seeds at field stage / laboratory stage due to theft.
j) Losses to seed crop whilst in transit.
k) Loss / damage due to operation of following perils directly or indirectly:
    (i) War, invasion, civil war, rebellion, conspiracy, persons acting maliciously.
    (ii) Nuclear reaction, nuclear radiation or radioactive contamination.
l) Loss or damage due to:
    (i) Willful negligence of the insured.
    (ii) Human action, birds and animals.

iii) Sum Insured

Sum Insured was equivalent to preceding three / five year's Average Seed Yield certified in respect of the identified unit area multiplied by 'Procurement Price' of the seed crop variety

prevailing in the previous season by National Seed Corporation (NSC). The Sum Insured may be increased up to 150 per cent of the average processed, tagged certified Seed Yield. A producing agency opting for higher Sum Insured was required to pay a correspondingly higher premium.

iv) Salvage

All seed crops identified for coverage under the Scheme have salvage values. Salvage values were calculated at a fixed percentage of Procurement Price (PP) as given below, which will be deducted from the claim amount before payment. Alternatively, the insurer paid the full amount of compensation (i.e., before deduction of salvage) and took over the possession of the salvage. The deduction of salvage was applicable in case of losses in Germination test only.

Table 2: Salvage Value under Seed Insurance Scheme

Crop	Salvage as per cent of Procurement Price	
	Hybrids	Other Varieties
Jowar and Bajra	30	**60**
Maize	40	**60**
Paddy, Wheat, Gram and Groundnut	40	**60**
Sunflower	30	**60**
Soyabean and Tur	40	**50**
Cotton	**20**	**20**

v) Loss Assessment Method

The certification agency officials, who periodically inspect the field, would intimate individual grower-wise, the details of damages / losses and rejection thereof to the seed producing organization and to the insurer. The insurer will arrange for surveying the loss and the compensation will be estimated and paid as per graded scale mentioned earlier. The first inspection of the seed crop was done by the State Seed Certification Agencies within 45 days in case loss is reported by the seed grower, otherwise if the crop is normal, the State Seed Certification Agencies worked out the inspections as per their routine norms. The amount of claim was proportionate to the area rejected.

Excess: 20 per cent of all admissible claims borne by the Insured.

a) Loss in Expected Raw Seed Yield

The seed producing organization and Certification agency both intimated the occurrence of the insured peril(s) to the insurer. The insurer along with Certification official and / or an independent surveyor would then inspect the affected area and collectively assess the

damage in terms of percentage loss. The estimation of percentage loss of yield of an insured field was with reference to the average yield certified.

Excess: 20 per cent of all admissible claims borne by the Insured.

b) Loss after Harvesting and until the Crop is ready for Transportation

Concerned seed producing organization / grower intimated the loss soon after the incident of loss to the insurer giving all the detailed information. The Insurer then arranged for survey / loss assessment and the compensation was estimated and paid.

Excess: 20 per cent of all admissible claims borne by the Insured.

c) Loss at Seed Certification Stage

Certification Agency and seed producing organization both intimated to the insurer the individual farmer-wise Actual Quantity Rejected due to failure in germination test on account of natural calamity along with the laboratory test results. The maximum amount of claim was the procurement value of the rejected quantity less salvage value as referred in Salvage value chart.

vi) Premium Rate

Crop-wise premiums are charged at the following rates:

Table 3: Premium Rates under Seed Insurance Scheme

Crop	Rate (per cent)	Crop	Rate (per cent)
Paddy	3.0	Wheat	**2.0**
Jowar	3.5	Bajra	**5.0**
Maize	5.0	Soyabean	**5.0**
Sunflower	2.5	Groundnut	**2.0**
Gram	5.0	Tur	**5.0**
Cotton	**5.0**		

vii) Sum Insured

Sum Insured is equivalent to preceding three/five year's Average Seed Yield certified in respect of the identified unit area multiplied by 'Procurement Price' of the seed crop variety prevailing in the previous season by National Seed Corporation (NSC). The Sum Insured may be increased up to 150% of the average processed, tagged certified Seed Yield. A producing agency opting for higher Sum Insured would be required to pay a correspondingly higher premium.

viii) Risk Sharing

100% Grant by Government of India, Ministry of Agriculture for publicity and Training of personnel for the states etc. through General Insurance Corporation of India.(GICI), Mobility/ telephone/ telex/telegram/fax/postage charges /stationary etc. for the state seed certification agencies and seed producing organizations, TA/DA, workshop and miscellaneous expenditure of Government of India officials. However, grants given to GICI are for risk sharing beyond 200%, on sunset basis.

ix) Reinsurance

General Insurance Corporation of India negotiated suitable reinsurance arrangement in the international market to cover the losses exceeding 100 per cent of premium income. In case the reinsurance arrangement also covered the Government of India's liability, the same was adjusted while receiving the Government of India's share of claims liability.

vi. Pilot Farm Income Insurance Scheme (FIIS) 2003-04

Crop insurance in India has been an important risk-transfer arrangement against mostly non-market perils such as crop losses from natural disasters and pest attacks. Mitigating price risks to cover the farm revenues has not received much attention in the space of agricultural insurance as price insurance is more effective for those products for which objective price data is available. The information asymmetry problems of moral hazard and adverse selection need to be overcome and loss assessment should be based on a reference price (futures price, spot market price), which cannot be influenced by the farmer.

Farm Income Insurance Scheme (FIIS) is revenue based insurance scheme which was introduced on a pilot basis during the R*abi* 2003-04 season. The pilot FIIS envisaged addressing the income risk, using the interaction between yield risk and price risk so as to stabilize farmers' crop income. The scheme was implemented during Rabi 2003-04 season in 15 districts of 8 States for wheat and 3 districts of 3 States for rice on pilot basis. The pilot was extended to 19 districts in four States for rice crop during Kharif 2004 season. Table 4 shows the coverage and experience of the FIIS pilots in India. The details of the scheme follow.

Table 4: FIIS - Coverage & Experience

Season	No. of States	No. Districts	Crops	Farmers Insured	Acreage (ha.)	Sum Insured (Rs. million)	Premium (Rs. million)	Claims (Rs. million)
Rabi 2003-04	11	18	Wheat & Rice	180206	191027	2391.46	140.62	14.37
Kharif 2004	4	19	Rice	234826	210795	1808.28	143.85	273.10
Total				**415032**	**401822**	**4199.74**	**284.47**	**287.47**

i) Objectives

- To provide financial support to farmers, in the event of loss in income from adverse incidence of crop yield (on account of natural calamities, pests and diseases) and market price fluctuations.
- To encourage the farmers to adopt prudent and progressive farming practices, in terms of both agricultural technology and market economics.
- To enhance food and livelihood security of the farming community.
- To help stabilize farm incomes, particularly in disaster years.

ii) Salient Features

Crops covered: Paddy (rice) and Wheat.

Farmers covered: All [Compulsory for Loanee farmers; and Voluntary for Non-Loanee farmers].

Risks Covered: The Scheme provided "Comprehensive Risk Insurance" against loss in farm income (Short fall in Actual Income [AI] over Guaranteed Income [GI]) in a Notified Area arising out of adverse fluctuations in yield due to occurrence of any one or combination of non-preventable natural perils such as Flood, Inundation, Storm, Cyclone, Hailstorm, Land slide, Drought, Dry spells, large-scale outbreak of Pests/ Diseases; and, adverse fluctuation of market prices, as measured against Minimum Support Price (MSP).

Sum Insured (i.e., Guaranteed Income) per hectare: Guaranteed Income (per hectare) = Average Yield of past 7 years × Indemnity Level × Minimum Support Price (MSP) of current year. The Sum Insured will be Guaranteed Income (GI) per hectare multiplied by the number of hectares sown with the crop. For this purpose, the acreage shown in the loan application (in case of loanee farmers) and proposal form (in case of Non-loanee farmers) will be reckoned as the acreage (hectares sown).

Premium Rates: Actuarial Premium Rates, State-wise, Crop-wise (irrigated and non-irrigated categories, if notified separately are treated as separate crops).

Premium Subsidy: The Premium Subsidy allowed was:

1. Small / Marginal farmers: 75 per cent of Premium
2. Other farmers: 50 per cent of Premium

The Premium Subsidy was borne by the Government of India and released to AICIL at the beginning of the Season based on estimates.

***Scheme Approach**:* The Scheme operated on "Area Approach" basis.

- The Yield was calculated at the District / Taluka / Block / Circle etc. level.
- The Market Price was measured at District / State level.

Indemnity Procedure

- **Actual Income** = current season's Actual Yield × current season's Market Price.
- **Market Price** of a crop = the current sales price of its "common (i.e., generic) variety" in the Market.
- These prices are recorded by the 'Agricultural Produce Market Committees' [APMC].
- From the first arrival of grain in the Market, each APMC will record the Daily Modal Price (DMP) of grain. This exercise will be done for 8 weeks.
- This DMP with quantity transacted will be sent to AICIL on a weekly basis.
- Agricultural Marketing Board (AMB) / Mandi Board will work out the APMC-wise weighted average of the DMP (weighted with quantity transacted) for the entire 8 weeks.
- Finally, AMB / Mandi Board will submit the Market Price of the District based on weighted averages of all APMCs in the District.

To limit the effects of external pressures on the market prices, a "capping" and "cupping" range of 20 per cent of MSP was applied on the current season's Market Price.

"**Capping**" is a limiting factor on the ***rising graph*** of prices.
"**Cupping**" is a limiting factor on the ***falling graph*** of prices.
Claims (i.e., 'Shortfall in Income') = Guaranteed Income – Actual Income.

Sharing of Claims

The product is new with unforeseen financial liabilities, as the Actual Income is based on Market price, while Guaranteed Income is based on MSP, (a notional price without a link to Market Price). Moreover, appropriate rating methodology is also not available at this stage. In view of the above, all claims exceeding 100 per cent of premium will be borne by the Government of India. The premium for the purpose will be 100 per cent of premium less the components of loading towards administrative and marketing expenses.

Areas for Pilot Project: The Crop-wise and State-wise Districts selected for pilot project conducted during Rabi 2003-04 season are given in Table 5:

Table 5: Crop-wise and State-wise Districts Selected for Farm Income Insurance Scheme

Crop	State	District
Wheat	Bihar	Buxar
	Chhattisgarh	Durg and Rajnandagaon
	Gujarat	Banaskantha
	Jammu & Kashmir	Jammu
	Jharkhand	Hazaribagh and Sahebganj
	Madhya Pradesh	Hoshangabad, Tikamgarh and Raisen
	Maharashtra	Parbhani
	Rajasthan	Kota and Pali
	Uttar Pradesh	Etawah, Kannauj, Mirzapur and Mathura
	Uttaranchal	Dehradun
Rice	Assam	Kamrup
	Karnataka	Mysore
	Tamil Nadu	Madurai

Note: In these experimental districts / crops, NAIS stood suspended; in the rest of the country, NAIS continued.

To summarize, following were the salient features of FIIS:

a) The crops covered were rice and wheat.

b) The scheme was based on the 'homogeneous area' approach and Insurance Unit (IU) can be an administrative unit such as a village panchayat, mandal, revenue circle, block, taluka or district.

c) The scheme is compulsory for borrowing farmers and voluntary for non-borrowing farmers.

d) The premium rates were actuarial, determined for each state at the district level.

e) The Government of India subsidized the gross premium payable by the insured farmers. The subsidy was 75 percent of the premium for small/marginal farmers and 50 percent for other farmers.

f) Two levels of indemnity, i.e. 90 percent for low-risk areas and 80 percent for high-risk areas.

g) If the actual income (current yield X current market price) is lower than guaranteed income (average yield of 7 years X level of indemnity [80% or 90%] X MSP), the insured farmer received the compensation.

h) Current market price arrived at using the weighted average of all the Markets in the District using daily modal price of 8 weeks from the first arrival of the grain in the market. Since Market Prices are often subjected to extraneous pulls & pressures, for achieving a balance, a "capping" & "cupping" range of 20 percent was used on the Market Price to reduce the impact of greater price volatilities on the program.

i) The Government procurement at MSP is suspended in the pilot districts for covered crops.

j) NAIS is suspended for the selected districts/crops where the pilot FIIS is implemented.

vii. National Agricultural Insurance Scheme (NAIS) or Rashtriya Krishi Bima Yojana (RKBY) [The current crop insurance scheme operational in India as a replacement of the Comprehensive Crop Insurance Scheme (CCIS)]

The current crop insurance scheme in operation in India is discussed at length in Section 2 of this report.

1.5Global Experiences with Crop Insurance

Many countries have experimented with and implemented ambitious crop insurance programs to enable farmers to cope with agricultural risks. Globally, billions of dollars are spent annually on supporting such programmes by way of public subsidies. Given the high costs and the alternative uses of these public funds, especially in developing countries, the need to take a look at the benefits of crop insurance and its alternatives becomes imperative.

Public crop insurance programmes have been around for several decades in US, Japan, Brazil, Sri Lanka, Mauritius, and Mexico. The U.S.[5] Government involvement in crop insurance began in 1938 after several attempts by the private sector failed to provide multi-peril crop insurance. The main reasons for the failure of private efforts were: too broad a coverage of risks, insufficient data for sound actuarial appraisal, group coverage inadequately tailored to the risks confronting individual farmers, and contracts written too late in the growing season. Two important aspects to be considered in the implementation of crop insurance were: first, the demand for crop insurance in the United States was related to both the premiums charged and the average or expected indemnities. It would take a large subsidy, probably in excess of 50 percent of premium, to get the majority of U.S. acreage enrolled on a voluntary basis. The second aspect was the effects of crop insurance, particularly on alternative risk-reducing activities, such as crop diversification and expansion of farm size. It appeared that insurance encourages crop production in marginal areas, but not dramatically. This was true even in areas that had no federal coverage before the disaster payments programme established in the year 1974 (Hazell, Pomareda, and Valdes, 1986). Until 1996, the only form of insurance provided by the United States Department of Agriculture (USDA) was traditional crop insurance that protected farmers against yield losses.

The historical focus on yield insurance is understandable for at least three reasons. First, in most areas yield risk for the major crops including corn, soybeans, cotton, wheat, grain sorghum, and barley, was much greater than price risk. Thus, yield insurance provided significant financial protection to many farmers. Second, until the 1996 crop year, farmers were able to count on Government commodity programmes for price insurance. The size of subsidy payments (deficiency payments) was inversely related to crop price, so that low prices brought on higher payments. The elimination of U.S. Government deficiency

[5] The crop insurance model in USA is discussed at length later

payments coincided with the introduction of revenue insurance programmes in 1996. Crop Revenue Coverage (CRC) and Income Protection (IP) became available in that year. Revenue Assurance (RA) became available in 1997, and Group Risk Income Protection (GRIP) was available in 1999 (Babcock and Hayes, 1997). Currently a variety of insurance schemes are available in the United States. These include yield insurance, which pays an indemnity when yield is low; price insurance, which covers low prices; and revenue insurance, which covers low gross revenue (price multiplied by yield). In addition, there exists "combined crop" revenue insurance, which pays when revenue from two crops (say corn and soybean) is low (Babcock, 1999).

An important characteristic of the crop insurance scheme in the US is that crop insurance is subsidized by the Government but administered through private companies. Hail insurance is not subsidized. So hail insurance is offered along with the subsidized Government policies by most insurer companies. Rates are based upon the history of crop losses due to hail in the county and competition also plays a factor in keeping rates low. Adverse selection is not an issue because companies set rates higher for high-risk areas. Moral hazard is also less of a problem, as hail is a natural event. The multi-peril insurance subsidized by the Government is considered to be too expensive, if offered without subsidies. The subsidized insurance programme administered through private companies is considered to be a significant improvement over the previous unpopular programmes administered by the Government, although it is not flawless (Ifft 2001).

In Canada, crop insurance was administered through an area approach, similar to that of India. Turvey and Islam (1995) indicated that the area approach was not only inequitable but also inefficient. The empirical research from 537 farms confirmed the belief that individual crop insurance is better in terms of risk reduction, but premiums would also 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. The crop insurance in Canada was voluntary at this time, unlike the NAIS. Adverse selection would be less of a problem at the individual level when insurance is mandatory. Cross-subsidization would be more of a problem, because the better farmers having to purchase insurance would indirectly subsidize the worse farmers. In Alberta, Canada, the Agricultural Financial Service Corporation (AFSC) developed a Satellite Imagery Insurance based on data from satellites that used specific wavelengths of light to estimate growth conditions on native pasture. It compensated producers when the average accumulated Pasture Vegetation Index (PVI) in a township fell below a threshold value of 90 per cent of the township normal PVI value from previous years. AFSC also developed lack-of-moisture insurance where Spring Soil Moisture was used to estimate moisture conditions at the beginning of the growing season for pasture and silage producers. Rainfall information was also collected for the months of May, June and July to determine the final insurance payments (Stoppa and Hess, 2003).

Mexico's first agricultural insurance program dates back to 1942. In 1961, the Crop and Livestock Insurance Act were passed, formally establishing the State run National Crop and

Live Stock Insurance Company (ANAGASA). ANAGASA began operations in 1963 and clients of state development banks, Banco Ejidal and Banco Agricola (late merged to form Banco Nacional de Credito Agricola - BANRURAL), were obliged to purchase crop insurance policies. The policies where multiple peril, premiums were subsidized and cultivated area insured was large. Unfortunately, due to lax monitoring, actuarially unsound pricing, and fraud (filing of false claims), losses for ANAGASA were staggeringly high. At one point, indemnity payments represented 70% of the loan recoveries of BANURAL. The numbers of claims for indemnification were astoundingly high. Eventually, the fiscal cost was deemed unacceptable and ANAGASA was closed in 1988.

In 1991, a new Government crop insurance company named AGROASEMEX was formed. Unlike its predecessor, AGROASEMEX only reinsures local private insurance companies (only five offer crop insurance products) and about 200 mutual insurance funds (Fondos de Aseguramiento or FONDOS). It serves as a technical adviser to the FONDOS, and manages the Federal premia subsidy program for the FONDOS. 3 The FONDOS tend to be in low-income regions of the country. The risks covered are drought, excess moisture, frost, hail, fire, wind, plant infestations, and livestock diseases, accidents, incapacity, and forced sacrifices. The products offered are for investments, expected yield, and greenhouses. Under this voluntary program, area insured has risen from 636,000 hectares in 1991 to 1.9 million in 2000. Similarly, livestock coverage has risen from 576,000 heads in 1991 to 9.7 million in 2000. The area, however, is much less than the area covered by its predecessor. In 2000, AGROASEMEX insured 1.9 million hectares out of a total of 21.9 million cultivated (8%). However, AGROASEMEX's program is more cost effective. For example, its ratio of indemnity to reinsurance averaged 13.06% for the period 1991-96 (Hernandez, 1997).

Mexico also experimented with the use of weather indices to reinsure their crop insurance. In 2001, the Mexican agricultural insurance programme (AGROASEMEX) used the weather index to reinsure part of their multiple crop insurance programmes. By using weather indices that were based on temperature and rainfall in the major production regions; a weather index was constructed that was highly correlated with the Mexican crop insurance loss experience. This method of reinsurance proved to be more efficient than traditional reinsurance (Stoppa and Hess, 2003).

Agricultural insurance has been available in Uruguay at a very limited scale. Between 1913 and 1993, it was under state monopoly. The State Insurance Bank (Banco de Seguros del Estado) was the only entity permitted to issue policies. Since then only two private companies have entered the marketplace, offering single peril policies. The limited coverage is due in part to an unofficial policy of virtually automatic post-disaster relief from the Government. When farmers face climatic and market shocks, normally they mobilize and lobby the Government for assistance. Therefore, they have little or no incentive to purchase private insurance. In addition, the Banco de Seguros del Estado is perceived as not honoring its contracts. When a policy issued by the Banco de Seguros del Estado states that an indemnity should be paid, technicalities are used to reduce or delay payment. As a result, re-enrollment rates fall. Since 2001, the Ministry of Agriculture has been trying to rationalize the

system by undertaking studies to design a new, more rational insurance scheme to replace the present anemic private sector efforts and the very expensive and nontransparent "post disaster emergency payments and debt forgiveness" schemes. Spanish insurance companies are advising the Uruguayan Government. A law is being proposed in Uruguay that would have the Government subsidize up to 60% of farm premiums for a multiple peril policy that covers partial loss, introduce an area yield product, and to establish a separate catastrophic emergency disaster fund open to only those that purchase crop insurance. The major impediments are lack of a set of complementary and well coordinated supporting institutions, the lack of a clear legal and regulatory framework, and the need to develop a "new vision about how to handle agricultural risk". On the positive side, Uruguay has long and reliable series of historical data on weather and agricultural production as well as a cadre of well-trained professionals in the subject matter (Wenner and Arias 2003).

The current crop insurance programme in Japan originated in the Agricultural Loss Compensation Law enacted in 1947 (Hazell, Pomareda, and Valdes, 1986). At the time of its introduction, Japan desperately needed to increase cereal production, and this necessitated encouraging the expansion of rice production in riskier areas. In Japan, subsidized crop insurance was enacted on a compulsory basis, partly to prevent new owner or farmers from reverting to tenant status in disaster years through distress land sales. Also, the subsidy was biased toward those farms located in the riskier areas. The programme was successful in attaining its objectives, though several adjustments had to be made over time. Originally, insurance coverage was based on the average yields for each village. This failed to adequately protect high - yield farmers, while it over-protected low-yield farmers. In response to widespread criticism, the coverage was changed in 1957 to reflect the average yields of individual plots. Farmers were also offered some flexibility in the amount of coverage they purchased. Crop insurance became increasingly irrelevant to the needs of many small farms which became part time units as Japan prospered in the post-war period. Since crop insurance was compulsory, it became necessary to increase each crop's minimum acreage at which insurance had to be purchased.

In the Latin American region, Brazil's national crop insurance programme called 'PROAGRO' was established in 1973 as a voluntary programme to assist farmers in repaying their loans in the event of certain natural disasters. It initially provided coverage of up to 80 per cent of the amount of a loan for a standard premium of 1 per cent. Loss ratios (indemnities divided by premiums) were high and climbed to 40 in 1975. The programme has survived with the aid of large Government subsidies. In 1980, the subsidy from the central bank represented 58 per cent of PROAGRO's total revenues. Lopes and Bias (in Hazell, Pomareda, and Valdes 1986) attributed PROAGRO's poor performance to three basic causes. First, the low premium rate charged and the high cost of administration. They calculated that the premium should not have been less than 6 per cent. Second, because the programme was voluntary, it attracted only a few participants, who tended to be high-risk producers. Third, the programme was too specialized in wheat and upland rice. A number of substantial changes have been made to PROAGRO since 1980. The programme now is compulsory for all farm production loans. The premium increases with the proportion of the loan covered, the

frequency of claims, and the use of traditional rather than recommended technologies. Finally, farmers can no longer claim indemnities for rice when the crop is under sown with pasture, previously a common source of abuse. Although the loss ratio declined to less than 3 in recent years, it remains to bee seen if the scheme will remain solvent financially. In spite of the limitations of this scheme, some variant of the programme is likely to continue as part of the Government's efforts to assist farmers and as a system for protecting the banking system in the form of credit-linked insurance. In contrast to PROAGRO, Sao Paulo's successful insurance scheme for cotton is in operation since 1939. The scheme is compulsory and has operated with an average loss ratio of 0.96 for the last two decades. One merit of state crop insurance as demonstrated in Brazil is that it shows the possibility of future transfer of federal programmes to state agencies or to private insurance companies.

There are important similarities in the evolution of crop insurance in the United States, Brazil, and Japan. The three have gone through considerable adjustments, learning from their own experiences. After heavy losses in the beginning years, programme administrators have introduced new rules, including higher premium rates. Subsidies have been essential, and they are provided by the Government on the grounds of broad social objectives. In Brazil, for example, crop insurance to some extent protects the banks that serve agriculture, which allocate credit to farmers at negative real-interest rates. To become self-financing, these programmes would have to raise premium rates substantially. However, as shown for the United States and suggested for Brazil, this could cause such a drop in participation that the programmes would have to be discontinued. Gudger and Avalos (1982) take the view of a practitioner called upon to assist in planning during the initial operation of an agricultural insurer. They use the Costa Rican experience to illustrate what frequently goes wrong in the design and operation of agricultural insurance. They provide evidence that historical experience with multiple-risk insurance in the private sector is not encouraging. The question of whether crop insurance should be public or private is important to rise, even if only to clarify the objectives and premises of public programmes.

There are a number of such crop insurance programmes in Switzerland, Chile, Spain, and other countries. These schemes are characterized by small size, limited clientele, and most critically, an inability to sustain catastrophic losses without concessional reinsurance from the Government. Interesting compromises are mixed-capital ventures, like Ecuador's, and non-profit, mutual crop insurance, like Bolivia's. In the latter, what began as a Government institution is evolving toward a mutual agency, in which the insured themselves are the owners of the company. All three types of programmes - private sector, mixed capital, and non-profit mutuals—have a rather short history, and thus their viability is not certain. However, they bear careful observation to see if they can indeed reach a mass market, or if they will instead remain confined to relatively few large-scale farmers (Peter Hazell, Carlos Pomareda, and Alberto Valdes, 1986).

Crop insurance in South Africa was started in 1929 when a group of farmers started a pool scheme. Subsidized multi-peril insurance was offered for some time, but for the past fifteen years no subsidies have been given. Hail is the main peril covered and many other perils are

also covered. Historical data and past claims play a role in determining the premiums and damage assessment is the biggest challenge for crop insurers. Crops at different stages are affected differently by hail, making knowledge essential for insurers. There are several players and new ones are continuously targeting this market. Several crops are covered, including maize, wheat, sunflowers, and citrus fruits. The South Africa 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.

The financial experience with publicly-provided, multiple-peril crop insurance has been disastrous. In all cases, programmes were heavily subsidized and governments not only paid part of the premium, but also most of the delivery and service costs, and they covered aggregate losses even when the losses exceed targeted levels over long periods of time. In order to be profitable, a purely private insurer would have to structure contracts so that premiums collected exceeded the average pay-outs (indemnities plus administrative costs). Hazell quantifies the condition for sustainable insurance as follows:

$$(A + I) / P < 1$$

where, A = average administrative costs; I = average indemnities paid; and P = average premiums paid.

Table 6 shows experience with crop insurance in some select countries. The loss ratio exceeds 2 in every case. Two extremes were noteworthy: in Brazil, the ratio of indemnities to premiums was very high while the ratio of administrative cost to premiums was relatively low during 1975-81; while in Japan, the situation was reversed during 1985-89. Pomareda (1982) explored ways in which improved financial management can help reduce the cost of agricultural insurance. Pomareda's analysis suggested that the premiums needed to cover indemnity and administrative costs for all-risk insurance should be in the order of 20 per cent. This was high compared to non-agricultural insurance, and high relative to farmers' demand for insurance. Crucial ways to reduce the cost of agricultural insurance appear to be improvements in actuarial practices, better management of investment portfolios, access to reinsurance, and reductions in administrative costs**.** An important lesson learnt from these trends and problems in crop insurance schemes worldwide is that one must invest a great deal in administrative cost and monitoring before having a crop insurance programme that will be actuarially sound.

Table 6: Financial Performance of Crop Insurance Programmes in Some Select Countries

Country	Period	I/P	A/P	(A+I)/P
Brazil	1975-81	4.29	0.28	4.57
Costa Rica	1970-89	2.26	0.54	2.80
Japan	1947-77	1.48	1.17	2.60
	1985-89	0.99	3.57	4.56
Mexico	1980-89	3.18	0.47	3.65
Philippines	1981-89	3.94	1.80	5.74
USA	1980-89	1.87	0.55	3.42

Source: Skees 2003

The ratio I / P measures the average returns to farmers' own investment in the insurance; i.e., the number of dollars received on an average per dollar of premium they pay from their own pocket. Apart from Japan, most farmers appeared to make a killing from crop insurance, receiving two to four times, as much money back as they pay in. Surprisingly, they still do not line up to buy it and it typically has to be made compulsory. A likely reason for this is adverse selection. Because farmers are often grouped into risk categories when the premium rates are calculated, but receive benefits that are tailored to their individual losses, then farmers in each group facing lower than average risks may end up paying too much for the average benefits they receive. But sometimes, farmers are reluctant to buy insurance even when it is profitable because they can expect to receive alternative payments from the Government in catastrophic years without paying any premium up front (e.g. emergency drought relief programmes). I / P ratios reported above are unlikely to have improved in more recent years. Indeed, Mishra reported that India's I / P ratio increased to 6.1 for the period 1985-94, and Skees (1999) reported that the US programme has an expected I / P of 4 for 1999.

Skees, Hazell, and Miranda (The World Bank) suggest the following guidelines for improving Government sponsored insurance products:

i) Make the insurer responsible for its own financial affairs, and deny it automatic access to Government funds when they incur losses. Subsidies are not necessarily ruled out, particularly for important target groups, but they should be fixed in advance on a pro-rated basis.

ii) Only insure "insurable" risks to the maximum extent possible, e.g., specific perils like hail damage. Where moral hazard cannot be avoided, then use deductibles and other co-insurance arrangements.

iii) Premiums should be based on sound, actuarial calculations, and adjusted over time to reflect actual loss payments.

iv) The insurer should develop a rational insurance portfolio for managing risk, and should not be tied rigidly to the lending portfolio of an agricultural development bank. They should be required to purchase realistic levels of re-insurance in the national or international insurance markets.

v) The insurance should be voluntary and in competition with the private sector.

vi) To avoid adverse selection, premium rates should be tailored to the indemnity payments that individual farmers receive, to the largest extent possible.

vii) Administrative costs must be controlled.

In Netherlands, mutual insurance concept has attained popularity as it has regulatory approval. Mutual crop insurance products like AVIPOL, Potato Pol were in vogue there for more than a decade and found to be effective. The role played insurers and reinsurers like Interpolis and Eureko-Re gives a good support to farmers and their aggregations. They also support activities like risk analysis, risk modeling, risk management and providing advice, and assistance for establishing mutual insurance.

In summary, traditional agricultural insurance programmes are financial failures because of high administrative costs and unresolved, adverse selection and moral hazard problems. Until now, many agricultural insurance programmes in the world have not been able to fully cover their own indemnity payments (I) and administrative costs (A) with the collected premiums (P).

1.6Relevant Cases of Public-Private Partnership in Crop Insurance

We discuss two important cases of public-private partnership which stand out in the global scenario:

Spanish Model

Spain has a rich experience in agricultural insurance. Different systems with a varying degree of involvement of the state were tested between the 1920s and the 1970s. Overall success, however, remained limited and participation rates disappointing. The current system is built on that experience. It was set up in 1978 and continues to evolve. The basic feature of the system is that all insurable agricultural risks are covered by the private sector and all types of policies are subsidized by the state. Most policies are of the type "multiple risk". In the year 2000, about 30 per cent of Spanish producers participated in the system and about 30 per cent of crop and 10 per cent of animal production were covered.

The system is based on an intricate partnership between the private and the public sector. The customers of the system are farmers who can take out agricultural insurance individually or obtain coverage through co-operatives and professional organizations. Participation in the system is voluntary. Besides the customers, the key-players of the system are:

- ENESA (Entidad Estatal de Seguros Agrarios), attached to the Ministry of Agriculture, Fisheries and Food. Its president is the under-secretary of the Ministry and its director is appointed by the Minister of Agriculture. All stakeholders of the system, including farmers, are represented in this organization.
- AGROSEGURO (Agrupacion Espaflola de Entidades Aseguradoras de los Seguros Agrarios Combinados), a pool of sixty private insurance companies which participate in a system of co-insurance. According to this system, the companies share the total risk underwritten in a given year by all members in proportion to their participation in the equity of AGROSEGURO. AGROSEGURO, on behalf of its members, assumes the day-to-day running of the programme, i.e. fixing and collecting premia, assessing losses, paying compensations, controlling farmers etc.
- CCS (Consorcio de Compensación de Seguros), a public enterprise with own resources, operating as a re-insurer (under the control of the Ministry of Economy). Re-insurance by CCS is obligatory.

For any given year, ENESA takes the lead in publishing the annual plan. On the basis of the framework set out in the plan, AGROSEGURO fixes the detailed conditions for all insurance products, in particular the regionally differentiated premium rates which vary according to risk exposure and also include administrative and re-insurance costs. Once the conditions for the various products are set, they are then commercialized through the networks of the insurance companies, which are members of the pool of AGROSEGURO. Obligatory re-insurance is provided by CCS, additional private re-insurance is provided by private companies for viable lines for coverage going beyond the level provided by CCS.

Subsidies from the state and the regions are paid out by ENESA and channeled through AGROSEGURO to the insurance companies. Public subsidies amount to up to 41 per cent of the premium. For the period of 1980 — 1999 taken together the claims/premium ratio was 113 per cent. Losses are covered by the insurance industry and CCS. A key feature of the Spanish system is the participatory approach. All stakeholders are represented in ENESA, which enables taking strategic decisions and fixing the framework for the system annually in a need based approach.

American Model

The Federal Crop Insurance Corporation (FCIC) was created in 1938 as a wholly owned Government corporation. It is currently administered by the Risk Management Agency (RMA). The RMA was set-up in 1996 to administer the agricultural insurance programmes and other non-insurance-related risk management and education programmes that help support U.S. agriculture. The RMA regulates and promotes insurance programme coverage, sets standard terms — including premium rates — of insurance contracts, ensures contract compliance, and provides premium and operating subsidies. Crop insurance policies are delivered — sold, serviced, and underwritten — by private insurance companies.

Companies that qualify to deliver crop insurance must annually submit plans of operation for approval by FCIC. The plan provides the FCIC with information on the ability of the company to pay potential underwriting losses and on the allocation of company's crop insurance business to the various risks sharing categories for the purpose of reinsurance.

In addition to re-insurance, the companies are paid a subsidy by FCIC for administrative, operating, and loss adjustment costs. The levels of administrative and operating subsidy and the terms of re-insurance are specified in the Standard Reinsurance Agreement (SRA), which applies to all companies delivering FCIC-reinsured policies. Private companies share the risk with FCIC by designating their crop insurance policies to risk sharing categories, called reinsurance funds.

Companies retain or cede to FCIC portions of premia and associated liability (potential indemnities). FCIC assumes all the underwriting risk on the ceded business and various shares of the underwriting risk on the retained business, determined by the particular category and level of losses. Companies can further reduce their underwriting risk on

retained business through private reinsurance markets. Insurance companies may develop new insurance products, which have to be submitted to the FCIC for approval. They can also offer private coverage without Government support that supplements the crop insurance programmes.

Chapter 2

NATIONAL AGRICULTURAL INSURANCE SCHEME (NAIS) / RASTRIYA KRISHI BIMA YOJANA (RKBY)

The crop insurance scheme currently being implemented in India is the National Agricultural Insurance Scheme (NAIS) which started from Rabi 1999-2000 season. Agriculture Insurance Company of India Ltd. (AICIL) took over the implementation of National Agricultural Insurance Scheme which until the financial year of 2002-03 was implemented by the General Insurance Corporation of India. The details of the scheme are explained below:

2.1Objectives

The objectives of the NAIS (RKBY) are as under:

(i) to provide insurance coverage and financial support to the farmers in the event of failure of any of the notified crop as a result of natural calamities, pests and diseases;

(ii) to encourage the farmers to adopt progressive farming practices, high value inputs and higher technology in agriculture; and

(iii) to help stabilize farm incomes, particularly in disaster years.

2.2Benefits Expected from Scheme

The Scheme is expected to:

i) be a critica1 instrument of development in the field of crop production, providing financial support to the farmers in the event of crop failure;

ii) encourage farmers to adopt progressive farming practices and higher technology in agriculture;

iii) help in maintaining flow of agricultural credit;

iv) provide significant benefits not merely to the insured farmers, but to the entire community directly and indirectly through spill over and multiplier effects in terms of maintaining production and employment, generation of market fees, taxes etc. and net acceleration to economic growth; and

v) streamline loss assessment procedures and help in building up huge and accurate statistical base for crop production.

2.3Salient Features of the Scheme

Crops Covered

The crops in the following broad groups in respect of which (a) the past yield data based on Crop Cutting Experiments (CCEs) is available for adequate number of years and (b) requisite number of CCEs are conducted for estimating the yield during the proposed season:

1. Food crops (Cereals, Millets and Pulses)
2. Oil seeds
3. Sugarcane, Cotton and Potato (annual commercial / annual horticultural crops)
4. Other annual commercial / annual horticultural crops subject to availability of past yield data will be covered in a period of three years. However, the crops which will be covered during the year will have to be spelt before the close of preceding year.

States and Areas Covered

The Scheme extends to all States and Union Territories. The States / UTs which are opting for the Scheme are required to take up all the crops identified for coverage in a given year.

Exit Clause: The States / Union Territories once opting for the Scheme will have to continue for a minimum period of three years.

Farmers Covered

All farmers including sharecroppers and tenant farmers growing the notified crops in the notified areas are eligible for coverage. The Scheme covers following groups of farmers:

A) On a compulsory basis: All farmers growing notified crops and availing Seasonal Agricultural Operations (SAO) loans / KCC loans and Jewel loans for the purpose of cultivation of the notified crop, from Financial Institutions (FI), i.e., Loanee Farmers.

B) On a voluntary basis: All other farmers growing notified crops (i.e., Non-Loanee farmers) that opt for the Scheme.

Risks Covered and Exclusions

Comprehensive risk insurance will be provided to cover yield losses due to non-preventable risks, viz.:

a) Natural Fire and Lightning

b) Storm, Hailstorm, Cyclone, Typhoon, Tempest, Hurricane, Tornado, etc.

c) Flood, Inundation and Landslide.

d) Drought and Dry spells

e) Pests / Diseases etc.

Losses arising out of war and nuclear risks, malicious damage and other preventable risks will be excluded.

Sum Insured / Limit of Coverage

The Sum Insured (SI) may extend to the value of the threshold yield of the insured crop at the option of the insured farmers. However, a farmer may also insure his crop beyond the value of threshold yield level up to 150 per cent of average yield of notified area on payment of premium at commercial rates. In case of Loanee farmers the Sum Insured would be at least equal to the amount of crop loan advanced. Further, in case of Loanee farmers, the Insurance Charges will be additionality to the scale of finance for the purpose of obtaining loan. In matters of Crop Loan disbursement procedures, guidelines of RBI / NABARD will be binding.

Premium Rates

Premium rates for different crops to be insured under NAIS are given in Table 7. Transition to the actuarial regime in case of cereals, millets, pulses and oil seeds would be made in a period of five years. The actuarial rates will be applied at District / Region / State level at the option of the State Government / Union Territory.

Table 7: Premium Rates under NAIS

S. No.	Season	Crops	Premium rate
1.	**Kharif**	Bajra and Oilseeds	3.5 per cent of Sum Insured or Actuarial rate, whichever is less.
		Other crops (cereals, other millets and pulses)	2.5 per cent of Sum Insured or Actuarial rate, whichever is less.
2.	**Rabi**	Wheat	1.5 per cent of Sum Insured or Actuarial rate, whichever is less
		Other crops (other cereals, millets, pulses and oilseeds)	2.0 per cent of Sum Insured or Actuarial rate, whichever is less
3.	**Kharif and Rabi**	Annual Commercial / Annual Horticultural crops	Actuarial rates.

Premium Subsidy

Fifty per cent subsidy in premium in case of loanee farmers and 55 per cent in case of non-loanee farmers are allowed in respect of small and marginal farmers, to be shared by the Government of India (5 per cent) and the concerned State / Union Territory (UT) Government (45 per cent). The premium subsidy was required to be phased out on sunset basis in a period of three to five years subject to the review of financial results and the response of farmers at the end of the first year of the implementation of the Scheme.

The definition of Small and Marginal farmer is as follows:

- Small Farmer: A cultivator with a land holding of 2 hectares (5 acres) or less, as defined in the land ceiling legislation of the concerned State / UT.

- Marginal Farmer: A cultivator with a land holding of 1 hectare (2.5 acres) or less.

Sharing of Risk

Risk is shared by Implementing Agency (IA) and the Government in the following manner:

Food Crops and Oilseeds: Until complete transition to actuarial regime in a period of five years takes place, claims beyond 100 per cent of premium will be borne by the Government. Thereafter, all normal claims, i.e., claims up to 150 per cent of premium will be met by IA and claims beyond 150 per cent will be paid out of Corpus Fund for a period of three years. After this period of three years, claims up to 200 per cent will be met by IA and above this ceiling, out of the Corpus Fund.

Annual Commercial Crops / Annual Horticultural Crops: Implementing Agency will bear all normal losses, i.e., claims up to 150 per cent of premium in the first three years and 200 per cent of premium thereafter subject to satisfactory claims experience. The claims beyond 150 per cent of premium in the first three years and 200 per cent of premium thereafter will be paid out of Corpus Fund. However, the period of three years stipulated for this purpose will be reviewed on the basis of financial results after the first year of implementation and the period will be extended to five years, if considered necessary.

To meet catastrophic losses, a Corpus Fund will be created with contributions from the Government of India and State Government / UT on 50:50 basis. A portion of Calamity Relief Fund (CRF) will be used for contribution to the Corpus Fund. The Corpus Fund will be managed by Implementing Agency (IA).

Area Approach and Unit of Insurance

The Scheme would operate on the basis of 'Area Approach' i.e., Defined Areas for each notified crop for widespread calamities and on an individual basis for localized calamities

such as hailstorm, landslide, cyclone and flood. The Defined Area (i.e., unit area of insurance) may be a Gram Panchayat, Mandal, Hobli, Circle, Firka, Block, Taluka etc. to be decided by the State / UT Govt. However, each participating State / UT Government is required to reach the level of Gram Panchayat as the unit in a maximum period of three years. Only Andhra Pradesh has succeeded in this endeavor so far.

Individual based assessment in case of localized calamities, to begin with, would be implemented in limited areas on experimental basis, initially and will be extended in the light of operational experience gained. The District Revenue administration will assist the Implementing Agency in assessing the extent of loss.

Seasonality Discipline

The broad seasonality discipline followed for Loanee farmers are as under:

Table 8: Cut –Off Dates Fixed for NAIS

Activity	Kharif	Rabi
Loaning period	April to September	October to Next March
Cut-off date for receipt of Declarations	November	May
Cut-off date for receipt of yield data	January / March	July / September

The broad cut-off dates for receipt of proposals in respect of Non-Loanee farmers will be as under:

Kharif season: 31st July

Rabi season: 31st December

However, seasonality discipline may be modified, if and where necessary in consultation with State / UT and the Govt. of India.

Estimation of Crop Yield

The State / UT Govt. plan and conduct the requisite number of Crop Cutting Experiments (CCEs) for all notified crops in the notified insurance units in order to assess the crop yield.

The State / UT Govt. is required to maintain a single series of Crop Cutting Experiments (CCEs) and resultant yield estimates, both for Crop Production estimates and Crop Insurance. Crop Cutting Experiments (CCEs) will be undertaken per unit area / per crop, on a sliding scale, as indicated below:

A Technical Advisory Committee (TAC) comprising representatives from National Sample Survey Organization (NSSO), Ministry of Agriculture (MoA) (Government of India) and Implementing Agency (IA) will be constituted at national level to decide the sample size of CCEs and all other technical matters pertaining to threshold yield / actual yield, etc. The

number of CCEs to be conducted is given in Table 9.

Table 9: Number of Crop Cutting Experiments to be Conducted under NAIS

S. No.	Unit Area	Minimum number of C.C.Es Required to be Done
1.	**Taluka / Tehsil / Block**	16
2.	**Mandal / Hobli/Firka / any other smaller unit area comprising 8 - 10 villages**	10
3.	**Gram Panchayat comprising 4-5 villages**	08

The yield data is furnished to IA by the State Government / UT in accordance with the cut-off dates fixed for all crops and areas notified, based on the total number of Crop Cutting Experiments (being not less than the minimum prescribed) conducted. The standard procedures for assessing the yield in respect of multiple picking crops is prepared by IA in consultation with the National Sample Survey Organization (NSSO) and circulated among implementing States / Union Territories.

A Committee comprising representatives of State / UT Government, National Sample Survey Organization (NSSO) and IA is required to be set up at the State level to monitor / supervise and advice in matters relating to adequacy and quality of CCEs.

Loss Assessment in Case of Localized Calamities

Loss assessment and modified indemnity procedures in case of occurrence of localized perils, viz., hailstorm, landslide, cyclone and floods, where settlement of claims will be formulated by IA in coordination with the concerned State / Union Territory. Settlement of such claims will be on individual basis between IA and insured. This procedure will be experimented in two districts and will be extended to other areas in the light of operational experience gained. The insured farmers who experience crop losses due to occurrence of these localized perils will give immediate notice to the financial institution / notified office of IA and in any case within 48 hours along with particulars of crop insured and extent and cause of damage.

On receipt of loss the intimation, IA will depute Loss Assessors to the area for assessment of crop loss. The District Revenue administration will assist IA in assessing the extent of crop loss.

IA will also develop Loss Adjuster Cadre and for this purpose a few Officers will be trained in loss assessment procedures. The services of unemployed Agricultural Graduates and retired Agricultural Department Officials may also be utilized for loss assessment after imparting initial training.

Levels of Indemnity and Threshold Yield

Three levels of indemnity, viz., 90 per cent, 80 per cent and 60 per cent corresponding to Low Risk, Medium Risk and High Risk areas will be available for all crops (cereals, millets, pulses and oilseeds and annual commercial / annual horticultural crops) based on Coefficient of Variation (C.V) in yield of past 10 years' data. However, the insured farmers of unit area may opt for higher level of indemnity on payment of additional premium based on actuarial rates.

The Threshold Yield (TY) or Guaranteed Yield for a crop in an Insurance Unit is the moving average based on past three years' average yield in case of rice and wheat and five years' average yield in case of other crops, multiplied by the level of indemnity.

Nature of Coverage and Indemnity

If the 'Actual Yield' (AY) per hectare of the insured crop for the defined area [on the basis of requisite number of Crop Cutting Experiments (CCEs)] in the insured season, falls short of the specified 'Threshold Yield' (TY), all the insured farmers growing that crop in the defined area are deemed to have suffered shortfall in their yield. The Scheme seeks to provide coverage against such contingency.

'Indemnity' is calculated as per the following formula:

(Shortfall in Yield / Threshold yield) × Sum Insured for the farmer.
{Shortfall in Yield = Threshold Yield - Actual Yield for the Defined Area}

Once the Yield Data is received from the State / Union Territory Government as per the prescribed cut-off dates, claims are worked out and settled by IA.

Implementing Agencies (IA)

An exclusive organization AICIL has been set up for implementation of RKBY. Till AICIL took over the RKBY, the 'G.I.C. of India' used to function as the Implementing Agency.

Reinsurance Cover

Efforts are required to be made by IA to obtain appropriate reinsurance cover for the proposed RKBY in the international Reinsurance market.

2.4Operational Modalities

A 'State Level Coordination Committee on Crop Insurance' (SLCCCI) is formed in all the implementing States / UTs for the purpose of overseeing implementation of the Scheme, headed by the Agricultural Production Commissioner (APC) or by an Official of equal rank of

the State and includes senior officers of the State, viz., Secretary (Agriculture), Secretary (Co-operation), Secretary (Finance), Director, Bureau of Statistics and Economics, Registrar of Co-operative Societies, representative of Ministry of Agriculture, Financial Institutions including NABARD, RBI, State Apex Co-operative Bank, Convener, State Level Bankers' Committee (SLBC) and Implementing Agency (IA).

Notification

At the beginning of each crop season, the State Government / UT administration notifies the Crops and Defined Areas to be covered during the season in accordance with the decision taken at the SLCCCI meeting.

The State Government / UT should notify the smallest possible units as defined areas (i.e., insurance units), which is preferably, the Village or the Gram Panchayat. In any case, the States / UTs will reach the level of Gram Panchayat within three years.

Collection of Proposal and Insurance Charges

The present Nodal Banks system under CCIS continues for NAIS (RKBY) as well, wherein IA is not required to deal with all the loan disbursing points and instead, deals only with designated Nodal points, mostly at district level.

Loanee Farmers (Compulsory Coverage)

For loanee farmers, the modalities will be the same as in the existing CCIS. A farmer opting for Sum Insured higher than the amount of loan availed by him will be treated at par with non-loanee farmer and relevant cut-off dates for submitting declarations apply. Further, a farmer may also insure his crop beyond value of threshold yield up to 150 per cent of average yield of notified area on payment of premium for balance sum insured at commercial rates.

In respect of loanee farmers availing sum insured beyond amount of loan availed, the details of those farmers availing sum insured beyond value of threshold yield will be furnished separately in a schedule in the Declaration.

Non-Loanee Farmers (Optional Coverage)

Those farmers desirous of joining the Scheme fill up Proposal Form of the Scheme and submit the same to the village branch of a Commercial Bank (CB) or Regional Rural Bank (RRB), or PACS (DCCB) with the requisite insurance charge / premium amount after opening an Account in their name or in an existing Account in their name.

The Nodal Banks in turn submit to the IA the Crop-wise and Notified Area-wise Crop Insurance Declarations in the prescribed format, (separately for non-loanee farmers) along

with the Insurance Charges / Premium, within the stipulated time.

In respect of optional coverage (non-loanee farmers), the entire amount of insurance charges / premium on the basis of the proposal of the farmer are deposited with the Branch / PACS within the stipulated dates and in turn, banks consolidate, prepare a Declaration and forward the same to IA with premium.

Receipt of Proposals Directly from Non – Loanee Farmers

On an experimental basis, (subject to infrastructure of IA), non-loanee farmers may submit proposals personally to IA with requisite insurance charges / premium. The IA will then consolidate these proposals and convert them into Declarations. However, it is mandatory that non-loanee farmers personally submitting proposals to IA should hold a bank account in the service area / designated bank branch to receive compensation, if any.

Option for Higher Sum Insured

Food Crops and Oilseeds: Sum Insured is worked out by multiplying the threshold yield of the crop with Minimum Support Price (MSP) or the market price (where MSP is not available) in respect of previous year. A farmer is eligible to cover up to the value of threshold yield of the crop at a given premium rate. Additionally, a farmer may extend the sum insured up to 150 per cent of the value of the average yield of the crop on payment of premium at Commercial (actuarial) rate for the part of the sum insured exceeding value of threshold yield.

Annual Commercial / Horticultural Crops: Sum insured may extend up to 150 per cent of the value of average yield of the crop at commercial (actuarial) rate for the entire sum insured. In case of Loanee farmers, the minimum sum insured is the amount of loan availed.

Seasonality Discipline - Submission of Declarations by Banks

<u>Loanee Farmers</u>

Banks will send to IA every month consolidated Crop Insurance Declarations in respect of loan disbursed to the loanee farmers for each crop and each Defined Area. The details of SAO loans disbursed for insurable crops during a month will be declared to IA in the form of consolidated Declarations before the end of the succeeding month. The detailed monthly cut-off dates in respect of such declarations will be as follows:

Those loanee farmers who would like to avail a sum insured of more than the amount of loan availed will indicate their choice to the Financial Institutions at the beginning of the season and for these farmers, the cut-off dates will be those applicable for Non-Loanee farmers.

Table 10: Monthly Cut –Off Dates for Declarations – Season wise under NAIS

Kharif season		Rabi season	
Month of Loaning	**Cut-off date for Receipt of Declarations by IA**	**Month of Loaning**	**Cut-off date for Receipt of Declarations by IA**
April	31st May	October	30th November
May	30th June	November	31st December
June	31stJuly	December	31st January
July	31st August	January	28th / 29th February
August	30th September	February	31st March
September	31st October	March	30th April
Final	30th November	Final	31st May

Source: AIC

Non-Loanee Farmers

The broad Cut-Off dates for receipt of Proposals by the Banks / IA, in respect of these farmers will be: (a) Kharif season: 31st July and (b) Rabi season: 31st December

In respect of these farmers, the last date of receipt of the consolidated proposals at IA, will be one month after the last date for receipt of proposals at the Nodal Branch. However, within these broad parameters suggested above for all categories of farmers, the seasonality discipline may be modified in consultation with State / UT Government and Government of India, depending on local conditions and crop season.

Important Conditions Applicable for Coverage of Risk

a) Loans given for unsown areas will not be covered by the Scheme, because, indemnity claims will arise under the Scheme, only after the crop has been sown and in the event of crop failure. Mere disbursement of loans by the financial institutions / submission of Proposal by a Non-Loanee farmer will not entitle him for compensation under the Scheme.

b) In the areas where crop is sown but, withered away / damaged on account of adverse seasonal conditions / pest and / or diseases and also where there is no possibility of reviving the crop, no further loaning should be made by the financing institutions. Any further loaning in such cases will not be covered by the Scheme.

c) The Scheme covers notified crops until harvesting stage only. Losses caused to crops which are spread in the field for drying after cutting / harvesting are excluded from the scope of the Scheme.

Procedure of Settlement of Claims

Once the yield data is received from the State Government as per the cut-off-dates decided, the claims are worked out as per Declarations received from FIs for each notified area and approval is obtained. Loss assessment and modified indemnity procedures in case of occurrence of localized perils, such as hailstorm, landslide, cyclone and flood where settlement of claims will be on individual basis, will be formulated by IA in consultation with State / U.T. Government. (Important: In case of Loanee farmers' full amount of loan is eligible for normal rates irrespective of the value of TY and / or AY).

Claims Approval: Claims will be approved by IA. However, the Government may at their option, scrutinize / examine a claim falling within their risk liability. Disputed claims / sub-standard claims, if any, will be referred to a Committee consisting of representatives of Ministry of Agriculture (GOI), concerned State Government and Insurance Agency.

Settlement / release of claims in the States / UTs which exceed set risk sharing limits of IA will be subject to receipt of funds from the Government.

Publicity / Awareness and Review

This Scheme requires adequate publicity in all the villages of the notified district. Besides audio-visual media, the services of Agricultural Extension Officers of the State / UT should be utilized. It is equally important to train people who are going to be involved in collection of premium, processing of Declarations, Proposal forms etc. in banks to avoid any confusion and misunderstanding. Training programmes and workshops, visit of IA Officers to the banks will help in clarifying the doubts, redressal of grievances and clearing bottlenecks in smooth implementation of the Scheme. Pamphlets will be distributed to all villages in participating States / UTs. A short film covering the salient features of the Scheme will be made by the IA for this purpose.

2.5General

The FIs will be paid, service charges @ 2.5 per cent of the premium collected in respect of both loanee and non-loanee farmers at the end of the season.

Correct premium rates should be ascertained from the Notification issued by IA and premium computation (Sum insured × Premium rate) should be done accurately. In respect of Small and Marginal farmers (i.e., farmers with a land holding of less than 2 hectares) only net premium (full premium less subsidy) need to be remitted. Remission of excess premium will not entitle for increase in sum insured / liability, at a later date.

Nodal banks must ensure coverage of all crop loans and shall obtain full and accurate particulars from all the FIs within their jurisdiction. They must ensure coverage of proposals received from all non-loanee farmers within their jurisdiction as per prescribed cut–off dates.

Claims under this scheme will be settled only on the basis of yield data furnished by the Directorate of Economics and Statistics arrived at through regular crop estimation surveys for production estimates (i.e., planned Crop Cutting Estimates) and not on any other basis such as *Annawari*, declaration of drought, declaration of floods, Gazette notification, etc. by any Department / Authority.

2.6 Working Example of Sum Insured and Premium[6]

The tables below illustrate how the sum insured and premium are operationalized under the NAIS.

Table 11: Sum Insured Limits and Premium Rates for Paddy / Rice

State Threshold Yield = 1930 Kg / Ha	State Average Yield = 2412 Kg / Ha	Min. Support Price of Rice = Rs. 7.35/ Kg
Value of Threshold Yield = Rs. 14200 / Ha	Value of Actual Yield = Rs. 26600 / Ha	
Normal (Flat) Premium Rate =2.5 per cent	Actual Premium Rate = 3.55 per cent	

Table 12: Sum Insured and Premium

Category	Particulars	Farmer "A" (Loanee) (Rs.)	Farmer "B" (Non - Loanee) (Rs.)
a) Compulsory Coverage	Loan Amount	12000	Nil
	Full Premium @ 2.5 per cent	300.00	Nil
	Subsidy 50 per cent of full premium	150.00	Nil
	Net Premium	150.00	Nil
b) Optional Coverage - up to value of Threshold Yield	Full premium from Rs.12000 to 14200 = Rs.2200@ 2.5 per cent (for Loanee Farmer)	55.00	-
	Normal coverage for Non-Loanee farmer	-	355.00
	Subsidy 50 per cent of Full Premium	27.50	177.50
	Net Premium	27.50	177.50
c) Optional Coverage – up to 150 per cent of Value of Average Yield	Full Premium from Rs. 14200 to 26600 = Rs.12400 @ 3.55 per cent	440.20	440.20
	Subsidy 50 per cent of Full Premium	220.10	220.10
	Net Premium	220.10	220.10
	Total Net Premium (a + b + c)	397.60	397.60

[6] Adapted from TNAU's report on the 'Evaluation of Crop Insurance in Tamil Nadu'

Example: Farmer "A", a loanee farmer and farmer "B", a non-loanee farmer each own 1 hectare under "Paddy / Rice" cultivation. (Being small and marginal farmers, they are eligible for 50 per cent subsidy in premium). Subsidy will vary from season to season.

