
Crop Insurance: A Risk Mitigating Strategy

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Preface

This study has been done by Ruby Rani, an Economic post graduate student of Delhi School of Economics, University of Delhi.

Rakshak Foundation creates awareness domestically and internationally about the rights and responsibilities of citizens towards the society and state. Rakshak engages in and supports social and scientific research on public policy and social issues.

Youth participation is of utmost important in the smooth and successful functioning of any country. Any social, public and economic policy affects the entire country in one way or the other. It is very crucial today that we as a youth should come forward and contribute our immense energy for the betterment of our society and the world at large.

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List of Abbreviations

NAIS: National Agriculture Insurance Company

mNAIS: Modified National Agriculture Insurance Company

WBCIS: Weather Based Crop Insurance Scheme

OECD: Organisation for Economic Co-operation and Development

CCIS: Comprehensive Crop Insurance Scheme

CCEs: Crop Cutting Experiments

BASIX: Microfinance Institution operating in India

GoI: Government of India

GDP: Gross Domestic Product

MSP: Minimum Support Price

RBI: Reserve Bank of India

IMD: Indian Meteorological Department

PPP: Public Private Partnership

WTO: World Trade Centre

GoI: Government of India

Executive Summary

Agriculture sector represents the paradox of the Indian economy. India is predominantly an agrarian economy where agriculture sector provides income and employment to more than half of the population. The Importance of this sector to the rest of the economy cannot be neglected. Any change in this sector leads to a multiplier effect for the rest of the economy. But Indian agriculture is marred with innumerable risks that leave Indian farmers at the mercy of the weather God.

In the dearth of institutional credit available to the farmers and low level of development of forward markets and contract farming in India, the risk management strategies available to the farmers are not enough to protect their income especially when they are hit hard during a bad agricultural year. A dominant feature of rural credit institutions representing the supply side is their unwillingness to extend adequate credit to small farmers because of information and enforcement problems. On the demand side, small and marginal farmers do not hold adequate land or other assets which could be used as collateral and consequently face the situation of inadequate availability of credit.

Agricultural insurance can stabilize farm income and investment and provides hedging against disastrous effect of losses due to natural hazards or marketing risks. Crop insurance stabilizes the farm income and helps the farmers to start production activity after a bad year of agriculture. It provides farmers with a minimum amount of protection and cushions the losses incurred by them after crop loss. It spreads the crop losses over space and time and helps farmers make more investments in agriculture and forms an important component of safety-net programs run by the respective governments in both developed as well as developing countries.

In India crop insurance has covered a long way since its beginning in the pre-independence era through the existing weather based crop insurance program. But still a large majority of the farming community is out of the purview of crop insurance. There are various reasons for lack of demand for insurance as well as supply side. Lack of affordability, lack of awareness and missing insurance culture, social factors etc. contributes for the insufficient demand while limited insurance products unable to cater to the needs of farmers as well as lack of infrastructure is often cited as supply side constraint. This insurance market is still under developed and has not utilized the full potential of this market given the vast agro economic environment and large farming community base in India.

The objective of this study is to study various crop insurance programs made available by the government as well as private sector and study the prospects of

privatization of insurance market. The government support to insurance use would be possible through direct subsidies for insurance premiums, through providing reinsurance, or through more indirect support by enhancing research and development of insurance products