Table 13: Sum Insured, Premium & Subsidy under NAIS

Particulars	Farmer "A" (Loanee)	Farmer "B" (Non - Loanee)
Amount of Loan	Rs.15,000	Nil
Amount of Coverage	Rs.20,000	Rs.16,000
Applicable Premium Rate	2.5 per cent (Normal Rate) up to Rs. Rs.15,000.	2.5 per cent (Normal Rate) up to Rs. Rs.14,200
	3.55 per cent (Actuarial Rate) for balance Rs.5,000.	3.55 per cent (Actuarial Rate) for balance Rs.1, 800.
Full Premium Amount	Rs.375.00 at Normal Rate + Rs.177.50 at Actuarial Rate, i.e., Rs.552.50 in all.	Rs.355.00 at Normal Rate + Rs.64.00 at Actuarial Rate, i.e., Rs.419.00 in all.
Subsidy	50 per cent of Full Premium, i.e., Rs. 276.25.	50 per cent of Full Premium, i.e., Rs. 209.50.
Net Premium Payable	Rs.276.25	Rs.209.50

2.7Performance of NAIS

The crop yield insurance scheme has been largely unsuccessful with low coverage and high claims to premium ratio. There are problems with both the design and implementation of the schemes. Crop Insurance to be a meaningful policy risk management tool, would have to reach out to a majority of farmers. At present only about 15 percent of farmers and 17 percent of cropped area. The diffusion of this risk management instrument has been slow and the coverage low in some of the States important from the point-of-view of agriculture. Product improvement, insurance education & communication, effective insurance delivery mechanism can contribute to higher levels of penetration.

We discuss the performance of NAIS in this section.

2.7.1 Coverage under NAIS

The details on number of farmers covered under NAIS from 1999 to 2007, cultivated area covered, sum insured by farmers, premium paid by them, subsidy released by the Government , total claims made and the number of farmers benefited during the period through the scheme are presented in Table 14.

Maharashtra stands first in terms of the number of farmers covered under NAIS from 1999 to 2007 with 17.2 per cent of the total number of farmers covered in India followed by Andhra Pradesh with 15.0 per cent. In terms of claims made, Gujarat topped the list with 24.9 per cent of the total claims settled in India followed by Andhra Pradesh with 17.2 per cent. At the national level, the number of farmers benefited accounted for 25.3 percent of the total

farmers insured. The shares of claims made to the sum insured during 1999 – 2007 for India was 8.9 per cent respectively. In 2005-06, the number of farmers covered in India under NAIS was 167.2 lakhs and this accounted for 13.8 per cent of the total number of farm households (1208.2 lakhs during 2000-01).

The Working Group constituted by the Planning Commission proposed 2.5 times increase in penetration by 2012, which appears difficult one to achieve despite multi-dimensional improvements in the program and delivery mechanism.

Table 14: State wise Coverage of National Agricultural Insurance Scheme

(16 Seasons from Rabi 1999-2000 to Kharif 2007)

S. No.	States	Farmers covered ('000s)	Area ('000 ha)	Sum Insured (Rs. Crores)	Premium (Rs. Crores)	Subsidy (Rs. Crores)	Total Claims (Rs. Crores)	Farmers Benefited ('000s)
1	A.P	16536.8	25702.1	24486.1	692.0	82.5	1749.3	3122.0
2	Assam	93.5	73.3	91.3	2.1	0.3	4.2	19.4
3	Bihar	2688.7	3192.4	3911.0	90.6	9.9	518.0	821.3
4	Chhattisgarh	4919.4	10343.2	3241.8	84.1	5.5	174.6	992.6
5	Goa	6.2	10.1	2.2	0.0	0.0	0.0	0.7
6	Gujarat	8342.1	19866.3	16066.6	683.0	41.9	2537.3	3102.0
7	Haryana	392.9	440.9	317.7	10.2	0.3	17.6	58.2
8	H.P	139.5	97.4	83.3	1.9	0.3	6.0	70.1
9	J & K	18.0	23.9	13.8	0.3	0.0	0.1	1.4
10	Jharkhand	2963.1	1403.9	866.0	22.0	1.3	127.2	747.9
11	Karnataka	7770.1	13316.4	8803.7	283.6	17.9	1227.6	3434.2
12	Kerala	273.0	229.8	344.1	7.2	1.5	19.0	55.9
13	M.P	13642.4	36229.1	12619.4	395.0	18.2	519.8	2710.9
14	Maharashtra	18959.5	18765.5	10782.0	399.8	46.8	1007.8	5530.4
15	Meghalaya	14.2	17.0	14.5	0.9	0.2	0.3	1.4
16	Orissa	8202.4	8426.8	7964.5	200.1	31.2	446.7	1526.9
17	Rajasthan	9107.2	20394.5	8768.6	244.9	4.4	765.5	1859.0
18	Sikkim	1.4	0.8	1.5	0.0	0.0	0.0	0.1
19	Tamil Nadu	1027.3 (0.93)	1659.4 (0.94)	1665.5 (1.46)	36.1 (1.04)	3.8 (1.25)	156.5 (1.54)	270.7 (0.97)
20	Tripura	9.7	6.0	10.1	0.3	0.0	0.5	2.6
21	U.P	9724.0	12525.8	9945.9	205.0	21.8	514.8	2536.5
22	Uttaranchal	69.6	73.7	104.3	1.8	0.2	5.2	18.7
23	West Bengal	5535.5	2864.2	4031.6	104.9	17.4	377.7	1075.3
24	And & Nic.	1.0	1.5	1.2	0.0	0.0	0.0	0.1
25	Pondicherry	20.7	31.1	41.2	0.8	0.1	1.5	3.8
	Total	**110458.2**	**175695.1**	**114177.9**	**3466.6**	**305.5**	**10177.2**	**27962.1**

Note: Figures in parenthesis indicate percentages to total, Source: AIC

There are two conspicuous features of the NAIS performance. The cumulative totals for the seven seasons, Rabi 1999-2000 to Rabi 2002-03, show a claim to premium ratio of 4.27 and Gujarat alone accounts for almost 43% of total claims. Among crops, groundnut accounts for 36% of claims and paddy for another 27%. Even in the case of annual commercial and

horticultural crops, which are supposed to be charged on an actuarial basis, the claim to premium ratio is 2.29. These crops account for 18% of total claims and 34% of total premium. Food crops and oilseeds have a claim to premium ratio of 5.31.

There are two factors that can help explain the performance of crop yield insurance - geographically uniform premiums set below actuarial levels, and no risk sharing by the implementing agency (Sinha 2007).

Uniform premium below actuarial level

There were two rates under the CCIS and four rates under the NAIS, based on crop categories, but making no distinction for geographical areas. The schemes do make a distinction in the level of indemnity. There are three levels of indemnity — 90%, 80%, 60%, corresponding to low/medium/high risk areas for all crops, based on coefficient of variation in yield of past 10 years of data. These relatively uniform premium rates in the presence of significant differences in yield volatility across different regions and crops can be expected to give rise to the problem of adverse selection.

For example, in case of rice the coefficient of variation of yield per hectare based on last 20 years of data, ranges from 6% for Punjab to 21% for Bihar, with an all India average of 13%. The difference is more pronounced in the case of groundnut. The coefficient of variation of yield, calculated using the last 20 years of data varies from 54% for Gujarat to 17% for Maharashtra and Karnataka. The high coefficient of variation for Gujarat may explain the large share of Gujarat in the total claims payment. The all India coefficient of variation for groundnut is 14%. The large coefficient of variation on all India basis for individual crops implies that even after geographical diversification, significant variability remains at the all India level for individual crops. Moreover, the coefficient of correlation across crop yields is high, indicating limited diversification across crops. This implies the presence of significant systemic risk in yield variability and the need for reserves or reinsurance for an actuarially based system. An additional advantage of actuarial rates is that it will facilitate timely payments of claims. Currently, the payments are delayed because of delays in payments by the State Governments following claims. With actuarial rates, the implementing agency will receive premium and subsidies up-front. Of course, the implementing agency will now have to maintain reserves and factor in the costs of managing such reserves.

No Risk sharing by the Implementing Agency

The second major problem with the current crop insurance system is that the Implementing Agency (IA) — the GIC till 2002-03 and the Agricultural Insurance Company since April 2003 — has no financial stake in the schemes. They are reimbursed for their administrative expenses and neither bear any of the risks nor earn any returns from the schemes. The major task of the implementing agency is the management of financial flows between the governments and the financial institutions dealing with farmers.

The IA also has little incentive and no means to expand crop insurance coverage. It is completely dependent on rural financial institutions - co-operative credit societies, regional rural banks and the rural branches of commercial banks. Co-operative credit societies have been playing the leading role in the disbursement of production credit to agriculture accounting for about 53% of total short-term credit to agriculture in 2001-02. However, the co-operative credit system is suffering from serious problems as pointed out by the Working Group on Agriculture Credit, Cooperation and Crop Insurance for formulation of the Tenth Five Year Plan.

While some of the cooperative banks are functioning well, the cooperative credit structure in general faces wide ranging problems like resource crunch, mismanagement, poor governance, low level of member participation, lack of credit discipline, high level of erosion of net worth and lack of professionalism in the banks. Moreover, some of the disparities in crop insurance coverage across states may be partly due to the disparities in the functioning of the credit system as pointed out by the Working Group.

The growth of the cooperatives across the country has witnessed regional, sectoral and sectional skewness. There are wide disparities in the performance of credit institutions both in regard to deposit mobilization and deployment of credit and these are reflected in the coverage of crop insurance in India which is mandatory for the loanee farmers i.e. those who have taken sanctioned credit limits for seasonal agricultural operations in a crop season.

The scheme is presently working on an administered rate regime, with direct governmental financing for claims exceeding the premium and subsidizing the premium of small / marginal farmers (only to an extent of 10 percent though). The Government's direct financial support to NAIS since its inception is given in the Table 15 below:

Table 15: Government's Direct Financial Support to NAIS

Year	Premium Subsidy (INR millions)	Claims Subsidy (INR millions)	Total Direct Financial Support (INR millions)
2000-01	543.41	10589.63	11133.04
2001-02	518.96	3586.22	4105.18
2002-03	483.58	16423.02	16906.6
2003-04	281.88	9411.92	9693.8
2004-05	224.54	8083.14	8307.68
2005-06	237.69	9339.18	9576.87
2006-07	321.71	12780.80	13102.51
Total	**2611.77**	**70213.91**	**72825.68**

Source: AIC

The overwhelming view is in favour of placing the program, in an actuarial regime, in which, the insurance company receives premium based on commercial rates and is responsible for all indemnities.

Chapter 3

WEATHER INSURANCE IN INDIA

Weather risk is the most significant agricultural production risks although risks of other inputs such as soil, seeds, fertilizers, and management practices contribute to yield volatility. Around sixty per cent of variations in yield can be attributed to various weather related shocks, be it those arising from erratic distribution of the volume and timing of rainfall-deficiency or excess rainfall, high or low temperature, excessive wind speed or high relative humidity and so on. Farmers in India have relied on traditional risk management strategies which fail under covariate weather shocks and the existing area yield insurance schemes (NAIS) are marked with sever deformities. Under these circumstances, a financial innovation in the form of weather insurance was introduced in the year 2003 as the 'index-based rainfall insurance'. Since then the weather insurance products have promised to overcome the limitations of the traditional crop insurance scheme and 'weather proof' the income streams of millions of agricultural households. The basic features of index-based weather insurance contracts have already been discussed in Section 1.1.3 earlier. In this section we discuss the state of weather insurance in India.

Weather Insurance is an insurance product based on a weather index which provides insurance for losses arising due to vagaries of weather. These weather indices could be deficit / excess rainfall, extreme fluctuations of temperature, relative humidity and / or a combination of above. Detailed correlation analysis is carried out to ascertain the way weather impacts yields of the crops to arrive at compensation levels. The basic idea is to estimate the percentage deviation in crop output due to adverse deviations in weather conditions. Hence, it is a financial protection based on the performance of specified index in relation to a specified trigger.

The general insurance companies have experimented with several weather insurance schemes for agriculture during the last seven years. As discussed earlier, these products are easy to administer, are designed taking into consideration the local agro-climatological properties, do not entail long term-liabilities on the governments, are rated based on actuarial principles and offer high level of flexibility in terms of coverage and indemnity level. We now discuss all the weather insurance schemes that have been introduced in India till date.

3.1Pilot Weather Based Crop Insurance Scheme (WBCIS)

From Kharif 2007 season, a Weather Based Crop Insurance Scheme (WBCIS) has been piloted across India to explore the effectiveness of Weather Based Crop Insurance as an alternative to the National Agricultural Insurance Scheme (NAIS) which is marred with many limitations as discussed in the previous chapter. WBCIS is intended to provide insurance protection to the cultivator against adverse weather incidence, such as deficit & excess rainfall, frost, heat (temperature), relative humidity, etc., which are deemed to adversely

impact the Rabi crops during its cultivation period. The Scheme shall run as a Pilot in selected areas, in selected States, for selected crops.

We discuss the main features of the scheme in this section.

Scope

Insurance coverage under the Scheme would be provided for crops raised between October / November and April (Rabi season). If the cultivation period of a crop does not strictly fall within the above season span or crosses over to the next season, in such cases, the sowing period of the crop shall determine the season in which it has to be categorized.

Area Approach

The Scheme operates on the principle of "Area Approach" in selected notified Reference Unit Areas. Area Approach signifies that a "Reference Unit Area" shall be considered as a Unit-Area of Insurance for the purpose of acceptance of risk and assessment of compensation as well. Therefore, all insured-cultivators of a Notified Crop in the notified Reference Unit Area shall be deemed to be on par so far as their terms of insurance coverage and assessment of compensation are concerned.

Coverage of States

To start with, the Scheme shall be implemented during Rabi 2007-08 seasons in the following States: Bihar, Chhattisgarh, Haryana, Madhya Pradesh, Punjab, and Rajasthan & Uttar Pradesh. Any addition/deletion of States may be considered by the Government of India/ Agriculture Insurance Company of India Ltd. (AIC), based on the willingness and the level of preparedness of the concerned State Government.

Geographical Coverage

i) "Reference Unit Areas" are linked to specific Reference Weather Stations.
ii) "Reference Weather Stations" are those which are commissioned for providing "Weather Data" for the purpose of assessment of compensation.
iii) "Reference Unit-Area" is a geographical area around a Reference Weather Station, pre-notified by the State Level Coordination Committee on Crop Insurance i.e., SLCCCI, which is deemed to be reflective of the Reference Weather Station's Weather Data. To the extent practicable, such Reference Unit-Area shall be restricted to 25 km. radius around the Reference Weather Station in case of Rainfall, and 100 km. radius in case of other weather parameters like Frost, Heat (Temperature), Relative humidity, etc.

Crops Covered

Cereals, Millets, Pulses, Oilseeds and annual commercial / horticultural crops grown during Rabi season The main crops could be wheat, barley, gram, lentil, mustard, potato, onion, cumin, coriander, fenugreek, isabgol etc. In respect of each Reference Unit Area, the crops to be covered would be notified by the SLCCCI, whereupon would be referred to as "Notified Crops". The crops listed above are only indicative & not exhaustive; any addition/deletion may be considered by AIC.

Cultivators Eligible for Coverage

All the cultivators (including sharecroppers and tenant cultivators) growing any Notified Crop in any Reference Unit Area shall be eligible for coverage. The Scheme shall be:

1. **Compulsory**: For All LOANEE APPLICANT CULTIVATORS i.e. those who have Sanctioned Credit Limit from a Financial Institution [FI] for a Notified Crop in a Reference Unit Area.

2. **Voluntary**: For NON-LOANEE CULTIVATORS i.e. those who do not have Sanctioned Credit Limit from any FI for a Notified Crop in a Reference Unit Area.

Financial Institution, for the purpose of the Scheme, includes all District Central Cooperative Banks and also the PACS affiliated to them, all Commercial Banks and all Regional Rural Banks, as defined in National Agriculture Insurance Scheme (NAIS).

Perils Covered

Deficit Rains, Un-seasonal / Excess Rains, Frost, Heat (Temperature), Relative humidity, etc are the weather perils, which are deemed to cause "Adverse Weather Incidence", leading to crop loss, would be covered under the Scheme: The specific "Adverse Weather Incidence" with its timing / duration applicable to a particular Notified Crop shall be notified by the SLCCCI. The perils listed above are only indicative & not exhaustive; any addition/ deletion may be considered by AIC, based on the availability of relevant data. For the purpose of this Scheme, "Adverse Weather Incidence" would be as defined hereinafter.

Risk Period (Insurance Period)

Risk period would be from "Sowing Period" to "Maturity" of the crop. Risk period, depending on the duration of the crop and the weather parameters chosen, could vary with individual crop and Reference Unit Area, and would be notified by the SLCCCI before the commencement of risk period.

Seasonality Discipline

Risk (insurance coverage) would be accepted till commencement of the risk period. No insurance coverage is allowed once the risk period begins.

Coverage Procedure

i) Insurance coverage of Loanee Applicant Cultivators shall be through the existing network of Financial Institutions [FI] at the grass-root level, using Nodal Bank system as in National Agricultural Insurance Scheme [NAIS].

ii) Insurance coverage of Non-Loanee Cultivators shall be through the existing network of FIs at the grass-root level; the Insurance Intermediaries and Authorized Representatives of AIC.

iii) Nodal Bank Branches shall be paid by AIC, a Service Charge of 5% on the actual Premium amount remitted by them, being in the nature of sharing the incidental management expenses incurred by them for servicing the Scheme.

iv) Insurance Intermediaries engaged by AIC for covering non-loanee cultivators would be paid remuneration at an appropriate percentage on the actual amount of premium collected through them from the farmers.

Sum Insured

Sum Insured is broadly equivalent to the 'cost of cultivation' and is pre-declared by AIC and notified in the Notification. The Sum Insured for an individual cultivator shall be the product of the cultivator's declared 'area under cultivation' (in hectare) for that Notified Crop and the Sum Insured per hectare as mentioned in the Notification. 'Area under cultivation' would always be expressed in terms of 'hectare'. An individual Cultivator's 'area under cultivation' (in hectare) for a Notified Crop in a notified Reference Unit Area shall be declared by him as follows:

i) Loanee Applicant Cultivators: 'Area under cultivation' for the Notified Crop as already declared by him in the Loan Application Form for the purpose of fixing his "Maximum Borrowing Limit [MBL]" by the Lending FI.

ii) Non-Loanee Cultivators The cultivator shall declare the 'area under cultivation' for each Notified Crop in the Insurance Proposal Form.

Premium Rates

Actuarial Premium Rates for each season for each Notified Crop and each notified Reference Unit Area shall be calculated by AIC using standard Premium Rating

methodology and the same shall be declared in the Notification before commencement of the season which shall be binding on all.

Premium Sharing & Subsidy

Of the total Premium, while a part thereof shall be payable by the insured cultivator, and the balance shall be borne by the Central Government and State Government on 50:50 basis and paid up-front to AIC as Premium Subsidy. It is clarified that, as far as AIC is concerned, risk incepts only upon receiving of FULL PREMIUM by it as detailed hereunder. The detailed structure of Premium Payable by the Insured is show in Table 16 below.

Table 16: Premium Slabs for WBCIS

Food Crops & Oilseeds		**Crops Premium Payable By Insured**
Wheat		1.5% or Actuarial Rate, whichever is less
Other crops (other Cereals, Millets, Pulses, & Oilseeds)		2.0% or Actuarial Rate, whichever is less
Annual Commercial/Horticultural Crops		
Sl.	**Premium Slab**	**Subsidy**
1	Up to 2%	No Subsidy
2	>2 – 5%	25%, subject to minimum net Premium of 2.00% payable by farmer
3	>5 – 8%	40%, subject to minimum net Premium of 3.75% payable by farmer
4	>8%	50%, subject to minimum net Premium of 4.80% and maximum net premium of 6% payable by farmer

Compensation (Payout)

a. AIC shall be responsible for all Payouts arising out of "Adverse Weather Incidence" strictly in terms of the Scheme terms & conditions read with the relevant Premium & Payout tables. However, this responsibility of AIC shall attach only when the 'Risk has incepted'; that is, AIC has duly received the FULL PREMIUM, directly from the Insured his own part, AND ALSO the corresponding Premium Subsidy part from the Governments.

b. Pay-out shall arise ONLY in case of Adverse Weather Incidence. Adverse Weather Incidence is equivalent to the deviation between "Trigger Weather" and "Actual Weather" Data recorded at a "Reference Weather Station" during the specified time-period. Trigger Weather is a pre-defined Weather Parameter applicable to a Notified

Crop in a notified Reference Unit Area. In case of Adverse Weather Incidence (AWI), all the insured cultivators growing the Notified Crop in the Reference Unit Area shall be deemed to have suffered the same level of AWI and the same proportion of crop-loss, and become eligible for the same rate of Payouts.

c. Pay-Out Disbursement

- ✓ Pay-outs would normally be made by AIC to the Nodal Banks within 45 days of closing of insurance period subject to receipt of the necessary actual weather data.
- ✓ So far as the Insured is concerned, the Pay-out procedure shall be automatic; that is to say, Payouts would be automatically computed by AIC on the basis of Actual Weather Data received, and the Payout would be automatically credited to the Insured's Bank Account through the concerned Nodal Bank /FI.
- ✓ Franchise up to 5% would be applied while processing the Payouts – which means, any actual Payout which is less than 5% of the Sum Insured shall not be paid-out. The franchise clause is factored-in while calculating the Actuarial Premium

3.1.1. Operational Modalities

The operational modalities are the guidelines for administering the scheme and shall hold joint validity with the scheme and subject to amendment if & when deemed fit.

1) Scheme acceptance by the State Government

i) CONSENT for Scheme – The "Consent" must be conveyed to GOI and AIC in writing, which shall imply the acceptance of all the provisions in totality as laid out in the Scheme & its Operational Modalities, as well as other guidelines issued from time to time.

ii) Nodal Department of State Government – The State Govt. shall designate a Department, may be the same Department looking after implementation of NAIS, for the purpose of implementation of the Scheme.

iii) Authorization to SLCCCI – In the States/UTs already implementing the NAIS, the same SLCCCI may be authorized to oversee the implementation of the Scheme on their behalf, in addition to NAIS.

iv) Composition of SLCCCI – If deemed necessary for the purposes of the Scheme, the present composition of SLCCCI, may be augmented by the inclusion of representatives from the State Agriculture University and the "India Meteorological Department [IMD]".

v) Constitution of SLCCCI – In the States/UTs not implementing NAIS at present, the SLCCCI should be constituted on the pattern suggested above.

2) Selection of Crops & Reference Unit Areas

a) At least 2 months in advance of the season, the State Government shall submit to AIC, a proposed list of Crops, and corresponding to each, the list of Reference Unit Areas to be notified for the season. This submission must be supported by:

- Historical Weather Data (in the daily format) in respect of each Reference Weather Station (RWS) at least for the past 25 years, which may be facilitated by them from the Data sources.
- For first-time Notifications, 10 years' Yield Data for the similar administrative unit Area.

b) AIC shall recommend the list to SLCCCI after verifying the sufficiency of the Data submitted.

c) Thereafter, the SLCCCI shall notify the Reference Unit Areas and the Crops corresponding to each Reference Unit Areas.

3) Notification for a Season

i) The Notification shall be issued by SLCCCI on behalf of the State Government and shall act as the Specific Guidelines for implementation of the Scheme in the State during a particular season.

ii) The State Government shall circulate the Notification to all concerned Departments, as well as the State Head Offices of all the concerned Institutions/Organizations that have been assigned a role in the administration of the Scheme in the State.

iii) The Notification shall be binding on all the Agencies concerned with the administering of the Scheme. It shall be the duty of the recipient Offices to circulate the Notification down the line, well in time for proper implementation of the Scheme in that season.

iv) The Notification shall include, inter-alia, the following:

- The Declaration of implementation of the Pilot Scheme in the State during a particular season.
- The List of Notified Crops [NC] and their corresponding Reference Unit Areas [RUA].
- Source of Current Season Weather Data, i.e. Reference Weather Station (RWS) for the purpose of Compensation-computation.
- Back-Up Weather Station [BWS] corresponding to each RWS.
- Seasonality Discipline (i.e. Cut-off Dates) applicable to the State and/or Reference Unit Areas [RUA].
- Premium Rates and the applicable Premium Subsidy for each Notified Crop in every Reference Unit Area.
- Payout structure (i.e. Benefit Table) for each Notified Crop in every Reference Unit Area.

- Any other directive or guideline specific to the State.

v) However, in case of any conflict between the “Scheme/Operational Modalities” and the “Notification”, the former shall prevail.

4) Insurance Coverage

i. Loanee Applicant Cultivator [LAC]

S. No.	Action Point	Action By	Elaborations
(a)	Loan application for a Notified crop in a notified RUA	Cultivator	In accordance with the Banking rules and procedures.
(b)	Sanction of the Credit Limit	Bank – Loan disbursing Branch	As per Bank's policies and rules
(c)	Computation of Sum Insured		As intimated by AIC/ as per Notification
(d)	Debit of the Premium against the sanctioned Credit Limit		Compulsory and automatic within cut-off date of Risk Acceptance period as mentioned in the Notification.
(e)	Remittance of collective Premium to the Nodal Bank Branch		The Premium amount must accompany insured "Cultivators' List" for identification purpose and must reach the Nodal Bank within 7 days.
(f)	Remittance of consolidated Premium to AIC	Nodal Branch of Bank	Premium draft must accompany LAC Declaration Form duly filled in and signed, along with insured "Cultivators' List" and must reach AIC within 15 days of cut-off date of Risk Acceptance period.

ii. Non-Loanee Cultivator [NLC] – Through Banking Network

S. No.	Action Point	Action By	Elaborations
(a)	Proposal in the prescribed Form for a Notified crop in a notified Reference Unit Area	Cultivator	In accordance with the Scheme rules and procedures to be submitted within the Risk Acceptance Period as mentioned in the Notification.
(b)	Computation of Sum Insured	Bank Branch	As per notification / intimation from AIC
(c)	Deposit of the Premium with the Bank Branch	Cultivator	The Cultivator must have an account in that Bank Branch.
(d)	Remittance of collective Premium to the Nodal Branch	Bank Branch	The Premium amount must accompany insured "Cultivators' List" for identification purpose and must reach the Nodal Bank within 7 days.
(e)	Remittance of consolidated premium to AIC	Nodal Branch of Bank	Premium draft must accompany NLC Declaration Form duly filled in and signed, along with "Cultivators' List" and must reach AIC within 15 days of cutoff date of Risk Acceptance period.

iii. Non-Loanee Cultivator [NLC] – Through Insurance Intermediaries

In this case, the Insurance Intermediary shall act as a guide and facilitator for the NLC:

- He shall advise the NLC as to the benefits and necessity of the Scheme.

- He shall guide the NLC through the procedures; filling up the necessary forms and collect the requisite Premium.
- He shall remit the consolidated Premium to AIC accompanied by the individual Proposal Forms and summary details in NLC Declarations.

5) Weather Data Submission

Sl.	Action Point	Action By	Elaborations
(a)	Historic Weather Data in respect of each proposed RUA	IMD, Third-Party (facilitated by State Govt.)	Well before the start of a season, to be considered for Notification
(b)	Current Season Weather Data [CSWD]	IMD, State Govt., Third-Party	As far as possible, Reference Weather Station should be an area can be serviceable by a Weather Station, i.e. Tehsil / Block

6) Compensation (Payout)

S. No.	Action Point	Action By	Elaborations
(a)	Calculation of Adverse Deviation in Weather Parameters	AIC	
(b)	Computation of Payout Rate	AIC	NC-wise, in each Reference Unit Area
(c)	Computation of Payout Amount	AIC	Nodal Branch-wise, for each Bank
(d)	Remittance of Payout Cheque / Demand Draft to the Nodal Bank Branch	AIC	To be accompanied by payout details
(e)	Onward Remittance of Payout to the root Branches	Nodal Branch of Bank	To be accompanied by individual cultivator's payout details
(f)	Credit of individual Compensation amount to the beneficiaries' account	Grass Root / Lending Branches of the Banks / Intermediary	Mandatory display of Payout details of the cultivators on the Notice Board

Note: The liability of AIC shall cease upon remitting the Payout amount to the Nodal Bank with the corresponding details

7) Review of the Scheme

The Pilot Scheme would be reviewed by AIC/GoI from time to time and suitable modifications / improvements would be considered.

Roles of Various Agencies/ Institutions/ Govt. Departments/ Committees

For the successful implementation and administration of the Scheme, the roles of the various Agencies/Institutions/Government Departments/ Committees are spelt out herein.

Government of India

- Liaison with the State Governments for giving their "CONSENT" for the Scheme and issue necessary directives from time to time for overall implementation of the Scheme.
- Issue Directives to all Financial Institutions [FIs] through "Reserve Bank of India [RBI]" and "National Bank for Agriculture and Rural Development [NABARD]", for smooth and effective implementation of the terms and conditions of the Scheme and its Operational Modalities.
- Liaison with India Meteorological Department [IMD] and other alternative Weather Data Sources to facilitate providing of Weather Data on near real-time basis to AIC.
- Facilitate providing of necessary Agronomic inputs from the Ministry of Agriculture and "Indian Agricultural Research Institute [IARI]" to AIC, as necessary for finalizing the Insurance structure, fixing the Payout Triggers, etc.
- Pay to AIC its contribution of the projected Premium Subsidy at the beginning of every crop season, based on fair estimates submitted by AIC and settle the balance of actual Premium Subsidy for the season, based on submission of seasonal Premium & Subsidy figures by AIC to enable them release the Payouts, if any, to the Nodal Banks.
- Consider the Review Report of AIC, as and when submitted, and also consider the modifications/improvements recommended therein by AIC.
- Create extensive Awareness and Publicity of the Scheme amongst the rural population through its own channels.

State Government

- Give its "CONSENT" for the Scheme in writing to GOI and AIC.
- Designate a Department which is connected to Crop Insurance activity in the State, to act as the Nodal Department for the purpose of the Scheme.
- Authorize the SLCCCI to oversee the implementation of the Scheme on its behalf, in addition to NAIS. The existing composition of SLCCCI may be augmented suitably. In the States/UTs not implementing NAIS at present, the SLCCCI should be constituted.
- Issue necessary Directives to all Agencies/Institutions/Government. Departments/ Committees involved in the implementation of the Scheme, conveying its acceptance of the Scheme; the authorization/constitution of SLCCCI to act on its behalf; and acceptance of provisions of the Scheme and the Operational Modalities.
- Submit to AIC at least 2 months in advance of a season, a proposed list of Crops, and the list of RUAs to be notified for the season. The requisite supporting data must also be submitted.
- Liaison with State Offices of India Meteorological Department [IMD] and other alternative Weather Data Sources to facilitate providing of Weather Data on near real-time basis to AIC.

- Facilitate providing of necessary Agronomic inputs from the Directorate of Agriculture and the State Agricultural University to AIC, as necessary for finalizing the Insurance Contract structure, fixing the Payout Triggers, etc.
- Pay to AIC its contribution of the projected Premium Subsidy at the beginning of every crop season, based on fair estimates submitted by AIC and settle the balance of actual Premium Subsidy for the season, based on submission of seasonal Premium & Subsidy figures by AIC to enable them release the Payouts, if any, to the Nodal Banks.
- Set up Monitoring and Review Committees as may be required from time to time to monitor and review the performance of the Scheme.
- Create extensive Awareness and Publicity of the Scheme amongst the rural population through its Agriculture and Extension Departments.

State Level Co-Ordination Committee on Crop Insurance [SLCCCI]

- Act on behalf of the State Government for the implementation of the Scheme in the State.
- Issue necessary Directives to all Financial Institutions [FIs] through the State Offices of "Reserve Bank of India [RBI]" and "National Bank for Agriculture and Rural Development [NABARD]", for smooth and effective implementation of provisions of the Scheme and its Operational Modalities.
- Before the commencement of each season, issue the SCHEME NOTIFICATION as per the time-schedule prescribed. The Notification must be sent to ALL Agencies/Institutions/Government. Departments/Committees involved in the implementation of the Scheme.
- Act as the Referee Forum to resolve issues arising in connection with implementation of the Scheme within the purview of the Scheme and its Operational Modalities.
- Review progress of the Scheme and issue necessary corrective or improvement directives through its Notification.

Financial Institutions [FI]

- All FIs shall continue with the existing system of Nodal Bank-Branches under "National Agricultural Insurance Scheme [NAIS]" to service the Scheme. In the States not implementing NAIS, the Nodal Bank-Branches system shall be created by the FIs with due consultation with AIC.
- The Nodal Bank-Branches of each FI would act as the dealing point for its subordinate Branches within its jurisdictional area. These Nodal Bank-Branches and their jurisdictional area shall be designated by their Head / Controlling Office), and informed to AIC.
- Commercial Banks would consider designating Nodal Bank-Branches at the level of one or a cluster of Districts. Preferably, the controlling Branch in that area may be designated as the Nodal Bank-Branch.

- Cooperative Banks may designate District Central Cooperative Banks [DCCB] as Nodal Bank-Branch.
- Regional Rural Banks [RRB] may designate their Head Office as Nodal Bank-Branch.
- The Nodal Bank-Branch shall be responsible for discharging their assigned roles under the Scheme on behalf of its FI in its designated jurisdictional area.
- Notifications, as well as other directives, guidelines, etc., shall flow in the channel of SLCCCI/AIC - Nodal Bank-Branch - Service (subordinate) Bank Branches/ PACs. Premium and Compensations remittance to and from AIC shall also follow the same channel.

The functions of the Nodal Bank-Branch would, inter-alia, include:

- Communicate Notifications, as well as other directives, guidelines, etc. to all Service (subordinate) Bank Branches within their jurisdictional area.
- Ensure that the Lending Branches within their jurisdictional area sanction additional loan component to the loanee cultivator (whose loan has already been sanctioned) towards Premium payable by him.
- Ensure that, for both Loanee Applicant Cultivators and Non Loanee Cultivators separately, Premium and related data is remitted to the Nodal Bank-Branch within time, and payouts received are credited into the Beneficiary Accounts within 7 days of receiving. Further to ensure that the payout details are displayed on the Notice boards of the Service Branches.
- Submit to AIC (within time), separately for both Loanee Applicant Cultivators and Non Loanee Cultivators, Notified Crop-wise, Reference Unit Area-wise Declarations in the prescribed format, along with the consolidated Premium payable as per the same. Further to remit to Service (subordinate) Bank Branches Compensation amounts and details, to be credited to the Beneficiary Accounts there.
- Allow AIC access to all relevant Records and Registers at the offices of the Nodal Bank Branch and Service (subordinate) Bank Branches within their jurisdictional area.

Under the administrative mechanism, the FIs are designated as the terminal service points for the Cultivators. Hence, it is their duty to ensure compulsory coverage of all eligible Loanee Applicant Cultivators and all desirous Non Loanee Cultivators. In case of any lapse on the part of any FI to provide this service to the Cultivators, any deprivation arising there from to the Cultivator shall be made good by that FI.

Agriculture Insurance Company of India Limited [AIC]

1) Administrative Agency & insurer of the Scheme entrusted with the role of running the Scheme in coordination with the Governments and Agencies/ Institutions/Committees involved in the implementation of the Scheme.

2) Actuarial Premium Rates – Preparation, Underwriting – responsibilities of processing and acceptance of risk.
3) Compensation – responsibility for processing, approval of Payout.
4) Co-insurance – creating a Pool with other Insurance companies, if required for sharing the risk.
5) Re-insurance – negotiating arrangements in the international market.
6) Awareness and Publicity – extensive efforts to create awareness and generate publicity for the Scheme at the grass-roots level. Efforts especially to enhance confidence levels in the Scheme through interactive clarification of its features and Operational Modalities.
7) Database – developing Crop-yield and Weather databases, as also related agri-insurance databases.
8) Information sharing – providing Returns/Statistics to the Governments.
9) Review – of the Pilot Scheme and recommendation of improvements to the Govt. of India.

Cultivators

- Loanee Applicant Cultivators [LAC] – COMPULSORY Coverage. All LACs who have been sanctioned Credit Limit for any NC in any RUA should insist on insurance coverage as per the provisions of the Scheme.
- Non-Loanee Cultivators [NLC] – VOLUNTARY Coverage. All NLCs desirous of taking insurance coverage under the Scheme for any Notified Crop in any Reference Unit Area may approach the nearest Bank Branch/Primary Agricultural Cooperative Society [PACS] / Insurance Intermediary within the cut-off date. The Non-Loanee Cultivator should have an Account in that Bank Branch/PACS.
  - ✓ The Non-Loanee Cultivator must insist on getting the form and service from the Bank Branch/Intermediary. He must fill-up the Proposal form completely in the prescribed format. If asked for, he must provide documentary evidence regarding his insurable interest in cultivating the land/crop (e.g. ownership/tenancy/cultivation rights) proposed for insurance.
  - ✓ The Non-Loanee Cultivator must submit the form and deposit requisite Premium to the Bank Branch / Insurance Intermediary.
  - ✓ The NLC, in his own interest may keep abreast of the developments from the Notice Board of the Bank Branch regarding compensation.

Chapter 4

EVALUATION STUDY ON WBCIS

4.1Terms of Reference

The terms of reference of the study are:

i) To study the scope of the cover under weather insurance in terms of –
   a) perils covered
   b) basis risk
   c) design of product to appropriately and adequately capture the risk

ii) To compare the overall effectiveness of Weather Insurance vis-à-vis National Agricultural Insurance Scheme (NAIS) in terms of the scope, benefits, transparency, settlement of claims, etc. in the light of 4 seasons' of implementation of WBCIS as a pilot.

iii) To examine and review the Weather Insurance and Weather Station density in the context of minimizing basis risk.

iv) To assess the reliability & accuracy of weather data provided through automatic weather stations, particularly private data providers.

v) To examine the scope for improving weather data system, data collection and data availability.

vi) To study and examine whether Weather Insurance could be a substitute for NAIS in the long run.

vii) To examine whether Weather Insurance and NAIS could operate simultaneously with an option for farmers to choose either of them.

viii) To examine the possibilities for integrating Weather Insurance with NAIS (like advance payouts, double trigger products, etc.).

ix) To analyze and compare the features of Weather Insurance products offered by various insurance companies including 'bench-marking' standards; and offering suggestions for improvement in the scheme.

x) To assess the impact and usefulness of private sector participation in the scheme by providing competitive environment & underwriting practices followed by them to satisfy the basic requirements of verifying insurable interests of the proposer in the subject matter of insurance.

xi) To examine the issues involved in scaling-up Weather Based Crop Insurance Scheme (WBCIS).

xii) To examine the efficacy & effectiveness of Weather Insurance in mitigating weathers risks at micro level (farmers), meso (banks, input suppliers, intermediaries etc.) and macro level (relief agencies, Government etc.)

xiii) To review and suggest the legal and regulatory environment for index insurance, particularly weather insurance.

4.2 Universe of the Study

The study was conducted in 2 Districts each of 4 States [2 States each from Kharif and Rabi] where the Pilot Weather Based Crop Insurance Scheme (WBCIS) was implemented. For the purpose of meaningful evaluation, comparison & analysis, another 2 States [1 State each from Kharif and Rabi] were selected where the Pilot WBCIS was not implemented, to provide some counterfactuals (though limited given the non-randomized nature of generating these counterfactuals) by serving as a Control Group. In order to capture the situation of states which have WBCIS partially or have witnessed other initiatives in Weather Based Crop Insurance, 2 States were added to the universe of the study.

4.3 Sample Size for Questionnaire Survey

A sample of 1000 farmers who availed Weather Insurance from the implementing insurance companies in the selected States comprise of the beneficiary group for the field survey. Further, 200 non-beneficiary farmers i.e. those who did not avail of the Weather Insurance Scheme were chosen from both implementing and non-implementing states, to serve as a Control Group for comparative analysis and purposive evaluation. In addition, 75 farmers [from 2 selected States where the Weather Based Crop Insurance Scheme (WBCIS) was not implemented but where weather insurance has been tried through other pilots] were selected for detailed interaction to ascertain their views/experiences regarding weather insurance.

4.4 Profile of Farmer Sample

The sampling procedure made sure the respondent farmers were a representative group comprising of beneficiary and non-beneficiary farmers drawn from various socio-economic categories [SC/ST/OBC/Women/General, Small Farmer/Marginal Farmer/Large Farmer, etc.]. The cropping patterns of the study regions was also be taken into account during sample selection based on feedback from agricultural experts and our partner intermediaries.

4.5 Sampling Methodology

The study was conducted on the set parameters applied for conducting socio-economic impact evaluation process. A multistage, systematic and purposive sampling methodology was adopted for the study, as detailed below:

a) ***Selection of States:*** The first stage sampling unit is States. The study was conducted in 4 States [2 States each from Kharif and Rabi] where the Pilot Weather Based Crop Insurance Scheme (WBCIS) was implemented. The States were selected, in consultation with the Ministry of Agriculture, in relation to the number of farmers covered under the scheme both in Kharif and Rabi as well as the extent of coverage under various crops. It was also ensured that the States so selected are from different Agro-climatic Zones for a fair assessment of the performance of the scheme and to arrive at meaningful conclusions.

For the purpose of comparison & analysis, another 2 States [1 State each from Kharif and Rabi] were selected where the Pilot WBCIS was not implemented, to serve as a Control Group. The Control Group States so selected were from different agro-climatic Zones.

b) ***Selection of Districts:*** At the second stage, 2 Districts were selected from each State where the Pilot Weather Based Crop Insurance Scheme (WBCIS) was implemented for at least two consecutive seasons [i.e. 8 districts in all]. The Districts were selected where the participation of farmers under the scheme has been the maximum.

In addition, 1 District each from the Control Group States where the Pilot WBCIS was not implemented [i.e. 2 Districts in total] were selected for interaction with farmers and other stakeholders to know their perspective regarding the scheme and its prospects, if implemented.

c) ***Selection of Beneficiary/Non-beneficiary Farmers:*** A representative group of 1000 beneficiary farmers comprising of 250 farmers from each of the 4 sample States [125 farmers per district] was selected for a detailed interaction/interview. For this purpose, an agency-wise, crop-wise and season-wise list of the beneficiary farmers was compiled for each selected district. The farmers, thereafter, were grouped category-wise i.e. Marginal Farmers, Small Farmers, Large Farmers, Women Farmers and SC/ST farmers. From each category, beneficiary farmers were selected on a random basis to make up the requisite number.

Similarly, 200 non-beneficiary farmers i.e. those who did not avail of the Weather Insurance Scheme comprising of 50 farmers each from the 2 sample States where the scheme was implemented [25 farmers per district] and 2 sample states where the scheme has not been implemented, were chosen for comparative analysis. It was

also ascertained from the non-beneficiary farmers i.e. control group farmers as to why they did not prefer to obtain weather insurance cover if they were aware about the scheme.

In addition, 75 farmers [from 2 selected States where the Weather Based Crop Insurance Scheme (WBCIS) was not implemented but where weather insurance has been tried through other pilots] were selected on a random basis for detailed interaction to ascertain their views/experiences regarding weather insurance.

4.6 Selection of Other Stakeholders

i) ***Banks:*** A total of 6 Banks [2 Banks each from Commercial Banks, Regional Rural Banks and Cooperative Banks] which implemented the Pilot Weather Based Crop Insurance Scheme (WBCIS), in the Sampled States were selected.

ii) ***Intermediaries****:* A total of 20 intermediaries [16 MFIs/NGOs/Experts and 4 Insurance Brokers] who are key stakeholders in the value chain of WBCIS were selected for detailed interaction.

iii) ***Technical Agencies:*** The Indian Agricultural Research Institute, New Delhi and 4 State Agricultural Universities [1 from each Sampled State] were covered for detailed interaction and feedback with regard to the Scheme and its operation.

4.7Study Tools

The Study was designed to start with preliminary discussions with the officials of Department of Agriculture in the Ministry of Agriculture, GoI and with the Agriculture Ministries in the sampled states.

The farmer survey provides the basic feedback for impact assessment and evaluation. The survey schedules have, therefore, been so designed as to lead to meaningful data particularly on well defined quantitative parameters relating to effective delivery of intended benefits, equity in extension of these benefits among different social and economic categories of farmers as also gender-equity. Separate survey schedules have been designed for beneficiary and non-beneficiary farmers keeping in view the terms of reference of the study and the key indicators for impact assessment.

The schedules were customized to capture information and data relating to, inter-alia, awareness of the weather insurance scheme, knowledge of various products on offer by insurance companies, satisfaction/acceptance level, opinion of farmers on premium rates and subsidy, claim payouts (if any) received by them, timeliness in receipt of payouts, transparency in scheme operation, knowledge of weather station and its location, perception about the reliability & accuracy of weather data, extent of support from agencies at the field

level, extent of impact on farm income, opinion regarding NAIS, constraints/problems faced in obtaining insurance cover, scope/suggestions for improvement in the scheme etc. The field surveys commenced upon receipt of approval of the study schedules/questionnaires by the clients and field testing thereof.

Schedules for the inter-active phase with various stakeholders were in the form of Structured Check Lists and Open-ended Questionnaire for each category of interviewees/agencies. Besides the primary data and information collected from the survey, the in depth social auditing of the scheme was undertaken by involving all the stakeholders' viz. policy planners, agricultural universities, researchers, insurance intermediaries / voluntary agencies, insurance companies, farmers' organizations/interest groups, beneficiary and non-beneficiary farmers, etc.

Relevant information from the State Government and implementing insurance companies was obtained on financial and physical performance of the Weather Insurance Scheme (crop-wise, season-wise and year-wise). Besides, the constraints and problems faced in the implementation process were collected and collated through key informant's check-lists and interview guides. Thus, the study tools for this important evaluation exercise include:

i) Farmer Beneficiary Schedule
ii) Farmer Non-Beneficiary Schedule (i.e. Control Farmer Schedule)
iii) Farmer Schedule for Non-Implementing States
iv) State Schedule
v) Schedule for Implementing Banks
vi) Schedule for Implementing Insurance Companies
vii) Schedule for Technical Agencies (IARI & SAUs)
viii) Schedule for Insurance Intermediaries (MFIs / NGOs / Insurance Brokers)

4.8 Field Survey, Data Collation and Analysis

The study team comprising of insurance experts and research associates undertook visits to sampled States/Districts for interaction with concerned officials of the State Government, Insurance Companies, Implementing Banks, State Agricultural Universities, Insurance Intermediaries and other stakeholders. The field survey was carried out by trained research associates and supervisors under the close guidance of the Core Team. The primary and secondary data collected from the field as well as different stakeholders was collated and analyzed using statistical analytical tools and inferences drawn thereon. By using statistical tools like multivariate analysis, correlation analysis, regression and test of hypothesis for the differences between farmer categories, namely beneficiary and non-beneficiary, SC/ST and general, small and marginal farmers vs. large farmers, etc. significant inferences were drawn on the basis of the statistical evidence and the critical hypothesis were tested. An attempt was made to understand the specific impacts of the programme in terms of expected outcomes. This has enabled us in identifying dimensions of efficiency and effectiveness parameters of the programme.

Chapter 5

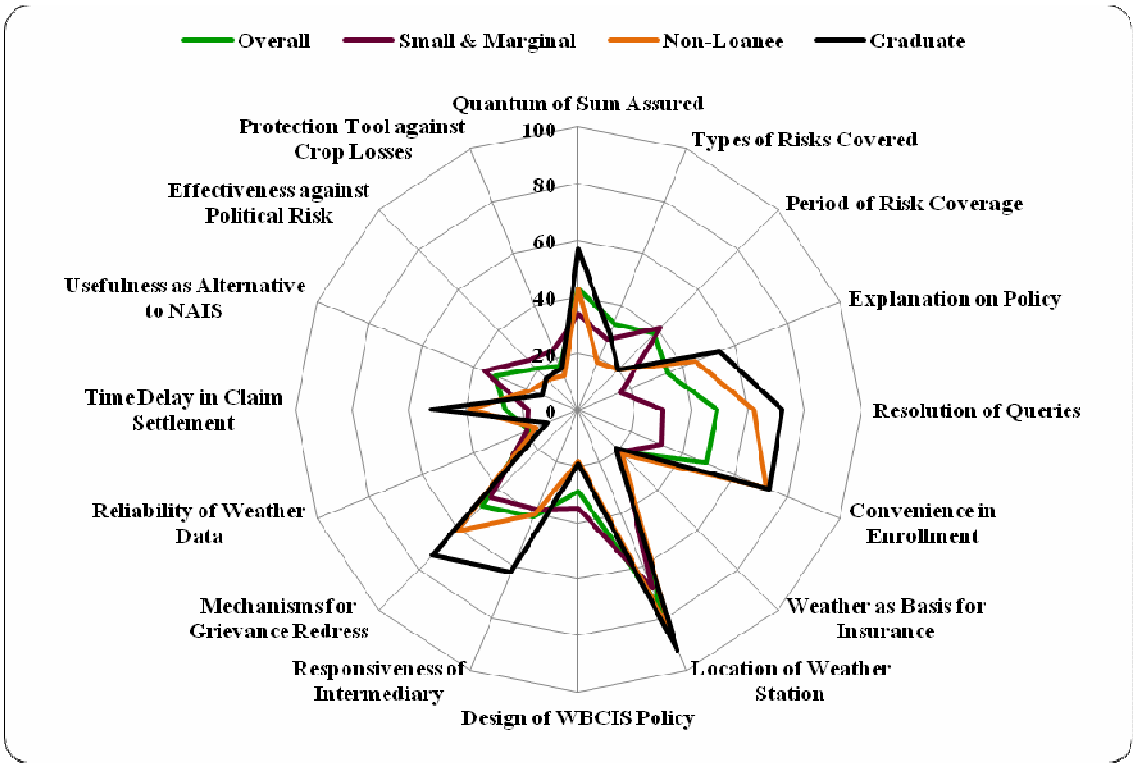
KEY FINDINGS FROM PRIMARY AND SECONDARY RESEARCH

5.1 Summary of Findings from Primary Research with Farmers

The following spider chart (REFERENCE CHART 1) summarizes the key findings from the primary data collected from farmer beneficiaries of WBCIS. This chart will be used further in the next chapter for validating the conclusions emerging from the primary research with farmers.

REFERENCE CHART 1

The following spider chart indicates the corresponding percentage of respondents of a given category who are not satisfied on various aspects (16 in our case) related to WBCIS. The categories of respondents have been taken as overall sample, small and marginal farmers, non-loanee farmers, and graduate farmers. These categories can be expected to represent a judicious balance of preferred farmers, demanding farmers and informed farmers.



Based on the spider chart above, the aspects of WBCIS with the maximum 'not satisfied' respondents are indicated below. The values in parentheses denote the percentage of 'not satisfied' respondents averaged across the four categories:

1. Location of Weather Station (80.8)
2. Mechanisms for Grievance Redress (56.5)
3. Convenience in Enrollment (56.5)
4. Resolution of Queries (53.3)
5. Responsiveness of Intermediary (45.3)

Considering the above five aspects with the highest level of 'not satisfied' respondents, it can be easily seen that the first aspect deals with basis risk while the remaining four aspects deal with service delivery and convenience.

Referring again to above spider chart, the aspects of WBCIS with the minimum 'not satisfied' respondents are indicated below. The values in parentheses denote the percentage of 'not satisfied' respondents averaged across the four categories:

1. Reliability of Weather Data (16.8)
2. Protection Tool against Crop Losses and Climate Change (17.3)
3. Effective against Political Risk and Manipulation (19.3)
4. Weather as Basis for Crop Insurance (20.8)
5. Usefulness as Alternative to NAIS (25.0)

Considering the above five aspects with the lowest level of 'not satisfied' respondents, it can be easily seen that the first and third aspects deal with transparency and reliability of WBCIS, the second and fourth aspect deal with the protection ability of weather insurance while the fifth aspects deals with its usefulness as an alternative to NAIS.

For the sake of completeness, it would be helpful to know the aspects of WBCIS that lie at the middle of the spectrum of 'not satisfied' respondents. Out of the 16 aspects of WBCIS on which satisfaction of farmer beneficiaries are sought, the following six define the mid-range responses. The values in parentheses denote the percentage of 'not satisfied' respondents averaged across the four categories:

1. Quantum of Sum Assured (44.3)
2. Explanation on WBCIS Policy (37.3)
3. Time Delay in Claim Settlement (33.8)
4. Period of Risk Coverage (29.8)
5. Types of Risks Covered (26.8)
6. Design of WBCIS Policy (25.3)

5.2Summary of Findings from Interactions with Other Key Stakeholders

Primary research with other key stakeholders in the crop insurance sector has provided critical insights for improving the effectiveness of crop insurance schemes in India. Detailed interactions were conducted with a wide spectrum of stakeholders including state agencies, intermediaries, insurers, social sector organizations, research institutions and subject matter experts. The main points from interactions with other key stakeholders are systematically summarized in the following section.

Issue	Responses from Other Key Stakeholders
Affordability of Weather Insurance	• Unanimous view that weather insurance cannot be affordable for small and marginal farmers without subsidy • Lack of willingness to pay exists among medium large farmers even when they may have the ability to pay for weather insurance • Since WBCIS is like a social good targeted at the farming community, the service tax applicable on it is not justified. Affordability of WBCIS can improve significantly with the withdrawal of service tax • Premium rates in excess of 10% are simply not justifiable unless farmers are sensitized about viewing crop insurance as an essential input in agricultural production • Many experts pointed out the covariant nature of weather and a host of loadings on the pure risk premiums as the key reasons for high actuarial premiums • Reinsurers have been identified as the key stakeholders that play an important role in determining the pricing for insurers who directly underwrite the risk • Premium subsidy under WBCIS has helped weather insurance come at par with NAIS (area-yield insurance) in affordability
Information Availability & Ease of Enrollment	• Huge gaps exist in explaining the working of WBCIS policies to clients with low educational attainment and limited exposure to sophisticated financial products • Practitioners have decried the inadequate investments towards sensitizing farmers and field sales personnel about policy mechanisms and limitations • The lack of system for systematic resolution of farmers' queries has been widely recognized. This is believed to cause disinterest among farmers which gets heightened if questions regarding high premiums/pricing of weather insurance are not dealt properly • Awareness among the channel partners and facilitators, including banks, is also not at an expert level, making WBCIS product communication a big challenge • Substantial scope exists for usage of ICT and other technologies to improve the product communication and enrollment process

	• Financial literacy and insurance education is important for sustainability of agricultural insurance schemes
Coverage	• WBCIS pilots are very important for reaching out to a larger section of the farming community which is either unaware of the NAIS or has had unsatisfactory/bitter experience with it • NAIS has to be ideally employed for covering low frequency, extreme severity loss incidences which can be easily detected • Coverage of Non-Loanee Cultivators has to be incentivized through higher commissions/margins for intermediaries • Universal coverage of entire farming community, at least for extreme loss events, should be attempted within the next 3 years • Simple/plain vanilla weather insurance policies need to be clearly differentiated from more sophisticated/exotic policies through proper branding and product communication • Gaps in terms of coverage of Rabi crops and other horticultural and high value commercial crops demand attention • Horticulture and livestock insurance are important insurance products for agriculture whose penetration is very low. These should complement crop insurance or weather insurance • Agricultural labourers should be offered rainfall insurance by AIC, as the income of these workers depends considerably on rainfall. Initially such coverage may be channelized through reliable intermediaries and can be scaled up after successful trials • Maximum sum assured under weather insurance needs special/immediate attention as farmers can hardly ever get the maximum sum assured indicated for each phase of their policy • States in order to lower the financial incidence of premium subsidy are generally allowing sum insured, which is much below the production cost. Farmers do feel the need for higher sum insured to reflect the increase in production cost components (labour, seeds, agrochemicals, technology, value-added inputs etc).
Product Design	• The agriculture insurance sector should strive at introducing simple/plain vanilla products under WBCIS which farmers, state Government officials, and functionaries at the grass root level should be able to evaluate objectively • More technically complex weather insurance products should be offered to farmers as options under which they can choose the level of risk coverage based on risk exposure and ability to pay • Weather parameters, other than rainfall and temperature, need to be included in weather insurance policies to provide credence to underlying weather insurance indices. • Weather insurance modeling should integrate agro-meteorological and agronomic information. Current state of product development calls for more concerted inter-disciplinary efforts which do not seem to be taking place in India. Focused &

Product Design	integrated research on crop-weather modeling for weather insurance should be supported which involves expertise from relevant disciplines like agronomy, agro-meteorology, financial economics and statistics. • Crop data generation for a given location should be in tandem with weather data collection. • It has been commonly observed that almost identical covers are being sold for a variety of crops. This disregards the specific agro-meteorological requirements for a crop. Further, it raises doubts on the ability of weather insurance to realistically reflect the impact of a particular weather parameter on crop production • Other parameters need to be gradually incorporated into weather insurance, but having multiple perils covered under a single weather insurance product would complicate the matter for farmers and other key stakeholders. Most insurers also resist drastic changes in product design as marketing agents need to be retrained regularly, thus escalating the administrative costs
Settlement Process	• Repeat take-ups of weather insurance have been suffering due to the claims not being declared timely. Data from weather stations, especially those managed by IMD, is delayed on most occasions without due/prior notice. This leads to unrest by farmers and breeds skepticism in farmers, particularly in light of the promise for reduced settlement period under weather insurance • Payout experiences lead to spurt in sales and repeated patronage in benefited locations and proximate areas which have earlier experienced low or no payouts • All stakeholders acknowledged unanimously that a standardized protocol for response of insurance intermediaries on farmer grievances and resolution of doubts of farmer-clients regarding claim settlement is conspicuous by its absence. Lack of proper grievance redress and query resolution pulls down the credibility and promise of weather insurance.
Weather as Basis for Crop Insurance and Key Infrastructure Required	• From field research and pilots, the location of the weather station for claim settlement has come out as the most important factor for farmer-clients to believe weather insurance as trustworthy • The density of AWS and IMD observatories holds the key to better pricing of risk products with passage of time and enabling the introduction of weather insurance based on other parameters

Weather as Basis for Crop Insurance and Key Infrastructure Required	• Weather infrastructure should be enhanced on high priority as any investment towards generation of weather data should be looked upon as an investment in public good with substantial payoffs in terms of ability to design more robust products in medium-long run. In the short term, it will substantially benefit the credibility of WBCIS due to more representative weather stations • Services of Private, Third-Party Weather Data Providers are critical for authentic and timely settlement of claims in many areas and in situations where no other alternative is available • Some farmers do entertain suspicion that the data provided by private / third-party data providers may not be accurate, and hence believe that more of public weather stations are required, instead of private weather stations. • Warehouse of daily rainfall data for weather insurance is also very important for disaster management as well as weather advisory service. • 5-10 km radius should be the limiting boundary for underwriting weather insurance. • The location of weather station for claim settlement has to be representative of the loss exposure of all the underlying farmer clients. Therefore it has to be finalized in consonance with the distribution of farmer clients covered under an insurance contract • Due to the high flexibility of location, proven reliability and timeliness of data supply by third-party weather stations, they are gaining increasing ground for Weather Insurance pilots. The agreements with Third-Party Weather Data providers have to be fairly meticulous for ensuring better returns from installation of farmer-location-specific weather stations • The best way to reduce basis risk is by intensifying the network of rainfall measurement and monitoring systems. This network can double up as an important weather and crop advisory platform in the areas where weather insurance is sold as well. IMD stations for weather insurance pilot may not be entirely reflective of the rainfall pattern in the insured areas. Appreciating this fact, AIC has attempted to underwrite rainfall insurance for some projects based on data from other Government weather stations managed by agricultural universities, KVKs, GSDMA, irrigation deptt. etc.

Relationship between WBCIS and NAIS	• On the important question of whether doing away with NAIS makes sense, the unanimous response has been in the negative • Comprehensive coverage of losses is the key advantage of NAIS which in case of WBCIS is its faster claim settlement • NAIS suits low frequency and extreme severity losses. WBCIS can be attuned to medium frequency and medium severity losses • On the idea of having NAIS and WBCIS available as separate options, the consensus was that having only one option made sense from practical considerations. It would be chaotic for farmers and implementing agencies to deal with both co-existing. The major problems can be: i. When there are claims under one and not under the other, farmers would most likely complain and a major hue and cry will occur. Administrative issues will also erupt. ii. Wide variations in premiums by way of the concessional subsidy have already created problems in farmers adopting insurance. While premium subsidy for NAIS is being gradually reduced, WBCIS is being supported by a considerable proportion of subsidy iii. Another important difference between the two schemes making the substitutability unreasonable is the difference in the payout frequencies and magnitudes of WBCIS and NAIS • Horticultural and specialized crops cannot be covered under NAIS due to lack of standardized yield database. WBCIS can act as an effective risk management solution for these crops which face specific weather perils needing specialized risk coverage • WBCIS is the comfortable option from official point of view given its lower administrative hassles and objective claim settlement. From the farmers perspective it is not that beneficial given NAIS's comprehensive coverage against multiple perils • Ideally farmers should be given the option of choosing between NAIS and WBCIS. Given the low awareness and limited understanding of crop insurance working among majority of farmers, it will be prudent to delay the transfer of choice to farmers. The perceptions of farmers, based on their experiences under crop insurance, have a significant influence on their overall opinion regarding the farmer-welfare schemes of the Government

5.3Key Inputs from Interactions with Insurers

5.3.1 Key Inputs from Interaction with AIC

- Pilots of WBCIS by state governments have contributed much-needed scale to weather insurance in India. Perceived advantages of WBCIS include less administrative burden, reasonably speedy claim settlement and objective assessment of claims

- States with lower level of perceived risks in crop production due to assured irrigation are also susceptible to certain risks like unseasonal/excess rains, unfavorable temperature rise

- Some of the states where Government has not been supporting WBCIS possibly because of its weak financial position, have also seen interest for weather insurance from farmers, mainly those undertaking cultivation of cash crops, horticultural crops or seeds

- Private agribusiness companies and corporate entities promoting contract farming are likely to play an instrumental role in making inroads for weather insurance in such states

- Facilitators like Sajjata Sangh, Microensure, WRMS etc can also likely to play a vital role in scaling up of weather insurance in India

- Weather insurance has been used for sales promotion by seed companies. After its successful trial for 2-3 years, it could become an essential component of seed packages from leading seed companies
- From the farmers' perspective, weather insurance is not considered 'comprehensive' insurance, and hence not a substitute for NAIS w.r.t. many crops.

- Owing to the technical limitations of weather insurance products, addressing such demands requires hybrid or double-trigger crop insurance products. One of the more workable alternatives could be to break-up the total sum assured under crop insurance into two equal components: the first component (50%) will be settled on the basis of weather-based index whereas the second component (50%) will be settled on the basis of area yields

- The component of crop insurance requiring area yields can take estimates of area yield from both CCEs and Remote-Sensing (RS) technology. The dependence on the estimates from RS technology can be gradually increased with improvement in its resolution and accuracy

- Differentiation in WBCIS can happen through improved service, convenience in enrollment, timely settlement and greater transparency

- Farmers are not equipped to understand the nuances of weather insurance product design. Benchmarking of weather insurance product, therefore, is vital as more and

more insurers are allowed to participate in the Government supported WBCIS. This would help in realizing the best value for the Government funds

- Government has to envisage and assign the proper role for crop insurance in India. To provide further impetus to crop insurance, other types of ad-hoc relief and agricultural support provided to farmers can be routed through the more efficient route of crop insurance

- Spanish model of crop insurance can provide useful directions to Indian crop insurance programme, particularly in terms of shaping the structure of public-private partnerships and involving different stakeholders as per their specific strengths, interests and requirements

- More focused efforts and investments may be directed towards development of technical and research competencies for improvement of weather insurance

- To optimize basis risk in weather insurance for plain areas, the coverage of insured farmers for rainfall parameter must be limited to 5 km. The corresponding coverage for temperature or other weather parameters may be relaxed to 10 to 15 km. For undulating areas or areas with microclimates, the above limits need to be suitably reduced.

General Suggestions from AIC

- **Agriculture Insurance Law:** Agriculture insurance is specialty insurance, and different from traditional general insurance in many respects. As an illustration, agriculture insurance, particularly crop insurance programme is conceived as a 'multiple-agency' approach in which Rural Financial Institutions (RFIs), State Government, Central Government etc. are actively involved, with the Government providing significant financial support. Moreover the programme is compulsory for loanee farmers. The programme, thus, is seen more as a social instrument of the Government rather than a commercial instrument. A programme of this nature and magnitude is unlikely to be effectively administered unless backed by a statute or law. It may be worthwhile to note that the countries like United States of America, Canada, Spain, Japan, Philippines etc. where crop insurance is being used as an integral part of 'agriculture risk management', a separate act / enactment is in force, and facilitating smooth implementation of the programme.

- **Incentives for Sustainable Agriculture Practices:** While subsidies are must in agriculture insurance, it would be equally important to build risk management stipulations and incentives into the programme for sustainable agricultural practices, like integrated pest management, low Green House Gases (GHG) crops, drought proofing, etc.

5.3.2 Key Inputs from Interaction with ICICI Lombard

- ICICI Lombard has implemented new features to gain the trust and confidence of farmers who have traditionally believed that their money is safe only with the public insurance companies. Integrating proposal form and cover note in one document to issue insurance policy on spot, has been one such feature. Some other salient features include usage of internet platform for policy purchase and issue, different distribution strategies for different geographies, direct person-to-person training for new sales personnel etc.

- WBCIS has emerged as a good proposition for our business. In order to meet the growing demand under WBCIS, ICICI Lombard can seamlessly employ more people for marketing WBCIS to interested farmers

- ICICI Lombard employs a mix of distribution strategy based on geography. Its sales force goes to the specific geography and identifies the influencers (lead farmers, panchayat representatives, grassroots organizations, banks etc) to effectively reach out to the local farmers and bring under the coverage of WBCIS

- ICICI Lombard has implemented a novel method for on-the-spot enrollment in WBCIS using a Point-of-Sale (POS) application. This method can go a long way in eliminating intermediation delays and other loopholes in current distribution process of WBCIS while reducing transaction costs for channel partners. After piloting this unique system during Rabi 2009-10 season, ICICI Lombard plans to replicate it across the country by Rabi 2010-11 season. It has many other advantages like secure, online data-sharing between insurer and channel partners, real-time update on changes by insurer, instant issue of policy etc.

- Weather stations have to be properly mapped and their numbers have to be increased as per the local needs. Quality and formats of weather data must be standardized

- Premium subsidy from Government payable to ICICI Lombard under WBCIS is routed through AIC. This circuitous route through a competing insurance company can be obviated to streamline the funds flow and minimize transaction costs for concerned parties. Timely receipt of premium subsidy is not only necessary for timely claim settlement but also for meeting the regulatory requirements under Section 64 VB of the Insurance Act, 1938

- Government should also try to ensure equal opportunity for all insurers participating in WBCIS. Since state governments themselves assess and verify insurance products to be introduced under WBCIS, they should place equal confidence in private and public insurers

- For ensuring sincere and sustained efforts for promotion of WBCIS, all new insurers applying for inclusion in WBCIS must be subject to achievement of certain critical business size in selling non-subsidized weather insurance. The investment made in

attaining the critical business size for commercial weather insurance would help the new insurer to understand and assimilate the key requirements for promoting WBCIS effectively

- Despite the interest of farmers, some states do not promote crop insurance because of the paucity of funds. Some states undertake crop insurance pilots as a goodwill gesture rather than as a initial step for a strategic programme for agricultural production risk management

- Service delivery is a key differentiating factor in crop insurance; even more due to its nature of a social good

- Crop insurance models of US and Spain are excellent models to draw insights for the public-private partnership model to strengthen crop insurance in India

- Government support in the form of premium subsidy is indispensable for WBCIS to attain widespread penetration in India. The caps on actuarial premiums and premium subsidy have to be hiked up for providing satisfactory coverage to cultivators in areas prone to high and frequent risk exposure

5.3.3 Key Inputs from Interaction with IFFCO-Tokio

- For IFFCO-Tokio, the farmer is not only a client for crop insurance but also a shareholder. Therefore it becomes difficult to sell WBCIS policies to such farmers unless they understand and accept the limitations of WBCIS. Unlike the case of other insurers, IFFCO Tokio provides a forum for farmers where they can stand up and make their case if they are dissatisfied with their experience of WBCIS

- IFFCO-Tokio takes utmost care in ensuring that the farmers buying WBCIS are fully aware of the basis risk in it. A fair proportion of farmers under the scope of WBCIS coverage by IFFCO-Tokio understand the difference between the loss estimated at the weather station and the actual loss in the fields. With growth in weather station density and improvement in product design, IFFCO-Tokio is hopeful that it would be pitch WBCIS more effectively to the farmers associated with IFFCO - one of its promoter organizations

- For 2010-11 season, IFFCO-Tokio is targeting 4 states aggressively which should help in increasing its total weather insurance portfolio from 70,000 farmers to 1,25,000 farmers. Most of the existing clients of IFFCO-Tokio are non-loanee cultivators

- IFFCO-Tokio supports the idea of entry barriers for new insurers seeking participation in WBCIS. Unless new insurers understand the unique challenges in selling weather insurance, they would not be able to sell WBCIS policies reliably and sustainably

- Government should promote the development of a centralized data centre for WBCIS and other requirements in agricultural extension, research and development. Weather

data from such centralized data centre should be priced reasonably to give thrust to product development and research in weather insurance

- In order to further bring down the cost of crop insurance for farmers, WBCIS policies should be exempted from service tax. Government has already waived service tax for many policies focused at rural and poor segments of the society

- IFFCO-Tokio finds merit in collaborative possibilities under WBCIS. These include standardized product for a given location, data sharing among insurers, and collective research for weather insurance product and services improvement

- Local reinsurance capacity within India has to be increased to counter the domination and skewed control of international reinsurers

- IMD is not able to match up with the increasing requirements of insurers, particularly after rapid expansion of WBCIS coverage. The certification of private weather stations by IMD has to be encouraged by Government for promoting public-private partnership in weather data management

5.4Findings from Secondary Data Provided by Insurers

Based on the secondary data on business performance of WBCIS provided by the three insurers, namely Agriculture Insurance Company of India (AIC), ICICI Lombard General Insurance Company (ICICI Lombard) and IFFCO-Tokio General Insurance Company (IFFCO-Tokio), this section analyzes the patterns of coverage, claims scenario, benefits accruing to farmers and growth of the weather insurance business in India, mainly under WBCIS.

5.4.1 Farmers Insured

Table 17 indicates the coverage of farmers by the three main insurers participating in WBCIS. AIC is the leader in providing weather based crop insurance in India followed by ICICI Lombard. IFFCO-Tokio has a marginal share of the market for weather based crop insurance having started late in 2008 with a meager coverage of only 200 farmers. There has been a phenomenal rise in the farmers insured by AIC under WBCIS, from around 44000 in Kharif 2007 to over 1.65 lakh farmers in the Kharif 2008 season. The biggest jump in coverage occurred in the Kharif 2009 agricultural season with AIC's policies covering more than 11 lakh farmers across India. Though coverage in the earlier Rabi seasons was low at an absolute level compared to Kharif coverage, AIC has consolidated its Kharif 2009 performance with more than 8.5 lakh insured farmers during Rabi 2009-10 season.

ICICI-Lombard's coverage of farmers is not as spectacular as that of AIC, though their marketing efforts saw a rise in the number of farmers insured from around 18,000 in Rabi 2007-08 to a little over 23,000 in Rabi 2008-09. One of the major reasons cited by ICICI

Lombard for their moderate growth during the initial seasons of WBCIS has been the time taken by them to gain the confidence of Government Agencies responsible for WBCIS in their respective states. Kharif coverage by ICICI Lombard commenced in the year 2008 with insurance of 18000 farmers under WBCIS. In spite of the significant efforts of AIC and ICICI Lombard to increase coverage under WBCIS, the cumulative coverage attained in Kharif 2009 was less than 12 lakh farmers, which indicates the wide schism between the farmers yet insured and those yet to be insured for an agrarian community of India's size and diversity.

Table 17: Farmers Insured under WBCIS

	AIC	ICICI Lombard	IFFCO-Tokio
Kharif 2007	43790	-	-
Rabi 2007-08	627167	7468	-
Kharif 2008	165199	18359	13
Rabi 2008-09	169973	23229	435
Kharif 2009	1133975	26642	194
Rabi 2009-10	869829	245384	-

5.4.2 Farmers Benefited

A very interesting aspect of the number of farmers benefiting from the WBCIS by way of claims paid out is that AIC leads in this aspect by leaps and bounds in comparison to its private counterparts. In Kharif 2009 around 80 per cent of the farmers insured received payouts while for ICICI Lombard this figure stood around 50 per cent. None of the farmers insured by IFFCO-Tokio were benefited. This becomes a significant indicator of the value farmers would ascribe to WBCIS or weather insurance product because Kharif 2009 saw country-wide droughts or drought like situations, and those farmers who do not receive payouts in a drought year start devaluing the need and utility of weather based crop insurance, irrespective of the superiority of product design. Table 18 depicts the farmers benefited in various seasons. It is evident that AIC has maintained reasonable level of claims attuned to the extant crop conditions.

Table 18: Farmers Benefited under WBCIS

	AIC	ICICI Lombard	IFFCO-Tokio
Kharif 2007	35275	-	-
Rabi 2007-08	187790	4937	-
Kharif 2008	104483	4479	13
Rabi 2008-09	112001	8343	433
Kharif 2009	888210	13539	0

5.4.3 Area Insured (in Hectares)

In congruity with the higher coverage by AIC, the Area Insured (in hectares) is also significantly higher than ICICI Lombard and IFFCO-Tokio. In Kharif 2009, AIC covered slightly less than 15 lakh hectares of crops in India under WBCIS compared to around one lakh hectares covered by ICICI-Lombard and a paltry 120 hectares by IFFCO-TOKIO (Table 19). The corresponding coverage of area insured under WBCIS in Rabi season has been erratic for AIC (falling from slightly less than 10 lakh hectares in Rabi 2007-08 to below two lakh hectare mark in Rabi 2008-09 and then rising to more than 12 lakh hectares in Rabi 2009-10). The growth in season-wise area coverage of ICICI Lombard had been more uniform till Rabi 2009-10 season when it rose phenomenally to more than 6 lakh hectares, an increase of more than 8.5 times over the previous Rabi season. The remarkable growth in area insured by both the leading insurers (under WBCIS) is an evidence of the thrust received by weather insurance in India in the form of Government support to WBCIS.

Table 19: Area Insured under WBCIS (in Hectare)

	AIC	ICICI Lombard	IFFCO-Tokio
Kharif 2007	50075	-	-
Rabi 2007-08	984553	33701	-
Kharif 2008	178655	42537	12
Rabi 2008-09	192820	72433	185
Kharif 2009	1460977	104989	118
Rabi 2009-10	1228094	637653	-

5.4.4 Total Premiums (in Lakh INR)

In terms of the premium collections, AIC takes up the largest chunk of premium collections pie owing to its higher share of farmers insured. During Kharif 2009 season, the total premium collected by ICICI Lombard is less than ten per cent of the total premium collected by AIC while the premium collection of IFFCO-Tokio is abysmally low at Rs.3 lakh. ICICI Lombard has managed to narrow the gap in WBCIS premiums between it and AIC by reaching a premium level of almost 50% of the premiums earned by AIC during Rabi 2009-10.

An interesting piece of evidence that is revealed by glancing through Table 20 is the higher per farmer premium earned by ICICI-Lombard on an average. For instance, in Kharif 2009 the premium collected per farmer (i.e. Total Premium Collected divided by Total Number of Farmers Insured) by ICICI Lombard stood at around Rs.5400 while it was Rs.1750 for AIC and Rs. 1550 for IFFCO-Tokio. This is on account of the higher value of average area insured per farmer for ICICI Lombard which means that it is able to insure a larger acreage from each farmer whom it is able to bring under its coverage.

Table 20: Total Premium Income under WBCIS (in Lakh INR)

	AIC	ICICI Lombard	IFFCO-Tokio
Kharif 2007	703.1	-	-
Rabi 2007-08	13845.1	325.1	-
Kharif 2008	3168	494.1	0.3
Rabi 2008-09	3589.9	1091.6	3.6
Kharif 2009	19894.5	1440	3
Rabi 2009-10	16115	7994	-

5.4.5 Total Claims (in Lakh INR)

The claims data from the three insurers shows a skewed distribution. AIC has the highest average claims ratio (claims to premium collected) vis-à-vis ICICI Lombard and IFFCO-TOKIO (Table 21). In Kharif 2009 which was the worst year (over the last three years of evaluation) in terms of moisture stress (water stress arising out of drought or drought like situations), the claims to premium ratio for AIC was at a high level of 81 per cent compared to 36 per cent for ICICI Lombard and zero per cent for IFFCO-TOKIO. During the Rabi 2009-10 season, ICICI Lombard has made up for its Kharif 2009 aberration through a higher claims ratio of 66%, which though lower than the corresponding 82% claims ratio for AIC, indicates the ability of ICICI Lombard to pay out large quantum of claims in seasons with substantially high risk coverage.

The differences in the claims ratio for the three insurers may point out the need for a differential subsidy regime. An insurer with high claims ratio (high probability of pay outs and lower premium) when compared with another with lower claims ratio (lower probability of pay outs and higher premium) deserves a higher dosage of price and non-price subsidies. By homogenizing the premium subsidies, the take-up of the products having poor claims ratio might be incentivized to the same extent as the one having better payout probability (and at lower premium). This might bring in a higher than proportional share of profits to the insurer having lower claims ratio over the future cropping season which is detrimental to farmers' welfare.

Table 21: Total Claims Made under WBCIS (in Lakh INR)

	AIC	ICICI Lombard	IFFCO-Tokio
Kharif 2007	524.1	-	-
Rabi 2007-08	10071.5	148.2	-
Kharif 2008	1439.8	165.1	0.3
Rabi 2008-09	2610.2	730.1	1.2
Kharif 2009	16126.6	475	0
Rabi 2009-10	13367	5285	-

5.4.6 Growth of Weather Insurance Portfolio of AIC and ICICI Lombard

The discussion on the performance of WBCIS so far reveals significant differences among the three insurers and brings out huge gaps in coverage both in terms of number of farmers covered or total acreage (across crops and regions). Though AIC emerges as the best performing insurer in terms of its '*value for money'* weather based crop insurance coverage provided to the Indian farmers, it should not be forgotten that it was pioneering experiment of ICICI Lombard in association with the World Bank and BASIX that saw the launch of the first index-based weather insurance scheme, which forms the core rationale for having WBCIS in the first place.

Table 22 shows the growth of the weather insurance portfolio of the two major weather insurance providers in India. As discussed earlier, ICICI Lombard started its weather insurance business in the year 2003-04 by way of its collaboration with BASIX, while AIC introduced weather insurance in its agricultural insurance portfolio in the following year (2004-05). It was only in the year 2005-06 that AIC's weather insurance business (in terms of acreage insured) overtook that of ICICI Lombard. The marketing year 2007-08 saw a spectacular jump in the coverage by AIC, crossing the 25 lakh acres mark, only to fall below the total coverage of 10 lakh acres during the next year. On the contrary ICICI Lombard continued to grow in a modest manner during the period, though at a substantially lower level compared to AIC. Section 6.4 discusses at length the indicators of growth in the weather insurance business in India. In the 2009-10 marketing year, both the insurers registered an almost parallel growth in their coverage performance owing to aggressive marketing campaigns and increased state support. While AIC exceeded 65 lakh acres insured land mark, ICICI Lombard crossed the 10 lakh acres barrier for the first time, ending up at slightly more than 20 lakh acres. The cumulative coverage of the two insurers exceeded 85 lakh acres during 2009-10 which is more than six (6) times the total coverage of slightly less than 15 lakh acres during the previous year (2008-09). It would not be an overstatement to aver that WBCIS has lent a new lease of life to weather insurance in India. A short discussion on this aspect of growth of weather insurance portfolio is also taken up in Section 6.4.2 in the next chapter.

Table 22: Weather Insurance Coverage of AIC & ICICI Lombard (in Acres)

Marketing Year	AIC[7]	ICICI Lombard
2003-04	-	1054
2004-05	5545	5736
2005-06	247026	107586
2006-07	142048	125185
2007-08	2586570	87002
2008-09	928688	458960
2009-10	6722677	2002477

5.4.7 Other Observations

The keen interest of the insurers and their sincere efforts in supporting the Government for promotion of crop insurance have certainly given boost to WBCIS in India. Under the WBCIS regime so far, the financial support of the Government has been well complemented by a fairly lenient regulatory environment; regarded conducive during the early stages of a new product or service. The result of favorable collaboration between Government and insurers is evident in the impressive leaps, in terms of farmer and area coverage under WBCIS.

Despite the presence of only three active insurers, the competitive landscape under WBCIS is not placid or less fiercely contested than it would, if there were higher number of competing insurers. With due regard to the inherent strengths of each other, both AIC and ICICI Lombard have indicated loopholes and weakness in the institutional design and process control of WBCIS as an enabling factor behind the quantum leap of their main competitor in terms of key business parameters under WBCIS. Even disregarding the innuendoes of the leading insurers, it is quite obvious that the relatively flexible stipulations related to underwriting and process evaluation under WBCIS, need to be reviewed rigorously and tightened, if required.

While AIC has drawn rave reviews from its channel partners (both WBCIS and Non-WBCIS portfolio) by virtue of its open and empowering approach, particularly during weather insurance product development; ICICI Lombard has demonstrated excellent responsiveness and transparency in sharing all vital data, related to its business statistics. This tops up the remarkable initiatives undertaken by ICICI Lombard for reducing inefficiencies due to intermediation and streamlining distribution. Some of the measures introduced by ICICI Lombard for improving customer-centric processes like enrollment, distribution, communication etc. and ensuring better operational control may be relevant for replication under the umbrella programme of WBCIS. Despite business statistics for WBCIS not strongly supporting its cause, IFFCO Tokio displayed admirable clarity on how it intends to

[7] Portfolio for AIC in terms of Total Area Insured from 2007-08 onwards has been equated to Total Area Insured by AIC under WBCIS. The area insured under Non-WBCIS portfolio of AIC has been ignored because of lack of reliable data.

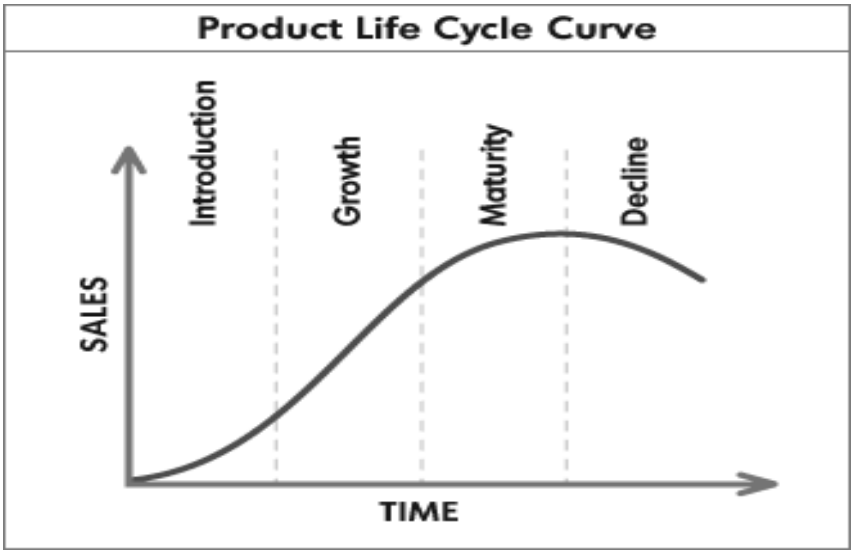
scale up its WBCIS coverage and the crucial groundwork necessary for it before its quest for scaling up its weather insurance portfolio. The understanding and commitment of IFFCO Tokio team regarding weather insurance could be regarded to be in good harmony with the basic goals and orientation of WBCIS.

Chapter 6

EMERGING SCENARIO AND KEY CONCLUSIONS

The multi-pronged and detailed field research for evaluation of WBCIS has thrown up a variety of perceptions, experiences, judgments, projections and perspectives that have enriched the evaluation exercise. In terms of product life cycle, weather insurance (WI) can be regarded as still going through its introduction stage or in terms of the diffusion of the innovation, it is still in a stage of infancy.

Chart 1: Product Life Cycle Curve



Both the supply and demand sides for this product are evolving with the supply side currently being at a higher level of understanding and sophistication compared to the demand side. Equally important, if not more important, the viewpoints of non-transactional actors (entities influencing the transactions between the supply and the demand side) have to be carefully interpreted as these actors have a balanced association with both supply and demand side entities and are usually endowed with a utilitarian orientation. The non-transactional actors mainly include welfare entities like Agencies and Organs of the State, Civil Society Organizations (Social/Voluntary Organizations, Scientific and Research Institutions, Media Bodies etc) and non-partisan individuals (volunteers/independent experts). However, the responses of a diverse set of stakeholders in the value chain of WI, including both transactional and non-transactional entities, are heterogeneous and intermingled with appreciation, criticism, skepticism, hopes and pragmatism. A systematic analysis of the different aspects related to the design and delivery of WBCIS scheme is presented in the following sections.

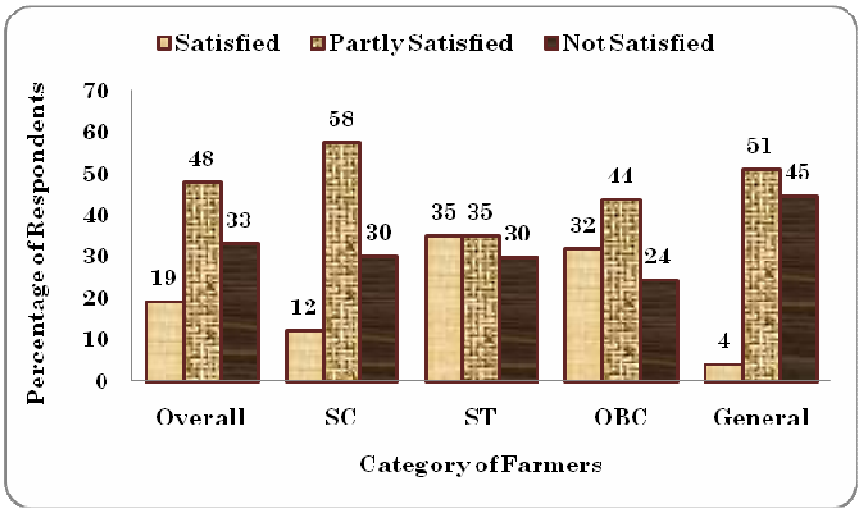
6.1Scope of Weather Insurance

6.1.1 Perils Covered

Indications from Farmer Beneficiaries of WBCIS

The satisfaction of farmer beneficiaries of WBCIS with the perils covered in weather insurance is illustrated in the following chart. Less than one-third of respondents from the entire sample are not satisfied with the perils covered under their WBCIS policy. More than three-fourth (76%) of the respondents from OBC category (constituting almost half (49%) of the entire sample) have expressed a sense of satisfaction with the coverage of perils. Though nearly 45% of respondents from the general category are not satisfied with the set of perils covered in WBCIS policies, this aspect of WBCIS does not figure among those 8 aspects of WBCIS (out of a total of 16 aspects) having the highest percentage of 'not satisfied' responses, on the basis on Reference Chart 1. Therefore the concern among farmer beneficiaries regarding the coverage of perils in WBCIS policies may be regarded as moderate and should be addressed in the medium to long term.

Chart 2: Response on Coverage of Perils under WBCIS



Indications from Other Key Stakeholders (Insurers, Specialists, Scientific Community)

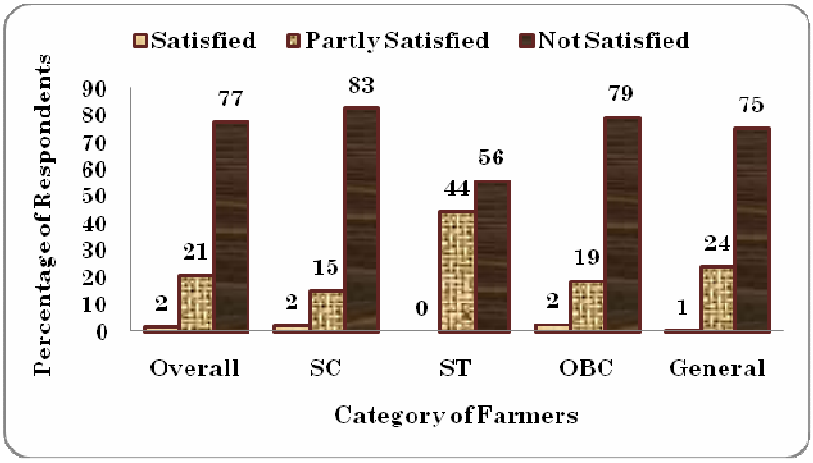
Increasing the number of perils in a WBCIS is not a constraint for insurers as they have demonstrated in case of policies for horticultural crops which require risk coverage for more complex weather events and other weather parameters in addition to rainfall and temperature. As is the usual case elsewhere, the quality of coverage under a peril is more important than the number of perils being covered. The issue of insufficient coverage of perils has not come out as a significant concern during interactions with other key stakeholders.

6.1.2 Basis Risk

Indications from Farmer Beneficiaries of WBCIS

The satisfaction of farmer beneficiaries of WBCIS with location of weather station is depicted below. More than three-fourth (77%) of respondents from the entire sample are not satisfied with location of the weather station. Both the OBC and General categories, which account for nearly 88% of respondents in the entire sample, have reinforced the negative opinion regarding the location of weather station, with more than 75% respondents 'not satisfied' with it. The location of weather station has the greatest bearing on the risk inherent in a weather insurance contract once key parameters of the contract have been set. In other words, basis risk during the operation of a weather insurance policy is largely a function of the location of the weather location.

Chart 3: Response on Location of Weather Station



Indications from Other Key Stakeholders (Insurers, State Agencies, Specialists)

All stakeholders in weather insurance irrespective of whether they represent the supply side, the demand side, or the non-transactional side, unanimously support the minimization of basis risk. Insurers that were earlier wary of using non-IMD stations have now become acceptable to settling weather insurance claims on the basis of data from the rain gauges maintained by various state Government agencies across India. Despite the high credibility and technical rigor associated with the weather data provided by IMD – the designated State Agency for this purpose, insurers have to avail the services of third-party weather data providers for addressing the dire shortfall of weather stations which can minimize basis risk in insured locations. The spurt in demand has triggered a race among key players for setting up new weather stations that may ultimately lead to an unsystematic network of weather stations with suboptimal spatial distribution.

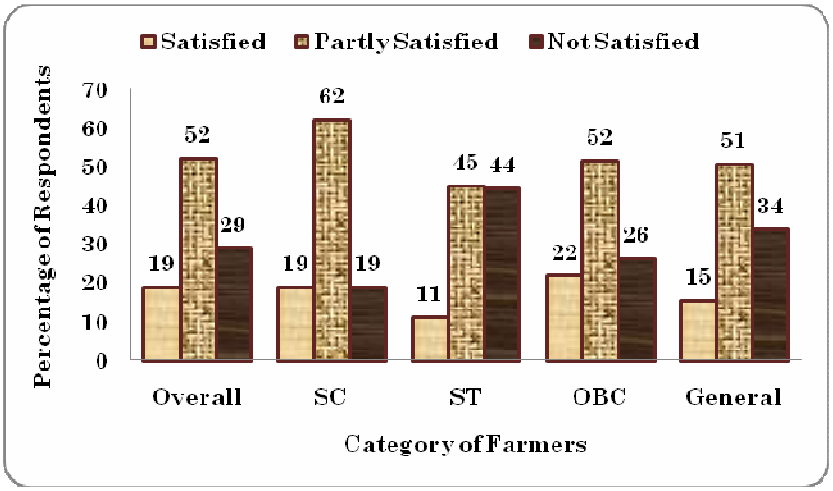
6.1.3 Design of Weather Insurance Products

The design of weather insurance product is like to a black box which has weather data as an input and a term-sheet as an output, with the intermediate process continuing to remain a mystery for even seasoned personnel dealing in sales and marketing of weather insurance. For a common man, the simplest evidence of a good weather insurance design is its claim payout during seasons which are adverse or devastating on a widespread level. One such adverse season was the Kharif 2009 season which has been regarded as possibly the worst Kharif season since 1972. Western India, in general, and Rajasthan, in particular, bore the greatest brunt of a devastating drought last year. The claim ratios (claims paid against premium collected) of AIC and ICICI Lombard for their weather insurance portfolio in Rajasthan during Kharif 2009 season were nearly 98% and 34% respectively. Loss ratios (total claims against sum assured) of more than 81% could be seen for certain locations insured by AIC which is a healthy sign of the ability of weather insurance product to pay in distressing times.

Indications from Farmer Beneficiaries

The satisfaction of farmer beneficiaries of WBCIS with the design of weather insurance policy is illustrated in the following chart. Less than 30% of respondents from the entire respondent sample are not satisfied with the design of their WBCIS policy. The design of WBCIS policy does not figure among those 8 aspects of WBCIS (out of a total of 16 aspects) having the highest percentage of 'not satisfied' responses, as indicated by Reference Chart 1. Therefore, the concern among farmer beneficiaries regarding the design of weather insurance policy can be regarded as moderate and may be addressed in the medium to long term.

Chart 4: Response on Design of WBCIS Policy



Due to the typical structure of a weather insurance term sheet, farmer customers may not find it easy to unravel the technicalities in the design of weather insurance. The task of

appraising and approving the designs of weather insurance products may hence be entrusted to the regulatory agencies, designated expert committees, and entities in the non-transactional space working to ensure a fair transaction between the supply side and the demand side of weather insurance. Owing to the practically limitless number of designs possible for weather insurance, the task of appraising a diverse portfolio of weather insurance designs and their contextual suitability is a specialized task that unfortunately has not been able to attract the level of attention and technical rigor which it truly deserves. The challenges in comprehensively evaluating weather insurance products are compounded by the fact that weather insurance products lie at a crossover of agriculture, statistics, meteorology, and financial risk management, each of which is a specialized field of knowledge with limited expertise available. Therefore the task of identifying resource persons with good understanding of more than one or two of the above fields is quite challenging and requires substantial efforts to bring such rare expertise on board.

Indications from Other Key Stakeholders (Insurers, Specialists, Scientific Community)

One of the common criticisms of weather insurance has been its limitation of insignificantly compensating the insured farmers for even the worst of crop seasons (e.g. Kharif 2009).

The following case study of a discerning customer aptly highlights how the issue of suboptimal indemnification by rainfall insurance could be brought out during its very first trial. For the less prudent, the time lag to sense this limitation of weather insurance may be slightly higher, 4 to 5 years by a conservative measure. Therefore the issues pertaining to design of weather insurance need to be addressed within the medium time horizon (1-3 years).

Such a situation for even an apparently well-designed weather insurance contract may be the result of the inadequacy in any or both of following parameters namely, the maximum sum assured, and the maximum probable loss. The term ‘total sum assured’ in weather insurance contract may be deemed anomalous in the sense that even when a farmer has lost the entire crop during a particular stage, the compensation accruing to that farmer under the policy may not be the maximum sum assured under the weather insurance contract. It will be rather simply the addition of the sum assured of the weather insurance covers operative during that stage. The consequent indemnity may only be a fraction of the maximum sum assured under the weather insurance policy bought by the farmer. The maximum probable loss denotes the highest cumulative payout (sum of payouts of all constituent covers) among all the cumulative payouts simulated historically from a weather insurance contract. The quantitative difference between maximum sum assured and maximum probable loss for a weather insurance contract represents a theoretical gap between the maximum payout committed by that contract and the actual payout that could be expected from that contract even in considerably adverse years.

"Rainfall Insurance is transparent and paid out at the right time but claims are small compared to my actual loss" - Govindbhai Somabhai Chavda, Shahpur, Mangrol, Junagadh

"Providences are stronger than deliberations." Few things would epitomize it better than Govindbhai's trial of rainfall insurance. It was one of those routine trips from his village to Mangrol during which Govindbhai saw a group of his fellow-villagers listening attentively to some talk by an outsider. A part-time farmer but a school teacher by occupation, Govindbhai could not douse his curiosity and ventured further to gain more details. Never could Govindbhai or anyone else have imagined that he would walk out with a stake much bigger than any of them who had been deliberately called to participate.

Govindbhai ended up having a rainfall insurance coverage for 5.5 acres. The role of premium subsidy by AKRSP (I) did play a big role in Govindbhai's decision as he clearly put it, "Subsidy by AKRSP(I) was a key motivator as I would have been reluctant to take chance with entire premium burden on myself."

The higher stake and the occupational traits (being a school teacher) made Govindbhai drill deeper into the nuances of his rainfall insurance. His keen observation was apparent when he pointed out, "The cheques for payment of rainfall insurance claims did not have an at-par facility which cost me some precious rupees." Despite his incisive eye, he attributes his experience of rainfall insurance to sheer luck, "I just came to know about weather insurance by chance. In the end, it turned out to be a good bet for me."

For a part-time farmer, one may imagine that Govindbhai would have been content with getting an indemnity payout of nearly three times the premium paid by him. In his words, "Claim received by me is a small portion, about 50%, of the actual loss suffered by me." He goes on to articulate his situation better, "After I had invested INR 22,000 for 5.5 acres of my crop, I spent Rs 3500 as premium to insure my investment. Why should I be satisfied with a total payout of INR 10,000 only when my actual loss in term of my investment is much higher at INR 17,500? If I start considering the loss in terms of potential revenue, the payout seems even smaller."

The explanation that basis risk and the covariant nature of rainfall insurance result in distortions of payouts vis-à-vis the actual losses of an individual farmer fails to placate Govindbhai. He avers, "I do not wish to be paid out in normal years but whenever I suffer a big loss, I should a get a reasonable claim." Will weather insurance ever be able to address Govindbhai's requirement?

Insurers have expressed their commitment to weather insurance products which fulfill the expectations of farmers and other key stakeholders. All of the insurers are working with at least one specialized external agency for technical support on product development. AIC and ICICI Lombard both have undertaken efforts in the past to tap the expertise of IARI - India's leading and internationally acclaimed research institution in agriculture. Despite the apparent synergies, the desired outcomes could not be achieved because of mismatch in resource requirements (time, investment in research, manpower etc) required to make a significant breakthrough. The limited size of weather insurance portfolio, reasonable uncertainties regarding its scalability and high claim ratios were some key deterrents for insurers to sustain investments in weather insurance product research and development with a long-term view. In the absence of long-term orientation and commensurate investment, it may be difficult for premier research institutions to put their best experts for weather insurance research and development, forgoing other socially and economically attractive research assignments.

6.2Transparency in WBCIS

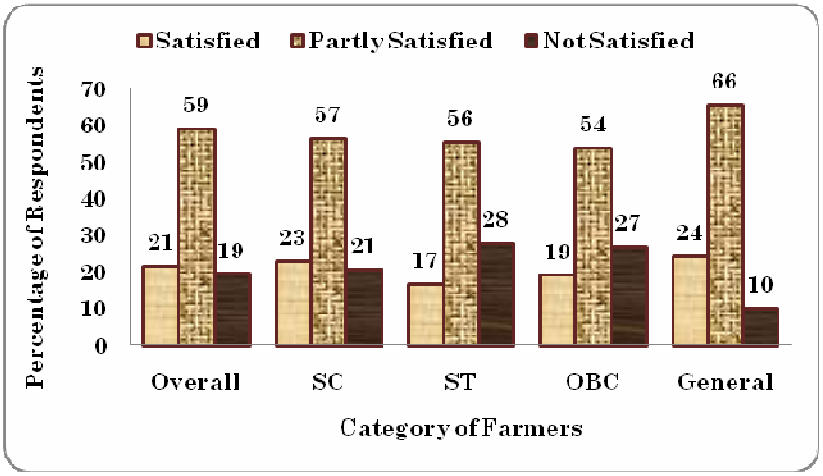
The issue of transparency in crop insurance can be visualized from multiple standpoints. Transparency in the context of WBCIS includes constructs like reliability of weather stations,

freedom from manipulation, explanation on weather insurance policy, resolution of queries and grievances. These constructs were investigated during the questionnaire survey of farmer beneficiaries and also during the interactions with other key stakeholders.

Indications from Farmer Beneficiaries on Reliability of Weather Stations

The satisfaction of farmer beneficiaries with the reliability of weather stations is illustrated in the following chart. Less than one-fifth (19%) of respondents from the entire respondent sample are not satisfied with the reliability of their weather station. Furthermore, the reliability of weather stations figures at the topmost place among those 5 aspects of WBCIS (out of a total of 16 aspects) having the lowest percentage of 'not satisfied' responses, as indicated by Reference Chart 1. Therefore the low level of concern among farmer beneficiaries for the reliability of weather stations lends credence to the transparency and reliability of WBCIS.

Chart 5: Response on Reliability of Weather Stations



Indications from Other Key Stakeholders on Reliability of Weather Stations

The reliability of weather stations has been regarded as unquestionable by most key stakeholders. Government agencies in those states, where low or no significant claims have occurred under WBCIS, have expressed low satisfaction with reliability of weather stations. This is not worrying as insurers are becoming more acceptable to the idea of using data from the weather set-up maintained by agencies of the state Government, provided the set-up meets basic criteria. With the installation of more weather stations of better quality and tamper-free operation, such isolated instances of dissatisfaction regarding reliability of weather stations would be further minimized.

Analysis of Satisfaction Level for IMD & Private Weather Stations

Gaps and weaknesses in the Indian agricultural extension system, the emerging state of WBCIS in India and the low level of awareness of crop insurance among farmers

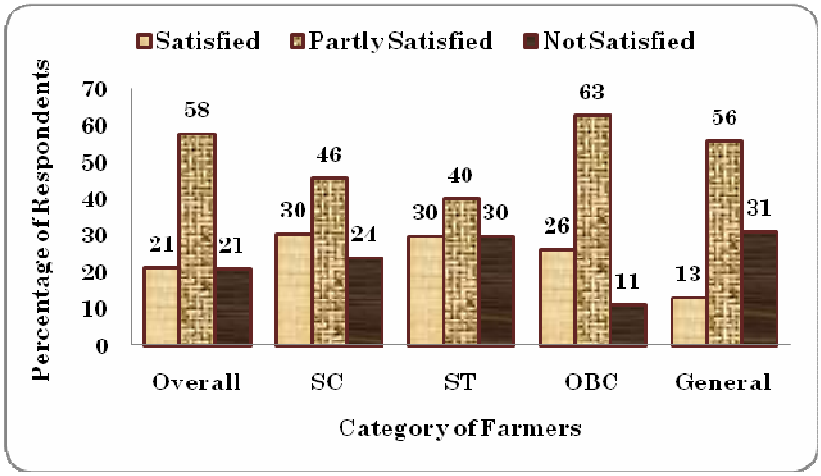
necessitated the development of a farmer beneficiary schedule which could be simple to administer while covering the broad aspects of WBCIS and crop insurance. More than sixteen aspects of WBCIS were included in the farmer beneficiary schedule out of which only one aspect pertained to satisfaction about the reliability of weather data. During the pre-test of farmer beneficiary schedule, it was validated that farmers could respond effectively only to those items which were broad in nature. The question regarding the ownership of settlement weather station, in terms of public (IMD) versus private, was discarded while retaining the question regarding the proximity of settlement weather station from the farmer's insured field. Since proximity of weather station was of considerably higher importance due to underlying basis risk, most farmers took note of this aspect in contrast to their low interest and awareness regarding the entity managing the weather station.

Even during the administration of the farmer schedule, the survey team did not get any specific inputs from farmers which could enable discrimination between IMD and private weather station. The views of other stakeholders (including insurers) regarding weather data services of IMD and private weather stations have been discussed in detail in the main report.

Indications from Farmer Beneficiaries on Effectiveness of WBCIS against Manipulation

The satisfaction of farmer beneficiaries with the effectiveness of WBCIS against manipulation and political risk is illustrated in the following chart. Slightly more than one-fifth (21%) of respondents from the entire sample are not satisfied with the effectiveness of WBCIS to deal with manipulation and political risk. Furthermore, the effectiveness of WBCIS against manipulation and political risk figures at the third place among those 5 aspects of WBCIS (out of a total of 16 aspects) having the lowest percentage of 'not satisfied' responses, as indicated by Reference Chart 1. Therefore the response of farmers strengthens the belief regarding the effectiveness of WBCIS to deal with manipulation and political risks.

Chart 6: Response on Effectiveness of WBCIS against Manipulations



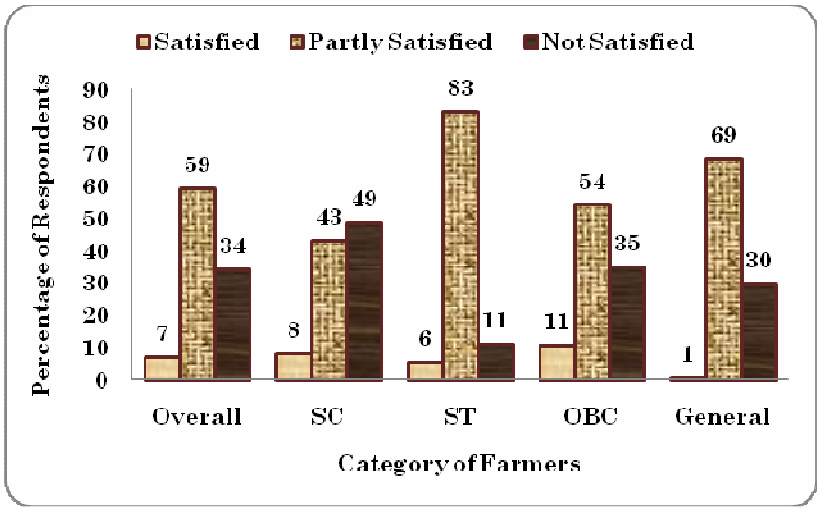
Indications from Other Key Stakeholders on Effectiveness of WBCIS against Manipulation

With weather data being public information, most key stakeholders could not envisage how the payouts under WBCIS may be manipulated to suit the interests of specific constituencies. IMD and even the third-party weather data providers have been able to maintain the authenticity of their weather data remarkably well. As in case of the previous construct, there were isolated instances of dissatisfaction regarding effectiveness of WBCIS against manipulation. These emanated mainly from Government agencies in those states, where low or no significant claims have occurred under WBCIS during their limited experience.

Indications from Farmer Beneficiaries on Explanation of WBCIS Policy

The satisfaction of farmer beneficiaries with the explanation of WBCIS policy at the time of purchase is illustrated in the following chart. Slightly more than one-third (34%) respondents from the entire sample are not satisfied with the explanation offered to them about the working of the WBCIS policy. The lack of proper explanation on policy working may be borne out of either poor customer service orientation or a deliberate intent to conceal. Looking at the other service related aspects of WBCIS, it is more likely that poor customer service orientation may be the reason behind the inability to offer proper explanation on WBCIS policy.

Chart 7: Response on Explanation of WBCIS Policy at Time of Purchase

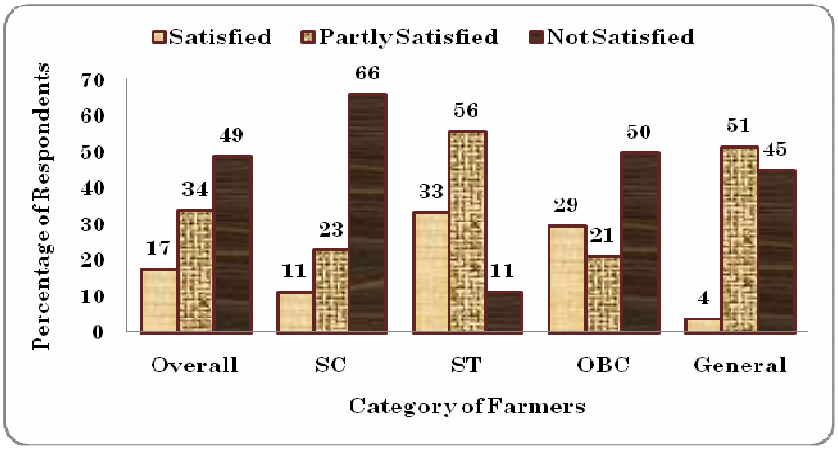


Indications from Farmer Beneficiaries on Resolution of Queries regarding WBCIS

The satisfaction of farmer beneficiaries of WBCIS regarding the resolution of their queries on WBCIS is illustrated in the following chart. Nearly half (49%) of the respondents from the entire sample are not satisfied with the resolution of their queries on WBCIS. There are three main possibilities behind such a high number of 'not satisfied' respondents. The first one

may have taken place if the response offered to the queries of these WBCIS beneficiaries may not have been of the desired quality. The second possibility pertains to the complete or partial lack of mechanisms for the WBCIS beneficiaries to voice their queries and to receive an appropriate response from concerned stakeholders. The third but the most unlikely possibility is of a deliberate attempt to mislead the WBCIS beneficiaries, perhaps due to some unknown motive. The third possibility may impinge on the transparency aspect of WBCIS whereas the first two point out the existing loopholes in the service delivery aspects of WBCIS, which get sidelined due to the treatment of WBCIS currently as a public good, rather than a market offering.

Chart 8: Response on Resolution of Queries regarding WBCIS



6.3Settlement of Claims

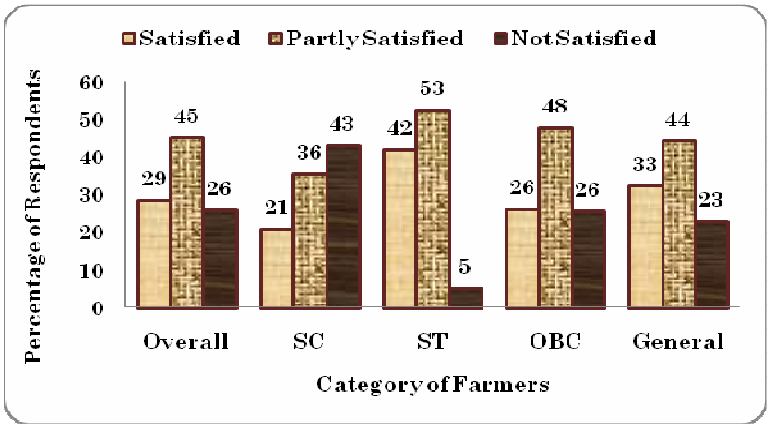
Settlement of claims can refer to both the timeliness and representativeness of claims. Timeliness of claim settlement is an inherent strength of WBCIS as weather data is the only external input required for computation of claims under WBCIS. Representativeness of claims under WBCIS refers to its ability to pay claims when the insured farmer and the other farmers falling under the same weather station suffer a tangible crop loss from adverse weather. Representativeness of claims is a function of the basis risk, weather insurance design and covariance of loss experience.

Indications from Farmer Beneficiaries on Time Delay in Intimation or Receipt of Claims

The satisfaction of farmer beneficiaries of WBCIS regarding the time delay in intimation or receipt of their claims is illustrated in the following chart. Slightly more than one-fourth (26%) of the respondents from the entire sample are not satisfied with the time delay in intimation or receipt of their payouts under WBCIS. Though the level of satisfaction could have been higher on this aspect which is the inherent strength of WBCIS, this aspect does not figure among those 8 aspects of WBCIS (out of a total of 16 aspects) having the highest percentage of 'not satisfied' responses, on the basis on Reference Chart 1. Therefore the concern among farmer beneficiaries regarding the timeliness of claim intimation/settlement

under WBCIS may be regarded as moderate and should be addressed in the medium to long term.

Chart 9: Response on Time Delay in Intimation or Receipt of WBCIS Claims



Analysis of Delays in Claim Settlement

The following table indicates the distribution of farmer-beneficiaries of WBCIS surveyed, who are not satisfied with the time taken for settlement of claims under WBCIS. The proportion of aggrieved respondents is highest in Bihar and lowest in Karnataka.

Table 23: Distribution of Respondents 'Not Satisfied' with Time Taken for Claim Settlement

State	Respondents 'Not Satisfied'	Proportion of Total Respondents
Bihar	124	49.6%
Rajasthan	95	38%
Chhattisgarh	99	39.6%
Karnataka	88	35.2%

Based on the discussions with progressive farmers (10 from each state) and unstructured inputs from the respondents covered during survey, farmers attribute the delay to insurers and the respective state governments. Some of these informants have tried to indirectly link the delays in claim settlement with the intent of the insurer's representatives to extract economic rent for speeding up the transfer of claims to farmers.

Representing the perspective of insurers, state-level officials and key resource persons from insurance companies have attributed the delay in claim settlement to the following causes.

a) Delay in Receipt of Data from Weather Data Providers: This has emerged as the most common and potent reason for delay in claim settlement. Before the advent of weather insurance in India, IMD was the sole entity in India dealing with recording, processing and supply of high-quality weather data. The administrative processes and the operational workflow of IMD could not align well with the need for regular, timely and seamless data sharing with insurers offering weather insurance. Such a gap spawned private, third-party weather data providers who could address the requirements of insurers in a more conducive manner. It would not be an overstatement that most of these private, third-party weather data providers owe their survival and growth to insurers offering weather insurance in India. Insurers could effectively avail the client-oriented functioning of the private, third-party weather data providers to scale up weather insurance in areas where there was absence or inadequate coverage of IMD weather stations. In line with the evolving requirements of insurers who are playing a key role in the weather data services domain of India, IMD has been realigning its workflow to meet these requirements. However, different regions are at different states of development with respect to the weather data infrastructure which can explain the differing levels of delay in receipt of weather data. Rajasthan, Karnataka and Chhattisgarh have seen the introduction of weather insurance earlier than Bihar coupled with the fact that the state of infrastructure in Bihar had to catch up with that in other states of India, including Rajasthan and Karnataka. The increase in penetration and outreach of weather station network can be expected to bring down the delays in claim settlement because of delay in weather data.

b) Delay in Receipt of State Government Share of WBCIS Subsidy towards Premiums: This has also been a major reason for delays in claim settlements. Unless the insurers receive the entire premium, they cannot settle their claim liabilities with farmers. Since the weather insurance portfolio of these insurers is reinsured, the insurers are reconfiguring their processes for improving adherence to norms for reinsurance. In the absence of due cooperation from State Governments in the form of timely release of their share of WBCIS subsidy, the insurers have to hold back the settlement of farmer claims.

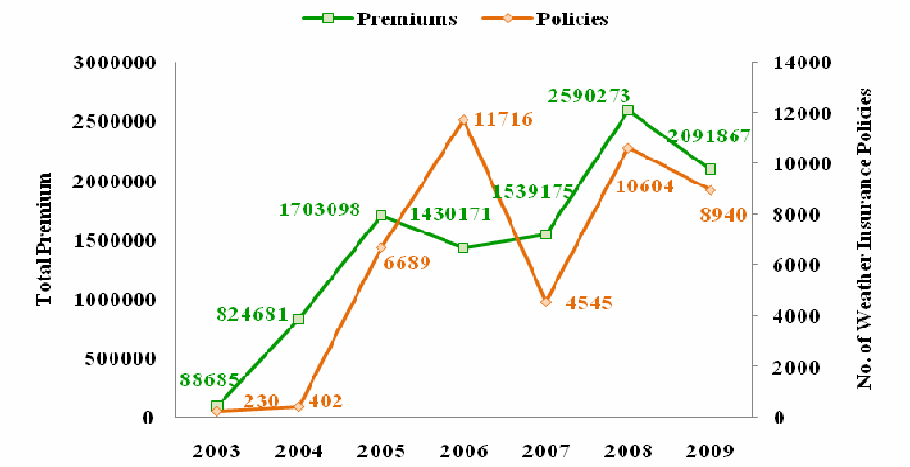
6.4Benefits of WBCIS

WBCIS has transformed the domain of agricultural risk management in India. Before the advent of WBCIS, weather insurance was a promising risk management tool that had created enough buzz to remain a talking point in India for many years to come. However the long-term customer appeal of weather insurance was dicey as farmers could not see a sustainable value proposition in regularly buying this useful but costly risk management instrument. The price-value mismatch had started to pull down the demand of weather insurance, and entities that had been extremely bullish on the positives and growth potential of weather insurance started becoming more realistic, diverting their resources for their more optimal utilization. The search for scale and growth path for weather insurance was becoming more elusive with every passing crop season.

Key Indicators of Weather Insurance Programme of BASIX

The chart below indicates the total premiums collected and the total number of weather insurance policies enrolled through BASIX – the organization which pioneered weather insurance in India. After hitting the peak number of 11,716 weather insurance policies in 2006, the farmer enrollment has been topsy-turvy. The weather insurance portfolio appears to have been beset with difficulties and stagnation as was evident during field interactions. Since 2007-08, there has been no change in the generic weather insurance product marketed by BASIX. This situation has been aggravated due to bad marketing experiences, mistiming of sales activities and insufficiency of products to cover the crop risks.

Chart 10: Key Indicators of Weather Insurance Portfolio for BASIX

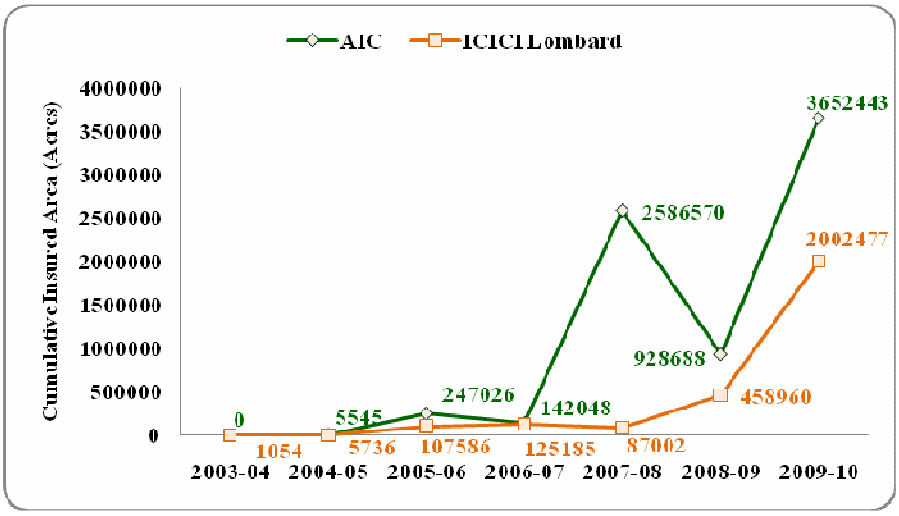


Growth of Weather Insurance Portfolio of AIC[8] and ICICI Lombard (in Area Insured)

It was during the budget of FY 2007-08 that Hon'ble Union Finance Minister laid the foundations for WBCIS by announcing an annual subsidy of INR 100 Crore. The interest of farmers in weather insurance got reinvigorated as a result of the affordable pricing of policies offered under WBCIS. Ever since then, weather insurance has been going from strength to strength in India. For the Kharif 2007 season, it was AIC which got greater impetus from WBCIS. However from Rabi 2007-08 season and thereafter, balance has been restored between AIC – the public sector insurance company, and other private sector companies operating in the weather insurance domain. The following graph depicts the spurt in cumulative insured areas of AIC from 2007-08 and ICICI Lombard from 2008-09 onwards.

[8] Portfolio for AIC in terms of Total Area Insured from 2007-08 onwards has been equated to Total Area Insured by AIC under WBCIS. The area insured under Non-WBCIS portfolio of AIC has been ignored because of lack of reliable data. For 2009-10, Total Area Insured by AIC under WBCIS during Kharif 2009 season has been taken as the Total Area Insured by AIC for the entire year.

Chart 11: Area Insured by Top 2 Insurers under Weather Insurance (in Acres)

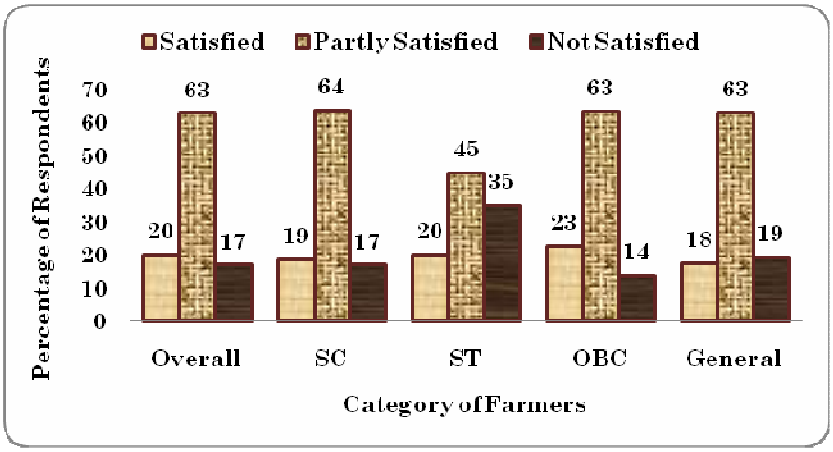


Indications from Farmer Beneficiaries on Effectiveness of WBCIS as a Protection Tool against Crop Losses & Climate Change Effects

The satisfaction of farmer beneficiaries of WBCIS on the effectiveness of WBCIS as a protection tool against crop losses and climate change effects is indicated below.

Slightly more than one-sixth (17%) of the respondents from the entire sample are not satisfied with the effectiveness of WBCIS as a protection tool against crop losses and climate change effects. This aspect of WBCIS figures at the second place among those 5 aspects of WBCIS (out of a total of 16 aspects) that got the lowest percentage of 'not satisfied' responses (Reference Chart 1).

Chart 12: Response on Usefulness of WBCIS against Crop Losses



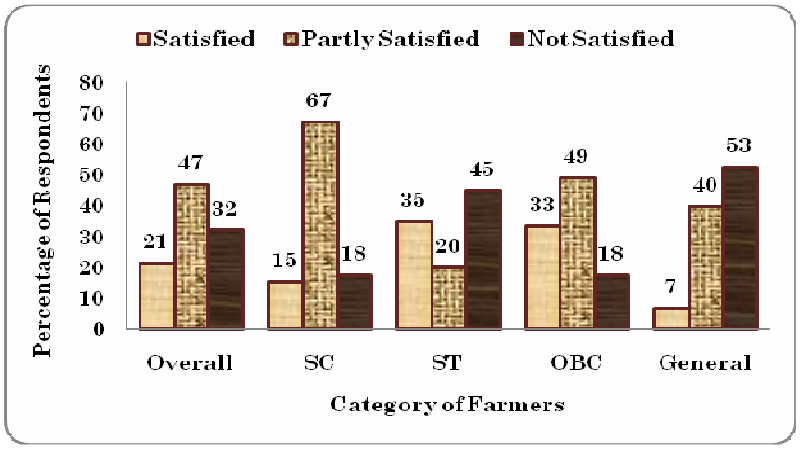
Indications from Farmer Beneficiaries on Usefulness of WBCIS as an Alternative to NAIS

The satisfaction of farmer beneficiaries on the usefulness of WBCIS as an alternative to NAIS is illustrated in the following chart. Slightly less than one-third (32%) of the respondents from the entire sample are not satisfied with the usefulness of WBCIS as an alternative to NAIS.

Indications from Other Key Stakeholders on Usefulness of WBCIS as an Alternative to NAIS

Most key stakeholders with a fair understanding of both WBCIS and NAIS have acknowledged the fact that both have some unique advantages and unique limitations. Since neither of these two types of crop insurance can singularly address the diverse production risk management of Indian farmers, it would be better to allow both of them as independent, standalone types. A more detailed discussion on whether and how NAIS and WBCIS can coexist and flourish is presented in the later sections of this chapter.

Chart 13: Response on Usefulness of WBCIS as an Alternative to NAIS



6.4.6 Claim Benefits of WBCIS

The true test of an insurance contract is its ability to pay claims when the insured has suffered losses under the insured perils. As farm-level or farmer-level production losses in India are unavailable in documented form, proxy indicators like percentage of total insured farmers benefited or claims ratio under WBCIS can serve as useful yardsticks for assessing the ability of WBCIS to benefit the insured farmers. The following charts depict these proxy indicators to give an estimate of the claim benefits provided by the three insurance companies participating in WBCIS. Over the first five seasons of its WBCIS experience, AIC has been able to provide claim benefit to nearly 62% (cumulative across all seasons) of the farmers insured by it. The overall claims ratio of AIC is nearly 77% which indicates that out of every 100 rupees of premium received by it, it has paid out an average of 77 rupees across

the six seasons of its WBCIS coverage. The corresponding percentage of farmers benefited for ICICI Lombard is 41% while its overall claim ratio during five seasons of its WBCIS participation has been 60%.

Of the six seasons of WBCIS coverage, including Rabi 2009-10, the one season where the ability of weather insurance to pay claims faced its toughest test was the Kharif 2009 season. This season was claimed to be the worst in the last 27 years and had widespread impact across India. Western India, particularly Rajasthan, suffered badly from drought and had to look upon relief from State and Central governments. Rajasthan, coincidentally, has been one of the foremost states in adoption of WBCIS. The claim ratios of the leading insurers, AIC and ICICI Lombard for Rajasthan during the Kharif 2009 season were 98% and 34% respectively. Except the conspicuous Kharif season, ICICI Lombard has fared well in terms of claims payment. Its claim ratio for the latest Rabi 2009-10 is 66% compared to 82% (approx) for AIC.

Chart 14: Percentage of Farmers Benefitted through Claims under WBCIS

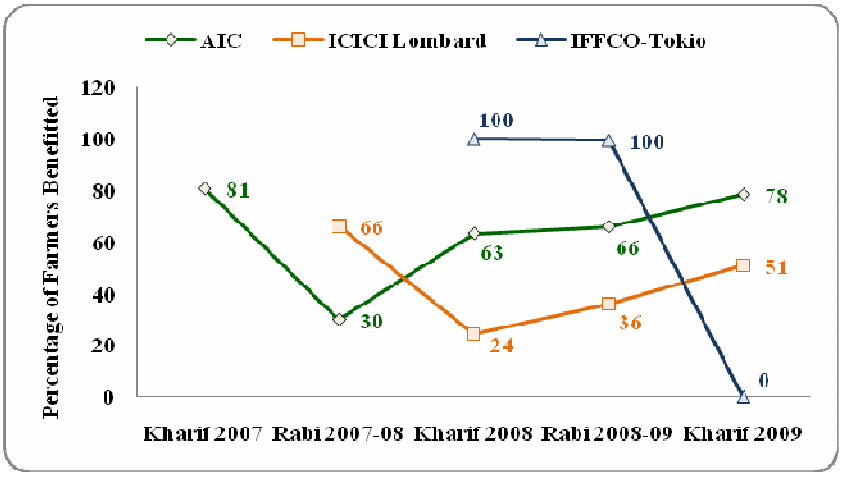
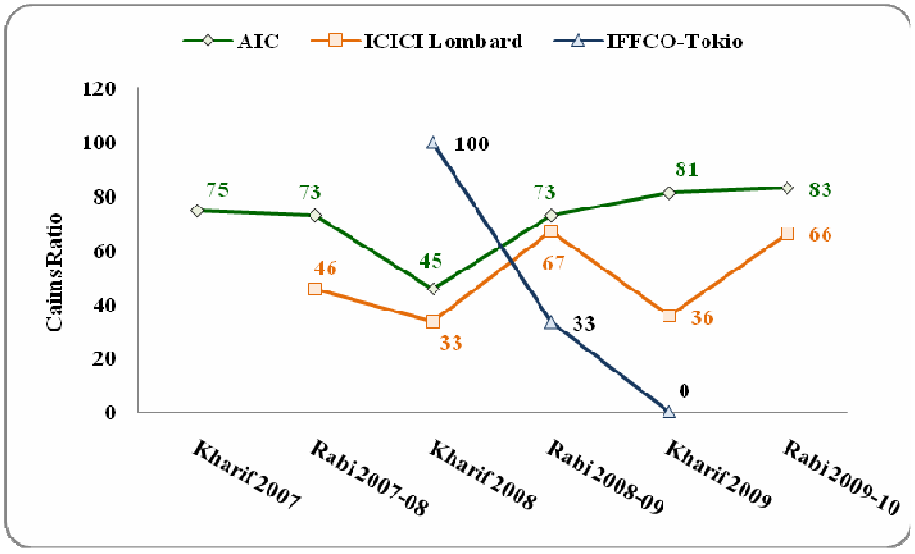


Chart 15: Claims Ratio under WBCIS



6.5Weather Station Infrastructure for WBCIS

The location of weather station has the greatest bearing on the basis risk in a weather insurance contract once the key parameters of the contract have been set. The location of weather insurance has the potential of turning weather insurance - basically a loss compensation instrument, into a lottery. On the question of what should be the ideal radius for coverage of rainfall, the responses have been wide-ranging, from 25 km to 5 km. These numbers can be regarded as guesstimates, moderated by the pulls of demand and constrained by the limitations of supply. However there seems to be a growing unison among key stakeholders that coverage under rainfall insurance should not be offered to a farm located at a radial distance of more than 10 km from a weather station. Starting from this heuristic value, there should be efforts to systematically bring this down to 5 km within a couple of years through better planning and guided enforcement. Since both Kharif and Rabi seasons would essentially use the same infrastructure for weather data, the heuristic radial distance for rainfall insurance would, in turn, become the guiding value for weather insurance based on temperature indices.

WBCIS has been successful in galvanizing insurers to look beyond the existing network of weather stations and work out pragmatic ways to meet the weather insurance demand, from wherever it had been emanating. The receptivity and the problem-solving orientation of insurers has been successful in spawning a whole new business class of third-party, private weather data providers.

The remarkable aspect of the flexibility displayed by insurers has been that the key attributes of weather data - reliability and accuracy, were not compromised at any point. Though there may have been some isolated errors, the neutrality and authenticity of third-party, private weather stations have never been in doubt. At the same time, the responsiveness, timeliness and representativeness of both weather data and the service providers have improved substantially enabling insurers, in many cases, to periodically track claim status and to compute interim claims much before the date of completion of risk coverage under WBCIS. The quality of the weather data for claim settlement is no more an issue of concern for the insurers and the insured, even when third-party, private weather data providers come into the picture.

The growth momentum in demand for weather insurance, triggered by WBCIS, has actuated the quest for achieving international standards in weather data services. IMD, the fountainhead of technical expertise on meteorology, has also responded keenly to the demand for new weather stations which work on state-of-the-art technology. During the period 2008-2010, IMD planned to set up more than 500 new automatic weather stations (including automatic rain gauges). ISRO, the apex institution in India for space research, has collaborated with IMD for installation of another 1000 AWS across India.

In the midst of competition for installation of new weather stations to serve weather insurance in India, the growth plans of all the weather data providers have to be harmonized

to tap synergies, reduce redundancies and minimize gaps in coverage. Data supply for weather insurance is likely to be the main revenue stream for most of these weather data providers before other revenue streams like sale of historical weather data for industrial/business research and other value-added services become potent. Unlike telecom sector which is seeing a rapid proliferation of network and service providers, it is difficult to envisage a scenario when weather data or services based on weather data could be sold profitably to an average citizen of India which could help in recovery of investments made towards creating a wide, dense network of weather stations.

6.6Relationship between NAIS and WBCIS

NAIS is a crop insurance which could not translate into conceptual appeal and structured design into fair, widespread, and sustainable value for its designated beneficiaries. As the largest crop insurance programme in the world, it has its share of unique advantages like comprehensive coverage, physical assessment and low physical infrastructure requirements.

Weather insurance is another type of crop insurance which was borne out of the need for objective, transparent, prompt and administratively-simple claim settlement. Right from its successful pilot, it was looked upon as a natural successor or alternative to traditional forms of crop insurance. With the passage of time, the innate limitations of weather insurance have surfaced and have raised serious questions about its ability to replace area yield insurance. Even the naysayers of NAIS have started to realize that weather insurance can be complementary to area-yield insurance, rather than acting as its substitute.

The hopes of the stakeholders in the crop insurance space have now shifted to remote-sensing technologies which is witnessing rapid advancement. Till the time remote-sensing technology becomes so reliable and cost-effective that it can be utilized for loss assessment of existing insurance units, the crop insurance sector in India will go through a transitional phase wherein NAIS and WBCIS can play the role of either complements or alternatives, but not substitutes. The application of remote-sensing for crop yield/loss estimation has shown the promise of rectifying the big malaise of NAIS, which is its loss assessment procedure: sub-optimal, unwieldy and error/risk-prone. Therefore the growth curve of remote-sensing applications will determine the future path of crop insurance in India.

On the question of offering NAIS and WBCIS as alternatives for the farmer-client to choose, there was no clear view. Though some experts who trust the discrimination ability of farmers, were in favour of giving farmers the option to choose their crop insurance type, there were an equal number of practitioners who felt that such an option will inevitably engender confusion, dissatisfaction and mistrust among farmers. Since there are bound to be mismatch in payouts for the same location under the two dissimilar crop insurance schemes, farmers may unintentionally or deliberately exploit this mismatch to demand parity with the more beneficial outcome. In case of unequal payouts from NAIS and WBCIS, either the farmer-clients will press for equal payouts on the pretext of insufficient awareness and

understanding or will turn away from crop insurance with dissatisfaction citing discrepancies/contradictions. The political economy of crucial support from farmers may cause a point of contention or rift between the State and the Centre if farmer dissatisfaction gains sufficient magnitude. Even when farmers will find one type of crop insurance better over the other, it will solely be on the narrow-minded basis of benefits received by them during their period of experience, rather than on the inherent strengths of the given insurance type. Therefore for a technically intricate concept like crop insurance, the aim of achieving a minimum threshold of awareness and understanding among farmers should be held paramount before empowering farmers with the option of choosing between different types of a social good like crop insurance.

After examining the potential pitfalls in offering farmers the option of choosing between NAIS and WBCIS, the possibility of integrating WBCIS with NAIS appears to make better sense with the inputs from various stakeholder groups. All key stakeholders, other than farmers, have acknowledged the unique advantages of WBCIS and NAIS and have supported the continuation of both types till a more optimal type of crop insurance is found. The viewpoints of the various key stakeholders, particularly those with a direct or indirect stake in the outcomes from crop insurance, have been in favour of the crop insurance scheme which has demonstrated better payout ability (more/bigger/widespread payouts) during their experience. Despite this natural preference, most of these stakeholders have also been realistic enough to admit that any one type of crop insurance, either WBCIS or NAIS, is incapable of meeting the expectations of the farmers and the larger community of stakeholders. Therefore, the possibility of integrating WBCIS with NAIS is more plausible in the current scenario. The workable approaches for achieving integration between WBCIS and NAIS are discussed in the next chapter.

6.7Analysis and Cross-Comparison of WBCIS Products Offered by Insurers

The involvement of designated agencies of the State Government in the administration of WBCIS has led to the standardization of WBCIS products, especially after one or two seasons of WBCIS experience in a given state. Though standardization of WBCIS products being offered by various insurers in a particular state is desirable for minimizing information asymmetries and simplifying product communication, it creates disincentives for insurers to undertake improvements in product development for reducing basis risk. Basis risk in weather insurance is not only inherent in the location of reference weather station but it is also a function of the design of the WBCIS product. The specialized nature of product development, the esoteric terminology used in a term sheet, and the concoction of agro-meteorology, statistics and economics within the underlying parameters have the undesirable effect of turning weather insurance into an incomprehensible device.

Two key factors underscore the need for proper evaluation of weather insurance products for rainfall, and consequently, the Kharif season. First, the Indian agricultural production system has been traditionally believed to be more sensitive to rainfall, particularly the rains from South-West monsoons. Owing to the predominantly rain-fed nature of agriculture in India,

mitigation of rainfall-related risks have merited higher priority in the earlier phases of weather insurance in India. Secondly, rainfall is a phenomenon which is observable to the human eye. Any adverse event arising from rainfall can be easily discerned and attributed to the specific adverse event compared to the more subtle and obscure impacts of temperature. The relationships between rainfall events and their corresponding impacts on crop output are better validated and, more importantly, commonly understood, which makes the tasks of appraising rainfall-based weather insurance covers easier.

The majority of WBCIS products employed for rainfall insurance during Kharif season employ predominantly covers of the following 3-4 types:

(i) Phase-wise deficient rainfall cover for insuring volume of rainfall
(ii) Consecutive dry days (CDD) cover for insuring dry spells or rainfall distribution
(iii) Excess/unseasonal rainfall cover for insuring against excessive/unseasonal rainfall

The fundamental designs being employed for capturing production risks arising from adverse weather events can be regarded incongruous with the peril/event being insured through them. For the sake of illustration, let us examine a commonly-used rainfall insurance cover like the Consecutive Dry Days (CDD) cover which aims to insure against drought spells. This cover will indemnify the farmer-subscriber for dry spells if there are 'X' number of consecutive days with daily rainfall on any day lower than 2.5 / 3 / 5 mm (threshold/benchmark values which are used commonly). If there is a rainfall incrementally greater than 2.5 / 3 / 5 mm just 1 or 2 days before 'X' number of consecutive dry days are over, can this meager rainfall be expected to have significance for the crop being exposed to a long drought spell? Furthermore for such small quantum of rainfall as 2.5 / 3 / 5 mm, the probability of lower rainfall received by most farms within the insured area will also be quite high. Covers as this one, reduce the insurance of the farmer to a largely discrete, binary (payout/no payout) outcome which is not representative of the nature of loss experience (continuous variable) in the farmers' fields. Consecutive dry days cover is an extremely useful cover but its definition and operationalisation under weather insurance have largely made it akin to a rainfall lottery.

On similar lines, consider the excess rainfall covers being employed in weather insurance contracts for Kharif season, as part of WBCIS. It is a well-understood concept that heavy and continuous rainfall within a short period of 1/2/3 days can cause damage to most Kharif crops under excessive rainfall peril. Continuous and heavy rainfall for more than 3 consecutive days is a relatively rare phenomenon. The definition of excess rainfall in some Kharif weather insurance covers is so anomalous that they treat a cumulative rainfall of more than 150 mm during a 44 day period as excess rainfall. Even intuitively, rainfall of less than 150 mm within a period of even 3-4 days cannot be regarded as excess rainfall. Such glaring contradictions in definition of weather perils abound in the WBCIS products which require a much critical evaluation before being offered under WBCIS.

Chapter 7

KEY SUGGESTIONS AND AGENDA FOR ACTION

The role of WBCIS in giving a vital impetus to weather insurance in India cannot be overemphasized. During the primary research, respondent entities from various sections of key stakeholders have provided their suggestions for improving outcomes of crop insurance in India.

7.1Suggestions from Key Stakeholders

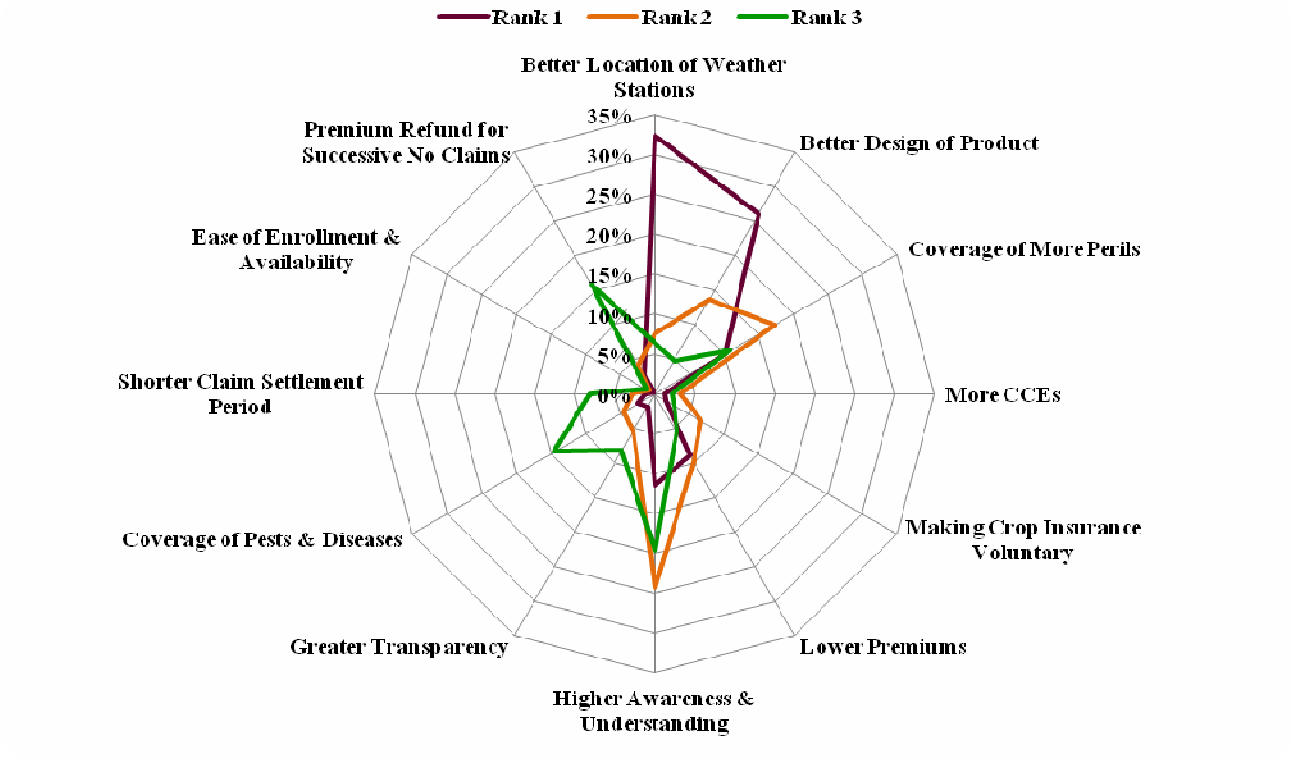
7.1.1 Suggestions from Farmer Beneficiaries of WBCIS

The key suggestions provided by the farmer beneficiaries of WBCIS have been summarized with the help of the following spider chart. During the questionnaire survey, the beneficiary farmers were asked to indicate their three most important suggestions for improvement of crop insurance. The ranking of the suggestions would help in prioritizing the efforts for dovetailing crop insurance with the expectations of the farmers.

REFERENCE CHART 2

The following spider chart indicates the corresponding percentage of farmer beneficiaries who have rooted for a particularly suggestion and placed it among their top 3 suggestions for improvement of crop insurance in India. The respondents have not been segregated on the basis of any characteristic variable. The percentages on the spider chart represent the percentage of respondents from the entire sample of beneficiary farmers of WBCIS from participating states. The aggregate percentage of respondents who have rooted for each suggestion, irrespective of its position within the top 3 ranks, can also be taken as a representative measure of its significance within the wide list of suggestions put forth by farmer beneficiaries of WBCIS.

Though respondents were asked to provide their suggestions for improvement of both NAIS and WBCIS, there is a preponderance of suggestions on various aspects of WBCIS due to the higher emphasis on WBCIS in the earlier sections of the questionnaire. This study also focuses more on understanding the perceptions and experiences of farmers regarding WBCIS. However its relationship with NAIS and the general views of farmers regarding NAIS have also been studied.



From the spider chart above, the 3 suggestions that gained the highest share of responses for the first rank are:

1. Better Location of Weather Station (32%)
2. Better Design of WBCIS Products (26%)
3. Greater Awareness & Understanding of Crop Insurance Working (11%)

Similarly, the 3 suggestions that gained the highest share of responses for the second rank are:

1. Greater Awareness & Understanding of Crop Insurance Working (24%)
2. Coverage of More Weather Parameters or More Perils (17%)
3. Better Design of WBCIS Products (11%)

The 3 suggestions that received the highest share of responses for the third rank are:

1. Greater Awareness & Understanding of Crop Insurance Working (20%)
2. Premium Refund for Successive No Claims (16%)
3. Coverage of Pest & Disease Risks in Weather-based Crop Insurance (15%)

The suggestions that received the highest aggregate (cumulative out of a maximum of 300%) percentage of responses among the top 3 ranks, irrespective of their position within the top 3 ranks, are as following:

1. Greater Awareness & Understanding of Crop Insurance Working (55%)
2. Better Location of Weather Station (46%)
3. Better Design of WBCIS Products (45%)

The above suggestions define the agenda for further work towards bringing crop insurance, particularly WBCIS, in alignment with the expectations of the farmers. The suggestions of farmer beneficiaries, that encompass a spectrum of issues associated with WBCIS, need to be complemented by suggestions from other key stakeholders. The views of subject matter experts, including both academicians and practitioners, endowed with a sagacious, well-rounded understanding of crop insurance can offer insights to address issues that result in sub-optimal outcomes for the crop insurance sector in India.

Main Suggestions for Improving Crop Insurance in India (Integrating Inputs from Farmers and Other Key Stakeholders)

Structural Reconfiguration of Indian Crop Insurance Model

Gaps and weaknesses in the Indian agricultural extension system coupled with the low level of educational attainment and awareness among farmers negate the benefits of a competitive market in terms of the variety of weather insurance products offered by different insurers. In such a setting, the aim should be to offer a competitive market in terms of client (farmer) services which have been decried by almost all stakeholders during primary research.

This calls for a crop insurance model in which a single well-evaluated and fine-tuned standardized crop insurance policy is sold across an entire location with emphasis on differentiation based on client services and product communication by various marketing agencies. The three leading insurers participating in WBCIS have supported a crop insurance model in which the main emphasis is on distribution and service delivery, rather than the product *per se*. The Spanish model and the USA model are the two models of crop insurance that have been indicated by the insurers as the most relevant to the Indian context.

Crop Insurance Model of Spain

Spain has a unique model of crop insurance in terms of both the program and the organizational set-up. The basic feature of the system is that all insurable agricultural risks are covered by the private sector and all types of policies are subsidized by the state.

Participation in the system is voluntary. It is a system in which 'AGROSEGURO' operates, both in its own right and on behalf of the insurers, who make up the co-insurance pool. The system is based on an intricate partnership between the private and the public sector. The key players of the system besides farmers, are ENESA (Entidad Estatal de Seguros Agrarios), attached to the Ministry of Agriculture; AGROSEGURO (Agrupación Española de Entidades Aseguradoras de los Seguros Agrarios Combinados), a pool of forty private insurance companies which participate in a system of co-insurance; CCS (Consorcio de Compensación de Seguros), a public enterprise with its own resources, operating as a re-insurer.

A key feature of the Spanish system is the participatory approach. All stakeholders are represented in ENESA, which enables taking strategic decisions and fixing the framework for the System (annual plans) in line with their needs. For any given year, ENESA takes the lead in publishing the annual plan. On the basis of the framework in the plan, AGROSEGURO fixes the detailed conditions for all insurance products, in particular the differentiated premium rates which vary according to risk exposure and also include administrative and re-insurance costs. Subsidies from the State and Autonomous Regions are paid out by ENESA and channelled through AGROSEGURO to the insurance companies.

Crop Insurance in US

The Federal Crop Insurance Corporation (FCIC) was created in 1938, as a wholly owned Government corporation. It is currently administered by the Risk Management Agency (RMA). The RMA was set-up in 1996, to administer the agricultural insurance programmes and other non insurance-related risk management and education programmes that help support US agriculture. The RMA regulates and promotes insurance programme coverage, sets standard terms – including premium rates – of insurance contracts, ensures contract compliance, and provides premium and operating subsidies.

Crop insurance policies are delivered – sold, serviced, and underwritten by private insurance companies, along with FCIC. Companies that qualify to deliver crop insurance must annually submit plans of operation for approval by FCIC. The plan provides FCIC with information on the ability of a company to pay potential underwriting losses and on the allocation of its crop insurance business to the various risks sharing categories, for the purpose of re-insurance. In addition to re-insurance, the companies are paid a subsidy by FCIC for administrative, operating, and loss adjustment costs. The levels of administrative and operating subsidy and the terms of re-insurance are specified in the Standard Reinsurance Agreement (SRA), which applies to all companies delivering FCIC-reinsured policies.

Private companies share the risk with FCIC by designating their crop insurance policies to risk sharing categories, called reinsurance funds. Companies retain or cede to FCIC portions of premia and associated liability. FCIC assumes all the underwriting risk on the ceded business and various shares of the underwriting risk on the retained business, determined by the particular category and level of losses. Companies can reduce underwriting risk on retained business, through private reinsurance markets.

For the Indian context, the role of AGROSEGURO or RMA can be played by a consortium of insurers participating in WBCIS. The representation of various insurers in the apex-level administrative or technical agency can be based on a mix of indicators that may include business size, experience in crop insurance, technical expertise, process excellence, investment (time, effort and funds) etc. This apex-level agency can be given the responsibility of setting the detailed conditions for all insurance products, in particular the product design and differentiated premium rates which vary according to risk exposure. Subsidies from Government can be channelized through this apex-level agency to the participating insurers. Reinsurance arrangements for the entire portfolio can be negotiated centrally to attract better business terms and to reduce transaction costs.

At the field-level, crop insurance policies may be distributed and serviced by insurers and their marketing agencies. Insurers who intend to participate only in distribution and service delivery of WBCIS may be allowed, entitling them only to marketing commissions or operating subsidies. The insurers participating at the apex-level can contribute as co-insurers or share-holders in the entire crop insurance portfolio. The exact structural configuration of the crop insurance model appropriate for India may be developed through detailed consultations with insurers, subject matter experts and technical agencies.

Universal Coverage of Farmers and Development of Macro-level Indices (Taluka-level Weather Indices) for Catastrophic Insurance

During primary research, universal coverage of farmers under crop insurance has been mooted by many key stakeholders, including insurers. Taking note that weather insurance is at best, a partial cover against covariate income shocks. No agricultural insurance scheme can indemnify full losses experienced by the farmer. An effort, however, should be made to optimize on the coverage of costs of production or getting close to the market value of the produce lost. To ensure minimum coverage for each farmer, catastrophic indices for weather need to be proposed and correlations between the different levels of risk should be validated keeping in view the relatively higher cost of formal insurance vis-à-vis traditional risk management strategies.

Furthermore, non-loanee farmers account for more than 50% of the total farmer base in India in the context of formal sources of credit. Such a huge segment of farmers comprising the non-loanee farmers, who are already devoid of cheaper institutional credit, virtually pays double penalty as they are largely left out of a majority of governmental programs including the crop insurance programme. At present, there are provisions to provide relief to such farmers in case of catastrophic weather events or crop disasters, but the quantum of such relief is largely ad-hoc and limited. In order to protect the non-borrowing farmers from extreme financial distress and provide basic economic security, the Government can introduce ‘Catastrophe Protection’ or ‘Non Insured Crop Loss Assistance’ for farmers, drawing inputs from a similar program in the USA.

Catastrophic Risk Protection (CAT) and

Non Insured Crop Disaster Assistance Program (NAP) in USA

Catastrophe Risk Protection in USA is the lowest level of Multiple Peril Crop Insurance (MPCI) coverage. Premiums for the CAT portion of all crop insurance policies are fully subsidized by the Federal Government , although most farmers will pay an administrative fee for document processing. Farmers with limited resources may be eligible for a waiver of the administrative fee for CAT coverage. Any crop insurance agent can assist producers in determining if they are eligible for a fee waiver.

CAT is a 50/55 coverage, meaning the losses exceeding 50% are payable @ 55%. In other words, in the event of 100% of loss, CAT cover pays a maximum of 27.5% loss to the farmer (55% of 50% loss).

NAP covers crops not insurable under typical crop insurance programs. These can be any crops, including those for feed, in any county where at least catastrophic protection is not available. The program protects against yield losses and prevented plantings due to catastrophic events such as drought, excessive rain, floods, earthquakes, and other adverse natural occurrences. Conditions related to these events such as fires or insect problems are also covered by NAP. Producers, landowners, and tenants with shares are eligible for the program. Protection is offered at the basic unit level.

NAP coverage pays an indemnity if the expected crop yield drops below 50 percent or where the producer is prevented from planting more than 35 percent of the insured acreage. The indemnity payment is calculated by multiplying the approved yield times the amount of production loss covered.

Such protection can also become an effective conduit for channelizing calamity and disaster relief funds from central and state governments. By linking relief funds to Catastrophe Protection or Crop Disaster Assistance, the benefit of such relief can be passed on to the targeted groups with greater efficiencies and transparency.

By developing taluka level weather indices for catastrophic insurance, the move towards more robust systems to mitigate climate change impacts is also ascertained. Catastrophic risks being low probability and high severity events have in principle a lower actuarially fair premium compared to more frequent and moderately severe crop loss events. This topping-up of plain vanilla crop insurance products with low premium catastrophic covers would ensure an excellent risk mitigation alternative to farmers at a higher level of granularity (e.g. at taluka level). As the weather database improves with time, and cheaper channels to deliver WBCIS or weather insurance evolve, the sophistication of climatological modeling could be harnessed to develop even village based covers, which could be envisioned as the ultimate challenge for the frontiers of weather based crop insurance over the medium to long term horizon. Problems of microclimates and basis risk could also be tackled under these layered-risk transfer provisions for a large section of farmers.

Relationship between NAIS and WBCIS and Need for Blended/Composite Products

After examining the potential pitfalls in preferring only type of crop insurance from NAIS and WBCIS, the possibility of integrating WBCIS with NAIS makes better sense based on inputs from various stakeholder groups. All key stakeholders, other than farmers, have acknowledged the unique advantages of WBCIS and NAIS and have supported the continuation of both types till a more optimal type of crop insurance is found. The viewpoints of the various key stakeholders, particularly those with a direct or indirect stake in the outcomes from crop insurance, have been in favour of the crop insurance scheme which has demonstrated better payout ability (more/bigger/widespread payouts) during their experience. Despite this natural preference, most of these stakeholders have also been realistic enough to admit that any one type of crop insurance, either WBCIS or NAIS, is incapable of meeting the expectations of the farmers and the larger community of stakeholders. Therefore, the possibility of integrating WBCIS with NAIS is more plausible in the current scenario.

Till the time remote-sensing based crop loss estimation evolves to reasonable perfection, an interim solution would be to blend the features of the area yield index and weather index. Such blended products, may appeal more to farmers and other stakeholders, as these would incorporate the respective strengths of both NAIS and WBCIS while limiting the undue dependence on any one of them. It may be expedient to promote such blended products, with ideally an equal contribution to the total sum assured. Such blended products may be continued with almost an equal emphasis on area yield index and weather index till an integration of remote-sensing index becomes possible. The area yield index may then be systematically phased out with improvement in reliability and granularity of remote-sensing index.

The hopes of the stakeholders in the crop insurance space have now shifted to remote-sensing technologies which is witnessing rapid advancement. Till the time remote-sensing technology becomes so reliable and cost-effective that it can be utilized for loss assessment of existing insurance units, the crop insurance sector in India will go through a transitional phase wherein NAIS and WBCIS can play the role of either complements or alternatives, but not substitutes. The application of remote-sensing for crop yield/loss estimation has shown the promise of rectifying the big malaise of NAIS, which is its loss assessment procedure: sub-optimal, unwieldy and error/risk-prone. Therefore the growth curve of remote-sensing applications will determine the future path of crop insurance in India.

Coverage of Perils under WBCIS

Coverage of further perils under WBCIS, with the predominant goal of meeting the expectations of farmers and other key stakeholders, must be resisted to the best extent possible. Multiple validation exercises in real-life conditions should be a prerequisite for inclusion of any new peril in a WBCIS policy. Experimental coverage of a peril should be

discriminated unequivocally from coverage of standard perils through proper representation in WBCIS policy. Rationalization of perils must be undertaken *ab initio* to gauge the effectiveness of the coverage of a peril under a given policy. Only perils which can be insured with reasonable representativeness and verifiability must be included. For example, the inclusion of pest and disease incidence under WBCIS must be re-examined thoroughly, as even the senior specialists in eminent research institutions, have expressed doubts about the ability to cover such a peril through a weather index. Ornamental or highly suspect perils should be weeded out from WBCIS policies through a systematic technical evaluation by a committee of suitable experts.

Hydro-Meteorological and Crop Loss Database Development

Data are critical for weather insurance to generate credible results in terms of payouts. The higher the quality of the data, the stronger would be the forecasting capability of the weather insurance models.

Crop loss data are the basis for the development of vulnerability functions to estimate overall risk leading to indemnification. It is recommended that in the future, crop loss data be gathered in a more systematic manner, that losses be recorded by peril and at the highest level of resolution possible. Having high resolution loss data would first improve the robustness of the vulnerability functions as the correlation between weather hazard and crop loss would be more spatially representative. It would also increase the understanding of the spatial distribution of risk and therefore allow for locally specific risk mitigation measures.

Crop loss information (at individual or at an aggregate level) may be fed in by the afflicted farmer customers through the toll-free phone service which can be stored in the centralized loss database. The validation of such losses may be undertaken both through physical verifications and juxtaposition with the corresponding weather or yield data. Development of a centralized loss database for collection of agricultural loss experience of farmers and hazard impact should be initiated. This information is a critical input in the product development process for weather insurance and has considerable bearing on how the product payouts correlate with the actual loss experience. Maintenance and update of centralized loss database can be subsequently managed by a suitable professional agency which would be responsible for collecting and processing information from the farmers and other agencies.

Hydro-meteorological data are the basis for hazard quantification. The more detailed and complete the data, the better the results. In the present for weather/rainfall data is limited to IMD stations and in some cases state govt. data on rainfall parameters only. It is recommended that additional stations be added to obtain a better understanding to the spatial variation of the hazard.

Although the sophistication of the risk assessment methods and tools is a function of the data available, the information derived from these tools quantifies with variable levels of certainty, the following hydro-meteorological parameters:

- Location and extent – is the area affected by one or more hydro-meteorological hazards such as drought, flood, cold waves, heat waves, and cyclones, if yes, then what types of hazard, and where?
- Frequency and probability of occurrence - how often are hazard events likely to occur (in both the short and the long term)?
- Intensity/severity - how severe are the events likely to be (e.g., flood levels; speed of winds and volume/rate of rainfall during hurricanes; magnitude and intensity of an individual hydro-meteorological peril
- Duration - how long will the hazard event last (from a few days or hours in the case of flood and hurricane to months or even years in the case of drought)?
- Probability/predictability - how reliably can we predict when and where events will happen?

Information about the onset speed of a weather hazard event is principally relevant to preparedness and early warning systems but may also have a direct bearing on planning decisions, if sufficient capabilities and capacities are not in place. Therefore, while a set of methods and tools are needed, strengthening capacities for meteorological, hydrological and climate related hazard monitoring, databases and methodologies for crop-weather relationship analysis in support of risk identification, reduction and risk transfer activities is a must.

Implementation of Integrated Data System in India

Improving weather data system for insurers and research community working on agricultural production risk management is the need of the hour. This calls for greater responsiveness from public agencies like IMD to leverage their contribution towards an integrated weather data system for India. In order to materialize the goal of an integrated data system, concerted efforts are required to tap the synergy in weather station installation by various public/private agencies. The current growth of weather station network in India is largely haphazard and devoid of a coordinated approach and integrated planning. Since most of the ongoing growth is driven by expansion in outreach and penetration of WBCIS, it would be in the interest of concerned agencies to take up this issue and work out ways to address it through the involvement and keen participation of key stakeholders.

In order to attain the objective of an integrated data system for India, Public- Private Partnerships (PPP) and integrated planning at the national level should be promoted. These

centralized efforts have to be followed by decentralized implementation in identified locations across the country.

Lack of adequate and reliable weather and crop loss data is considered to be a major constraint in developing an accurate understanding of the current and future crop production loss variability. Often the data collected are stored in various formats ranging from log book to spreadsheets to telemetry systems. Development of integrated data management systems will provide an effective basis not only for storing and analyzing data like rainfall and flow data but also for disseminating such information. As experienced today, not all records, be they meteorological observations or crop loss data, are available in electronic format. Such information collected and stored in one central place would form a core element of knowledge and information for planning purposes. The need for such an integrated data management system to capture historical records for complete and safe long term storage is reinforced by the increase use of crop growth and hydro-meteorological models to quantify risk and develop climate risk management policies in years to follow.

The requirements for a high-density weather station network are not uniform across the country. These are influenced considerably by the exposure of crop yields to weather-borne risks, presence of microclimates, spatial distribution of landholdings and demand for crop insurance. Based on above factors, the 600+ districts of India can be categorized in terms of high-priority, medium-priority and low-priority for implementation of a high-density weather station network. The need for high-density weather station network is more pertinent to locations frequently exposed to deficient/low rainfall/drought conditions. For locations prone to excess/unseasonal rainfall, the density requirement of weather stations is significantly reduced. Taking the average size of a district in India as 5,000 square km and the area covered by a weather-station with 10 km radial coverage as 315 square km, the total number of weather-stations required in a high-priority district would be nearly 16. If we assume that half (50%) of the nearly 625 districts within India fall under the category of high-priority districts, for implementing high-density weather station network, the total requirement of weather stations for these high-priority districts comes to almost 5000 (313*16) weather stations. Considering the recent growth in automatic weather stations, it would be reasonable to expect that nearly 1000 weather stations would be currently operational in these 313 districts. Therefore the immediate demand of weather stations is around 4000 weather stations. This translates into an investment requirement of nearly INR 40 Crore, presuming the cost of a reliable, basic, automatic weather station to be INR 1 lakh.

Based on our interaction with the subject matter experts and important stakeholders in the weather-based crop insurance sector, it is imperative to conduct a series of joint workshops which are inter-disciplinary in nature with a mandate of estimating investment requirements and developing a systematic approach for achieving optimal station density (15-20 weather stations per district of nearly 5 thousand sq km area).

Benchmarking of Weather Insurance Products

By their very nature, weather insurance products are difficult to comprehend for a typical Indian farmer who is equipped with limited capacities and experience. The multitude of weather insurance products offered by various weather insurance providers necessitates the need for benchmarking the various products to enable the farmer to make an informed choice. Through benchmarking it may be ascertained whether the products offered by the different insurance companies carry at least comparable benefits (Protection vis-à-vis Premium). The complex weather insurance products may be disintegrated into the constituent covers for different perils.

Approach for Benchmarking of Weather Insurance Contracts

Start Day of Contract: Most field crops, which are of strategic importance to the food security of our economy, need to be sown by farmers in their respective growing season. Sowing dates have a proven and significant influence on the occurrence of subsequent crop stages and their durations. For the Kharif season, the sowing date is a function of sowing rainfall which varies from location to location. There are two ways in which the dynamic sowing date (varying from location to location and year to year) can be built into the weather insurance contract. One way is to incorporate the specific triggers which reflect the ideal conditions for sowing, into a weather insurance contract. Suppose for groundnut in Gujarat, the ideal condition for sowing is more than 60 mm rainfall in 2-3 consecutive days. The date of sowing event can be identified from the weather data which may later be validated from local officials from agriculture department. The dates of subsequent crop stages can be made dependent on this sowing cover, included in the weather insurance contract. Another way is to offer weather insurance contracts in a location after the completion of the sowing event in that location. A basket of weather insurance contracts can be offered to farmer-customers, in which the dates of constituent covers have start dates and durations, corresponding to the specific sowing date of that farmer-customer. Implementation of the latter approach would require the development of software applications for automation of weather insurance product design/structuring.

Commencement Dates & Durations of Key Stages: Based on the sowing dates and specific agronomic information, the commencement dates and durations of key stages have to be identified. The concept of dynamic dates and durations of different covers, based on the difference in sowing dates, has not been incorporated in any of the weather insurance products being currently sold under WBCIS.

Weather Perils and Parameters of Significance for Key Stages: After finalization of commencement dates and durations of key crop stages, it is necessary to enlist the set of perils of significance which can adversely affect the productivity under a given crop stage. The perils can be segregated into endogenous (internal/controllable) or exogenous (external/uncontrollable) for inclusion under crop insurance policy. For exogenous risks, the causative weather conditions have to be specified in terms of the key weather parameters.

Since all the weather parameters do not have adequate historical database, it will be important to isolate only those perils whose dependence on weather parameters (with long time series of historical data) is well-established and practically validated. It is to be noted that the strength of relationship of the particular weather parameter with a given peril has to pass stringent tests of scientific rigour and has to be backed by institutions with highest levels of expertise in the given crop or domain.

Period of Time for Consideration of each Relevant Weather Parameter: After identification of specific weather perils for inclusion in weather insurance contract, the period of time for consideration of the relevant parameters has to be meticulously chosen. In case of deficient rainfall, the period of consideration may be upwards of 7 days. In most WBCIS contracts, the period of consideration of rainfall under deficient rainfall volume cover is one month or more. With improvement in product design and customer understanding, this level may be brought down to weekly level. For more demanding customers, the switch towards 20/14/10 days of period of consideration for rainfall may be initiated to provide impetus to improvement of WBCIS products. Likewise, in case of excess rainfall, the maximum allowable period of consideration may be 4/5 days with daily, two-day or three-day cumulative rainfall set as triggers/strikes for payout. The period of consideration for temperature parameter, more pertinent for Rabi crops, has greater uncertainty and possibility of error. This is borne out of the relatively less availability of rigorous scientific evidence for weather-related losses in Rabi crops. The information currently available in India for Rabi crops may be sufficient for most research studies but may not suffice the stringent requirement for settling a weather insurance contract. Therefore, greater attention has to be accorded to improvement of weather insurance for Kharif crops before moving on to Rabi crops.

Relative Significance/Weight for Each Period of Consideration or Peril: The occurrence of weather peril may cause different economic impact (loss) in different periods of consideration for a peril. For example, deficient rainfall in the 3rd week of September cause different degree of loss compared to deficient rainfall in 4th week of September. In order to differentiate between or provide relative significance to various periods under a given cover, weights or multiplying factors are given to such periods.

Design of Weather Index: A weather index is essentially a function which expresses the economic variables (revenue/income/yield) in terms of weather parameters. Values of a weather index for crop insurance represent different levels of crop productivity and thus indicate the economic manifestation of weather parameters (in terms of yields). Examples of some weather indices are as follows:

Heating Degree Days: One of the first indices developed and still among the most popular ones, is the Heating Degree Day (HDD) index. The idea of structuring a HDD index came about in order to correlate revenue fluctuations and temperature. Analysis of the relationships between temperature and demand for heating in the US showed that the

threshold of 65 degree F was the turning point for increase in energy demand for heating. Based on such a threshold, the number of heating degrees per day is given by

$$HDD = \max [0; 65°\text{-}T],$$

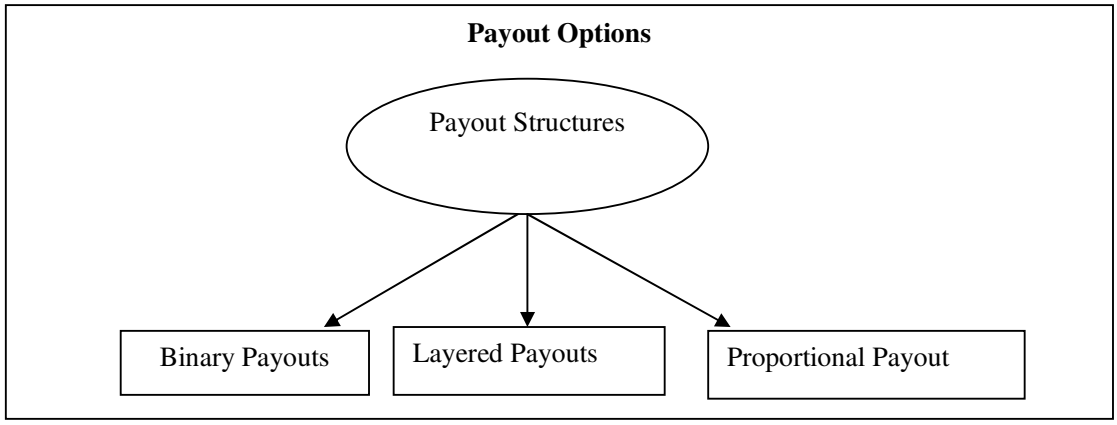
Where T is the average of the high and low temperatures of the day

Selyaninov Hydrothermal Ratio Index[9]*:* SHR is as an index used to monitor the impact of air drought on winter wheat crop yields in Ukraine

$$SHR = \sum_{15\,April\text{-}June} Daily\ Rainfall \Big/ \left(0.1 \times \sum_{15\,April\text{-}June} Average\ Daily\ Temperature\right)$$

Caps/Floors/Triggers/Strikes/Threshold Values for Specific Weather Parameter: These values can be deemed to be the most critical parameters for a weather insurance contract. The interplay of these values with the indemnity payment rates (or notional) control a trade-off between the protection level inherent in a weather insurance contract and the corresponding price (manifest a premium) for the given protection level. It is during the process of setting the caps/floors/triggers/strikes and the indemnity payment rates (or notional) that the greatest dilution takes place in a weather insurance contract, in terms of the protection offered by it.

Indemnity Payment Rates/ Payout Structure: Indemnity payment rates determine the quantum of indemnity to be paid out at different values of index under a weather insurance contract. Indemnity payout structures for weather insurance can be of the following types.



The graph of the indemnity payout structure is a vital tool for understanding how the sum assured for a weather insurance contract is distributed across the entire spectrum of the

[9] Source: 'Managing Agricultural Production Risk' published in 2005 by The World Bank

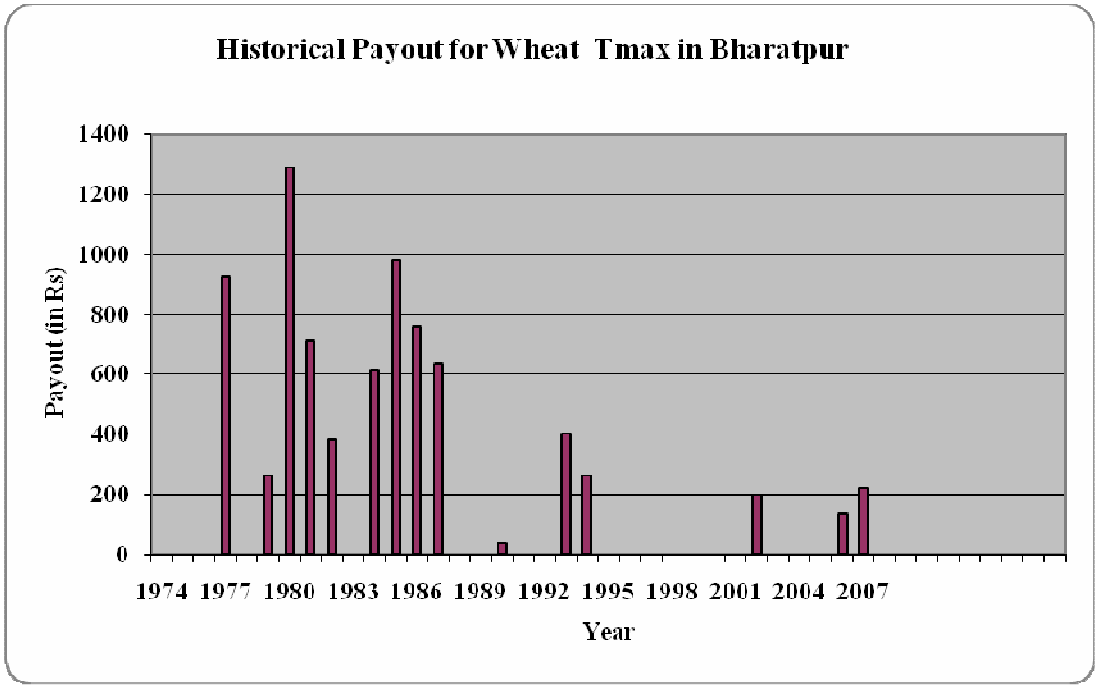
weather index. The curvature or flatness of a payout structure gives a quick indication of the lumped or well-distributed nature of indemnity for a weather insurance contract.

Historical Payout Distribution: It is the year-wise distribution of claims as simulated for all historical years, considered for the structuring of a weather insurance and computation of pure risk premium through burning cost method. The graph of historical payout distribution when viewed in conjunction with the term sheet of a weather insurance contract provides an instant snapshot of the payout frequency, level of loading and protection level. It is one of the most comprehensive tools for evaluation of a weather insurance contract. A sample historical payout distribution graph for maximum temperature peril for wheat crop in Bharatpur is given below for illustration. The term sheet for the same weather insurance precedes the graph.

Term sheet for Tmax Weather Insurance Cover for Wheat in Bharatpur

Cover Phase, From	**1-Jan-09**
To	**31-Mar-09**
Strike (HDD)	0
Exit (HDD)	10
Standard Loss Rate between strike and exit i.e. Notional (Rs / HDD)	600
Policy Limit (Rs)	6000

Historical Payout Distribution Graph for Preceding Term sheet



Maximum Sum Assured / Policy Limit: The term 'total sum assured/policy limit' in weather insurance contract may be deemed anomalous in the sense that even when a farmer has lost the entire crop during a particular stage, the compensation accruing to that farmer under the policy may not be the maximum sum assured/policy limit for the given weather insurance contract. The consequent indemnity may only be a fraction of the maximum sum assured under the weather insurance policy bought by the farmer. The maximum probable loss denotes the highest cumulative payout simulated historically from a weather insurance contract. The quantitative difference between maximum sum assured and maximum probable loss for a weather insurance contract represents a theoretical gap between the maximum payout committed by that contract and the actual payout that could be expected from that contract even in considerably adverse years.

Juxtaposing the above Table and Chart from the preceding point 9, we can easily see that the maximum probable loss for the given weather insurance contract is Rs 1300 (approx) whereas the maximum sum assured or policy limit is Rs 6000. In the more than 30 years of historical simulation of the given weather insurance contract, the highest payout receivable to a farmer would have been nearly Rs 1300 whereas the policy limit is Rs 6000. Such contradictions undermine the protective value of weather insurance and need to be minimized to the best extent.

Need for Technical Advisory Body on Crop Insurance

As crop insurance built on a scientific platform is being increasingly used as important welfare mechanism with substantial financial support from the Government , it makes sense to create a '**Technical Advisory Body**' **(TAB)** by the Government within the Ministry of Agriculture and Cooperation (GoI) to review the progress of crop insurance schemes on continuous basis and to provide policy directions.

The fundamental mandate of the **'Technical Advisory Body'** would be to approve roll-out of only those weather insurance products under WBCIS which can ensure balance between expectations of the demand side and deliverability of the supply side. The TAB may also take the role of agriculture insurance development agency with technical functions and can work closely with IRDA. The suggestions of insurers and premier research institutions can be invited for identifying such subject matters experts from India who can objectively assess weather insurance products and provide inputs for improving them. Since weather-based crop insurance is a relatively new financial instrument even globally, the possibility of involving international experts (like actuaries, crop-weather simulation experts etc) in such a body may be considered.

To complement the process for improving weather insurance products, medium-term research projects may be commissioned by the Government. As part of these projects, high quality weather data from IMD may be analyzed through inter-disciplinary research exercises involving research institutions, agricultural universities, industry think-tanks which can take up region and crop specific correlation and calibration exercises. The public good nature of

these research outcomes could go a long way in making partial insurance products like index-based weather insurance more popular and gradually affordable.

Improving Financial Literacy and Technical Understanding of Farmers through Context-Specific, Proven Measures

There are substantial challenges in marketing weather insurance and complex agricultural insurance schemes to farmers and rural communities with low literacy and limited financial sophistication. Most marketing agents in the field and even personnel from the insurance company have their own doubts when it comes to the difference between NAIS and WBCIS. As evident from our primary research findings, huge gaps are seen with regard to proper understanding of insurance in general and weather insurance in particular.

Considering the substantial financial outlay on providing crop insurance to farmers, the expenditure on its dissemination and promotion through mass media should, at best, be considered marginal vis-à-vis the annual revenue expenditure on operations and financial support. The awareness-building campaign for crop insurance may be modeled on the lines of the remarkably effective communication and promotional campaign employed for Mahatma Gandhi Rural Employment Guarantee Scheme (alternatively NREGS). The network of institutions falling in the framework of Local Self Governance should also be more effectively utilized for promotion of crop insurance. In order to address the queries and grievances of potential and existing farmer-clients in a personalized manner, the mass-level awareness building efforts could be complemented by toll-free helplines. It may be useful to avail the existing set-up of toll-free facility made available by Agricultural Universities and other extension agencies. Interactive media sensitive to local conditions like street-plays or insurance games should be employed in areas of more focused sales activity in order to simplify the insurance mechanism and to make the potential adopters more comfortable with complex insurance products.

Improvement in Service Delivery Aspects of Crop Insurance

One aspect of WBCIS and weather insurance schemes in India that frequently came out from our focus group discussions (FGDs), field surveys and interaction with intermediaries and experts is the need for improvement in service delivery. Both pre and post policy sales period service holds the key to customer satisfaction as in any other product. If the farmers believe that they are valued by the insurers as well as by the intermediaries, their trust in the weather insurance being marketed also goes up. Studies with farmers of SEWA in Gujarat and BASIX in Andhra Pradesh (Cole et al 2009, Gine et al 2008) provide quantitative evidence on the role of trust and service delivery aspects in making weather insurance work for the Indian farmers.

Value added services like periodic dissemination of weather index data and claims situation could go a long way in improving the popularity of the products marketed. Use of SMS based

weather data dissemination to progressive farmers or influential farming groups in the social network of the farming community or complimentary services like pre sowing weather forecasts could be provided at extremely low costs while the corresponding returns from these minimal investments by the suppliers could more than proportionately increase the returns over the long run. Input dealers and field extension agents could be incentivized to hand hold the clients in the early days of being introduced to weather insurance policies which would create a conducive environment for a fast and educated growth of an important risk management strategy like weather based crop insurance. Discount schemes on premium discounts for next season or lottery draws with modest gifts could be used as a marketing strategy to influence farmers to purchase multiple policies of rainfall insurance (based on their risk appetite and ability to pay) as most of the voluntary purchased are confined to single unit purchases.

Physical Individual/Area Assessment of Non-Indexable/Localized (Hail/Frost/Wind) Losses (under both WBCIS and NAIS)

NAIS presently provides for individual assessment of losses in case of localized risks, viz. hailstorm, landslide and flooding, on an experimental basis. Farmers feel the experiment is not adequate, and it should be implemented on a full scale, covering all areas. Earlier Government reviews have supported the view that the localized calamities should be assessed on an 'individual' basis in all the areas. But it should be reiterated that historical data and past claims play a role in determining the premiums and damage assessment continues to be the biggest challenge for crop insurers. Crops at different stages are affected differently by hail/frost/wind making knowledge of losses arising out of these essential for insurers. The practice of physical individual/area assessment of losses from non-indexable/localized perils (Hail/Frost/Wind) must be extended to the entire coverage of NAIS and WBCIS.

A tentative suggestion for testing avenues to attain this integration could be by way of a '*Complete Insurance Model Village'* pilot as mooted by AICIL and to be realized in association with a consortium comprising organizations like NABARD, development agencies of Gujarat, third-party weather data providers and research institutions. A cluster of contiguous villages could be taken up and laden with the adequate weather infrastructure as well as physical yield assessment trials and then compared to some control clusters to see the effectiveness of this integration and how a possible sharing of the cost of covering different layers of risks as discussed earlier could be developed. Farmers' feedback should be timely and appropriately factored in while developing such an integration framework and the findings from the experiments should be stress-tested over a few seasons before coming out with prescriptive ways to scale up the model.

Making Crop Insurance Mandatory for Contract Farming Initiatives

With an increasing focus and participation of private sector entities across the entire agricultural value chain, the role of quality-oriented agricultural production is also gaining impetus through an increasing number of contract farming initiatives.

It is a known fact that the economic exposure to uncontrollable risks is significantly higher for a farmer participating in contract farming initiative than his peers on account of the higher investments by the former for crop inputs, technology and quality control. In order to safeguard the interest of farmers participating in contract farming and to promote trials/adoption by other farmers through demonstration effect, crop insurance needs to be given the status of a mandatory input under contract farming initiatives. The responsibility of arranging crop insurance from suitable insurers can lie with the contract farming sponsor or aggregator. Taking into account the diverse nature of crops covered under contract farming, it is essential to give thrust to new product development by insurers to cater to demand by contract farming sponsors.

Promoting Collective-based Models of Crop Insurance

Self-help groups (SHGs) for rural women are one of those few programmes that have endured and given good results. Their achievements have been impressive in mobilising the potential for savings and thrift even among the poorest of the poor. They have helped in delivering bank credit to the poor and in inculcating the habit of timely repayment of bank loans.

With the outreach and penetration of self-help groups (SHGs) and other interest-based collectives spreading deep into the rural hinterlands of India, there are enormous opportunities to leverage these SHGs and other interest-based collectives for increasing the patronage and reach of crop insurance in India. The utilization of SHGs and other interest-based collectives as a vehicle for sales, distribution and post-sales service delivery is going to be a win-win proposition as it can reduce the typical insurance problems of moral hazard, high administrative and transaction costs, lack of customer feedback and poor post sales service delivery. All such advantages associated with merit focused pilot projects to assess the effectiveness of SHGs and other interest-based collectives in crop insurance promotion, administration and service delivery. The selection of the SHGs and other interest-based collectives or the location for such pilot projects should take due consideration of the wide differences in the institutional strengths and operational efficiencies across SHGs and other interest-based collectives.

Two potential models on the lines of which crop insurance programmes based on SHG and other interest-based collectives may be tried out in India are summarized in the following boxes:

SHG-based Model of Crop Insurance by Prof V.M. Rao

Rao V.M. suggests an SHG-type model of insurance for farmers in order to set up a simple and feasible arrangement for insuring their enterprises against risk and uncertainty caused by weather. While an SHG-type model would not be adequate by itself to protect the farmer from the hazards of his occupation, it could be of help as a base and an initial framework for developing an insurance system to meet the requirements of modernized agriculture. He suggests that the guaranteed yield would be fixed at village level on the basis of simple average of five years. Farmers participating in the programme can choose the number of units of insurance based on how much he / she is willing to pay as premium. Claims would be paid on 'area approach' at village level and the aggregate payout is decided on the basis of actual sample yield estimated during the current season and the aggregate value of sum insured. The claim is distributed in the proportion of the number of units of insurance bought. If the accumulated premium fund available in a year is less than the total amount of compensation to be paid, the lower amount will be used to calculate the amount of compensation to be paid per unit of premium per acre. In the event of a lack of agreement among the farmer members about the status of the activity in a deficit year, an expert can be asked to estimate the degree of the loss in that year.

Rao also suggests a variant of the above model, in which the Government / NGO/ funding agency that sponsors the programme will contribute to the premium fund of the community. Each year this contribution can be a fixed percentage of the total amount of premium collected by the community in that year and will be paid to the community at the end of the year. This can serve as an incentive for the community to start operating the insurance programme and augment the funds available for the payment of compensation during deficit years. The administrative costs, which in any case would be meager, can be paid out from the premium fund.

Rao rightly believes that a valuable by-product of the SHG model of insurance will be the data base on farmer-wise acreage, output and income of different crop and non-crop activities in the community over a period of years. The community itself can learn to monitor these data carefully to improve their capacity to cope with the risks inherent in their occupation. It could also open up new vistas for analyses of the farm economy and weather and market fluctuations by researchers and policy-makers. Further, insurance companies will find the database invaluable for developing new insurance products for farmers. Thus, the SHG model for farmer insurance could trigger innovative developments within the rural communities, including individual farm based insurance.

Mutual Crop Insurance by People's Mutuals of Dhan Foundation

Mutual Crop Income Insurance (MCII) for groundnut crop was piloted in Nattarampalli, a block in Vellore district of Tamil Nadu, India through support of DHAN Foundation. After three years of experience of deficit rainfall insurance, the technical constraints in designing a product that fully reflects the relationship between crop performance and rainfall forced the participants to discontinue rainfall insurance. The search for an alternative insurance mechanism brought them to Eureko Re, a Dutch reinsurance company which offered its support to mutuality based crop income insurance.

Under MCII, farmers are indemnified based on actual losses, with loss assessment and price monitoring done by older and wiser farmers. As participating farmers are already organized into various collectives, the necessary social capital for piloting Mutual Crop Insurance (MCI) is already in existence. The covariant nature of rainfed agriculture, which makes it difficult to insure, was addressed through pooling of risks of diverse collectives, each with different risk profile. Further this pilot has become feasible due to training and reinsurance support by People Mutuals, technical support given by Mutual Insurance Association of Netherlands (MIAN) and financial support and back up guarantee support given by Eureko Re.

To design the MCII product, the data on past experience of rainfed groundnut cultivation in Nattarampalli was collected from a group of farmers. This included frequency, levels and causes of loss, variations across the location and cost of cultivation. The preliminary product was discussed in detail with the Mutual Insurance Committee (MIC) which customized it in terms of sum insured and premium per acre. It was decided to go for the groundnut mutual income insurance policy with Rs. 2000 as sum insured and Rs. 500 as premium per acre. The design of the product was such that cost of cultivation was considered as the bench mark for compensation and not the expected income, to make the product affordable to farmers.

Moral hazard risk was addressed by introducing retention, requiring farmers to pay a pre-determined percentage of their loss themselves. The insured farmers own the mutual pool and thus critically assess the farmers accepted as members of the insurance pool. This environment of social control and familiarity of colleague farmers with production circumstances have resulted in avoiding farms that repeatedly face loss, thereby addressing adverse selection. Last year, a total area of 74.1 acres belonging to 190 farmers was insured with the total premium and total sum insured being INR 37,065 and INR 148,260 respectively. Out of the 190 insured, 64 farmers received compensation amounting to INR 21, 250. Piloting MCII has resulted in rich learning on designing and implementing mutual crop insurance and on various aspects of groundnut cultivation in Nattarampalli.

Legal and Regulatory Improvements

The continued imposition of service tax on weather insurance policies is startling considering that other forms of insurance targeted at similar socio-economic segments have been exempted from service tax. Service tax on weather insurance policies sold to farmers must be waived reinforcing its utility as a social good.

The definition of insurable interest must be widened by AIC to include agricultural labourers in its service net. The income of these workers depends considerably on rainfall. Initially such coverage of agricultural labourers under WBCIS may be channelized through reliable intermediaries and can be scaled up after successful trials

Due to the structure of WBCIS, it becomes difficult for insurers to meet the stipulated regulatory provision under Section 64 VB of the Insurance Act, 1938. Either the structure of WBCIS or the concerned regulatory provision has to be modified suitably to ensure proper compliance by insurers.

The ceilings on actuarial premiums and premium subsidy have to be hiked up for providing satisfactory coverage to cultivators in areas prone to high and frequent risk exposure. In order to incentivize the insurance intermediaries for serving their farmer-clients better, their commission may be computed on a value much higher than the subsidized premium being paid by a farmer insured under WBCIS. According to some key intermediaries, the commissions for a WBCIS policy are relatively small to demand substantial efforts in marketing and service delivery.

The maximum probable loss denotes the highest cumulative payout (sum of payouts of all constituent covers) among all the cumulative payouts simulated historically from a weather insurance contract. The quantitative difference between maximum sum assured and maximum probable loss for a weather insurance contract represents a theoretical gap between the maximum payout committed by that contract and the actual payout that could be expected from that contract even in considerably adverse years. In order to improve the representativeness and verifiability of WBCIS products, the quantum of maximum sum assured should be made equal to the maximum probable loss under that policy. In order to facilitate farmer-clients and other key stakeholders to choose their WBCIS policy more effectively and enhance transparency, insurers should provide historical payout distribution table/chart for the given weather insurance contract for all years considered for structuring that contract.

Other Suggestions

Some other aspects of making WBCIS work for Indian farming communities is the need to understand the stabilizing effects of WBCIS with our without NAIS. It may be noted that when single crops are insured, the revenue streams might be stabilized for that specific crop, but in reality the farmers go for a mix of crop by way of mixed farming or inter-cropping, thus creating a situation where the covariance of the revenues between the different crops grown matter in ensuring the overall stability of the cropping systems as a whole. Since both price and quantity volatility induces revenue fluctuations, a robust weather based crop insurance system should be sensitive to the price and quantity movements of other crops which are not insured. It is possible that the overall stability may fall in spite of having insurance for single crop, when the correlations from the revenues from other crops are significant and move in the opposite direction.

'Welfare effects' of WBCIS payouts should be studied to estimate the impact of the differences in income and asset positions of those who got payouts as against those who did not at times of droughts or village level catastrophes. The question whether the payouts are substantial enough to shield household consumption from weather shocks needs thorough evaluation. Also, there might be substantial distortions in the labour markets because of a skewed income enhancement situation and certain '*price effects'* might emerge, when one section of the agrarian community gets cash rich because of payouts while others like the preponderant agricultural labourers get nothing.

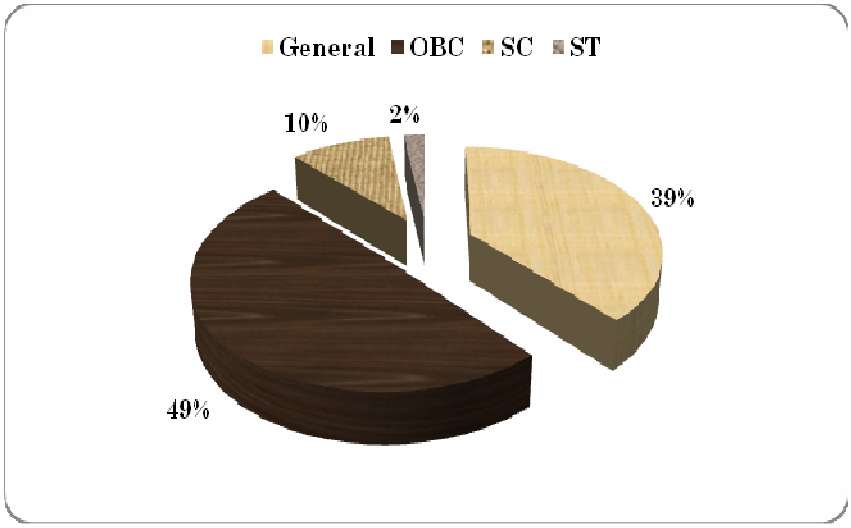
Annexure 1: Primary Research Data Outputs

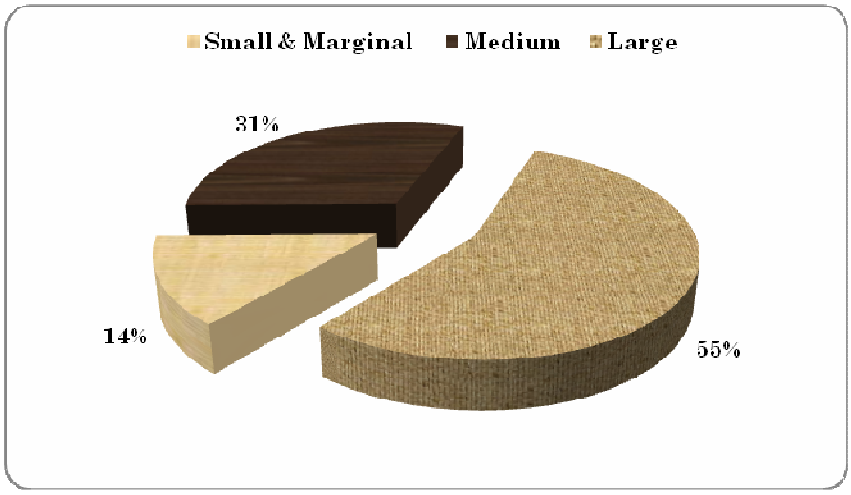
1.1 Composition of Sample in terms of Key Variables

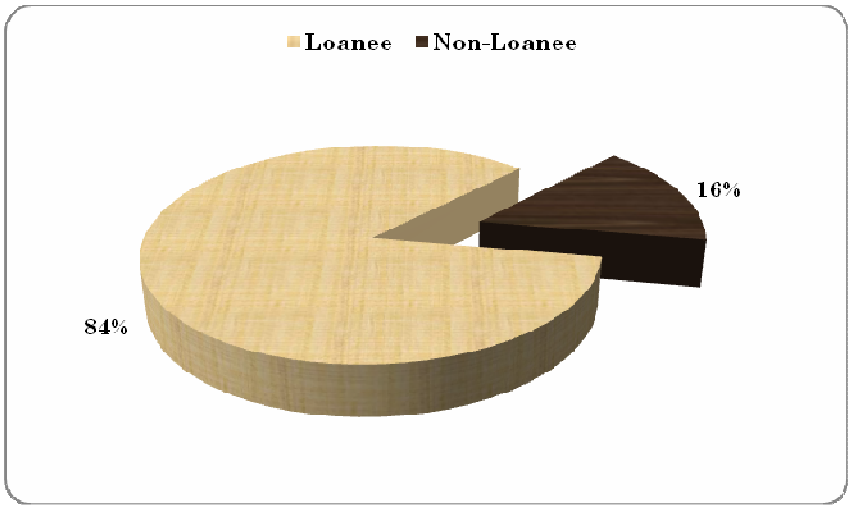
Looking at the composition of the sample of the farm households by social groups, around three-fifth (61%) belong to the backward sections of which around three-fourth belong to the OBC category. The rest of the sampled households belong to the general category.

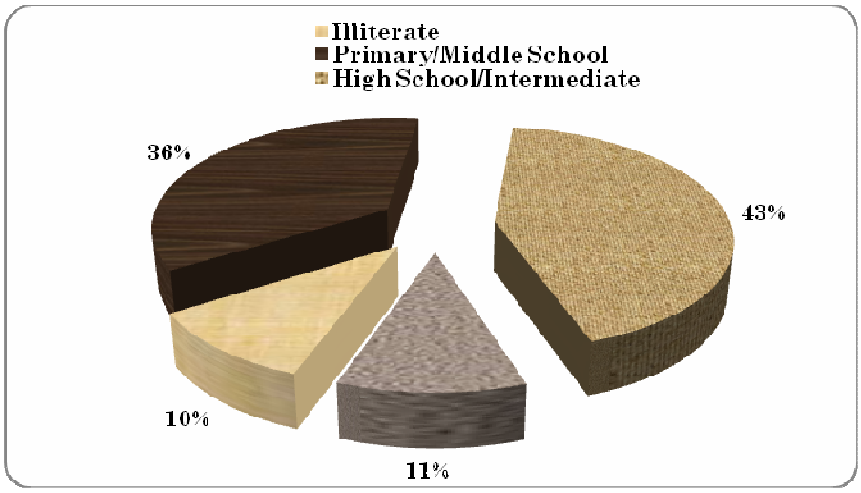
In terms of credit usage from banks, 84% of the respondents are loanee farmers availing agricultural credit from banks. In terms of the land holding size, 55% of the respondents within the insurance beneficiaries sample are large farmers, medium farmers constitute a little over 30% while small and marginal farmers comprise 14%.

As far as the literacy level of the sampled households is concerned, only 10% of the households are illiterate. The literacy profile is also quite impressive with 36% of them having completed the primary/middle school level, 43% having completed intermediate/high school level and the rest 11% being graduates. It indicates the sampled farmers having modest education levels to be able to respond to all the questions regarding the performance of WBCIS and NAIS.




Small & Marginal
Medium
Large
31%
14%
55%

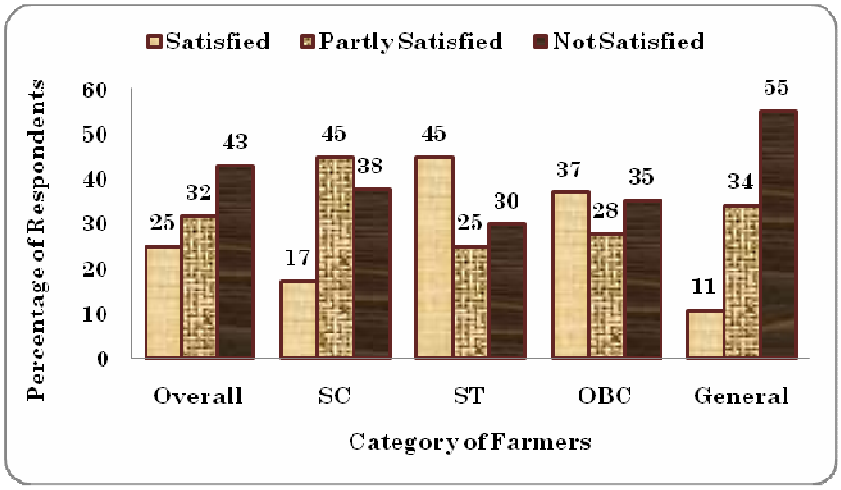

Loanee
Non-Loanee
16%
84%

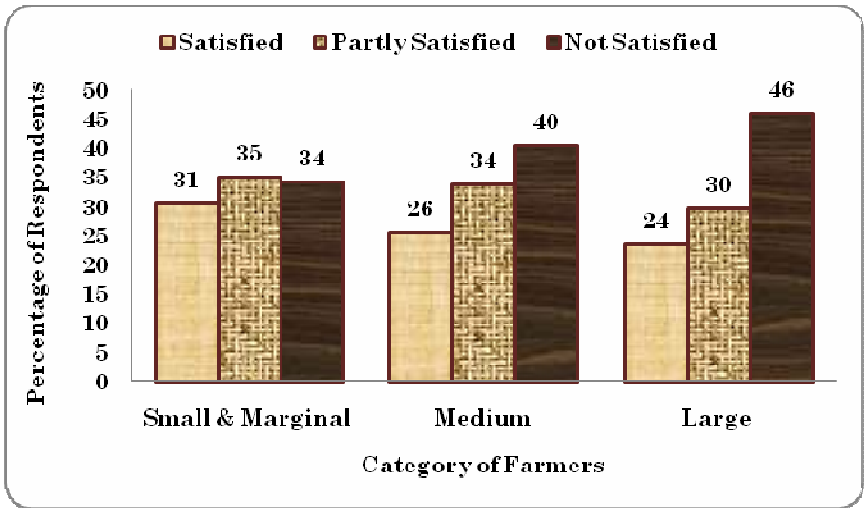

Illiterate
Primary/Middle School
High School/Intermediate
36%
43%
10%
11%

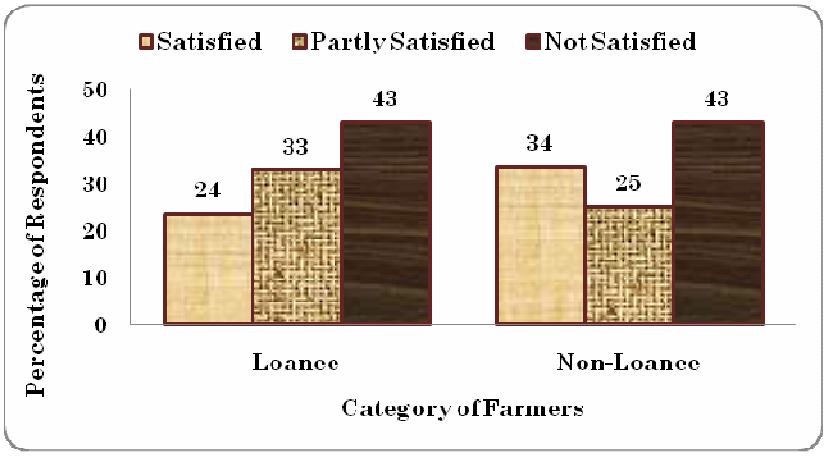
1.2 Satisfaction Analysis for Quantum of Sum Assured

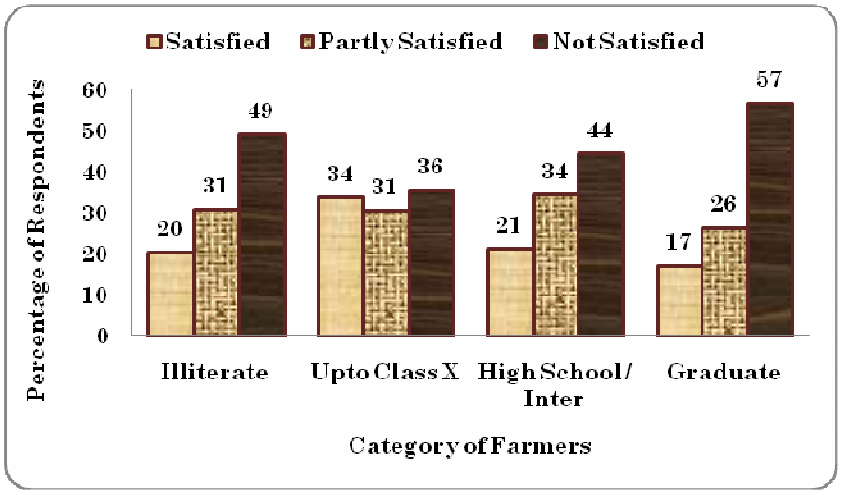
Analyzing the satisfaction level among the farmers regarding the quantum of sum insured, 25% of the sample report satisfaction, with another 32% reporting partially satisfied. However, a large percentage of them (43%) are not satisfied with the quantity of sum insured that reflects the inadequacy of the scheme in covering the crop losses experienced or expected by the farming community. Decomposing the sample into different social groups, the lowest satisfaction rate is expressed among the general category (11%) followed by the SC category (17%). Interestingly, ST (45%) and the OBC (37%), on the other contrary have a quite high satisfaction level. This may reflect on the fact that the type of crops and the amount invested in cultivation as well as the risks associated are greater for the general and SC categories. The cost of cultivation data has not been collected as a part of our survey, but based on field work in the sample regions and interactions with agricultural scientists and farmers during focus group discussions (FGDs), it can be argued that those who report satisfaction with the sum insured as being adequate enough to cover the cost of cultivation given the expected value of production, have lower cost of cultivation on an average. It may also be possible that there may be other state specific schemes for the ST and OBC categories that do not cover the SC and general categories, making the high satisfaction reporting groups to be happy with status quo, as far as sum insured is concerned.

Going by size class of land holding, small and marginal farmers are more satisfied (31%) than the medium (26%) and the large farmers (24%). This trend might arise due to the very nature of small and marginal holding agrarian life. These farmers eke out a living under more deplorable conditions than others given their higher vulnerability to agricultural production risks and even a small amount of support might reflect in higher satisfaction, compared to the middle and large farmers who are better-off and have developed higher aspiration levels. In terms of indebtedness categories, the level of satisfaction is higher in case on non-loanee farmers than in case of loanee farmers. By education groups, the illiterates have a lower level of satisfaction. This is a reflection of the established relationship between educational levels and appreciation of the need for insurance. Another interesting observation is that the farmers having education level up to the tenth standard have higher satisfaction level than both the illiterates and the better educated individuals.


Satisfied
Partly Satisfied
Not Satisfied
Percentage of Respondents
60
50
40
30
20
10
0
25
32
43
17
45
38
45
25
30
37
28
35
11
34
55
Overall
SC
ST
OBC
General
Category of Farmers

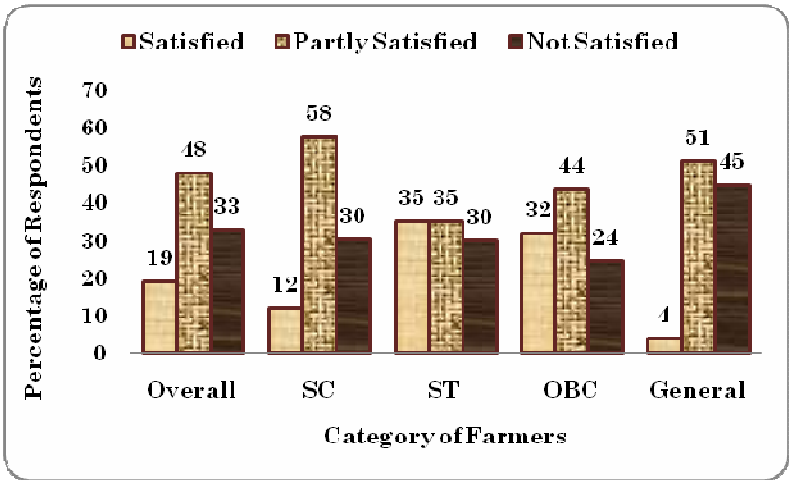

Satisfied
Partly Satisfied
Not Satisfied
Percentage of Respondents
50
45
40
35
30
25
20
15
10
5
0
31
35
34
26
34
40
24
30
46
Small & Marginal
Medium
Large
Category of Farmers

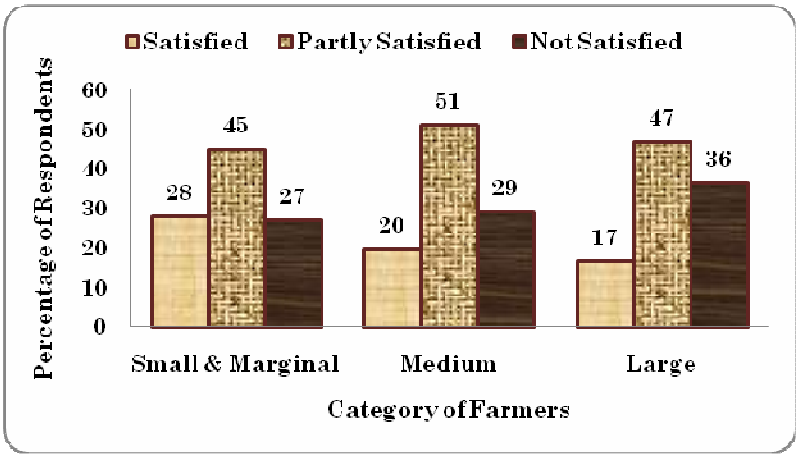

Satisfied
Partly Satisfied
Not Satisfied
Percentage of Respondents
50
40
30
20
10
0
24
33
43
34
25
43
Loance
Non-Loance
Category of Farmers

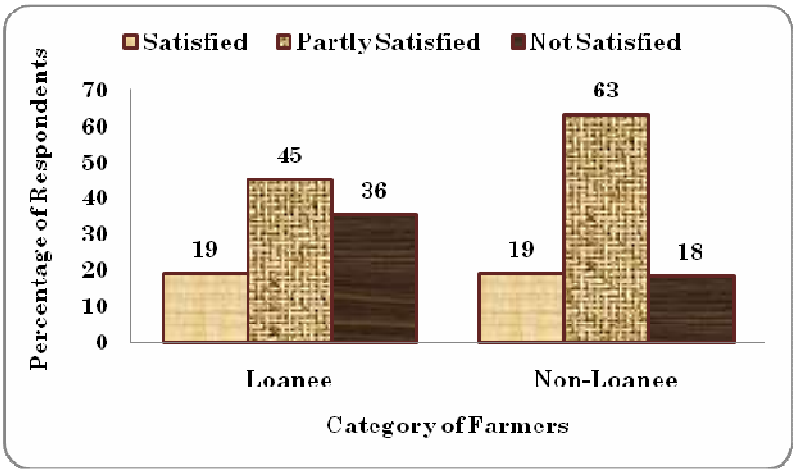


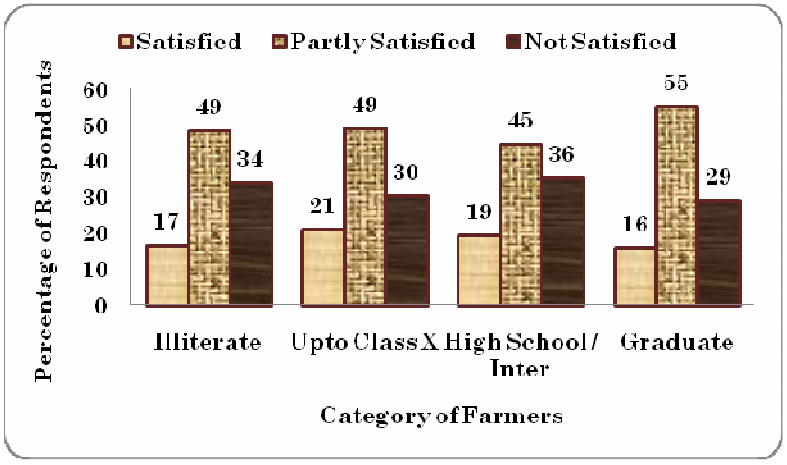
1.3 Satisfaction Analysis for Types of Risks Covered

In the analysis of the satisfaction about the types of risks covered by WBCIS, almost the same pattern is observed as in case of opinion about the amount of sum insured. The notable exception is the response pattern by indebtedness category where both the loanee farmers as well as the non-loanee farmers have the same level of full satisfaction whereas the loanee farmers have very high level of dissatisfaction compared to the non-loanee farmers. This can be possibly explained by the inadequacies of the coverage of risk types faced by the loanee farmers who have higher exposure to the mandatory crop insurance scheme (NAIS), which in principle is more comprehensive than the pilot WBCIS, compared to the non-loanee farmers. The structural differences in cropping patterns, access to protective irrigation and debt-servicing obligation could also play an important role in driving these differences in self-reported satisfaction.





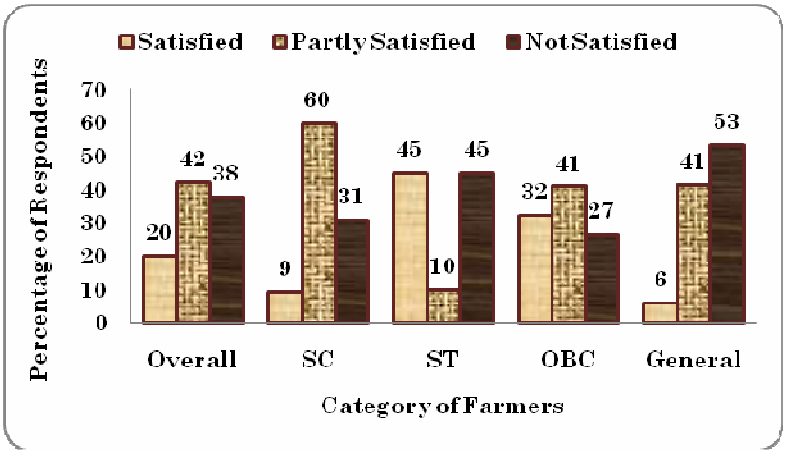


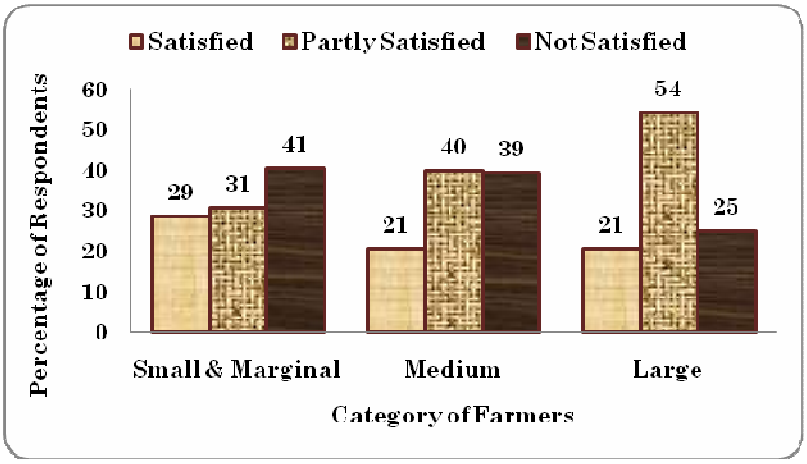


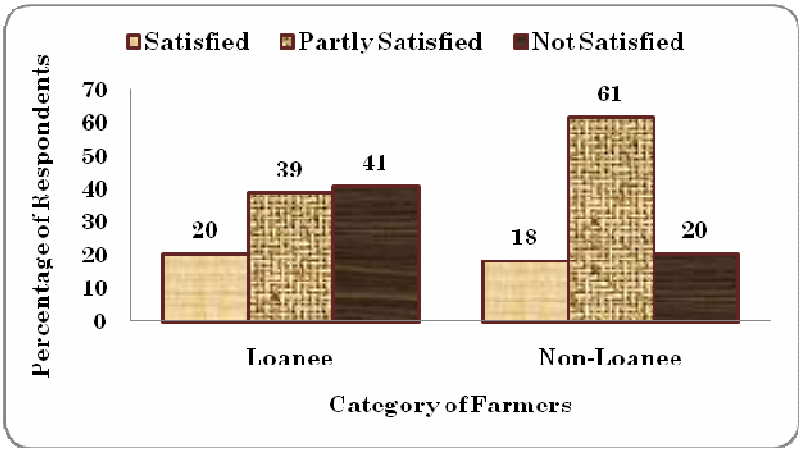
1.4 Satisfaction Analysis for Period of Risk Coverage

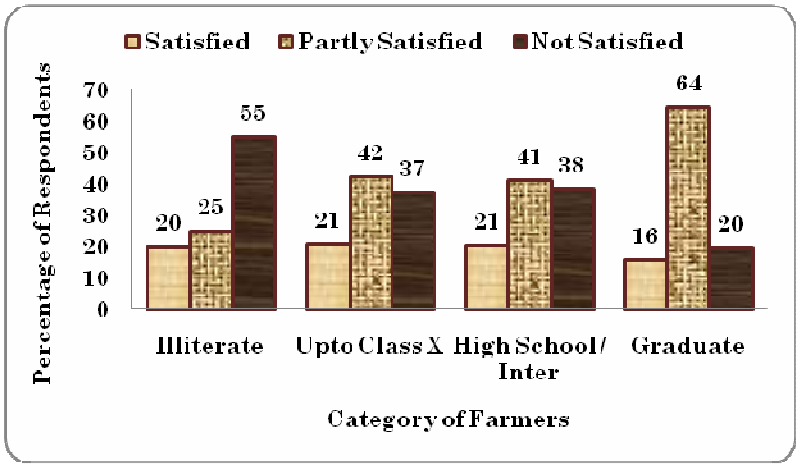
The general pattern as observed in the previous two sub-sections is also observed in the satisfaction among the farmers with regard to the period of risk coverage with some additional findings. In case of social group-wise analysis of satisfaction, it is very clear that

compared to the ST and OBC category who have very high satisfaction rates, SC and general category have very low satisfaction rates that may be ascribed to their higher dependence on agriculture both due to the growing of longer duration crops with possible overlapping of the crops' growing season as well as low opportunities to hedge income shocks by off-farm avenues in general. In case of loanee farmers, the higher level of dissatisfaction may arise from the inability of the scheme to cover the credit risk to its full extent.



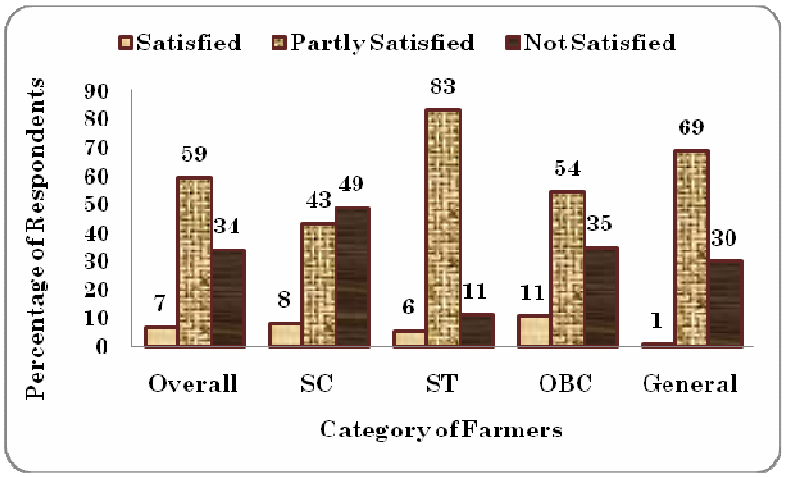


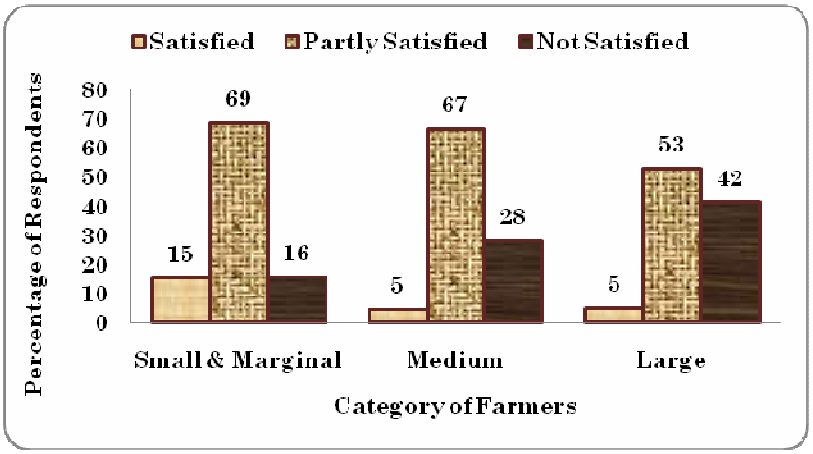


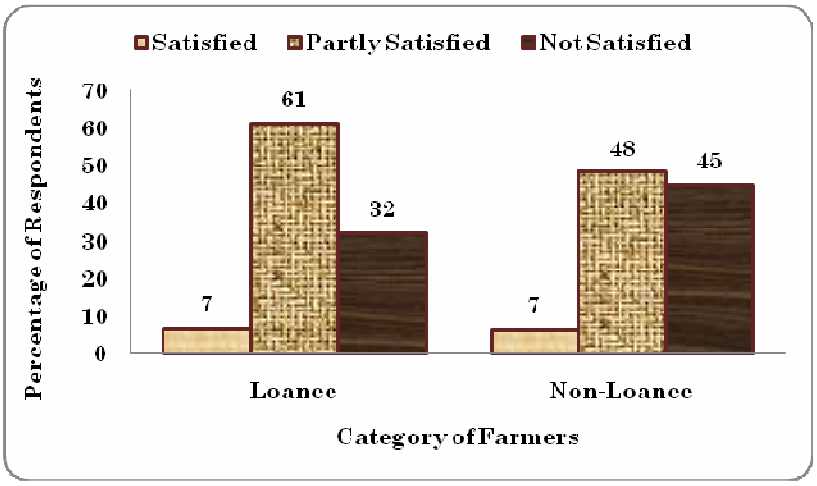


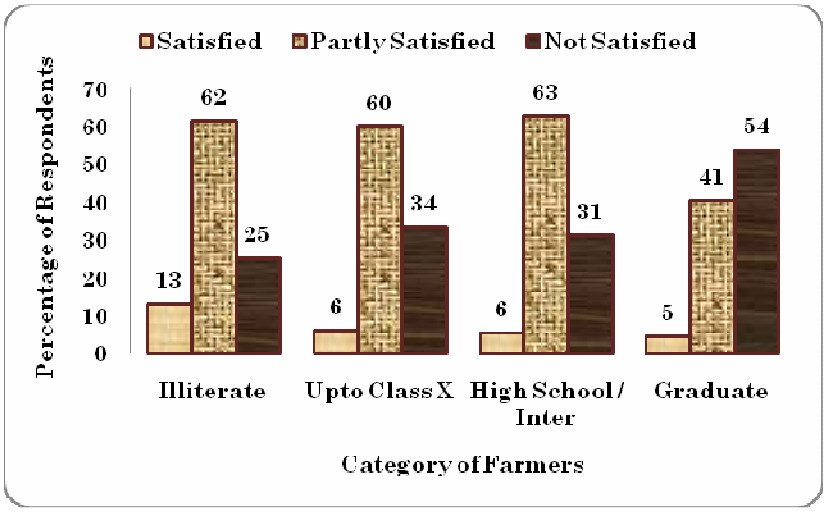
1.5 Satisfaction Analysis for Explanation on Policy Working

Explanation of policy working is a very important indicator that might make or mar the operationalization of any agricultural insurance scheme in the developing world and our findings corroborate the same. Farmers' response to the questions on satisfaction with this aspect does bring out the poor state of affairs in terms of explanatory power of the suppliers of insurance. The general category farmers who have been associated with higher literacy and education levels report an abysmally low satisfaction (1 per cent). The other social groups also report low satisfaction levels in this aspect. The trend persists even for the analysis based on size class of land holdings and there is no difference between the satisfaction levels of loanee and non-loanee cultivators as far as explanation on policy working of WBCIS is concerned. The inability of the marketing agents/intermediaries/delivery channel to simplify and communicate complex actuarial terms to the farmers, or the inability of these parties to understand the mechanism and fundamentals of agriculture insurance contracts themselves can be held responsible for the invariably low awareness levels observed in the field. These stylized facts substantiate the case for customized massive insurance education and financial literacy campaigns during the marketing phase.





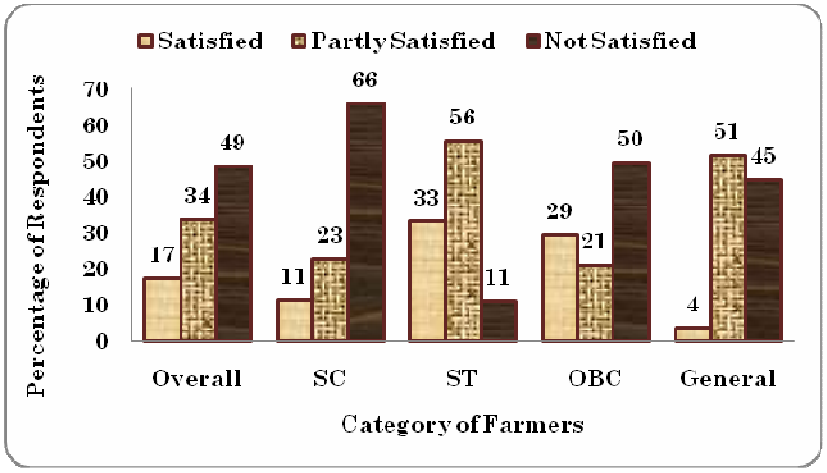


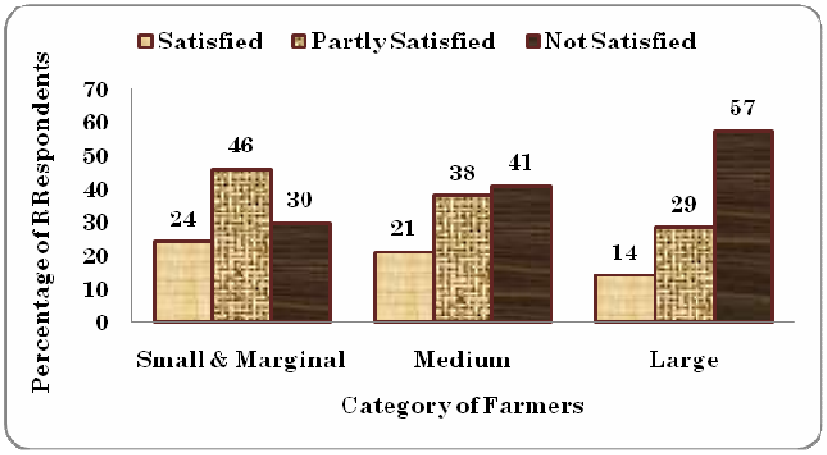


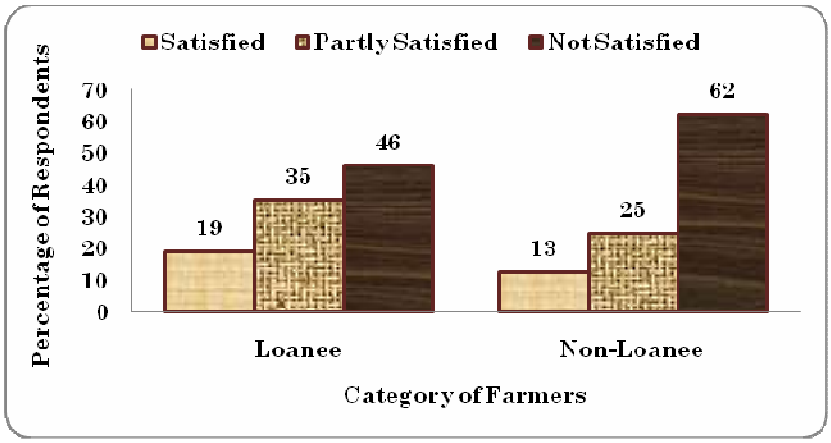
1.6 Satisfaction Analysis for Resolution of Queries regarding WBCIS

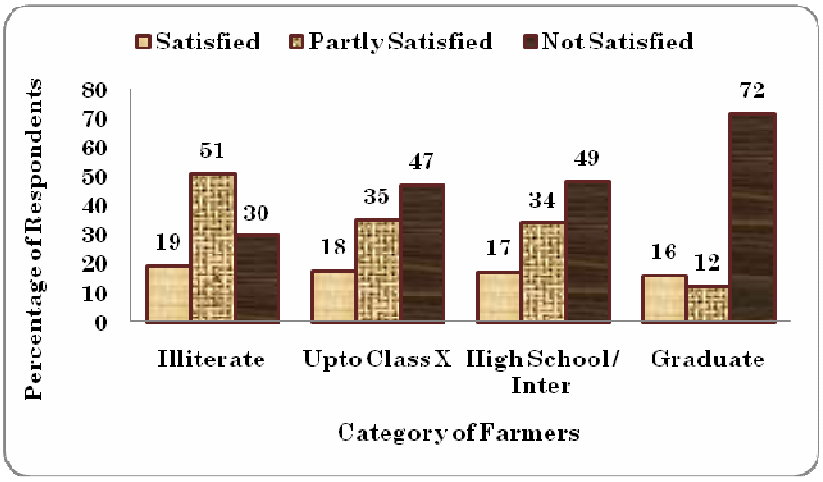
In the analysis of satisfaction for the resolution of queries among the farmers, it is clear that the satisfaction is inversely related to the size of the holding and education level i.e. larger farmers and more educated farmers report higher dissatisfaction levels. Also, the satisfaction

level is quite low for the farmers falling under the SC and general category that clearly reflects that there is some problem regarding the clarity on the pattern of cultivation practiced by them or that there may be caste sensitive practices driven by vested interests that is actually impeding the resolution. This hints at some politico-economy forces at play that might create problems in getting the resolution of queries regarding WBCIS a complicated process in rural India.



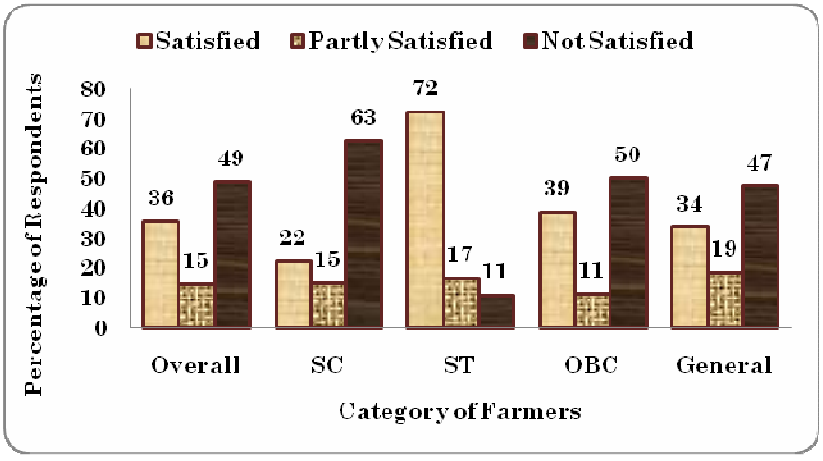


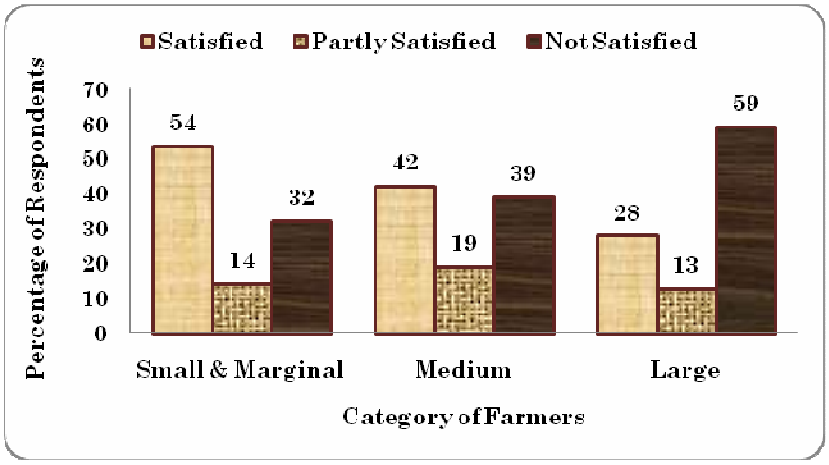


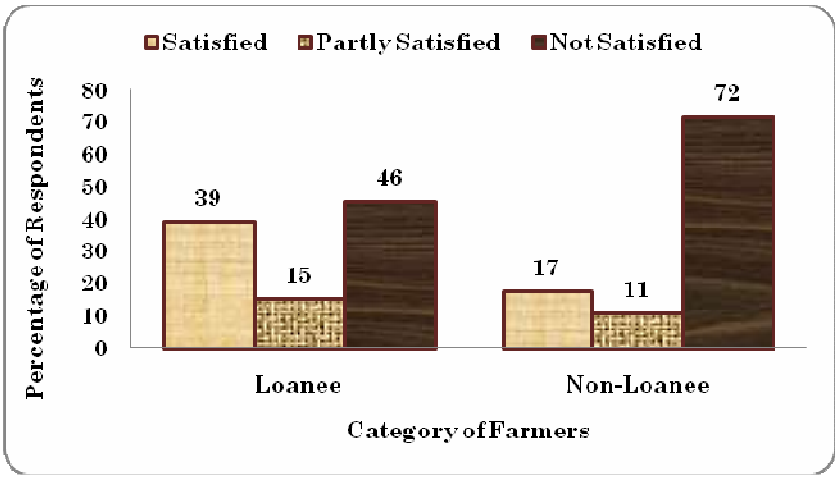


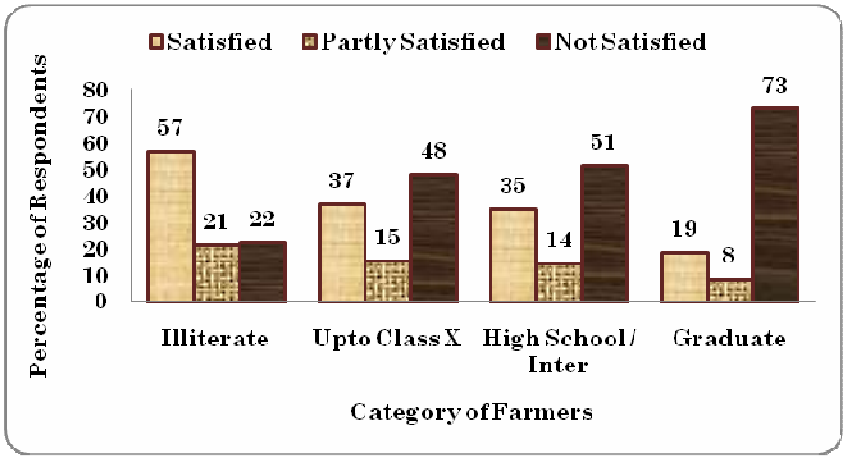
1.7 Satisfaction Analysis for Convenience in Enrollment under WBCIS

From the responses elicited from the farmers, it is clear that ST and OBC farmers, small and marginal farmers as well as the loanee farmers (for whom it was mandatory), enrollment under WBCIS is reported to be more convenient vis-à-vis other groups. The respondents from the ST category report a very high satisfaction level at 72 per cent; small and marginal farmers at 54 per cent and loanee farmers at 39 per cent, which is significantly higher than reported by the other corresponding groups in the comparison. This is a positive development in the sense that WBCIS could be claimed to have succeeded in terms of its goals to provide adequate protection to the farming community, the most vulnerable of them being the groups discussed above.



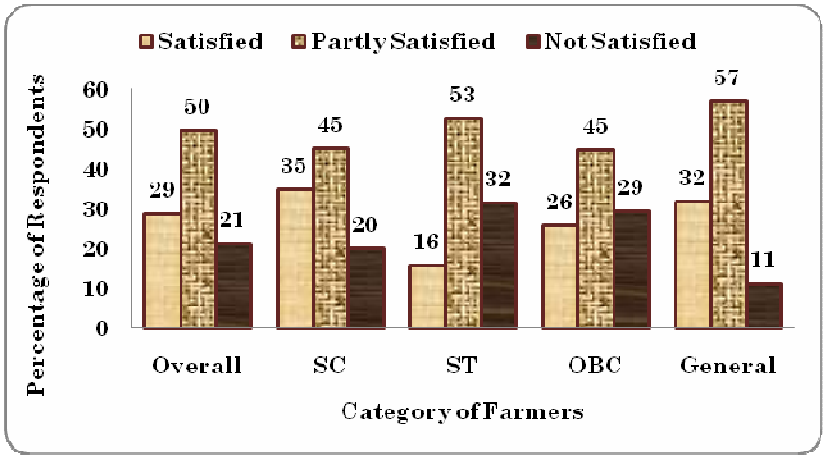

Satisfied
Partly Satisfied
Not Satisfied
Percentage of Respondents
70
60
50
40
30
20
10
0
54
14
32
42
19
39
28
13
59
Small & Marginal
Medium
Large
Category of Farmers

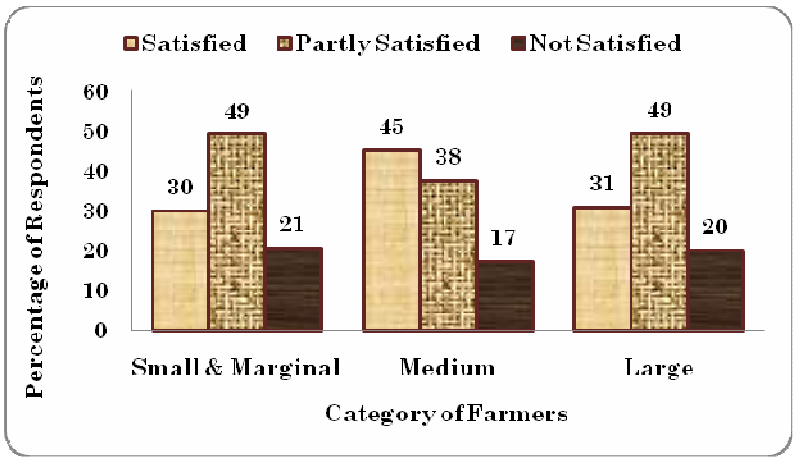

Satisfied
Partly Satisfied
Not Satisfied
Percentage of Respondents
80
70
60
50
40
30
20
10
0
39
15
46
17
11
72
Loanee
Non-Loanee
Category of Farmers

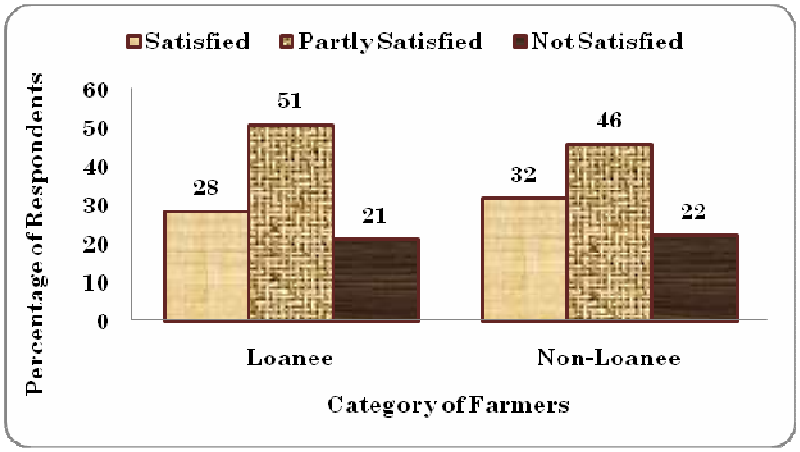

Satisfied
Partly Satisfied
Not Satisfied
Percentage of Respondents
80
70
60
50
40
30
20
10
0
57
21
22
37
15
48
35
14
51
19
8
73
Illiterate
Upto Class X
High School / Inter
Graduate
Category of Farmers

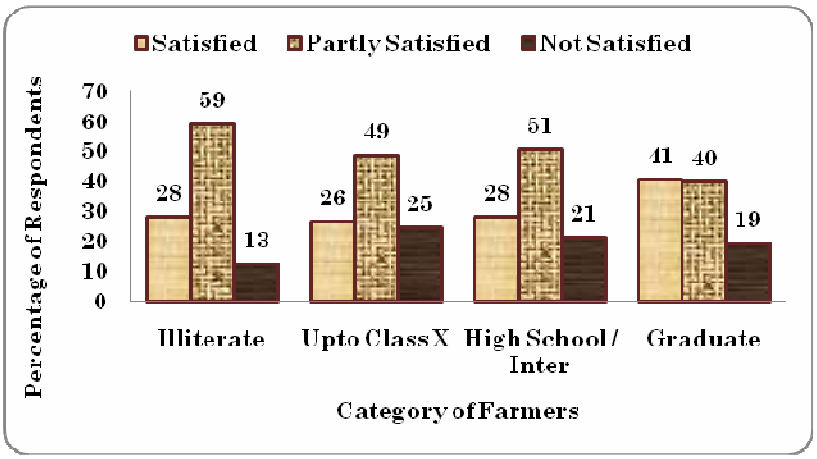
1.8 Satisfaction Analysis for Weather as a Basis for Crop Insurance

There seems to be greater appreciation among the non-ST, non-OBC; medium and large farmers and non-loanee and better educated farmers about the weather as the basis of crop insurance. The reasons for low satisfaction levels among the other categories may arise from the generally lower awareness and poor prior experiences with NAIS in contrast with the satisfied groups. Other plausible reasons could be the heterogeneity in vulnerability to production risks, default risk as well as the technological risk in case of small and marginal farmers who have most likely not been exposed to the concepts of weather as a basis of crop insurance or weather insurance initiatives as their more educated, progressive or wealthier counterparts.



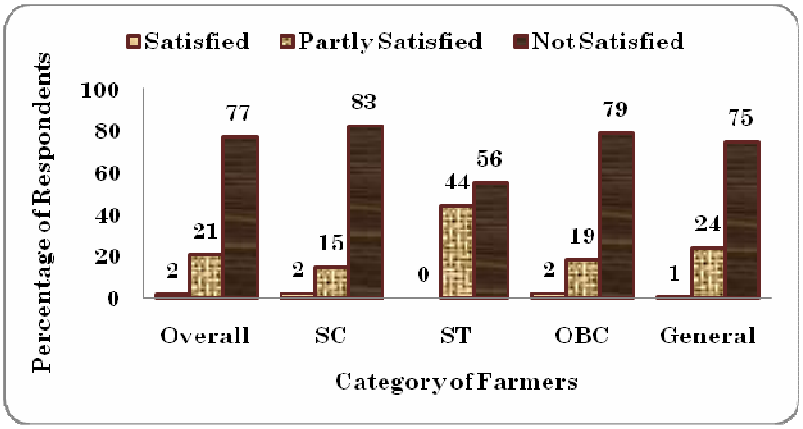


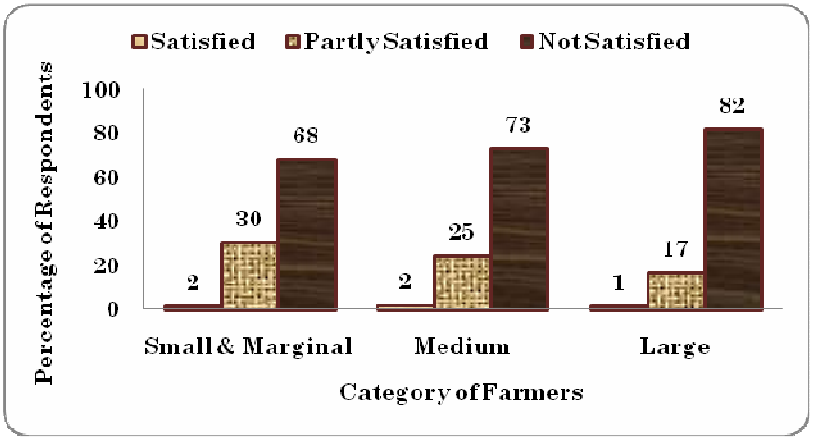


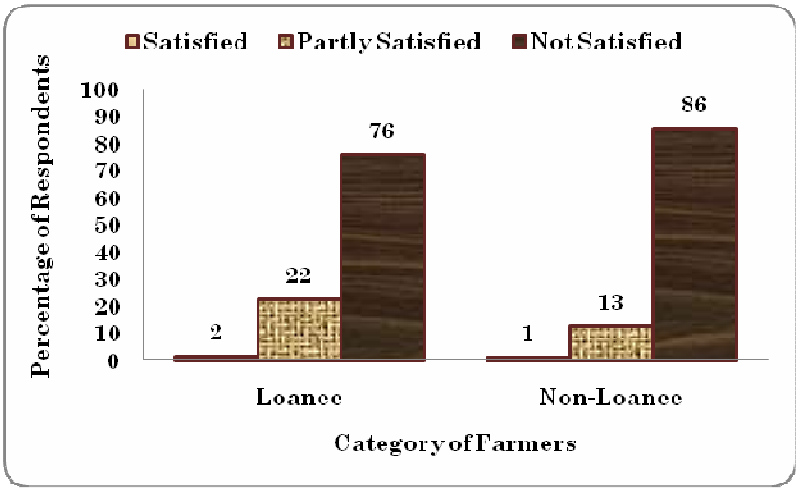


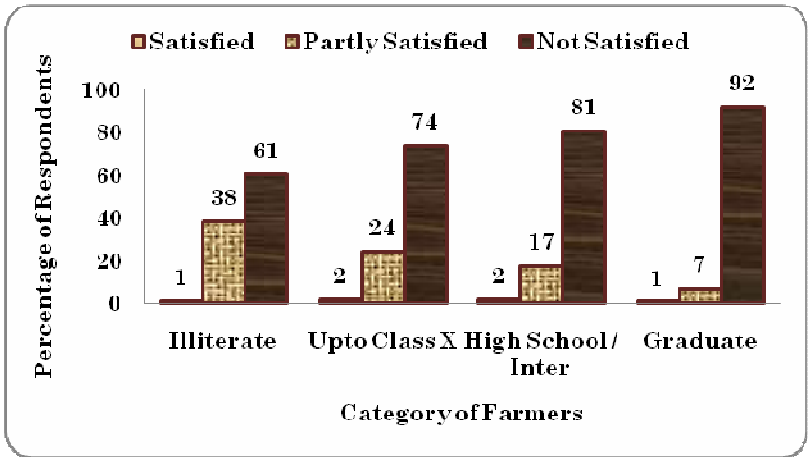
1.9 Satisfaction Analysis for Location of Weather Station

There is unequivocal consensus among the farmers across different classifications in their dissatisfaction about the location of weather stations. The very high dissatisfaction levels or extremely low satisfaction levels (0 per cent or 1 per cent) on an average cuts across all the farmers groups we have analyzed so far. These are most likely borne out of their bad experience in the accuracy of the weather predictions (forecasts) that is crucial for planting and agricultural decisions. Unmitigated basis risk and the low correlation of measured parameters with experienced losses or phenomena of microclimates are very likely to deflate the satisfaction with the WBCIS in its current form.


Satisfied
Partly Satisfied
Not Satisfied
Percentage of Respondents
100
80
60
40
20
0
2
21
77
2
15
83
0
44
56
2
19
79
1
24
75
Overall
SC
ST
OBC
General
Category of Farmers

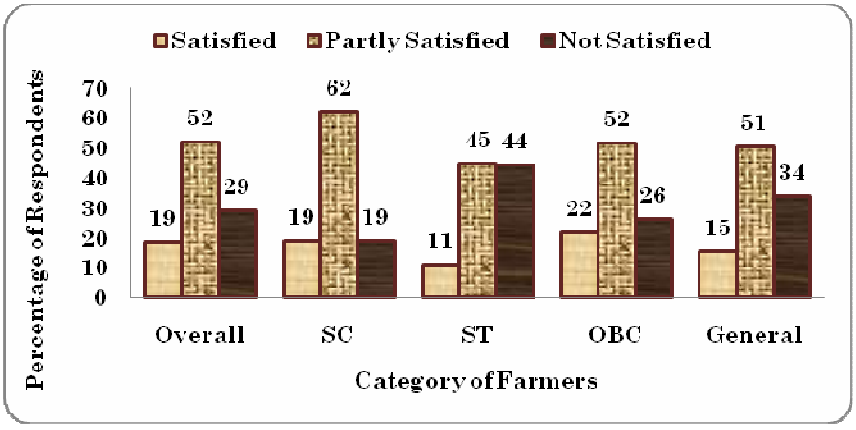

Satisfied
Partly Satisfied
Not Satisfied
Percentage of Respondents
100
80
60
40
20
0
2
30
68
2
25
73
1
17
82
Small & Marginal
Medium
Large
Category of Farmers

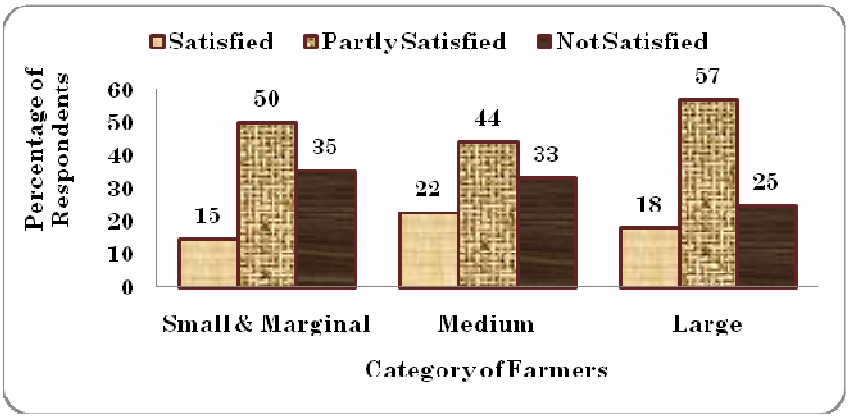

Satisfied
Partly Satisfied
Not Satisfied
Percentage of Respondents
100
90
80
70
60
50
40
30
20
10
0
2
22
76
1
13
86
Loanee
Non-Loanee
Category of Farmers

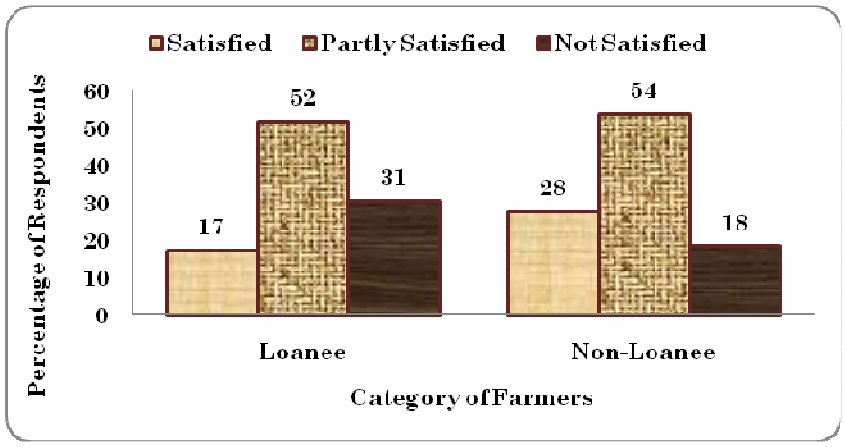


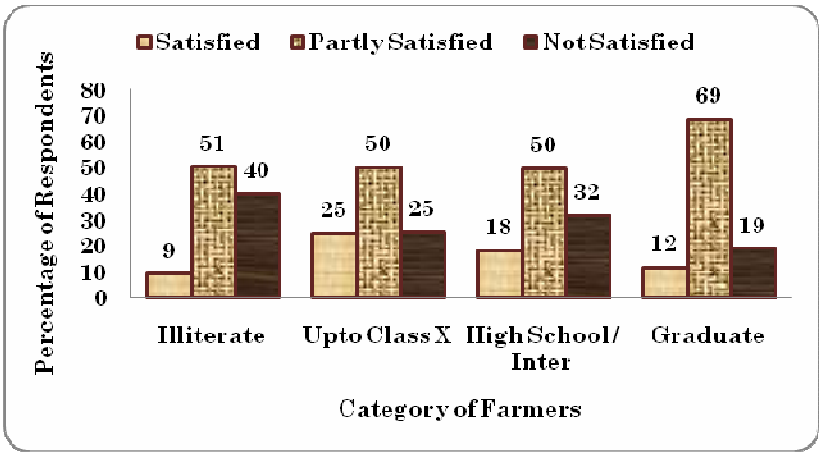
1.10 Satisfaction Analysis for Design of WBCIS Policy

The lack of knowledge surrounding the clarity about the actuarial rules and mechanisms involved in the designing of weather insurance policies seem to be pervading across the farm segments as the level of partially satisfied sampled farmers is more than half, whereas the level of satisfaction is much lower than that of both partially satisfied as well as not satisfied groups. However, there seems to be more dissatisfaction among the ST farmers vis-à-vis other caste groups; loanee farmers vis-à-vis non-loanee farmers; and illiterates and high school educated vis-à-vis other education groups reflecting confusion among farmers on the various important aspects of WBCIS discussed so far.





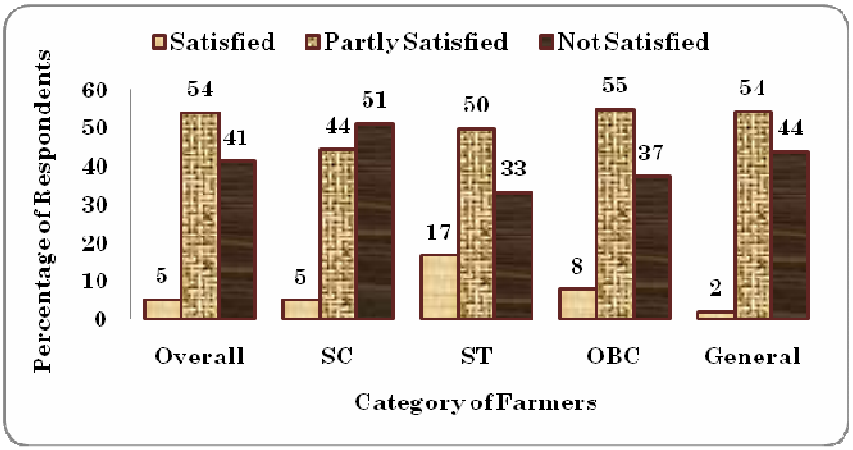


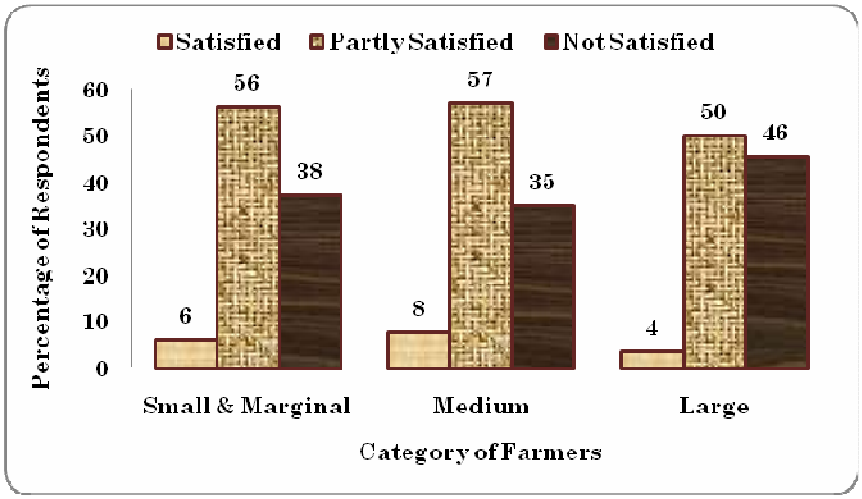


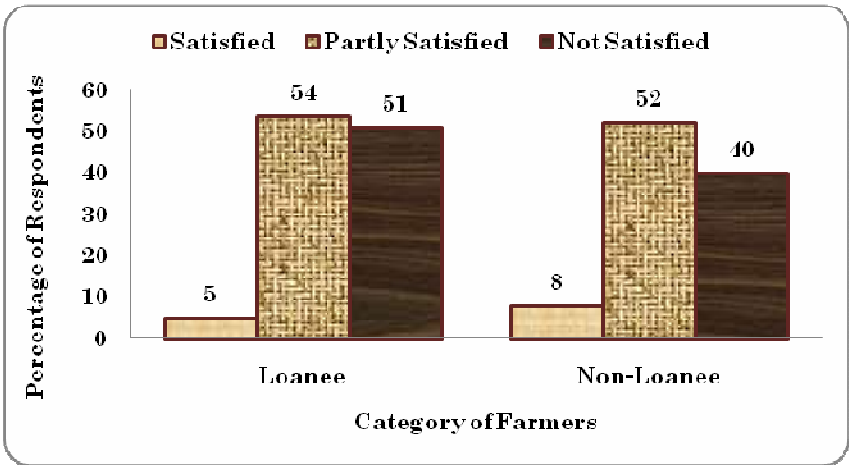
1.11 Satisfaction Analysis for Responsiveness of Insurance Intermediary

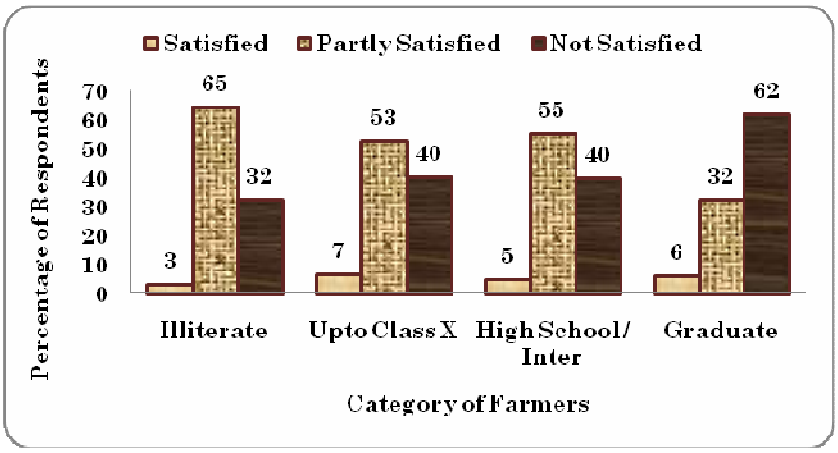
On the question of responsiveness of the insurance intermediary, the overall satisfaction level is at a very low level of 5 per cent overall with the ST category reporting the highest satisfaction level of 17 per cent. The satisfaction with responsiveness of insurance intermediaries remains at very low levels (less than 8 per cent) even when we consider the

differences across size class of land holding and remains so for the loanee and non-loanee categories. Education appears to be worsening the satisfaction levels with the responsiveness of the insurance intermediaries as expected, since the more awareness a farmer has about the insurance mechanism, the more would be the complaints or queries directed at the intermediaries and given the low level of general awareness among intermediaries as proven earlier, the dissatisfaction levels are bound to be higher. These perceptions about satisfaction with the insurance intermediation is a very important reminder of the practical problems that handicap faster diffusion of formal risk management in India and the increasing need for better intermediary and consumer education initiatives for WBCIS to deliver value to the end clients sustainably.



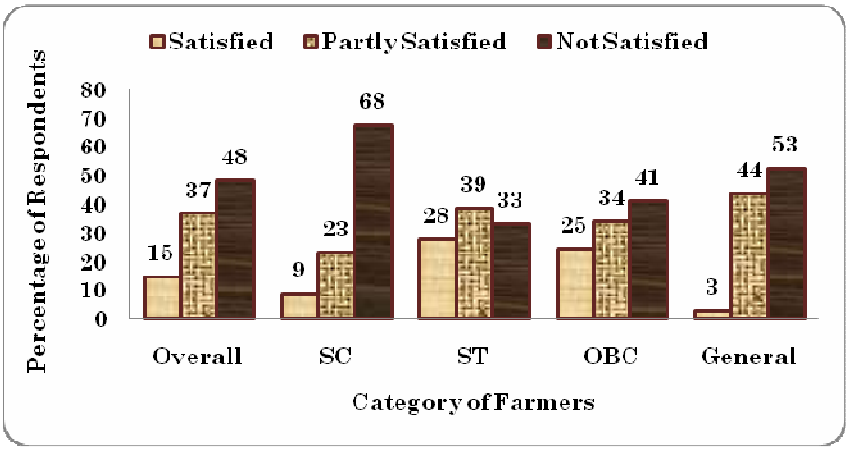


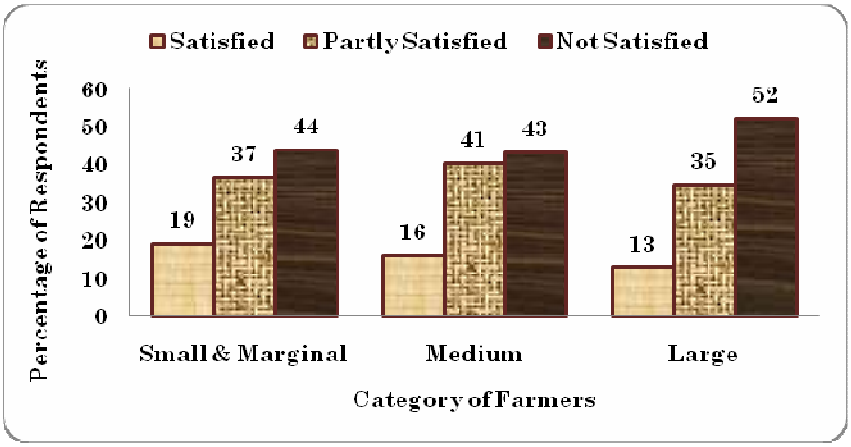


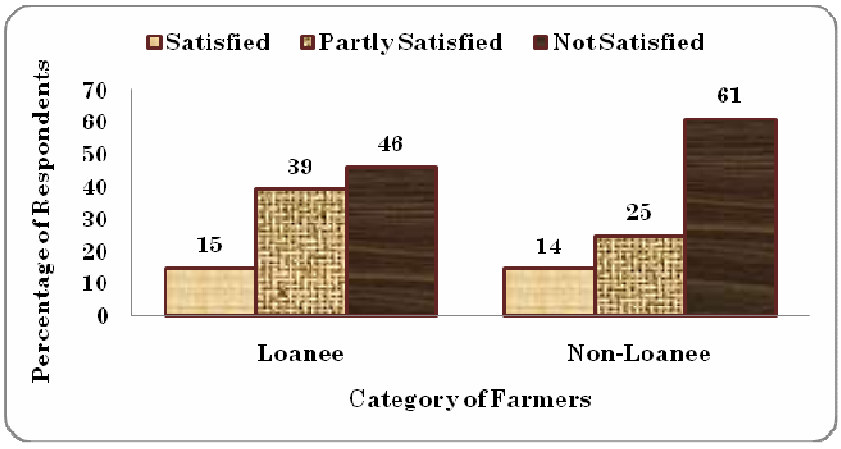


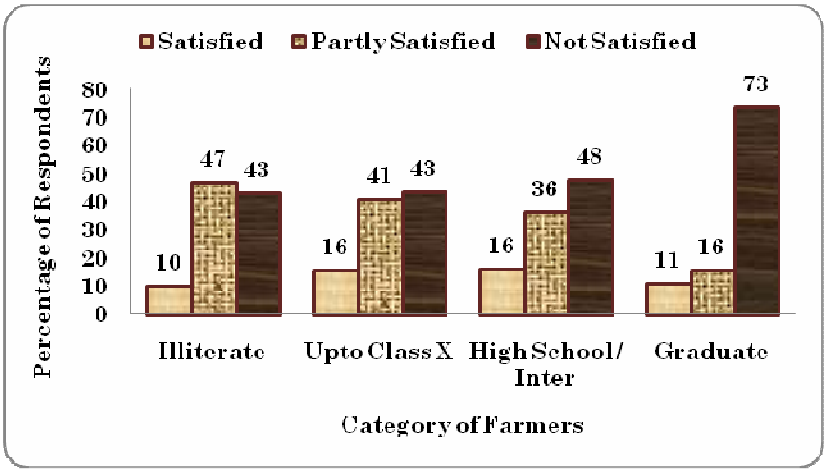
1.12 Satisfaction Analysis for Mechanism regarding Grievance Redress

Satisfaction in terms of grievance redressal is at an extremely low level of 15 per cent on an average with the general category farmers reporting lowest satisfaction levels of 3 per cent and the STs that of the highest level at 28 per cent. This corroborates the findings on very low satisfaction levels in terms of responsiveness of the insurance intermediaries. It is noteworthy that the SCs report a high dissatisfaction level of 68 per cent. The dissatisfaction levels are seen increasing with landholding and education level and are at a level higher than 40 per cent across all these sub-groups considered. These low satisfaction levels might be explained by the low intensity of general insurance in general and low penetration of agricultural insurance in particular across rural India. With the sector and the knowledge base on what works and what does not work, huge gaps in grievance redressal mechanisms exist as reflected in our findings.


Satisfied
Partly Satisfied
Not Satisfied
Percentage of Respondents
80
70
60
50
40
30
20
10
0
15
37
48
9
23
68
28
39
33
25
34
41
3
44
53
Overall
SC
ST
OBC
General
Category of Farmers

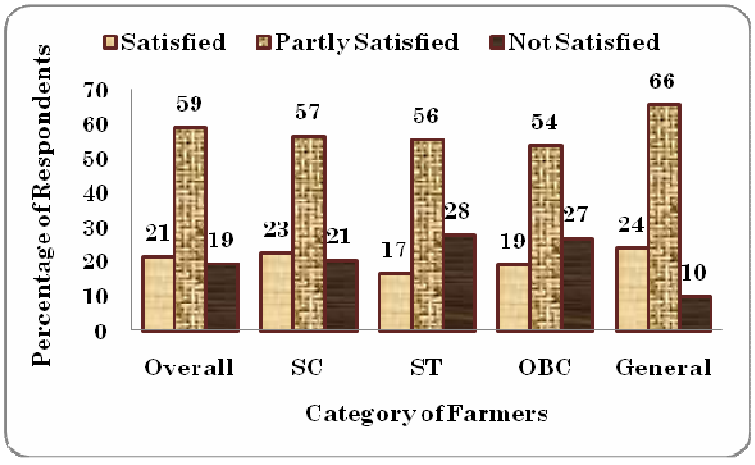

Satisfied
Partly Satisfied
Not Satisfied
Percentage of Respondents
60
50
40
30
20
10
0
19
37
44
16
41
43
13
35
52
Small & Marginal
Medium
Large
Category of Farmers

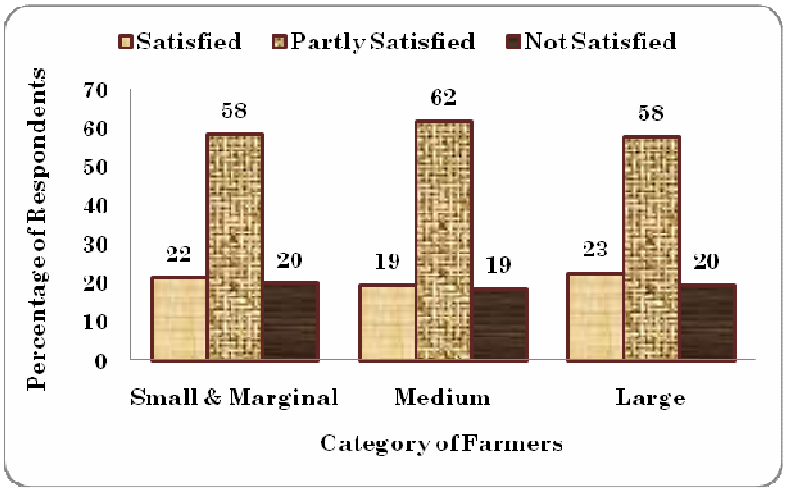

Satisfied
Partly Satisfied
Not Satisfied
Percentage of Respondents
70
60
50
40
30
20
10
0
15
39
46
14
25
61
Loanee
Non-Loanee
Category of Farmers

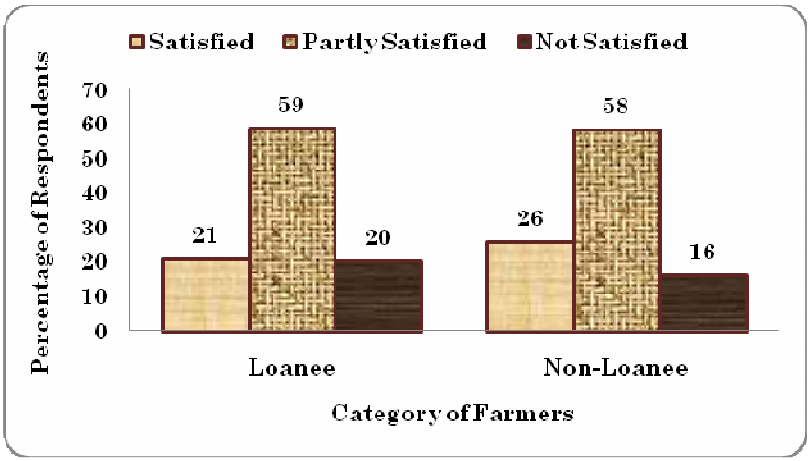


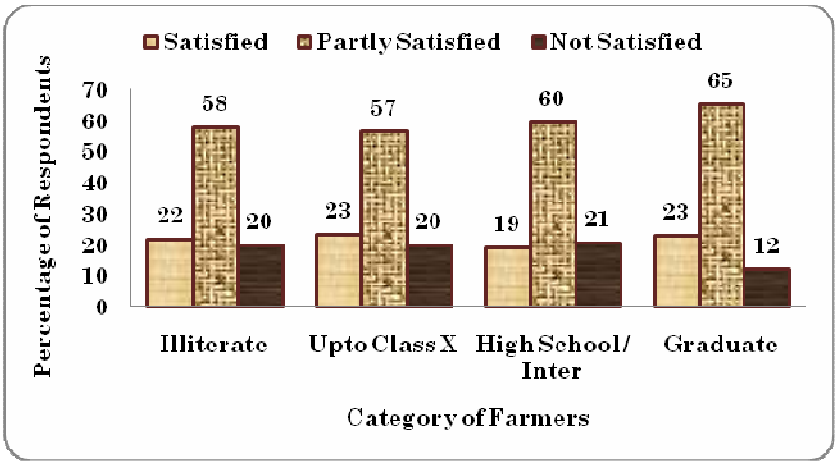
1.13 Satisfaction Analysis for Reliability of Weather Station & Data

A striking inference from the analysis of satisfaction with reliability of weather station and weather data regarding WBCIS is the high partial satisfaction levels for all the social groups considered, with the overall percentage being at a high level of 59 per cent. The satisfaction level remains modest at around 20 per cent, without significant variations between and among the categories considered, hinting at an inherent absence of information about the significance of weather data infrastructure in the study regions and the relevance of specialized information on agro-meteorological databases (and models) in dictating the mechanism of WBCIS.



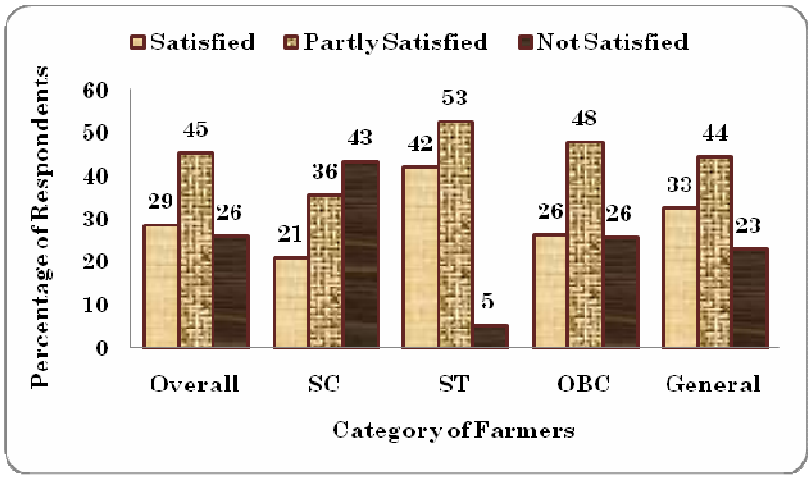

Satisfied
Partly Satisfied
Not Satisfied
Percentage of Respondents
70
60
50
40
30
20
10
0
22
58
20
19
62
19
23
58
20
Small & Marginal
Medium
Large
Category of Farmers

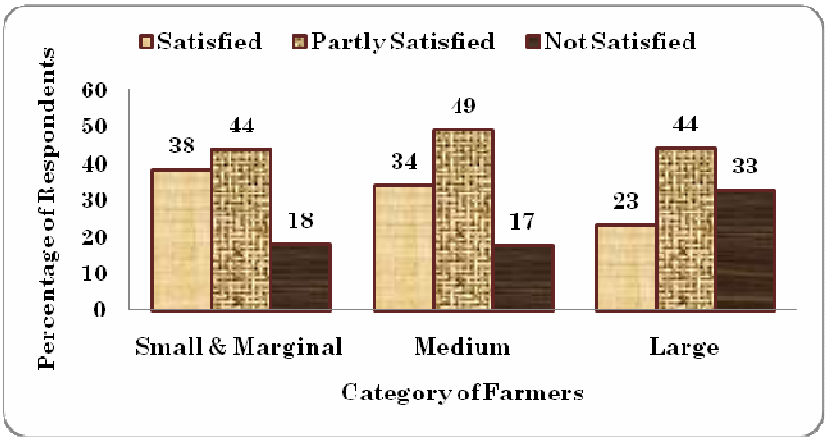

Satisfied
Partly Satisfied
Not Satisfied
Percentage of Respondents
70
60
50
40
30
20
10
0
21
59
20
26
58
16
Loanee
Non-Loanee
Category of Farmers

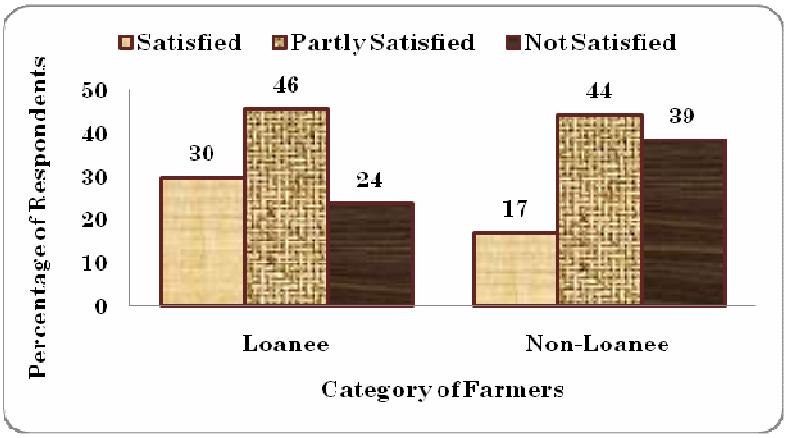

Satisfied
Partly Satisfied
Not Satisfied
Percentage of Respondents
70
60
50
40
30
20
10
0
22
58
20
23
57
20
19
60
21
23
65
12
Illiterate
Upto Class X
High School/ Inter
Graduate
Category of Farmers

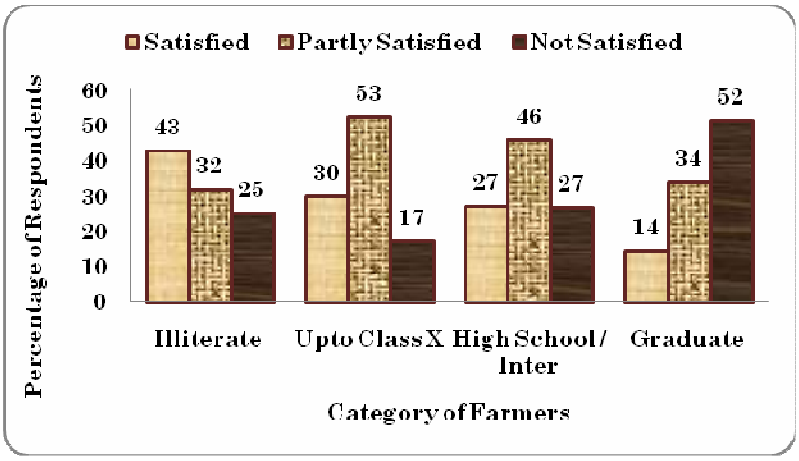
1.14 Satisfaction Analysis for Time Taken for Intimation or Receipt of Claims

Time taken for intimation or receipt of claims is a very sensitive element of agricultural insurance scheme design and holds the key to the adoption of WBCIS by farming communities in India. The satisfaction levels are at a modest level of 30 per cent overall, with the reported levels of satisfaction improving when we consider the communities by size class of land holding. The small and marginal farmers seem to have had a satisfactory experience with WBCIS claims receipt and turn around time which is reflected in their comparatively higher satisfaction rating levels at 40 per cent. The loanee farmers' satisfaction level is almost double that of the non-loanee farmers and this hints at inherent differences in perception or access to information for these structurally different categories of farmers. As another important role of education in influencing farmers' perceptions of the utility of weather based crop insurance, it is the graduate farmers who report significantly higher dissatisfaction levels compared to their less educated counterparts. This is in line with the accumulated evidence of education in positively influencing the perceptions around WBCIS features, and substantiates the importance of disseminating product information and insurance fundamentals among the less educated or illiterate farmers. This aspect has been corroborated by Gaurav et al (2010) where they show the significantly higher returns to insurance education and financial literacy intervention among lower than median literacy and financial literacy groups of farmers in Gujarat.





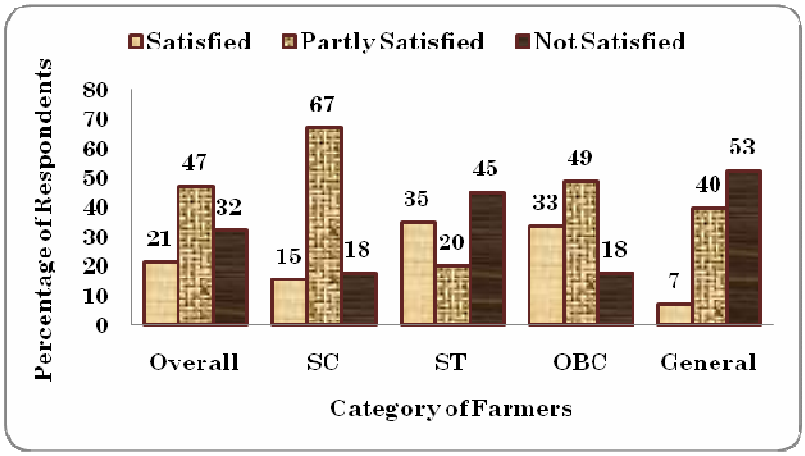


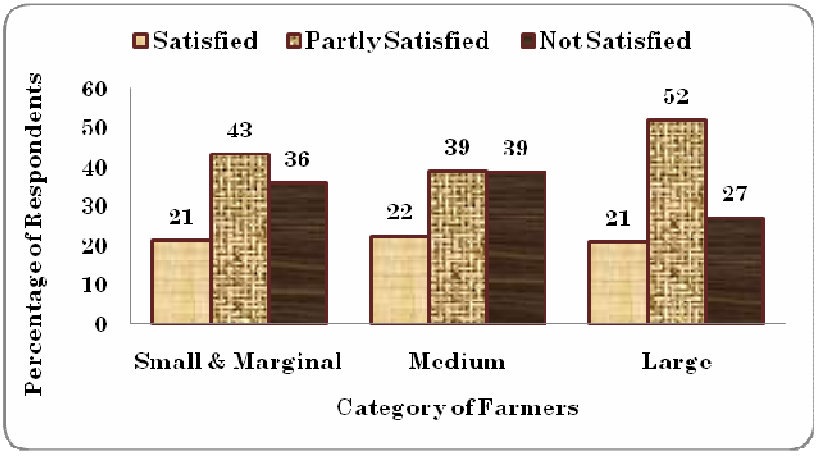


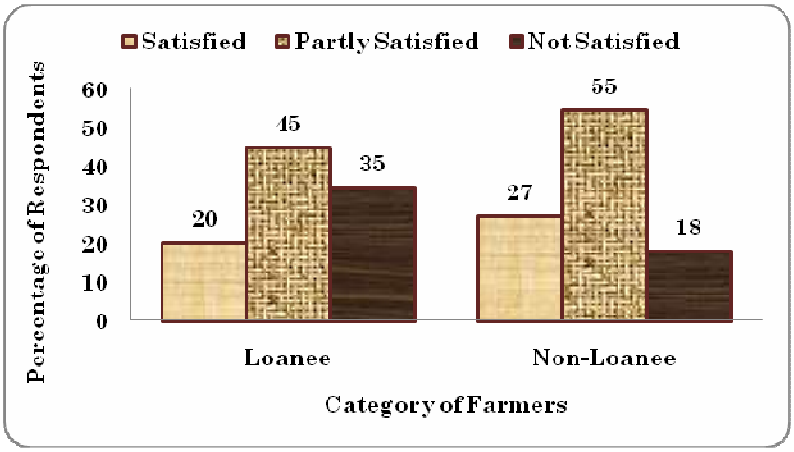
1.15 Satisfaction Analysis for Usefulness of WBCIS as an Alternative to NAIS

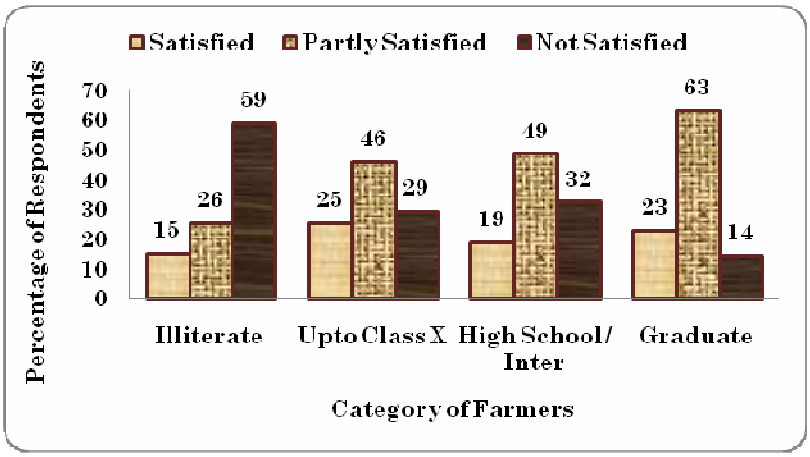
Coming to the crux of the basis for the evaluation of WBCIS in India, when the farmers were asked to rate their satisfaction levels in terms of the usefulness of WBCIS as an alternative to NAIS, around 20 per cent farmers preferred WBCIS to NAIS. This level was the lowest among the general category of farmers (7 per cent) while the SC, ST and OBC groups reported high satisfaction levels of around 30 per cent. Interestingly, there is no significant

variation among the satisfaction levels by size class of land holding and around 20 per cent of the respondents in each category of land holding class are satisfied if WBCIS replaces NAIS. As expected, the loanee farmers expressed lower preference for replacing NAIS with WBCIS vis-à-vis the non loanee farmers as they have been habituated to NAIS given its mandatory nature or WBCIS being mandatory for only a few seasons. On the other hand, the non-loanee farmers who have been primarily excluded from the NAIS as evident from the coverage data analyzed earlier in our study, WBCIS promises to be an interesting risk management alternative, conditional on their knowledge of NAIS. With higher educational attainment, the preference figures for substituting NAIS with WBCIS does not gather much momentum as around 20 to 25 per cent report of being satisfied with this possibility, for the various educational groups considered. It can thus be inferred that the findings from the primary data of our study does not provide substantial evidence for us to conclude that WBCIS can replace NAIS without making some section of the farming community worse off (dissatisfied) in general, while making some other sub-group better off.



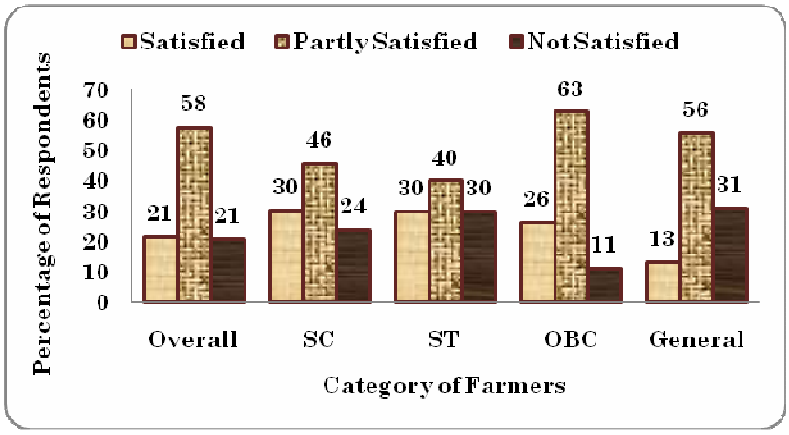


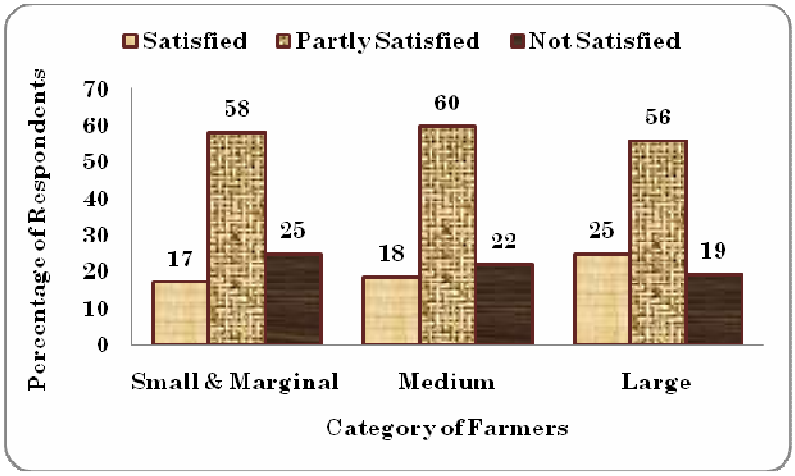


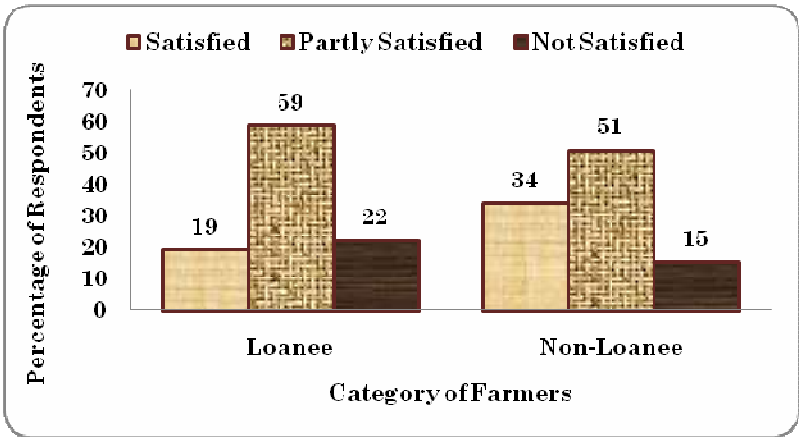


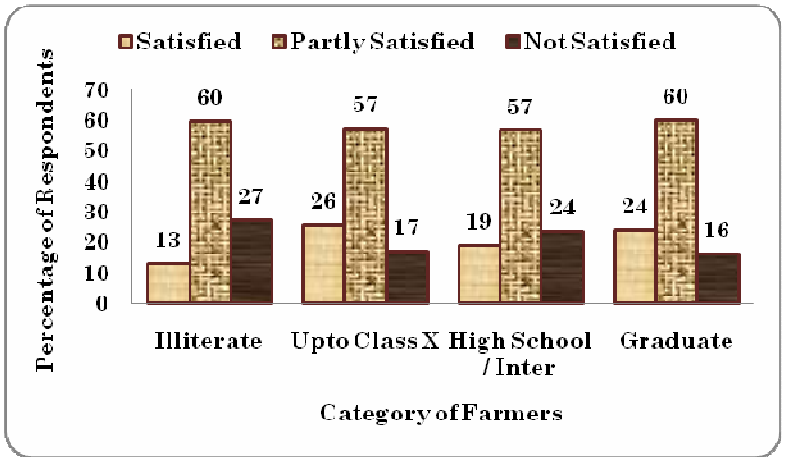
1.16 Satisfaction Analysis for Effectiveness of WBCIS in Avoiding Political Risk

NAIS has been critiqued to be prone to political manipulation and an alternative like WBCIS has been argued to emerge as a more stable scheme that is insulated against such manipulations or political risks. This hypothesis can be tested against the perceptions reported by the surveyed farmers. Around 20 per cent of the farmers surveyed approve of the superiority of WBCIS in avoiding political risks while land holding wise differences are not very striking. It may, however, be observed that the difference to the response for this question on satisfaction level is significantly different between the loanee and the loanee farmers, with the loanee farmers expressing lower satisfaction of 19 per cent and the non-loanee farmers expressing an almost double satisfaction level at 34 per cent. This hints at a possible air of insecurity among the loanee farmers who believe payouts under NAIS to be politically dictated and an alternative like WBCIS could perhaps be detrimental to future payouts. More educated farmers seem to be having a greater preference of WBCIS over NAIS in terms of isolation from political risks and these may be an outcome of the ability (or higher awareness) of the better educated farmers to better correlate past political events or vested interests in influencing payouts.


Satisfied
Partly Satisfied
Not Satisfied
Percentage of Respondents
70
60
50
40
30
20
10
0
21
58
21
30
46
24
30
40
30
26
63
11
13
56
31
Overall
SC
ST
OBC
General
Category of Farmers

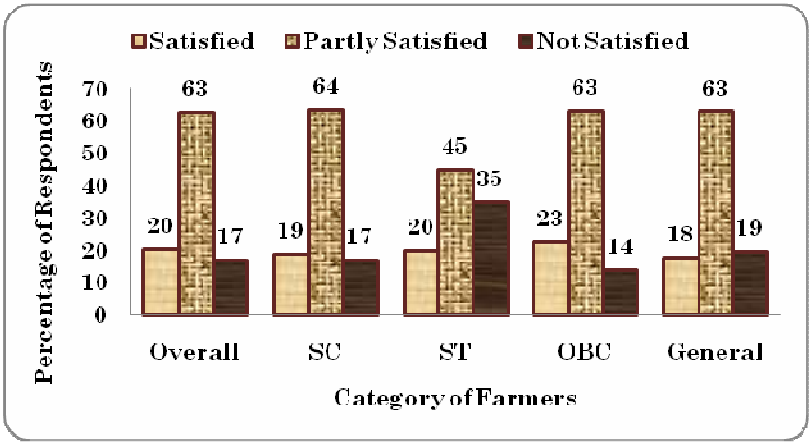

Satisfied
Partly Satisfied
Not Satisfied
Percentage of Respondents
70
60
50
40
30
20
10
0
17
58
25
18
60
22
25
56
19
Small & Marginal
Medium
Large
Category of Farmers

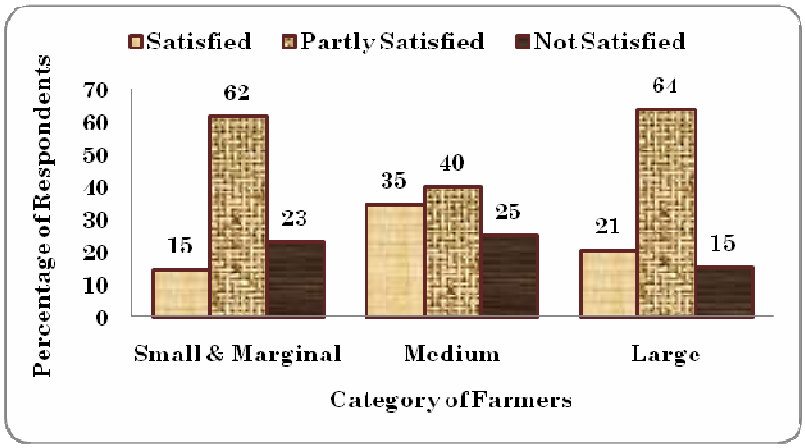

Satisfied
Partly Satisfied
Not Satisfied
Percentage of Respondents
70
60
50
40
30
20
10
0
19
59
22
34
51
15
Loanee
Non-Loanee
Category of Farmers

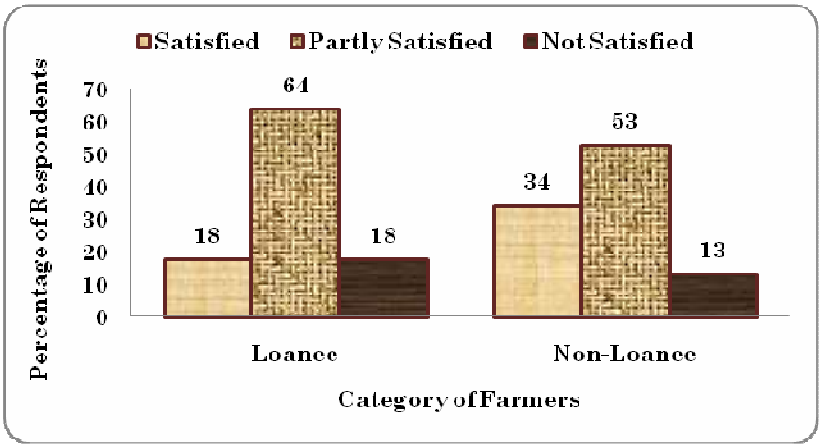


1.17 Satisfaction Analysis for Effectiveness of WBCIS as Protection against Crop Losses & Climate Change

Given the uncertainty around the effects of climate change on Indian agriculture, mostly the effects on crop yields, the responses given by farmers are reflective of their ignorance of the same and nature of assessments which are short-term in nature. This is evident from the very low satisfaction levels reported by illiterate farmers (4 per cent) as against the significantly higher levels reported by their more educated counterparts. The satisfaction levels around WBCIS as providing sound protection against crop losses and climate change stands around 20 per cent, without drastic variations among the different social groups or size class of landholding considered. Non-loanee farmers' assessment of the beneficial coverage provided by WBCIS is almost twice that of what the loanee farmers think (18 per cent). This can largely be explained by the 'bank loan' nature of NAIS where insurance comes attached with credit and the loanee farmers being habituated with a heavily subsidized comprehensive crop insurance scheme where the yield losses are calibrated against field based crop assessment losses unlike the WBCIS case.




Satisfied
Partly Satisfied
Not Satisfied
Percentage of Respondents
70
60
50
40
30
20
10
0
15
62
23
35
40
25
21
64
15
Small & Marginal
Medium
Large
Category of Farmers


Satisfied
Partly Satisfied
Not Satisfied
Percentage of Respondents
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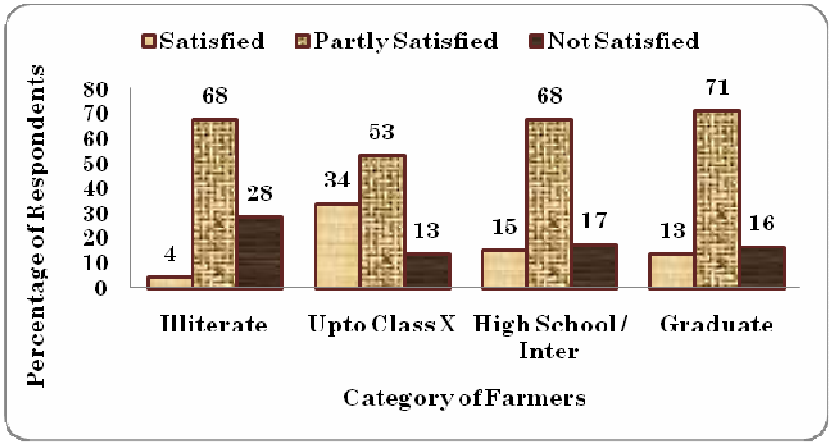
60
50
40
30
20
10
0
18
64
18
34
53
13
Loance
Non-Loance
Category of Farmers


Satisfied
Partly Satisfied
Not Satisfied
Percentage of Respondents
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70
60
50
40
30
20
10
0
4
68
28
34
53
13
15
68
17
13
71
16
Illiterate
Upto Class X
High School / Inter
Graduate
Category of Farmers

Annexure 2: Main Points from Interactions with Experts and Intermediaries

a. Affordability

There was a unanimous consensus among all the intermediaries interacted with, that weather insurance products currently being marketed in India are not affordable to the small and marginal farmers while the medium and big farmers might have the ability to pay though the willingness to pay does not seem to be evident given low percentage of multiple unit adoption hinting at non price factors depressing the demand for weather insurance among this market segment. Premium rates in excess of 10 per cent do not justify as a risk mitigation strategy for the vulnerable farmers if the frequency of payouts is not rationalized or the probability of the policy paying out or not payout is not properly communicated to the farming community. Based on its past experience with marketing rainfall insurance to thousands of farmers in Gujarat, Sajjata Sangh has succeeded in convincing NABARD to subsidize the premium for the Kharif 2010 season and investing in automatic weather stations. Farms of SEWA have also been provided low priced rainfall insurance for the last four years given the sensitivity of the landless agricultural labourers and small-holder farmers to premium rates (Cole et al 2009).

But the experts had differing views on the issue of the premium rates being high. Most identified the host of loadings to the actuarially fair premium being the factor that inflates the premium rate for the farmer. Basis risk and high cost of administering insurance to the rural clients drive the premium rates into the low affordability region. According to some of the weather insurance product design and delivery experts, unsubsidized weather insurance does not make sense for the small and marginal farmers in India today and the weather insurance sector is rife with pricing problems. Actuarial rates would be at least 3 to 4 times the average losses and the loading of administration and marketing charges makes the weather insurance products costly.

A few experts stressed the importance of subsidies in making agriculture insurance affordable in a developing country like India and why there is no need to subsidize the private insurance. Cross-subsidization is always going to happen. The poor end up subsidizing the rich or the small and marginal farmers subsidizing the bigger farmers is a reality of crop insurance. The fundamental problem is that the claims rate is high in agriculture insurance as agricultural shocks are covariate in nature. An important point that demands attention is the scope for insurers to differentiate on the basis of product and service attributes. On the importance of setting premium at affordable rates, the general view was that premium with fair loading is desirable. The claims probability in agriculture insurance is at a higher rate of 25 per cent or 30 per cent unlike other general insurance product categories where it is even as low as 0.03 per cent for some product lines. This idiosyncrasy should be factored into identifying loading factors that pull up the insurance price. The Government of India should not subsidize the policy by tax payers' money without taking into account these considerations and take note of the fact that the system of weighting is not transparent when the claims ratio is high as 80 per cent or 85 per cent on an average. Most of the agricultural insurance products have proportional reinsurance and the Government of India should be properly communicated about the actual pricing formula adopted by the insurer.

Reinsurers have been identified as important stakeholders who play an important role in determining the pricing for the insurer who directly underwrite the risk while role of TPAs has helped in data availability and claims management processes, which is in turn influences the loading factors and the actuarially fair premium or expected losses itself. The experts indicated that the pricing done by the insurers in India was transparent and all the stakeholders in the delivery system should be incentivized to deliver crop insurance affordably. The importance of having an 'actuarial regime' for NAIS should be highlighted and the weather based crop insurance schemes can then go alongside. Reduction in basis risk would introduce conducive reduction in the premium rates. Lowering down of the settlement region of NAIS and investing in weather infrastructure for better estimation of crop losses in weather insurance are critical for making the crop insurance market participation for farmers in India more cost effective.

b. Information Availability and Ease of Enrolment

The interaction with subject matter experts and intermediaries who actively work with farmers availing crop insurance and weather insurance, predominantly in the form of rainfall insurance, reveals huge gap existing with regard to explaining the working of the policy to clients with low educational attainment and limited exposure to sophisticated financial products and services.

The biggest challenges that the predominantly credit linked NAIS faces is the low level of awareness among farmers and lack of knowledge of the claims management mechanism. To complicate things, more sophisticated products like weather insurance have been launched without focusing on the need to educate the farmers with low financial literacy and limited financial experiences about sophisticated risk management products which are complex financial instruments. To evaluate the performance of the WBCIS vis-à-vis the NAIS, it is very important to gauge how sensitive are our farmers to the principles of insurance and subtle variations in the trigger and indemnification processes. BASIX's insurance experts reiterate the need for sprucing up availability of information about the policy mechanisms and the limitations of the insurance products during the marketing phase. NAIS being mandatory does not face the problems of being marketed, while the banking network could go a step further in raising the awareness levels.

AKRSP (I)'s experience is that farmers' inability to access insurance is a problem. Awareness about insurance scheme amongst the farmers is not that great. Illiteracy from farmers' side and lack of willingness from the companies has compounded the problems of the farmers. The same was iterated by Sajjata Sangh, which is a network of NGOs working in the space of natural resource management in Gujarat and which has been promoting Weather Insurance in the state over the last two Kharif seasons.

Experts from TNAU argue that the coverage of public crop insurance products is wider given that it is mandatory for the loanee farmers, but with limited success in terms of actual number of farmers covered and benefited, while the insurers have diversified with many weather insurance products, the coverage of which, however, has not shown much headway. Both yield and weather based insurance products have been delivered to the farmers of Tamilnadu who face problems of enrolment given farmers' poor understanding of the enrolment process and the claims management procedures.

According to Microensure, there is no system in place for systematic resolution of the farmers queries, making the enrolment process very inconvenient and most farmers lose interest in these insurance products if their queries are not timely addressed within a critical window of the agricultural planning period when the farmers could consider paying for the premium of a new or poorly understood product. Based on client interactions, it has been established that the pricing is not communicated properly to the buyers. The marketing teams are not even aware of the production communication challenges. The private insurers do not seem to be keen on village level meetings and awareness generation among farmers.

c. Coverage

On the coverage features of both NAIS and WBCIS, the experiences of the intermediaries and views of the experts revolve around the three important aspects of Sum Insured, Types of Risks Covered and Period of Coverage.

Some experts stressed on the fact that NAIS is needed for low probability extreme severity loss events. There are glaring exclusions in NAIS Coverage**.** NAIS is synonymous with 'Bank Insurance'. Non-loanee cultivators (NLCs) constitute less than 3 per cent of the total farmers covered under NAIS (cumulative) and cases of adverse selection with the inclusion of NLCs has been observed in Maharashtra and Chhattisgarh. It is worth noting that till 2006, there was not a single NLC in Andhra Pradesh as per the NAIS and only five farmers got covered through the financial institutions in the year 2006 (for coriander). For these Rs.2700 was the total premium collected where claims to the tune of Rs.30, 000 were settled. The coverage of NLCs is the highest in Maharashtra as the compulsion on NAIS being mandatory for the loanee farmers has been relaxed.

The seasonality discipline is an important aspect of administering crop insurance in the developing world. The NLCs face a tightened seasonality discipline with respect to their loanee counterparts which is deliberately enforced upon them to bring in more discipline to avoid misuse of crop insurance arising out of adverse selection. The shorter cut off dates (as mentioned in the guidelines) controls for bad risk farmers seeking insurance at a delayed stage e.g. Latur and Osmanabad in 2006 and 2007 which were consecutive drought years and crop failure was imminent, the farmers agitated and compelled the Government to extend the cut off dates to 31st August. The relaxations coincided with dry spells and assured pay outs. A law and order situation emerged with a terrific rush around the banks to get the declaration forms and proposal forms filled up and submitted as the pay outs were a sure thing. Such adverse selection needs to be averted.

The Hon'ble Finance Minister's announcement in the annual budget 2007 regarding premium subsidy in fact came in after due consideration of the scope of providing faster payouts to farmers incurring financial losses on account of adverse weather conditions. The premium rates of the two schemes have been kept at par to be an incentive compatible for the farmers, and in the long run as long as the actuarially priced insurance covers are not affordable to the small and marginal farmers in India, subsidies on the premium cannot be done away with. The concessional premium regime has to give way to the actuarial pricing regime gradually. Mostly annual commercial crops and horticultural crops, 50 per cent subsidy to start with, saw more commercial crop growers join the scheme. Over time there has been a drastic reduction in this premium support (10% in Kharif 2009), to the dismay of

the farming community. The actuarial rate of 8 to 9 per cent is a binding constraint for farmers.

Some experts believe that there are coverage issues in the crop insurance (NAIS) and the ideal approach should be improving the coverage of protection given to the entire yield rather than link them to crop loans only. The WBCIS pilots are very important to understand the problems in reaching out to a larger section of the farming community who are mostly unaware of the NAIS or have had bad experiences with it. It would also help us in a better understanding of the take-up behaviour as well as problems with multiple insurance purchases and repeat take-ups. Yield based insurance is very important in the Indian scenario given the volatility in crop yields given its sensitivity to monsoon and other natural calamities. Farmers should be given the option to choose between WBCIS and NAIS. Universal coverage should be pursued over the next few years and the farmers should have at least a sound coverage under any of the two schemes to ensure modest liquidity at bad times when they really need the pay outs. The experts opined that both WBCIS and NAIS need to be continued and extended to the uncovered communities. Some concerns have been raised about the products being complicated by the private insurers while AIC has improved in terms of its geographical coverage and commitment to cover more crops with every passing season. Discontinuing of the products by insurers has been a problem and it should be regulated against. The agriculture insurance sector should strive at introducing simple products, the farmers, state Government officials and functionaries at the grass root level should be able to objectively evaluate. Claim verification should be improved and 'plain vanilla' products should be available. Riskier products should be innovated upon and the farmers should be given an option to decide the additional level of risk cover given their risk exposure and ability to pay.

A few experts opined that the coverage gap persists in terms of number of farmers being reached out by crop insurance dictated by the focus on reaching out to the loanee cultivators and not the non-loanee cultivators in most cases. The weather insurance market is very thin in spite of the huge potential and untapped segments. Gaps in terms of coverage of Rabi crops and other horticultural and high value commercial crops demand attention as well. It is only by high payout frequency (without proportional increase in the premium because of higher payouts) is important to ensure higher take up. According to experts, two stakeholders in the weather insurance business who hold a key to scaling up weather insurance are reinsurers and third party administrators (TPA).

Discontinuation of products has been a major problem across all the areas where Weather Insurance had been introduced sometime or the other. Lessons from the health micro insurance delivery and product design can be incorporated into weather insurance. For instance, the notion of co-payment could well be a standard feature of weather insurance with the farmers bearing a certain critical percentage of the losses incurred. This would do away with problems associated with information asymmetry.

The sum insured needs special attention in the near future as the level of indemnification between input costs and output value should be attuned to local experiences. Farmers do not actually get whatever is shown as the maximum sum insured in each phase as for each phase there are caps on the payouts which are not transparently communicated to the farmers.

d. Basis for Settlement

Weather as basis for crop losses, location of weather station as an indicator of the weather experienced at the farm and design of insurance policy to reflect key productions were important areas that was discussed by all the intermediaries and experts.

The experts identified some important aspects of agricultural and farm insurance that need to considered seriously over the next five or ten years:

- The relationship between climate change and insurance effects are also not clear and various scenarios for agricultural insurance in India need to be studied.
- Horticulture and livestock insurance are important insurance segments whose penetration are very low and should complement crop insurance or weather insurance.
- Financial literacy and insurance education is important for sustainability of properly designed agricultural insurance schemes.
- The density of AWS and IMD observatories needs to be increased. This holds the key to better pricing of the risk products with maturity and introducing products based on other parameters.
- The correlation between crop yields and weather parameters need to be improved to address the problem of basis risk and instill faith in weather based insurance among the agricultural communities.

On the issue of weather infrastructure and need for immediate action to increase the investment in weather infrastructure in India, the most significant factors were identified by the officials of the India Meteorological Department (IMD). IMD aired the concern that basis risk is a major barrier to scaling up weather insurance in India. Around 32000 observatories would be required to bring in reference within 5 km radius and improve the representativeness of weather data suitable for designing weather insurance products. They raised questions pertaining to the management of the new weather stations or observatories installed and how the AMC and verification would be standardized. They also cited earlier interactions with the Ministry of Agriculture, Government of India on these lines. IMD is already providing Agromet advisory services in 130 stations apart from their free online forecast services for 5 days to the public.

The philosophy should be making use of the existing network of weather stations and observatories to design comprehensive covers and writing weather derivatives with the available weather parameters. Location specific data based on IMD observatories and AWS would take time. Other parameters need to be taken up to provide credence to weather insurance models. Modeling should integrate agro-meteorological and agronomic information and these call for more concerted inter-disciplinary efforts which do not seem to be happening today. Crop data generation should be in tandem with weather data collection. More collaborative research should be undertaken. The State Agricultural Universities (SAUs), field units and insurers should chalk out the operational modalities of such collaboration. Explaining the given scope of representation is important and so is conducting more simulations making use of data available from all the stations. In this

context, works by J.W. Hansen is deemed important where he has done simulations for Africa. Pilot simulation exercises need to be taken up on similar lines in India. The IMD officials stressed on the need for a Public-Private-Partnership (PPP) model to cover all the villages in India that make use of frontier science and technology in solving the problems of millions of farmers and the poorest of the poor.

e. Settlement Process

The intermediaries cited stylized facts of the state of reliability of weather data in claims settlement for weather insurance/WBCIS and the lags in the claims settlement process.

According to the experiences shared by BASIX, weather Infrastructure[10] and reliability of weather data are two limiting constraints in the Indian weather insurance markets today. Though the promise of weather insurance that the BASIX story is synonymous with faces serious doubts from skeptics in the farming community, academia and policy arena, it should be well understood that without proper support from the channel partners and feedback from the ultimate consumers i.e. the farmers, even a basic financial product like savings bank account cannot experience high adoption rates, leave aside a complex product like rainfall insurance.

Repeat take-ups have been suffering due to the claims not being declared timely and operations team opposing to marketing of rainfall insurance products. This hints at how the renewals cannot be sustained without continuous product improvements and constant support for the insurers. Number or volumes is what drive the private insurers to undertake new crops and new areas. All these years BASIX has had generic products and in other insurance lines has had a master policy approach. With BASIX acquiring a 'corporate agency' license, some regulatory challenges may crop up as IRDA regulation stipulates the corporate agency to carry on business with one insurer only. In that scenario, Royal Sundaram General Insurance Company has to start launching weather insurance products with BASIX and the current insurer ICICI Lombard will have to stay out of the weather insurance business with BASIX. These regulatory uncertainties are being sorted out.

Product development initiatives have stagnated and the area specific feedback from farmers has died out. The problem of marketing rainfall insurance has emerged in spite of the monetary incentives in place. The insurance agents have been paid a commission of 15% on the gross premium collected, but off late support from the channel partners are not forthcoming due to internal issues. After the 2003 pilots, the experience was conducive to growth to innovations and consumer satisfaction for a few years. Since 2007-08, no change in the product has happened and this situation has aggravated due to bad marketing

[10] BASIX has relied on weather data from IMD, NCMSL and Ingen Technologies weather stations and their officials believe, the best way to reduce basis risk is intensifying the network of rainfall measurement and monitoring systems. This can double as an important weather and crop advisory platform in the areas that are provided weather insurance as well.

experiences, mistiming of sales activities and insufficiency of products to cover the crop risks. The most important problem of 'basis risk' remains to be addressed. The generic products approach to BASIX's rainfall insurance business saw an exception in Chhattisgarh and Rajasthan where crop specific insurance was provided. BASIX has never collaborated with AICIL citing loyalty to its first insurer ICICI Lombard.

f. Limits to Weather Insurance

It is an irony that the USP of weather insurance or index-based rainfall insurance was its timely claim settlement (within 45 days of receiving weather data), but off late delays in settling claims have been reported. BASIX focuses on retail insurance business and given that rainfall insurance is another line of business and it is marketed along with other products like life insurance, livestock insurance etc. There is also a limit on the percentage of the total portfolio that can be crop loans (20 per cent for BASIX's portfolio) and out of BASIX's one million clients, only 15 per cent have been extended crop loans. Huge gaps in providing rainfall insurance to its crop loans clients exist and servicing other non-client pictures is not a priority for BASIX.

BASIX has been able to sell around 40,000 policies so far with claims to the tune of Rs.1 crore being processed so far. The Claims ratio has remained on the higher side of 50 to 60 per cent in the rainfall insurance business while it went up to as high a figure of 300 per cent in Kharif 2009 season.

Political risks are rampant in the agriculture insurance market. In Anantapur district, every farmer expects a payout as the crop insurance scheme has made it prone to receive payouts once in every two years. These perceptions of rainfall insurance as "rainfall lotteries" need to be tackled by strategic communication to the clients and better post sales service to differentiate index-based weather insurance from the more comprehensive crop insurance scheme. This knowledge can inform our choice in gradually choosing between NAIS and WBCIS in the near future.

g. Grievance Redressal

According to all the experts and stakeholders interacted with, it clearly comes out that in spite of a conducive regulatory environment for the promotion of micro insurance in general and weather based crop insurance in particular, a standardized protocol for response of insurance intermediaries on grievances and clearing of doubts regarding claims mechanisms for grievance redressal is conspicuous by its absence. This calls for the need for a crop insurance ombudsman and a mandatory communication of the possible ways of getting the grievances redressed for the consumers during the marketing of weather insurance policies. Having these red herrings and disclaimers in place would also necessitate the intermediaries and insurers to give more thought to educating their clients about the products and services they would end up paying for. This would create a win-win situation for all the parties to the contracts.

h. Overall Effectiveness

To gauge the overall effectiveness of WBCIS vis-à-vis NAIS, opinions on three critical aspects were thoroughly evaluated. These aspects are :

i. Usefulness of WBCIS as an Alternative to NAIS
ii. Effectiveness of WBCIS in avoiding political risks and manipulation of claims
iii. Effectiveness of WBCIS as a protection tool against crop losses and climate change

On the important question of whether doing away with NAIS makes sense, the unanimous response has been in the negative.

Most of the experts felt that no doubt weather insurance and WBCIS are very good products (with ample scope for product modification) the area yield crop insurance schemes are better given their coverage of losses. In spite of the high administration costs and the high cost incurred in loss assessment unlike the WBCIS, with lower correlation between rainfall and yield being established for the existing crops being covered, NAIS should definitely continue in its present form.

On the decision to continue or discontinue WBCIS, the unanimous consensus was that WBCIS should not be discontinued as it is a step in the right direction and as long as the problems in marketing insurance in rural markets persist, any agricultural insurance product would not be an exception. Given the low awareness among the NLCs and the inability of the rural banking system to deliver the mandated insurance, the insurers should improve the marketing outlets or build upon existing marketing channels. Other parameters need to be gradually developed, but having multiple perils covered under a single weather insurance product would complicate the matter. Most insurers also resist changes in product design drastically as the marketing agents need to be retrained regularly which might pull up administrative costs, and hence the premium. The uncertainty loading by reinsures needs to be curtailed to be capped.

The views of Swiss Re also reflect this idea of continuing with WBCIS and NAIS both. The products are fine in their philosophy and the product structuring needs to be more sensitive to the stakeholders across the value chain ensuring the simplicity and incentive compatibility. By having a transparent claims process system in place, the true demand for the services along with the efficiency of delivery mechanisms can be guaranteed.

The most important views on the overall effectiveness and the need for continuing both these schemes with substantial modification come from the study conducted by TNAU. The discussion with the farmers who were covered under different insurance products indicated that both yield as well as weather based insurance products were useful to them. However, these schemes need to be slightly refined so that they would be more effective. The following suggestions by farmers are deemed important for the success of agricultural insurance:

Annexure 3: Case Studies

To capture the essence of the barriers to scaling up crop insurance and weather insurance in Indian conditions, we highlight the cases of two important non-governmental groups actively working towards promoting agricultural risk management in India, namely Sajjata Sangh and AKRSP (I).

CASE 1: Sajjata Sangh, Ahmedabad, Gujarat

(i) **Name of the Entity:** Sajjata Sangh

(ii) **Legal Structure:** Network of NGOs

(iii) **Address:** C/O Development Support Centre, Nr. Govt. tube well, Bopal

(iv) **Name of Respondent:** Natu Macwana

(v) **Designation of Respondent**: Coordinator

(vi) **Contact No:** 09428826157

(vii) **No. of Farmers Served:** + 1500

(viii) **Experience in Insurance / Agriculture:** Implementing Sustainable Community based Approaches to Livelihood Enhancement (SCALE) Programme in Gujarat since last 8 years. Promoting Rainfall insurance in Gujarat since last three years

Please describe your background in the insurance/agriculture/finance/industry and your current role?

In order to better understand the barriers to scaling-up weather insurance, Sajjata Sangh had instituted a research study with the financial support from Aga Khan Foundation under SCALE program in the year 2006 on providing a cushion to the farmers against crop losses on account of weather vagaries by providing Rainfall Insurance cover to the farmers. Based on the study recommendations, 35 farmers were insured (covering 39 acres of land) against the crop losses on account of uncertain weather perils like inadequate and untimely rainfall in the operational area of its partner NGO SAVA (Saurashtra Voluntary Actions) in Jamnagar in 2006. In the same year, the farmers also got a claim of Rs. 1010 under volume cover. Taking forward this positive experience, SAVA mobilized 110 farmers to buy customized product, thereby insuring 180 acres of land under groundnut in 2007.

With financial support from OXFAM INDIA, Sajjata Sangh expanded its outreach by making Weather Insurance available in 425 villages of 8 districts and 25 blocks of the state. Eight partners were involved in promoting weather insurance which at present is available for three crops namely cotton, groundnut and maize for Kharif 2008 and 2009 season.

As a result of these efforts, 1377 farmers, of which 59% are small and marginal farmers and 9% are women farmers purchased rainfall insurance. Due to the strong follow up with regional and head office of AIC, it declared the claim in just 15 days after the completion of product stages. Out of the insured 1377 farmers, a total of 1277 farmers have received claim

under deficit and excess rainfall cover. A total sum of Rs. 17,98,000 was received as payout against the premium of Rs. 17, 92,101.

What are the three most influential trends facing the Indian Crop Insurance sector today? What other trends may become influential over the next 5-10 years?

Since traditional risk management strategies of the farmers fail against covariate weather shocks and the existing multi-peril crop insurance scheme (NAIS) has not performed satisfactorily in terms of its coverage of the predominant non-loanee farmers, weather insurance emerges as an important alternative.

During the annual budgets for F.Y. 2006-07 and 2007-08, the Finance Minister of India had allocated subsidy to the tune of INR 1 billion and INR 500 million respectively for giving thrust to this promising financial instrument for agricultural risk management. These announcements resulted in the implementation of the pilot Weather Based Crop Insurance Scheme (WBCIS) across select locations for specific crops since Kharif 2007. The idea was to provide insurance protection to the farmers against adverse weather incidence, such as deficit and excess rainfall, high or low temperature, humidity etc. which are deemed to impact adversely the crop production. Of the total premium, while a part thereof shall be payable by the insured cultivator, and the balance shall be borne by the Central Government and State Government on 50:50 basis and paid up-front to the insurer as Premium Subsidy. Under this scheme the risk incepts only upon the insurer's receiving of the full premium as per crop-group specific (wheat, cereals, millets, pulses, oilseeds, annual commercial/horticultural crops) premium slabs.

Owing to the high subsidy to the tune of 50%-75% of the actuarial premium, Weather Insurance in India has been tried by a large number of farmers in states across India with extremely impressive response in states like Bihar and Rajasthan. The positive response of farmers with provision of subsidy and premiums comparable to NAIS proves the indispensability of bringing Weather Insurance on an equal platform with the existing crop insurance scheme (area-yield crop insurance or NAIS) which is highly subsidized by the Government.

On account of its unique and significant benefits (like faster payouts, no need for costly crop cutting experiments to assess yield loss, factoring in separate risk covers for different phases of the crop phenology, unit based policies to enable the farmers to choose the number of policies as per perceived risk and ability to pay) vis-à-vis the traditional crop insurance (area-yield crop insurance), Weather Insurance holds a worthy proposition for a typical Indian farmer who is either oblivious of its traditional counterpart or has given up on it (area-yield crop insurance) due to its glaring limitations. The sum-insured for the loanee cultivators and non-loanee applicant cultivators as well as the payout mechanisms differ drastically. For the loanee cultivators, the crop insurance being mandatory, the premium for the notified crop is deducted from the farmers' sanctioned credit. The large number of non-loanee cultivators who are excluded from the formal credit delivery system are usually ignorant or have fallacious understanding of crop insurance. Practical challenges in delivering crop insurance to these needy sections of agricultural community remain to be addressed.

How do you assess the journey of Pilot Weather-based Crop Insurance Scheme (WBCIS) in India?

From its first pilot in India during 2003, weather-index based insurance has presented itself as a potentially useful risk mitigation instrument for farmers undertaking rainfed agriculture. The conceptual appeal of weather-index based insurance has elicited expectations of varying optimism, ranging from "Weather-index based insurance can also help alleviate chronic poverty (USAID 2006)" to "major input suppliers could offer this type of insurance product in order to increase reach and uptake (Hess and Syroka 2005)." It was hoped that weather-index based insurance would be tied to input credit thus enabling microfinance institutions (MFIs) in India to effectively lend to the farming community. Almost all the leading MFIs of India, with the exception of BASIX, Dhan Foundation and a few others, have been bypassing the Indian farmers because of the peculiar cash flows and the higher level of exogenous risks (predominantly weather risks) in farming. The continued neglect of farmers by such MFIs even with increased awareness and understanding of weather-index based insurance indicates a deeper concern regarding the efficacy of this instrument.

On the other hand, there exists few doubts regarding the relevance of weather-index based insurance for a subsistence farmer systematically exposed to the vagaries of weather. Skees (2007) acknowledges that the effects of weather risk are felt most acutely at the household level, particularly by poor, vulnerable agricultural households, the majority of which are subsistence farmers. Considering the significant number of pilots for weather-index based insurance in India, clear-cut indications of the acceptability of weather-index based insurance by Indian farmers as an effective measure to counter weather risks are still amiss. The question put forth by Cole et al. (2009) "Why don't more households participate when formal markets are available?" epitomizes the lack of clarity regarding willingness of farmers to adopt formal risk management instruments like weather-index based insurance.

In general, what are the 3 most significant challenges faced by WBCIS in India today?

Nevertheless, the three biggest challenges in scaling-up affordable weather insurance are:

a) designing a weather index with higher predictive capability to proxy crop losses taking into account the inter-farm variability at an acceptable level of disaggregation; and
b) the large 'basis risk' inherent in the rainfall index which is the most preferred and widely-adopted weather index in India.
c) products available have been skewed towards the major Kharif commercial crops in the region and affordable weather insurance for Rabi and other horticultural crops are lacking in the state.

These three challenges emphasize the need for innovations and experience-based initiatives revolving around designing and delivering a complex financial contract like Weather Insurance to a vast population of uninsured agricultural households (both cultivator and agricultural labourer households, or anyone whose livelihoods is intrinsically exposed to the vagaries of weather induced outcomes). Such initiatives have to integrate essential support services and value-added components that can lend sustainability to these initiatives through continued patronage by the client-farmers.

In general, what are the 3 most significant opportunities of WBCIS in the next 3-5 years?

The promotion of Weather Insurance in a sustainable manner would help inculcate a worthwhile practice among the farmers of Gujarat for protecting themselves against crop losses arising from an external, uncontrollable factor like weather and in the process contribute to securing their livelihoods by stabilization of their incomes. The need for financial support also emerges from the products being in a stage of infancy in terms of accuracy of the correlation between measured weather and realized yield losses given the lack of longer disaggregate location specific adequate weather parameter measuring and monitoring infrastructure. The premium also needs to be brought down gradually as the loadings in the insurance pricing reduce and administrative costs are rationalized by the insurer. This is possible with a scale that imparts higher geographical diversification of risk on the insurer's portfolio in the long run.

These products being very complex and given the limited financial experiences of the farmers (most of whom do not even have simple savings products and life and non-life insurance coverage is not universal) communicating the costs, benefits and design mechanism of weather insurance to farmers, the true demand for weather insurance remains deflated. We also hosted a first of its kind study of the determinants of rainfall insurance adoption by farmers in three talukas of Gujarat (Khambha in Amreli, Jambusar in Bharuch and Ghogha in Bhavnagar) in Kharif 2009 season. The study was supported by the ILO Micro insurance Innovation Facility. This study has given us a fair idea of the factors that influence farmers' adoption of weather insurance and the most important finding of the study, that promotional campaigns and training sessions for the farmers as done by Sajjata Sangh partner NGOs in the study talukas has a significant impact on take-up. Given the success of this study and the importance of similar initiatives elsewhere, ILO has started highlighting our study to their grantee communities and experts worldwide.

How do you assess the reliability and accuracy of Private/Third Parties providing weather data through automatic weather stations? How can these entities play a defining role in scaling up of WBCIS?

The single most important aspect that has emerged during the field research and pilots on Weather Insurance relates to the location of weather station based on which the proposed Weather Insurance contracts would be settled. The location of weather station for contract settlement has to be representative of the loss exposure of all the underlying farmer clients and, therefore, has to be finalized in consonance with the distribution of farmer clients covered under a common Weather Insurance contract. It is useful to always remember that there is a trade-off between the geographical coverage of a Weather Insurance pilot and the basis risk inherent in it due to the costs of weather stations. Therefore, it would always be useful to have 'geographically-focused' and 'location-intensive' pilots for optimizing the benefits of weather stations. Due to the high flexibility of location, proven reliability and timeliness of data supply by third-party weather stations, they are gaining increasing ground for Weather Insurance pilots. The agreements with Third-Party Weather Data providers have to be fairly meticulous for ensuring better returns from installation of farmer-location-specific weather stations. This is also imperative given the increased frequency of variations on account of microclimates within an agro-ecological zone and the data from this dense network of weather stations would also enable rationalization of risk mitigation and disaster

management programmes of the respective departments and the State Government/Central Government.

Earlier, the Government and the insurance company relied only on Indian Metrological Department (IMD) stations for recording of rainfall data. In Gujarat, there are only 16 IMD Centers established at various places which was increasing the geographical distance between our field areas to respective reference weather stations to as high as about 100 km. This unacceptable degree of basis risk defeats the very purpose of having weather insurance products sensitive to local conditions. Also historically, there have been different rainfall patterns in neighbouring talukas for instance - Mangrol and Mailiya in Junagadh district. Hence, the above mentioned respective IMD stations for our defined areas were not entirely reflective of the rainfall pattern in our field areas. After realizing the above fact, AIC agreed for other Government weather stations like agriculture universities, KVKs, GSDMA, irrigation department etc. to take as a reference weather station for recording of rainfall data.

Still there are some pockets of villages in some blocks which are at a distance of more than 40 km from the above agreed reference weather stations. To the extent practicable, such Reference Unit-Area shall be restricted to 10 km radius around the Reference Weather Station in case of rainfall. A higher radius of around 40 km is feasible for writing non-rainfall parametric insurance but for rainfall insurance products, a distance beyond 10 km makes the product impotent to deal with the experience of yield losses in the concerned areas.

CASE 2: Aga Khan Rural Support Programme (India) [AKRSP], Ahmedabad, Gujarat

(i) **Name of the Entity:** Aga Khan Rural Support Programme (India)

(ii) **Legal Structure:** Section 25 Company

(iii) **Address:** Aga Khan Rural Support Programme (India), 9th Floor Corporate House, Opp. Dinesh Hall, Off. Ashram Road, Ahmedabad-09, Gujarat

(iv) **Name of Respondent:** J P Tripathi

(v) **Designation of Respondent:** Area Manager (Gadu)

(vi) **Contact No:** 09825464902

(vii) **Total Full-time Employee Strength of Entity:** 235

(viii) **No. of Farmers Served:** 100000

(ix) **No. of Offices Operational in India:** 27 offices (Head Quarters in Ahmedabad)

(x) **Experience in Insurance** / **Agriculture:** 2 years

(xi) **Details of Experience in Agriculture Insurance** / **Crop Insurance:** Since 2008-09, we have been involved in preparation of the WBCIS product modules for our field area in Gujarat and MP on cotton, groundnut and soyabean crops with rainfall as the parameter for the weather. In 2009-10, we have implemented the WBCIS in our field areas of Gujarat for cotton and ground nut crops.

Please describe your background in the insurance/agriculture/finance/industry and your current role?

Other details are as above but as far as the present role is concerned, we are involved in disseminating the information about the product to the farmers in our field areas and in association with AIC we have helped in designing the weather insurance product for cotton, groundnut crops.

What are the three most influential trends facing the Indian Crop Insurance sector today? What other trends may become influential over the next 5-10 years?

Farmers' inability to access insurance*:* Awareness about insurance scheme amongst the farmers is not that great. Illiteracy from farmers' side and lack of willingness from the companies has compounded the problems of the farmers.

Lack of transparency in claims disbursement (in case of NAIS): The small number of farmers who are able to reach the insurance systems have stepped back as there is no transparency in settling of claims and if at all there are settlements, it takes years by that time calamity has taken its toll.

High premium rates (in case of WBCIS): The premium rates of WBCIS is very high in our area it costs between 9-16% and it is really high. Why cant these insurance schemes are designed like the medi-claim schemes where the premium rates are less than 1%.

What specific influence will these short & long term trends have on Crop Insurance sector in India in the next 3-5 years? Who will benefit the most from these changes?

This sector will have to innovate itself in order to save itself from getting lost. Innovation for mass awareness, easy services for small and marginal farmers and also on reducing the premium rates. It will definitely need support from Government.

Who is at greatest risk from these changes?

If changes do not happen for supporting the crop insurance sector and farmers reaching out for crop insurance in such a case it is the farmers who are at great risk – climate change patterns and no insurance is a big catastrophe in waiting.

How do you assess the journey of Pilot Weather-based Crop Insurance Scheme (WBCIS) in India?

It is like a refreshing cool wind in hot summers – having all the formula (designed very meticulously for crop and region, transparent calculation methods, fast claim disbursements) for success except the premium rates.

Where do you see WBCIS in the next 3-5 years?

It is bound to grow provided premium rates are reduced and focus given on its proper extension amongst the farmers.

How do you assess the delivering ability of WBCIS compared to that of Area Yield Insurance (NAIS)?

Although it covers lesser risk but it has the capacity to grow big. Comparing it with NAIS is quite premature and inappropriate. NAIS is hugely subsidized on the other hand WBCIS is not, even their presence in the market is also different, but as said earlier WBCIS is there to stay provided it is taken care of properly.

In general, what are the 3 most significant challenges faced by WBCIS in India today?

- Lack of weather automated stations at block levels – we need at least two stations per block/ taluka
- High premium rates
- Lack of a good extension mechanism

In general, what are the 3 most significant opportunities of WBCIS in the next 3-5 years?

- Wide area pilots has created some swirl in various parts of the country, which should lead to easy expansion
- Scope for Innovation in designs
- Can be adopted by small farmers as well even if he is not accessing the bank loans

What farmer needs related to Crop Insurance are not being addressed effectively today?

A good comprehensive cover from – weather perils and market fluctuations

What are the main challenges to the repeat purchase of WBCIS?

No package schemes available – current design address the farmers' need of three months. It has to be designed for multiple years and multi season (Kharif, Rabi and Summers).

How can these challenges be overcome?

Making year round risk cover available for farmers on the various crop combinations they grow and installation of automatic weather stations in every block. Of course with affordable premium rates.

What could be done to leverage technology for improving the accuracy of WBCIS and NAIS?

For any insurance scheme, it is important to establish the transparency in deciding claims and keeping political influence out.

In terms of WBCIS, what drives the farmer's purchase decision-making process?

Premium rates and weather station location.

From your perspective, what could an Insurance Company underwriting Crop Insurance do to bring greater value to insurance intermediaries?

- Good extension mechanism
- Low premium rates
- Comprehensive risk cover
- Fast grievances redress mechanism

How do you assess the reliability and accuracy of Private/Third Parties providing weather data through automatic weather stations? How can these entities play a defining role in scaling up of WBCIS?

We have found them quite reliable (we were linked with NCSML). They definitely have a good role to play as it will take years for Government to establish the automatic weather stations and even if they do, its maintenance and accuracy will remain a sector where these agencies will have to be involved. In such a condition, the third parties can play a very good role. But under current, they are charging very hefty price for weather station and data (5000/month /station).

What do you suggest to derive the best benefits from NAIS and WBCIS, considering their respective strengths? In case these are to co-exist, what needs to be done to facilitate farmers in defining the future role for these two variants?

WBCIS will need heavy investments form Government firstly for installation of the station and on the other hand in subsidizing the premium rates. Once the above is done, farmer will have good risk cover for their inputs and also for their output (large samples are taken for calculating the production losses in a region in a transparent manner).

Annexure 4: List of NGOs / Micro Finance Institutions (MFIs) / Insurance Brokers / SAUs /Subject Matter Experts Covered during Primary Research

S. No.	Name of Institution / Name of Officials interacted with*	Category (NGO/MFI/Broker/SAU/ Subject Matter Expert)
1.	Krushi, Hyderabad Mr. Premchand, GM	NGO/MFI
2.	BASIX, Hyderabad Mr. A. Satheesh, Head (Insurance), Mr.Venu P., AM and Mr. Vatsal Joshi, Consultant (Micro Insurance)	NGO/MFI
3.	Microensure / Micro insurance Agency, Hyderabad Dr. G.Srinivasa Rao, Head, Agriculture Risk Management and Insurance	Micro Insurance Intermediary
4.	Centre for Agriculture and Rural Development Studies (CARDS), Tamilnadu Agriculture University, Coimbatore Dr. M. Chandrasekaran, Professor and Head, Deptt. Of Agriculture Economics Dr. K. Mani, Prof. Agri. Econ. Dr. R. Venkataraman, Prof ARM Dr. D. Suresh Kumar, Assoc. Prof, Agri. Econ.	SAU
5.	India Meteorological Department (IMD), Pune Shri H.R.Hatwar, Additional DGM Dr. R.P.Samui (Dy.DGM) Dr. N. Chattopadhyay, Director, Agro Met, IMD	Technical Institution
6.	Indian Agricultural Research Institute, Division of Environmental Sciences, Delhi Dr. P.K. Aggarwal, National Professor	Research Institution
7.	Yes Bank, Mumbai Mr. A. Chakravarthy	MFI/Broker
8.	Sajjata Sangh, Ahmedabad Mr. Natu Macwana, Coordinator	NGO/MFI
9.	The Aga Khan Rural Support Programme in India [AKRSP (I)], Ahmedabad Mr. Apoorva Oza, CEO	NGO/MFI
10.	Self Employed Women's Association (SEWA), Ahmedabad Ms. Reemaben Nanavaty, Director, Economic and Rural Development Programme Ms. Chhaya Bhavsar, District Coordinator of Bodeli District, Gujarat, *SEWA*/Project Manager, CMF-*SEWA* Weather Insurance Project	NGO/MFI
11.	Centre for Insurance and Risk Management(CIRM), Institute for Financial Management and Research (IFMR), Chennai Ms. Rupalee Ruchismita, ED	Subject Matter Experts
12.	Centre for Sustainable Agriculture (CSA), Hyderabad/Wardha Mr.Vijay Barapatre, Coordinator Mr. Chandrashekhar Dorlikar, Coordinator	Sustainable Farming and Traditional Insurance Mechanism Experts
13.	Gokhale Institute of Politics and Economics(GIPE), Pune Dr. Rajas Parchure, Director in Charge	Subject Matter Expert

14.	Swiss Re, Mumbai Ms. Harini Kannan, VP, Weather and Environmental Risk	International Reinsurance Company
15.	Dr. Shawn Cole, Harvard Business School, USA	Subject Matter Expert
16.	Dr. Jeremy Tobacman, Wharton Business School, USA	Subject Matter Expert
17.	College of Agriculture and Banking (CAB), RBI, Pune Faculty Members	Training & Research Institution
18.	Dr. Dewan Singh, Prof. & Head, Department of Agricultural Meteorology, Haryana Agricultural University, Hisar	SAU
19.	Dr. G.S. Bains, Prof. & Head, Department of Agricultural Meteorology, Punjab Agricultural University, Ludhiana	SAU
20.	Dr. V.P.N. Singh, Prof. & Head, Department of Agronomy, Chandra Shekhar Azad University of Agriculture & Technology, Kanpur	SAU
21.	Dr. Abdus Sattar and Dr. N.K. Choudhary, Head, Department of Agronomy, Rajendra Agricultural University, Samastipur, Bihar	SAU
22.	Dr. P.S. Dharamraj, Project Director, Agriculture Research station, University of Agricultural Sciences Gulbarga	SAU
23.	Dr. Raju Teggelli, Programme Coordinator, Krishi Vigyan Kendra, University of Agricultural Sciences, Gulbarga	SAU/KVK
24.	Dr. Venkatesh Chief, Agro Climatology Division, RARS, University of Agricultural Sciences, Bijapur	SAU
25.	DCM Shriram Consolidated Ltd (DSCL), New Delhi Mr. Saket Jain, CFO	Brokers
26.	JB Boda Group, Mumbai Mr. P.P.Rao, General Manager Mr. Varun, JB Boda Reinsurance Group	Brokers
27.	Centre for Microfinance (CMF), Chennai Mr. Justin Oliver, Executive Director	Weather Insurance Operations Expert
28.	Mr. Nirupam Datta, Research Scholar, Indira Gandhi Institute for Developmental Research (IGIDR), Mumbai	Agricultural Economics Expert

*excluding officials of State Government and implementing insurance companies

Annexure 5

Report on Additional Aspects indicated by Additional Secretary (Credit & Coop.), Ministry of Agriculture, Government of India during the meeting held on 23.6. 2010

I. Comparative Analysis of Weather Insurance Products of AIC and ICICI Lombard

Study of Rainfall Insurance Contracts implemented in Rajasthan during Kharif 2009

A comparative analysis of rainfall insurance products of AIC and ICICI Lombard can serve the following key objectives:

a) To understand the strengths and weaknesses in the design of rainfall insurance contracts offered by these insurers

b) To understand the reasons for variation in the payout frequencies of the rainfall insurance contracts offered for the same location

c) To determine the economic value offered by the rainfall insurance contracts of AIC and ICICI Lombard

Among the Indian states that have made the greatest progress under the pilot WBCIS scheme, Rajasthan can be regarded as the leader both in terms of outreach and penetration. The Kharif 2009 season turned out to be the worst in India during the last 27 years. Western India, particularly Rajasthan, suffered badly from drought. 26 out of the 33 districts in Rajasthan were declared as drought-affected during Kharif 2009. This debilitating season provided an opportunity for rainfall insurance to prove its benefits for farmers. Based on the data provided by AIC and ICICI Lombard related to their rainfall insurance contracts for Rajasthan during Kharif 2009, the following contracts are analyzed below for meeting the objectives outlined above.

i) Groundnut and Maize rainfall insurance for Chittorgarh

ii) Guar rainfall insurance for Jodhpur and Jaisalmer

The term sheets and payout table for the above contracts are provided as Annexure to this note.

Fundamental Design of Rainfall Insurance Contracts

The involvement of designated agencies of the State Government in the administration of WBCIS has led to the standardization of the fundamental design of WBCIS products. Since weather insurance is aimed at protecting farmers against agricultural production risks, there has been undue emphasis on the opinion of agricultural experts for suggesting and reviewing product designs of weather insurance contracts. Weather insurance products lie at a crossover of agriculture, statistics, meteorology, and financial economics, each of which is a specialized field of knowledge with limited expertise available. In the absence of an integrated and specialized evaluation of weather insurance products, there are flagrant weaknesses that abound in the contracts offered under the Pilot WBCIS scheme.

Table 1: Comparison of Designs of Groundnut and Maize Contracts for Chittorgarh

Design Feature	Groundnut		Maize	
	AIC	ICICI LOMBARD	AIC	ICICI LOMBARD
Sowing Trigger/Cover	N	N	N	N
Variable/Dynamic Start Dates	N	N	N	N
Deficient Rainfall Volume Cover	Y	N	Y	Y
Multiple Strike/Trigger values for Deficient Rainfall Covers	Y	Y	Y	Y
Rainfall Distribution / Dry Spell Cover (CDD)	Y	Y	Y	N
Deficient Rainfall Volume Cover Start Day	21 June	-	21 June	25 June
Deficient Rainfall Volume Cover End Day	30 Sept	-	30 Sept	29 Oct
Rainfall Distribution / Dry Spell Cover Start Day	1 July	1 July	1 July	-
Rainfall Distribution / Dry Spell Cover End Day	31 Aug	10 Sept	31 Aug	-
Dry Day Rainfall Threshold (in mm per day)	2.5	0	2.5	-
Consecutive Dry Day Strike (Days)	20	19	20	-
Consecutive Dry Day Exit (Days)	30	60	30	-
Percentage of Max Payout for 31 Consecutive Dry Days	100	12	100	-
Percentage of Max Payout for 10 mm Rainfall Volume in Phase 1	74	-	75	17
Percentage of Max Payout for 10 mm Rainfall Volume in Phase 2	89	-	88	84
Percentage of Max Payout for 10 mm Rainfall Volume in Phase 3	83	-	67	37
Excess Rainfall Index	Daily	Two-day	Daily	Fortnightly &

Design Feature	Groundnut		Maize	
	AIC	ICICI LOMBARD	AIC	ICICI LOMBARD
Computation Period				more
Percentage of Max Payout for 120 mm Rainfall Volume on any 1 Day after 15 Sept	100	40	100	0

Key: Y- Yes; N-No

Key Observations based on Table 1:

- AIC has offered both deficient rainfall volume and deficient rainfall distribution (Consecutive Dry Days or CDD) covers in the contracts for groundnut and maize in Chittorgarh. On the other hand, ICICI Lombard has offered only one of the two deficient rainfall covers as part of the contracts for groundnut and maize in Chittorgarh.

- Sowing dates have a proven and significant influence on the occurrence of subsequent crop stages and their durations. For the Kharif season, the sowing date is a function of sowing rainfall which varies from location to location. For all the four contracts analyzed above, the sowing dates for all the insured plots have been deemed to be the same. This is incompatible with the ground realities where farmers within the same village are seen to be sowing their crops on different dates. Variation in sowing dates leads to different start dates for subsequent crop stages which follow sowing.

- Consecutive Dry Days (CDD) cover is one of the two deficient rainfall covers and is aimed at insuring farmers against long dry spells that may culminate into losses from moisture stress. Under this cover, farmers will be indemnified for dry spells if there are 'X' number of consecutive days with daily rainfall lower than 2.5 mm (for AIC) or equal to 0 mm (for ICICI Lombard). If there is a rainfall incrementally greater than 2.5 mm (for AIC) or 0 mm (for ICICI Lombard) just 1 or 2 days before 'X' number of consecutive dry days are over, farmers will not be entitled to any insurance payout on account of dry spells (or moisture stress, in effect). It is worth considering as to how a rainfall of less than 5 mm can compensate for the moisture stress of a period as long as 18-20 days or more. Furthermore, for such small quantum of rainfall (< 5 mm), the probability of lower rainfall received by most farms within the insured area will also be quite high. Covers as this one, reduce the insurance of the farmer to a largely discrete, binary (payout/no payout) outcome which is not representative of the nature of loss experience (continuous variable) in the farmers' fields. Consecutive dry days cover is an extremely useful cover but its definition and implementation under the pilot WBCIS have largely made it akin to a rainfall lottery. In case of the CDD covers provided by ICICI Lombard, it is staggering to know that even 31 consecutive days of zero rainfall entitle an insured farmer to 12% of

sum assured under this cover whereas a farmer opting for the CDD covers from AIC could easily claim 100% of maximum payout for this cover.

- Rainfall volume cover protects farmers against crop losses from stage-wise rainfall falling below a threshold quantity (in mm). The threshold quantity under rainfall volume cover can be either the normal stage-wise rainfall or a critical rainfall required for sustenance of the crop against severe moisture stress. Normal stage-wise rainfall values are usually provided in scientific literature like crop calendars, agro-meteorological publications. Critical rainfall for sustenance against severe moisture stress is highly preferred by insurers as the threshold quantity under the rainfall volume cover. The limitation of using critical rainfall for sustenance as the threshold quantity vis-à-vis normal stage-wise rainfall is that the former is mostly a small percentage of the latter. For example, the threshold quantity for the third phase of the maize rainfall insurance for Chittorgarh is 50 mm for AIC (for a 41 day phase) and 80 mm for ICICI Lombard (for a 75 day phase).

- Multiple trigger or strike values are used by both AIC and ICICI Lombard to modulate payout rates / notional. A tendency to keep payout rates / notional considerably high near the exit value is a common practice. However, sometimes the differences in payout rates/notional for various levels of trigger/strike values becomes too lopsided. Under the deficient rainfall volume cover offered by ICICI Lombard for maize in Chittorgarh, a farmer-subscriber was entitled to a mere 17% and 37% of the maximum sum assured for Phase 1 and Phase 3 when the total rainfall in each of these phases would have been just 10 mm. The corresponding percentage of maximum sum assured payable under a similar cover by AIC would have been 75% (for Phase 1) and 67% (for Phase 3) respectively.

- Heavy and continuous rainfall within a short period of 1/2/3 days can cause damage to most Kharif crops. Excess rainfall cover tries to provide protection to farmer against such unfavorable rainfall events. Excess rainfall cover may also include coverage for untimely rainfall which, in case of Kharif crops, may take place during stages like flowering and harvest. Nevertheless, continuous and heavy rainfall is a more potent threat during the Kharif season and constitutes a major worry of farmers. Continuous and heavy rainfall for more than 3 consecutive days is a relatively rare phenomenon. An excess rainfall cover should preferably encompass 1-day excess rainfall followed by excess rainfall events over 2 and 3 successive days. It is surprising that the definition of excess rainfall in some Kharif weather insurance covers is so anomalous that they treat a cumulative rainfall of more than 150 mm during a 44 day period as excess rainfall.

- A review of the excess rainfall covers offered for groundnut and maize in Chittorgarh indicates that AIC has considered the daily rainfall as the index for excess rainfall whereas ICICI Lombard has considered the cumulative rainfall during any two consecutive days as the excess rainfall index for groundnut and total rainfall during a 75-day period as the excess rainfall index for maize. Assuming a 120 mm rainfall on any one day after 15 September till end of excess rainfall cover period, the percentage of maximum payout payable to an insured farmer is 100% of maximum sum assured (for excess rainfall cover) under both contracts of AIC. Taking the same conditions, the excess rainfall covers by ICICI Lombard entitle the farmer-subscribers to 40% of maximum sum assured under the groundnut contract and 0% of maximum sum assured for the maize contract.

Table 2: Comparison of Designs of Guar Contracts for Jodhpur and Jaisalmer

Design Feature	Jodhpur		Jaisalmer	
	AIC	ICICI LOMBARD	AIC	ICICI LOMBARD
Sowing Trigger/Cover	N	N	N	N
Variable/Dynamic Start Dates	N	N	N	N
Deficient Rainfall Volume Cover	Y	N	N	N
Rainfall Distribution / Dry Spell Cover (CDD)	Y	Y	Y	Y
Deficient Rainfall Volume Cover Start Day	1 July	-	-	-
Deficient Rainfall Volume Cover End Day	30 Sept	-	-	-
Rainfall Distribution / Dry Spell Cover Start Day	1 July	25 July	1 July	1 July
Rainfall Distribution / Dry Spell Cover End Day	31 Aug	31 Aug	31 Aug	10 Sept
Dry Day Rainfall Threshold (in mm per day)	2.5	0	1.0	0
Consecutive Dry Day Strike (Days)	28	19	35	29
Consecutive Dry Day Exit (Days)	42	37	45	70
Percentage of Max Payout for 35 Consecutive Dry Days	50	30	15	4
Percentage of Max Payout for 10 mm Rainfall Volume in Phase 1	20	-	-	-
Percentage of Max Payout for 10 mm Rainfall Volume in Phase 2	54	-	-	-

Percentage of Max Payout for 10 mm Rainfall Volume in Phase 3	10	-	-	-
Excess Rainfall Index Computation Period	Daily	Two-day	Daily	Two-day
Percentage of Max Payout for 100 mm Rainfall Volume on any 1 Day after 15 Sept	66	0	100	65

Key Observations based on Table 2:

- AIC has offered both deficient rainfall volume and deficient rainfall distribution covers for guar in Jodhpur while it has offered only deficient rainfall distribution cover (CDD) for guar in Jaisalmer. On the other hand, ICICI Lombard has offered only deficient rainfall distribution cover (CDD) as part of the guar contracts for Jodhpur and Jaisalmer.

- For all the four guar contracts analyzed above, the sowing dates for all the insured plots have been deemed to be the same.

- In case of the CDD covers provided by ICICI Lombard, a spell of 35 consecutive days of zero rainfall entitles an insured farmer to 30% of maximum sum assured (under CDD cover) for Jodhpur and 4% of maximum sum assured for Jaisalmer. For AIC, a dry spell of 35 consecutive days entitles the farmer to 50% of maximum sum assured for Jodhpur and 15% of maximum sum assured for Jaisalmer.

- Under the deficient rainfall volume cover offered by AIC for guar in Chittorgarh, a farmer-subscriber was entitled to a mere 20% and 10% of the maximum sum assured for Phase 1 and Phase 3 when the total rainfall in each of these phases would have been just 10 mm. This indicates the difficulty of insuring a reasonable amount of rainfall volume in the given premium limits set under WBCIS. Regions with different levels of systemic rainfall have to be classified and provided different levels of premium subsidy support under WBCIS to maintain reasonableness in design of rainfall insurance contracts.

- A review of the excess rainfall covers offered for guar in Jodhpur and Jaisalmer indicates that AIC has considered the daily rainfall as the index for excess rainfall whereas ICICI Lombard has considered the cumulative rainfall during any two consecutive days as the excess rainfall index. Assuming a 100 mm rainfall on any one day after 15 September till end of excess rainfall cover period, the percentage of maximum payout payable to an insured farmer from AIC is 66% and 100% of maximum sum assured (for excess rainfall cover) under guar contracts for Jodhpur and Jaisalmer. Taking the same conditions, the excess rainfall covers by ICICI Lombard entitle the farmer-subscribers to 0 % of

maximum sum assured under the guar contract for Jodhpur and 65% of maximum sum assured under the guar contract in Jaisalmer.

Payout Frequencies for Rainfall Insurance Contracts

The payout frequency of an insurance contract is more easily understood in terms of the payout cycle or the return period for payout. The payout cycle or return period indicates the average number of years in which an insurance contract has yielded a payout historically. For a more comprehensive assessment, the payout cycles or return periods corresponding to various levels of payout can be calculated and compared for different insurance contracts. Such an exercise has been done below for the contracts analyzed in the previous section.

Table 3: Comparison of Payout Cycle for Groundnut and Maize Contracts for Chittorgarh

Feature	Groundnut		Maize	
	AIC	ICICI LOMBARD	AIC	ICICI LOMBARD
No. of Years Considered	26	44	26	44
No. of Payout Years	16	10	17	25
Policy Limit (INR)	13,000	15,000	15,000	13,500
Payout Cycle (in Years) for Payout > INR 0	1.6	4.4	1.5	1.8
Payout Cycle (in Years) for Payout > 1% of Policy Limit	1.7	4.9	2.7	2.1
Payout Cycle (in Years) for Payout > 2.5% of Policy Limit	2.4	14.7	4.3	4
Payout Cycle (in Years) for Payout > 5% of Policy Limit	8.7	22	5.2	5.5
Payout Cycle (in Years) for Payout > 10% of Policy Limit	13	Undefined	6.5	Undefined
Payout Cycle (in Years) for Payout > 15% of Policy Limit	13	Undefined	8.7	Undefined
Payout Cycle (in Years) for Payout > 20% of Policy Limit	Undefined	Undefined	26	Undefined
Payout Cycle (in Years) for Payout > 25% of Policy Limit	Undefined	Undefined	Undefined	Undefined

Key Observations based on Table 3:

- Considering the groundnut contract for Chittorgarh, the payout cycle for a payout (irrespective of its quantum) is 1.6 years for AIC and 4.4 years for ICICI Lombard. This indicates that a payout under the groundnut contract for Chittorgarh, on an average, takes place every 1.6 years in case of AIC and every 4.4 years in case of ICICI Lombard. Regarding the maize contract for the same location, the payout cycle for both insurers is more comparable being 1.5 years for AIC and 1.8 years for ICICI Lombard.

- Moving on to the payout cycles for payout levels exceeding 1%, 2.5% and 5% of the corresponding policy limits, the payout cycle for groundnut contract in Chittorgarh increases to 1.7 years, 2.4 years and 8.7 years for AIC whereas it is significantly higher at 4.9 years, 14.7 years and 22 years for ICICI Lombard. The payout cycles of the groundnut contract from AIC are much shorter than those of the contract from ICICI Lombard. A shorter payout cycles would manifest into higher frequency of payout.

- For the maize contract in Chittorgarh, the payout cycles for the same level of payouts are 2.7 years, 4.3 years and 5.2 years for AIC while they are 2.1 years, 4 years and 5.5 years for ICICI Lombard. The maize contract from ICICI Lombard has a lower payout cycle compared to AIC at lower levels of payout (1% and 2.5% of policy limit) while it becomes higher at the level of 5% of the policy limit.

- At the payout level of 10% of the policy limit, the payout cycles under both the contracts from ICICI Lombard become infinite, indicating the absence of any payout exceeding 10% of policy limit, as per the historical payout distribution. For AIC, the payout cycles at this level are 13 years for its groundnut contract and 6.5 years for its maize contract.

- At the payout level of 15% of the policy limit, the payout cycles for the groundnut and maize contract of AIC for Chittorgarh are 13 years and 8.7 years respectively.

- At the payout level of 20% of the policy limit, all the contract except the maize contract of AIC indicate an undefined return period. The maize contract of AIC shows a return period of 26 years for a payout equivalent to 20% of the policy limit.

- No contract has a finite payout cycle for payout levels exceeding 25% of policy limit highlighting the fact that there are no historical incidences of payout greater than 25% of the policy limit for any of the four contracts.

Table 4: Comparison of Payout Cycle for Guar Contracts in Jodhpur and Jaisalmer

Feature	Jodhpur		Jaisalmer	
	AIC	ICICI LOMBARD	AIC	ICICI LOMBARD
No. of Years Considered	25	39	23	46
No. of Payout Years	18	15	11	18
Policy Limit (INR)	10,000	15,000	10,000	15,000
Payout Cycle (in Years) for Payout > INR 0	1.4	2.6	2.1	2.5
Payout Cycle (in Years) for Payout > 1% of Policy Limit	2.1	2.6	2.3	2.5
Payout Cycle (in Years) for Payout > 2.5% of Policy Limit	2.1	5.6	3.3	11.5
Payout Cycle (in Years) for Payout > 5% of Policy Limit	2.5	13	3.8	15.3
Payout Cycle (in Years) for Payout > 10% of Policy Limit	3.1	39	4.6	15.3
Payout Cycle (in Years) for Payout > 15% of Policy Limit	6.25	Undefined	4.6	46
Payout Cycle (in Years) for Payout > 20% of Policy Limit	12.5	Undefined	7.7	46
Payout Cycle (in Years) for Payout > 25% of Policy Limit	12.5	Undefined	23	46
Payout Cycle (in Years) for Payout > 30% of Policy Limit	Undefined	Undefined	23	46
Payout Cycle (in Years) for Payout > 35% of Policy Limit	Undefined	Undefined	Undefined	46

Key Observations based on Table 4:

- Examining the guar contract for Jodhpur, the payout cycle for a payout (irrespective of its quantum) is 1.4 years for AIC and 2.6 years for ICICI Lombard. This indicates that a payout under the guar contract for Jodhpur, on an average, takes place every 1.4 years in case of AIC and every 2.6 years in case of ICICI Lombard. Regarding the guar contract for Jaisalmer, the payout cycle for both insurers is more comparable being 2.1 years for AIC and 2.5 years for ICICI Lombard.

- Moving on to the payout cycles for payout exceeding 1%, 2.5% and 5% of the corresponding policy limits, the payout cycles for guar contract in Jodhpur increase to 2.1 years, 2.1 years and 2.5 years for AIC whereas these are at 2.6 years, 5.6 years and 13 years for ICICI Lombard. The payout cycles of the guar contract for Jodhpur from AIC become shorter at higher payout levels compared to those of the contract from ICICI Lombard.

- For the guar contract of Jaisalmer, the payout cycles for the same level of payouts are 2.3 years, 3.3 years and 3.8 years for AIC while they are 2.5 years, 11.5 years and 15.3 years for ICICI Lombard. The payout cycles of the guar contract for Jodhpur from AIC become shorter at higher payout levels compared to those of the contract from ICICI Lombard.

- At the payout level of 10% of the policy limit, the payout cycles of all the four contracts (from both AIC and ICICI Lombard) remain finite unlike in the case of the contracts for Chittorgarh analyzed in the previous section. For the guar contracts of Jodhpur and Jaisalmer, the payout cycles are 3.1 years and 4.6 years respectively in case of AIC whereas they are significantly higher at 39 years and 15.3 years respectively. The payout cycle for guar contract of ICICI Lombard for Jaisalmer becomes constant at 46 years till the payout level of

- At the payout level of 15% of the policy limit, the guar contract of ICICI Lombard for Jodhpur starts showing an undefined payout cycle. At this payout level, the payout cycle of the guar contract of ICICI Lombard for Jaisalmer becomes 46 years which remains constant till the contract reaches a payout level of slightly more than 37.5%. In case of the contracts of AIC for Jodhpur and Jaisalmer, the payout cycles are 6.25 years and 4.6 years respectively at payout level of 15% of policy limit; 12.5 years and 7.7 years at payout level of 20% of policy limit; 12.5 years and 23 years respectively at payout level of 25% of the policy limit.

- At the payout level of 30% of the policy limit, the payout cycle for the Jodhpur contract of AIC becomes undefined whereas it is 23 years for the Jaisalmer contract of AIC. When the payout level becomes 35% of the policy level, the payout cycle for the Jaisalmer contract of AIC also becomes undefined leaving the ICICI Lombard contract for Jaisalmer with a finite payout cycle of 46 years.

- No contract has a finite payout cycle for payout levels exceeding 25% of policy limit highlighting the fact that there are no historical incidences of payout greater than 25% of the policy limit for any of the four contracts.

Economic Value and Pricing Indicators for Rainfall Insurance Contracts

Pricing of weather insurance is almost entirely done in India using the burning cost method. This is the simplest method of weather contract pricing. It involves taking historical values of the weather index, and applying the weather contract to these values for computing the historical payouts. The average of these historical payouts is deemed as the burning cost which Assuming the data used to calculate the historical indexes are of good quality for the risk analysis, HBA can give a useful and intuitive first indication of the mean and range of possible payouts of a weather contract. The total premium charged by an insurer for its weather insurance product is constituted of two main components namely expected loss and risk margin. The burning cost derived from the simulation of payouts of a weather insurance contract is taken as the expected loss. This component is expected to be paid out (on an average basis) for every season of coverage under a given weather insurance contract. The other component – risk margin, is determined by the risk preferences of the (re)insurance company providing the risk protection: that is, by how they measure the cost of risk with respect to return for the purposes of risk management, capital allocation and business expenses.

The following tables compare the chosen contracts on the key pricing indicators which can enable a better understanding of the economic value imparted to the customer and the financial support provided to crop insurance (the Indian Government, in this case).

Table 5: Comparison of Pricing Indicators for Groundnut & Maize Contracts for Chittorgarh

Feature	Groundnut		Maize	
	AIC	ICICI LOMBARD	AIC	ICICI LOMBARD
Total Policy Limit (in INR)	13,000	15,000	15,000	13,500
Total Premium (in INR)	1,300	1,655	1,500	1,100
Burning Cost (in INR)	402	108	563	286
Risk Margin (in INR)	898	1,547	937	814
Risk Margin (as % of Total Premium)	69	93	62	74
Highest Historical Payout (INR)	2484	1435	3086	1316
Highest Historical Payout (as % of Policy Limit)	19	9.6	21	9.8

Key Observations based on Table 5:

- The expected loss components (burning costs) for groundnut and maize contracts of AIC for Chittorgarh are 31% and 38% respectively. This means that these contracts can be expected to pay out (on an average basis) 31% and 38% of their total premiums for every season of coverage. On the other hand, the expected loss components for the same contracts of ICICI Lombard are 7% and 26% respectively.

- The highest historical payouts for groundnut and maize contracts of AIC for Chittorgarh are 19% and 21% respectively of the respective policy limits. On the other hand, the highest historical payouts for the same contracts of ICICI Lombard are 7% and 26% respectively.

- The policy limit or maximum sum assured of a weather insurance contract is a misnomer as it is perceived as the maximum payout that can be expected for that contract. However, in actual practice, the highest historical payout denotes the greatest cumulative payout (sum of payouts of all constituent covers) among all the cumulative payouts simulated historically from a weather insurance contract. The quantitative difference between

maximum sum assured and the highest historical payout for a weather insurance contract represents a financial gap between the maximum payout committed by that contract and the actual payout that could be expected from that contract even in adverse years. In order to improve the economic value imparted to farmer-subscribers, it should be ensured that the highest historical payout for WBCIS products lies between 33% and 50% of the policy limit.

Table 6: Comparison of Pricing Indicators for Guar Contracts in Jodhpur and Jaisalmer

	AIC Jodhpur	ILGIC Jodhpur	AIC Jaisalmer	ILGIC Jaisalmer
Total Policy Limit (in INR)	10,000	15,000	10,000	15,000
Total Premium (in INR)	1,000	1,655	1,000	1,655
Burning Cost (in INR)	641	214	585	311
Risk Margin (in INR)	359	1,441	415	1,344
Risk Margin (as % of Total Premium)	36	87	42	81
Highest Historical Payout (INR)	2712	2075	3500	5884
Highest Historical Payout (as % of Policy Limit)	27	14	35	39

Key Observations based on Table 6:

- The expected loss components (burning costs) for guar contracts of AIC for Jodhpur and Jaisalmer are 64% and 58% respectively. This means that these contracts can be expected to pay out (on an average basis) 64% and 58% of their total premiums for every season of coverage. On the other hand, the expected loss components for the same contracts of ICICI Lombard are 13% and 19% respectively.

- The highest historical payouts for guar contracts of AIC for Jodhpur and Jaisalmer are 19% and 21% respectively of the respective policy limits. On the other hand, the highest historical payouts for the same contracts of ICICI Lombard are 14% and 39% respectively.

II. Comparative Analysis of IMD and Private Weather Stations based on Payouts

A comparison of IMD and private weather stations based on their payout performance is fraught with anomaly as a weather station that is working properly should have no influence on the payout for the location covered by it. The relative efficacy of weather stations needs to be ideally gauged on the basis of technical performance yardsticks provided in the specifications for the equipments used in the weather station. The role of human inputs in the quality of measurement of weather data has become negligible after introduction of automatic weather stations. However, for the sake of exploratory understanding, a comparison between the payout performance of IMD and private weather stations is provided below. Homogeneity, in terms of the location of these weather stations under the same district, has been ensured for comparability. The following tables are drawn from the data furnished by AIC related to their WBCIS coverage in Rajasthan during Kharif 2009 season. Table 7 compares the payout (Rs/Ha) between IMD and private weather stations of two districts for the same crop. Table 8, on the other hand, compares the district-wise portfolio for five other districts where both IMD and private weather stations were utilized under WBCIS.

Table 7: Comparison of Payout Performance of IMD and Private Weather Stations (Crop-wise)

Table 8: Comparison of Payout Performance of IMD and Private Weather Stations

(District-wise Portfolio)

Key Observations based on Table 7 and Table 8:

- In table 7, the payouts of all the three contracts for Bharatpur are higher under the IMD weather station than under the private (NCMSL) weather station. These outcomes cannot be attributed to the type (service provider) of weather stations but are most likely to be the result of difference in rainfall received by them owing to their distinct locations. Furthermore, all the three contracts are likely to follow a similar pattern of payouts since the crops covered under the three contracts for Bharatpur are Bajra, Jowar and Guar; all of which are sturdy, rain-fed crops having relatively similar rainfall requirements for crop sustenance. In case of the three contracts for Sawai Madhopur, the payout (per unit) of contract for one crop (groundnut) is significantly higher under the IMD weather station while the payout (per unit) of contract for another crop (chilly) is substantially higher for the private (NCMSL) weather station. The payout (per unit) of the contract for the third crop (sesamum) does not significantly vary between IMD and private weather stations.

- In table 8, the comparative analysis of weather stations based on payout performance is done for the entire portfolio under a weather station, irrespective of the type of rainfall insurance contract. Taking into account the even higher probability of error in drawing inferences, it can be observed that in three (Banswara, Bundi and Jodhpur etc.), out of the five districts considered in table 8, the average payout per unit are significantly higher under private weather stations (NCMSL) than under IMD weather stations. For one district (Bhilwara), the average payout per unit is considerably higher under IMD weather station than under private (NCMSL) weather station. For the remaining one district (Ajmer), the difference in average payout per unit for IMD and private weather stations is marginal.

- On the basis of the above points, it is apparent that there is no conclusive or discernible difference in the average payout per unit under IMD and private weather stations. It is more important to ensure the technical robustness, proper maintenance/calibration, tamper-free operation (recording, transmission and processing of weather data) which will go a long way in achieving fair outcomes for all the stakeholders in WBCIS.

III. Establishment of Technical Support Unit for Crop Insurance in the Ministry of Agriculture and its Proposed Structure

Background and Rationale

In the recent years, the crop insurance domain in India has witnessed an increase in focus from key stakeholders amid a quest for dynamism and constant improvement in design and delivery of crop insurance products. Weather insurance - introduced in the developing world through a pilot in India during 2003 instantly caught the fancy of policymakers and developmental entities by virtue of its potential for shielding the Indian farmers from the spectre of weather risks. Starting on a high note, the hopes from weather insurance started dwindling in India until the Indian Government lent a vital impetus to it through the launch of WBCIS in 2007. Ever since, the penetration and outreach of weather insurance in India has increased phenomenally.

The large quantum of financial support by the Government to weather insurance (mainly in the form of premium subsidy) in particular and to crop insurance (both as premium subsidy and stop-loss reinsurance to NAIS) in general, warrants that crop insurance delivers best value to farmer-subscribers. With the increased scope for blending of different types of crop insurance indices (yield/weather/remote-sensing) and the resultant limitless number of designs possible for crop insurance products, the task of appraising a diverse portfolio of crop insurance products and their contextual suitability is a specialized task that unfortunately has not been able to attract the level of attention and technical rigor which it truly deserves. The challenges in comprehensively evaluating the current and upcoming crop insurance products are compounded by the fact that these insurance products lie at a crossover of multiple specialized fields of knowledge.

A need for a well-equipped Technical Support Unit (TSU) with a mandate for ensuring the best value from crop insurance in India and making the Indian crop insurance programme a shining example for other crop insurance programmes cannot be overemphasized. India has already gained a leadership stature in implementation of weather insurance and is poised to become the innovation factory of the world with respect to new developments in crop insurance. Besides the argument for best value realization from public funds, the rationale for a specialized Technical Support Unit for crop insurance is reinforced by the following observations:

- Based on the exercises carried out in Section I of this note, the need for benchmarking of weather insurance products has gained reasonable credence as it would help ensure that the different products offered under WBCIS carry comparable benefits for farmer-subscribers. Benchmarking of crop insurance products would be a fundamental mandate of the proposed TSU which would ensure the roll-out of only those crop insurance products which can ensure balance between expectations of the demand side and deliverability of the supply side.

- Some of the key stakeholders in the crop insurance domain have indicated loopholes and weakness in the institutional design and process control of WBCIS. The relatively flexible stipulations related to underwriting and process control under WBCIS, need to be reviewed rigorously and tightened which may be best carried out by a specialized agency like the proposed TSU

- Lack of adequate and reliable weather and crop loss data is considered to be a major constraint in developing an accurate understanding of the current and future crop production loss variability. An integrated data system for management of agricultural risk management initiatives in India is the need of the hour. The responsibility for development and implementation of such an integrated data system can be entrusted to the proposed Technical Support Unit. Improvements in crop and weather system will lend a cutting-edge to the Indian crop insurance programme in which long-term investments like development of an integrated databank for agricultural risk management, large investments in awareness/capacity building for crop insurance etc. have taken a backseat.

- To complement the process for improving weather insurance products, medium-term research projects may be commissioned by the Government under the purview of the proposed Technical Support Unit. As part of these projects, taluka level weather indices for catastrophic insurance can be developed as an initial step towards more robust systems to mitigate climate change impacts. Catastrophic risks being low probability and high severity events have in principle a lower actuarially fair premium compared to more frequent and moderately severe crop loss events. The low premium catastrophic covers would ensure an excellent risk mitigation alternative to farmers at a higher level of granularity (e.g. at taluka level). Simultaneously, high quality weather data from IMD and other agencies may be analyzed through inter-disciplinary research exercises involving research institutions, agricultural universities and industry think-tanks which can take up region/crop specific calibration exercises for improvement of crop insurance through blending of indices and actual field pilots.

- Service delivery issues in crop insurance have emerged as the key concerns of farmers during the field research undertaken as part of this study. The proposed Technical Support Unit can develop service and quality guidelines for crop insurance and ensure their proper implementation through mechanisms like audits, monitoring, customer feedback etc.

Design and Composition of Technical Support Unit for Crop Insurance

The proposed Technical Support Unit (TSU) should ideally be a separate, independent unit operating under the overall leadership and guidance of the Ministry of Agriculture and Cooperation (GOI).

The suggestions of insurers and premier research institutions can be invited for identifying such subject matters experts from India who can objectively assess crop insurance products and provide inputs for improving them. Since weather-based crop insurance and blended crop insurance products are relatively new financial instruments even globally, the possibility of involving international experts (like actuaries, crop-weather simulation experts etc) in such a body may also be considered. The proposed TSU can have both full-time and invited members and a small team of full-time professionals. A broad composition of the TSU is suggested in the following table.

Table 9: Suggested Composition of TSU for Crop Insurance

Role	Background / Organization	No.	Membership Type
Crop Insurance Experts	Insurance Companies / Crop Insurance Consultants	4	1 Full-time / 3 Invited
Field Crops Experts	Agricultural Research Institutions / Govt. Organizations / Agribusiness Companies	2	1 Full-time / 1 Invited
Horticultural Experts	Agricultural Research Institutions / Govt. Organizations / Agribusiness Companies	2	1 Full-time / 1 Invited
Plantation Crop Experts	Agricultural Research Institutions / Govt. Organizations / Agribusiness Companies	1	1 Invited
Actuarial Experts	Insurance Companies / Independent Practitioners	2	2 Invited
Agricultural Statistics Professionals / Data Modellers	Agricultural Research Institutions / Govt. Organizations / FIs	3	2 Full-time / 1 Invited
Agro-meteorology Experts	IMD/ Agricultural Research Institutions	2	1 Full-time / 1 Invited
Agricultural Economists	Agricultural Research Institutions / Govt. Organizations / FIs	2	1 Full-time / 1 Invited
Reinsurance Experts	Reinsurance Brokers / Insurance Consultants	1	1 Invited
IT Professionals (Database Mgmt & S/W Development)	IT Companies / IT Consultants	3	2 Full-time / 1 Invited
Legal & Regulatory Issues Expert	IRDA / Insurance Companies	1	1 Invited
Rural Insurance Marketing Experts	Insurance Brokers / Corporate Insurance Agents /	1	1 Invited
Rural Development Specialists	NGOs	2	2 Invited
System Development Experts (System Architects)	IT Companies / Risk Mgmt. or Insurance Consultants	2	1 Full-time / 1 Invited
GOI Representatives (Agriculture Ministry)		2	2 Invited
Total Members in Proposed TSU			**10 Full-time & 20 Invited**

Operational Leadership of Technical Support Unit for Crop Insurance

The responsibility of the operational leadership of the proposed TSU should be assigned to an individual with a minimum of 15 years experience in handling major areas related to crop insurance. The operational head of TSU should be at least a postgraduate in agriculture and should ideally have earned a doctorate in a relevant area. The ideal candidate would be someone who is familiar with the process for development of weather insurance products and other upcoming blended crop insurance. A judicious mix of implementation work, research, academic publication and relevant international experience in crop insurance will enhance the suitability of the candidate for the operational leadership of TSU and will enable a better utilization of the diverse profile of the TSU members.

Financing

In the current scenario when the cumulative annual premiums for weather insurance can be projected reasonably to exceed 1000 crores by 2010-11 marketing year, 1% of the total premiums from the WBCIS portfolio of the participating insurers could be arranged as contribution towards technical assistance for weather insurance provided by the proposed TSU. Further, funding for specific research and pilot projects can be raised by the TSU itself from relevant Government Agencies or suitable developmental funding agencies.

Appendix 1: Sample Rainfall Insurance Contracts for Rajasthan during Kharif 2009

WEATHER BASED CROP INSURANCE SCHEME (KHARIF 2009)

TERM SHEET

State:	RAJASTHAN	District:	CHITTORGARH	Ref. Weather Station : As per Govt. Notification

Crop: GROUNDNUT Unit: Hectare

1. **DEFICIT RAINFALL**

			PHASE - I				PHASE - II				PHASE - III		
1 A.	RAINFALL VOLUME	PERIOD	21-Jun	to	15-Jul		16-Jul	to	15-Aug		16-Aug	to	30-Sep
		TRIGGER I (<)	60	mm			120	mm			80	mm	
		TRIGGER II (<)	30	mm			60	mm			40	mm	
		EXIT	0				0				0		
		RATE I (Rs./ mm)	15				15				20		
		RATE II (Rs./ mm)	52				27				43		
		Max. Payout (Rs.)	2000				2500				2500		

TOTAL PAYOUT (Rs.) 7000

1 B.	RAINFALL DISTRIBUTION (Consecutive Dry Days)	PERIOD	1-Jul	to		31-Aug
		TRIGGER DAYS (>=)	20	25		30
		PAYOUT (Rs.)	1000	2000		3500

TOTAL PAYOUT (Rs.) 3500

Note: Rainfall of less than 2.5 mm in a day shall not be considered as a rainy day and multiple events shall be considered for the final payout.

			PHASE - I			
2.	EXCESS RAINFALL (Multiple events)	PERIOD	1-Sep	to		31-Oct
		DAILY RAINFALL TRIGGER (>)	50	mm		
		EXIT (mm)	120	mm		
		Payout (Rs. / mm)	36			
		Max. Payout	2500			

TOTAL PAYOUT (Rs.)		2500
TOTAL SUM INSURED (Rs.)		13000
PREMIUM (Rs.)		1300
PREMIUM %		10%

TERMSHEET FOR WEATHER INDEX INSURANCE

Crops	Groundnut
Reference Weather Station	**IMD:** Chittorgarh, **NCMSL:** Begun, Nimbahera, Bassi, Badi Sadri, Kapasan, Kanera, Bhadesar
Index A	Maximum Number of Consecutive Dry Days (CDD) where a dry day is a day with rainfall equal to 0 mm

Cover Phase, From	**1-Jul-09**
To	**10-Sep-09**
Strike 1 (CDD's)	**19**
Strike 2 (CDD's)	**30**
Strike 3 (CDD's)	**40**
Strike 4 (CDD's)	**50**
Exit (CDD's)	**60**
Payout 1(in Rs) for CDD > strike1 and <= strike2	**300**
Payout 2 (in Rs) for CDD > strike2 and <= strike3	**900**
Payout 3 (in Rs) for CDD > strike3 and <= strike4	**2250**
Payout 4 (in Rs) for CDD > strike4 and <= Exit	**4500**
Maximum Payout (in Rs) for CDD > Exit	**7500**

Index B Maximum rainfall on any two consecutive days recorded in mm during cover phase

Cover Phase, From	**1-Jul-09**	**16-Sep-09**
To	**15-Aug-09**	**9-Oct-09**
Strike Call (mm) >	**250**	**80**
Exit Call (mm) =>	**400**	**180**
Standard Loss Rate between strike and exit - Notional (Rs / mm)	**25.00**	**37.50**
Policy Limit Call (Rs)	**3750**	**3750**

Premium (Rs)	**1,655**
Farmer's Share (Rs)	**580**

Combined policy limit (Rs) **15,000**

Data Source Independent Third party

Settlement Date Thirty days after the data release by data provider and verified by Insurer.

- Premium inclusive of service tax

WEATHER BASED CROP INSURANCE SCHEME (KHARIF 2009)

TERM SHEET

State:	RAJASTHAN	Distrcit:	CHITTORGARH

Ref. Weather Station : As per Govt. Notification

Crop:	MAIZE

Unit: Hectare

1. DEFICIT RAINFALL

			PHASE - I				PHASE - II				PHASE - III		
1 A.	RAINFALL VOLUME	PERIOD	21-Jun	to	15-Jul		16-Jul	to	20-Aug		21-Aug	to	30-Sep
		TRIGGER I (<)	60	mm			120	mm			50	mm	
		TRIGGER II (<)	30	mm			60	mm			25	mm	
		EXIT	0				0				0		
		RATE I (Rs./ mm)	8				15				25		
		RATE II (Rs./ mm)	25				43				115		
		Max. Payout (Rs.)	1000				3500				3500		

TOTAL PAYOUT (Rs.) 8000

1 B.	RAINFALL DISTRIBUTION (Consecutive Dry Days)	PERIOD	1-Jul		to		31-Aug
		TRIGGER DAYS (>=)	20		25		30
		PAYOUT (Rs.)	1000		2500		4000

TOTAL PAYOUT (Rs.) 4000

Note: Rainfall of less than 2.5 mm in a day shall not be considered as a rainy day and multiple events shall be considered for the final payout.

PHASE - I

2.	EXCESS RAINFALL (Multiple events)	PERIOD		1-Sep	to	15-Oct
		DAILY RAINFALL TRIGGER (>)		50	mm	
		EXIT (mm)		120	mm	
		Payout (Rs. / mm)		43		
		Max. Payout		3000		

TOTAL PAYOUT (Rs.)		3000
TOTAL SUM INSURED (Rs.)		15000
PREMIUM (Rs.)		1500
PREMIUM %		10%

TERMSHEET FOR WEATHER INDEX INSURANCE

Crops	Maize
Reference Weather Station	**IMD:** Chittorgarh, **NCMSL:** Begun, Nimbahera, Bassi, Badi Sadri, Kapasan, Kanera, Bhadesar
Index	Aggregate rainfall during the cover phases in mm.

Cover Phase, From	**25-Jun-09**	**10-Jul-09**	**15-Aug-09**
To	**9-Jul-09**	**14-Aug-09**	**29-Oct-09**
PUT			
Strike 1 Put (mm) <	40	200	80
Strike 2 Put (mm) <	5	50	5
Exit Put (mm) =<	0	0	0
Notional 1 Put (Rs / mm)	7.14	6.67	20.00
Notional 2 Put (Rs / mm)	200.00	80.00	450.00
Policy Limit Put (Rs)	1,250	5,000	3,750
CALL			
Strike Call (mm)	400	-	575
Exit Call (mm)	600	-	1275
Notional Call (Rs / mm)	5.00	-	3.57
Policy Limit Call (Rs)	1,000.00	-	2500.00

Premium (Rs)	**1,100**
Farmer's Share (Rs)	**275**

Combined policy limit (Rs)	10,000
Data Source	Independent Third party
Settlement Date	Thirty days after the data release by data provider and verified by Insurer.

- Premium inclusive of service tax

WEATHER BASED CROP INSURANCE SCHEME (KHARIF 2009)

TERM SHEET

State: **RAJASTHAN** Distrcit: **JODHPUR** **Ref. Weather Station : As per Govt. Notification**

Crop: **GUAR** **Unit: Hectare**

1. DEFICIT RAINFALL

			PHASE - I	PHASE - II	PHASE - III
1 A.	RAINFALL VOLUME	PERIOD	1-Jul to 20-Jul	21-Jul to 20-Aug	21-Aug to 30-Sep
		TRIGGER I (<)	25 mm	40 mm	25 mm
		TRIGGER II (<)	10 mm	20 mm	10 mm
		EXIT	0	0	0
		RATE I (Rs./ mm)	10	8	15
		RATE II (Rs./ mm)	60	92	203
		Max. Payout (Rs.)	750	2000	2250

TOTAL PAYOUT (Rs.)	5000

1 B.	RAINFALL DISTRIBUTION (Consecutive Dry Days)	PERIOD	1-Jul	to	31-Aug
		TRIGGER DAYS (>=)	28	35	42
		PAYOUT (Rs.)	500	1250	2500

TOTAL PAYOUT (Rs.)	2500

Note: Rainfall of less than 2.5 mm in a day shall not be considered as a rainy day and multiple events shall be considered for the final payout.

			PHASE - I
2.	EXCESS RAINFALL (Multiple events)	PERIOD	1-Sep to 31-Oct
		DAILY RAINFALL TRIGGER (>)	60 mm
		EXIT (mm)	120 mm
		Payout (Rs. / mm)	42
		Max. Payout	2500

TOTAL PAYOUT (Rs.)	2500

TOTAL SUM INSURED (Rs.)	10000
PREMIUM (Rs.)	1000
PREMIUM %	10%

TERMSHEET FOR WEATHER INDEX INSURANCE

Crops	Guar
Reference Weather Station	**IMD:** Jodhpur; **NCMSL:** Phalodi, Shergarh, Bhopalgarh
Index A	Maximum Number of Consecutive Dry Days (CDD) where a dry day is a day with rainfall equal to 0 mm

Cover Phase, From	**25-Jul-09**
To	**31-Aug-09**
Strike 1 (CDD's)	**19**
Strike 2 (CDD's)	**25**
Strike 3 (CDD's)	**30**
Strike 4 (CDD's)	**35**
Exit (CDD's)	**37**
Payout 1(in Rs) for CDD > strike1 and <= strike2	**300**
Payout 2 (in Rs) for CDD > strike2 and <= strike3	**900**
Payout 3 (in Rs) for CDD > strike3 and <= strike4	**2250**
Payout 4 (in Rs) for CDD > strike4 and <= Exit	**4500**
Maximum Payout (in Rs) for CDD > Exit	**7500**

Index B	Maximum rainfall on any two consecutive days recorded in mm during cover phase

Cover Phase, From	**1-Jul-09**
To	**15-Aug-09**
Strike Call (mm) >	**170**
Exit Call (mm) =>	**320**
Standard Loss Rate between strike and exit - Notional (Rs / mm)	**50.00**
Policy Limit Call (Rs)	**7500**

Premium (Rs)	**1,655**
Farmer's Share (Rs)	**414**

Combined policy limit (Rs)	**15,000**
Data Source	Independent Third party
Settlement Date	Thirty days after the data release by data prov

- Premium inclusive of service tax

TERMSHEET FOR WEATHER INDEX INSURANCE

Crops	Guar
Reference Weather Station	**IMD:** Jaisalmer; **NCMSL:** Mohangarh, Pokhran, Fatehgarh, Ramgarh, Nachna, Sultana
Index A	Maximum Number of Consecutive Dry Days (CDD) where a dry day is a day with rainfall equal to 0 mm

Cover Phase, From	**1-Jul-09**
To	**10-Sep-09**
Strike 1 (CDD's)	**29**
Strike 2 (CDD's)	**46**
Strike 3 (CDD's)	**52**
Strike 4 (CDD's)	**63**
Exit (CDD's)	**70**
Payout 1(in Rs) for CDD > strike1 and <= strike2	**300**
Payout 2 (in Rs) for CDD > strike2 and <= strike3	**900**
Payout 3 (in Rs) for CDD > strike3 and <= strike4	**2250**
Payout 4 (in Rs) for CDD > strike4 and <= Exit	**4500**
Maximum Payout (in Rs) for CDD > Exit	**7500**

Index B Maximum rainfall on any two consecutive days recorded in mm during cover phase

Cover Phase, From	**1-Jul-09**	**16-Sep-09**
To	**15-Aug-09**	**9-Oct-09**
Strike Call (mm) >	**170**	**35**
Exit Call (mm) =>	**320**	**135**
Standard Loss Rate between strike and exit - Notional (Rs / mm)	**25.00**	**37.50**
Policy Limit Call (Rs)	**3750**	**3750**

Premium (Rs)	**1,655**
Farmer's Share (Rs)	**414**

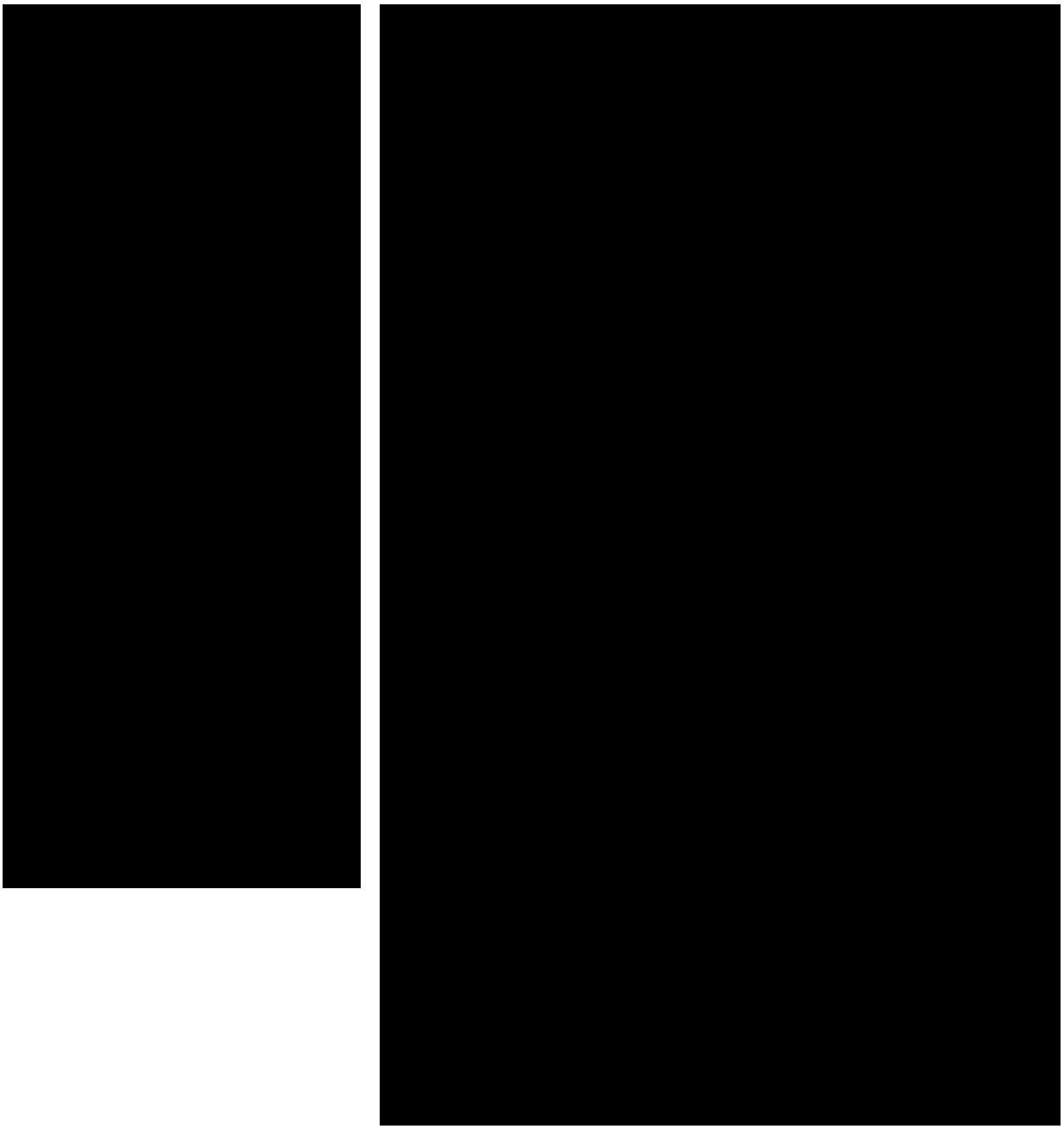
Combined policy limit (Rs)	**15,000**
Data Source	Independent Third party
Settlement Date	Thirty days after the data release by data provider and verified by Insurer.

- Premium inclusive of service tax

Appendix 2: Historical Payouts for Contracts in Appendix 1

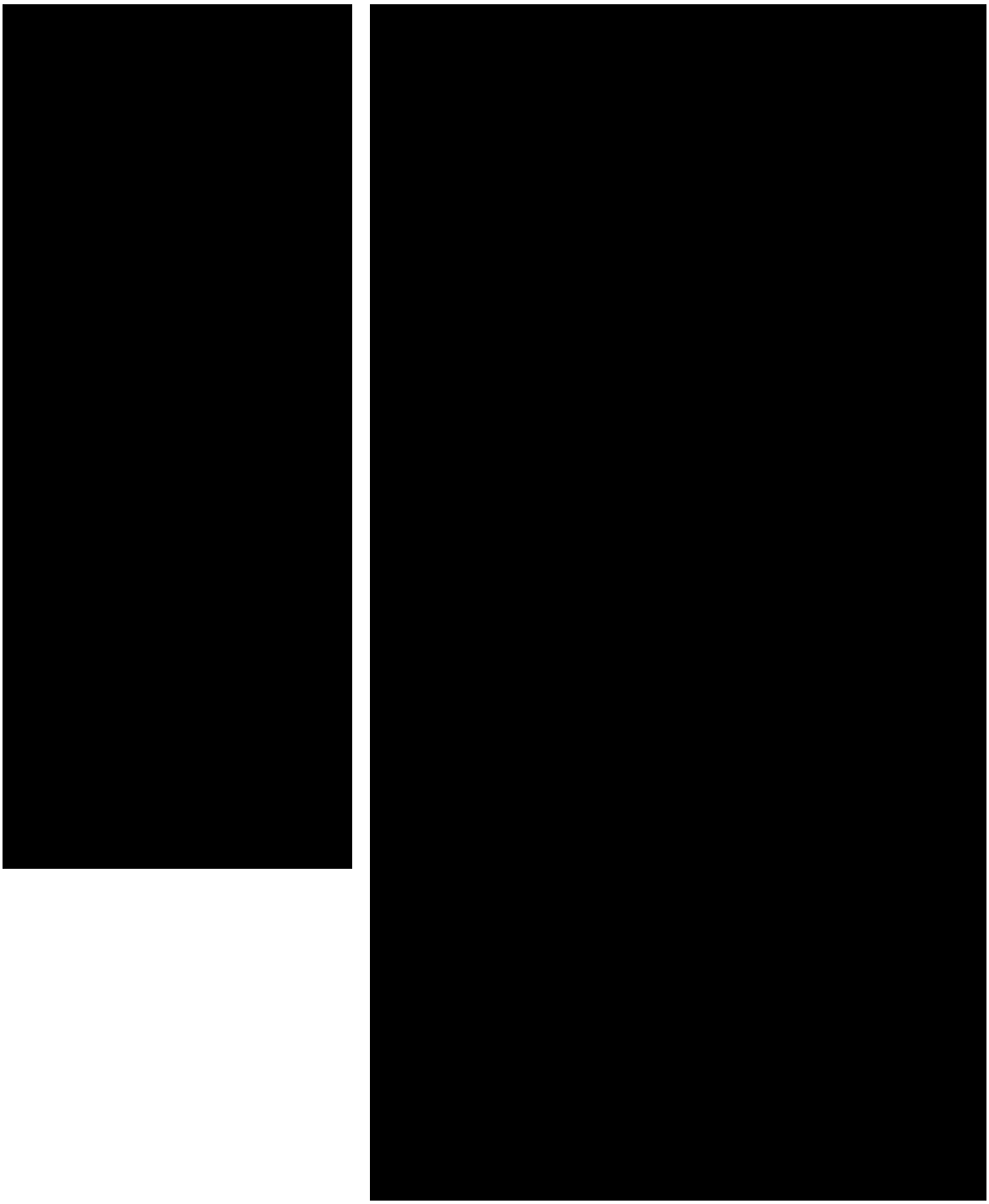
Chittorgarh Groundnut

AIC ICICI Lombard



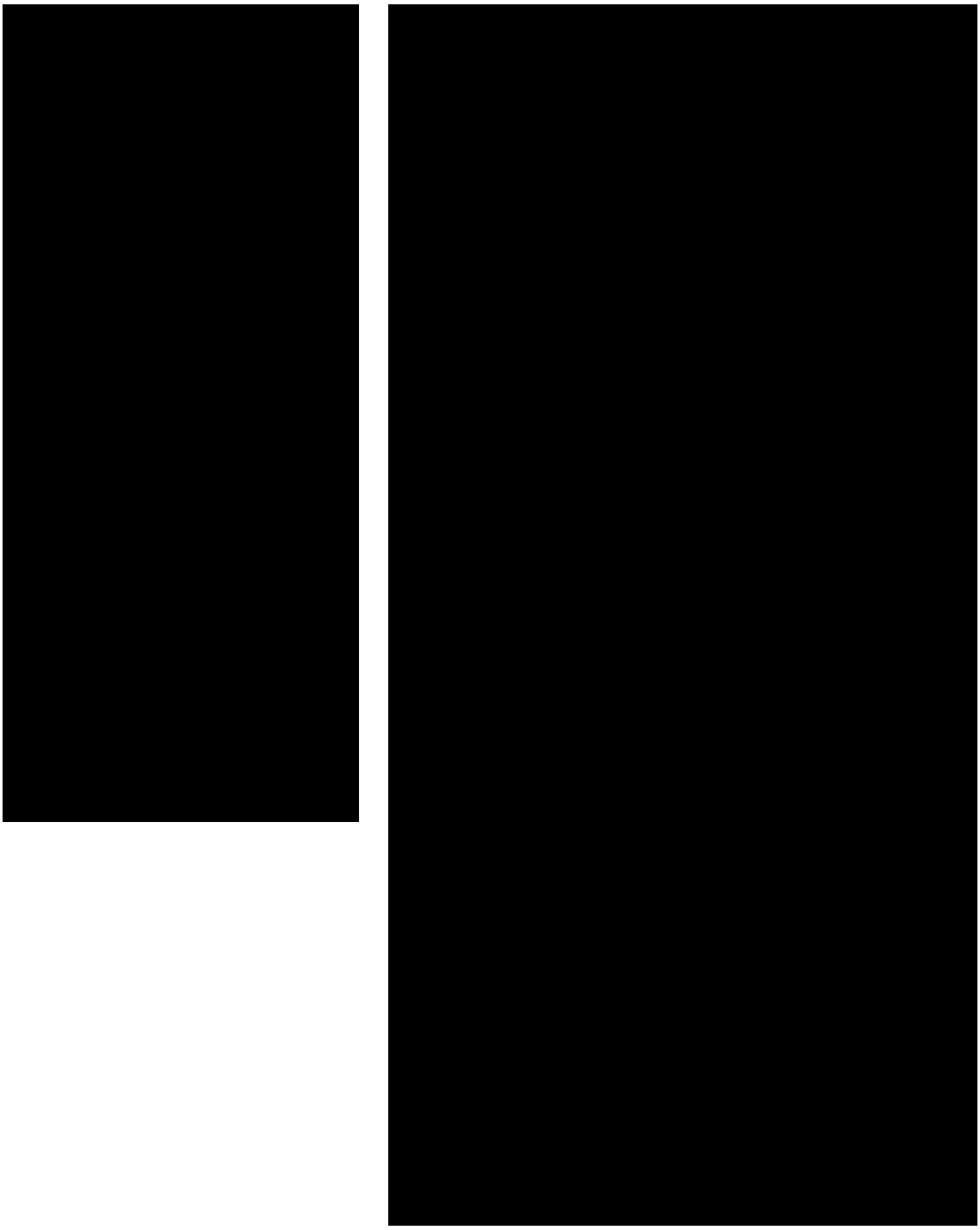
Chittorgarh Maize

AIC ICICI Lombard



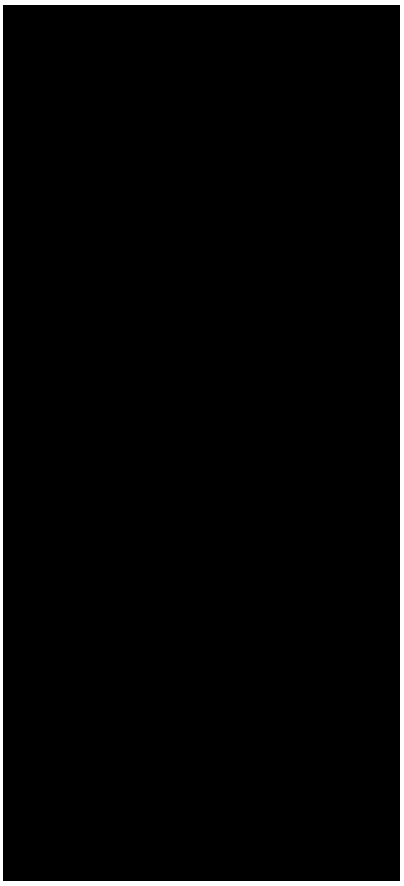
Jodhpur Guar

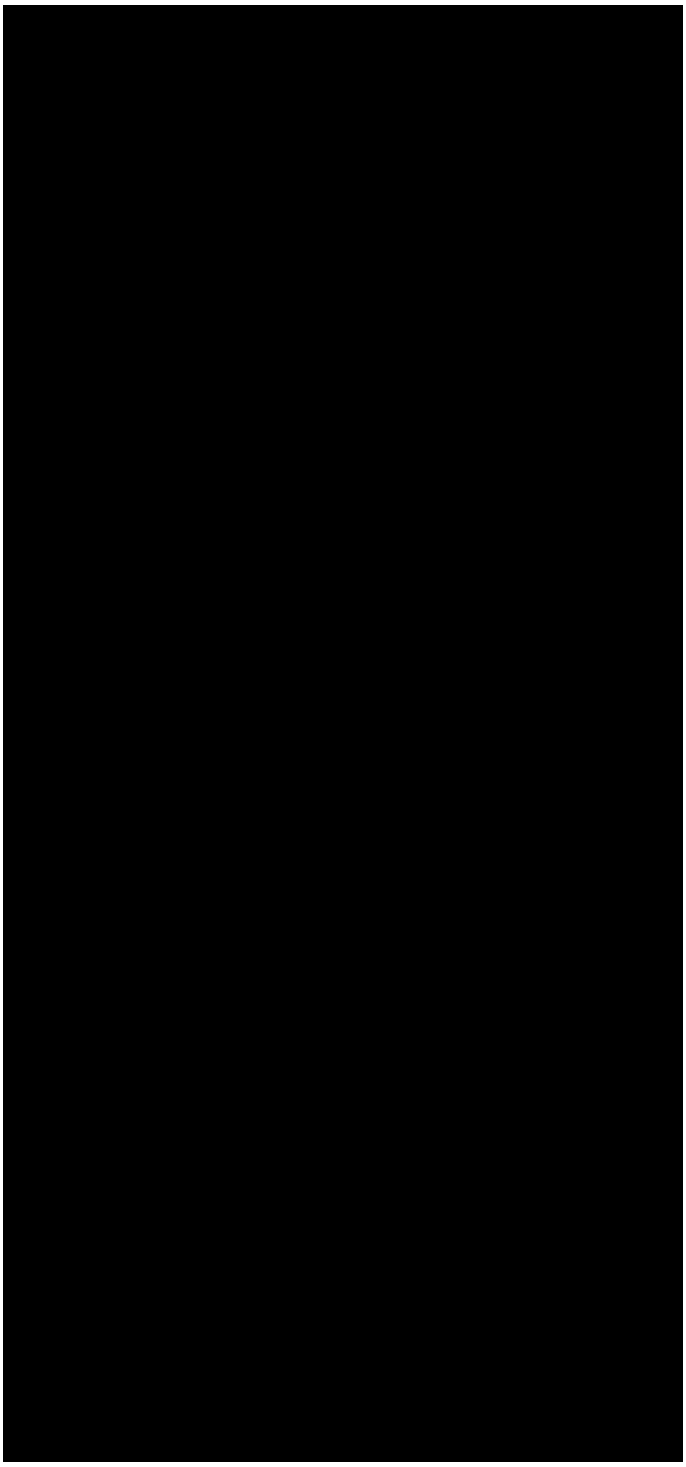
AIC ICICI Lombard



Jaisalmer Guar

AIC ICICI Lombard





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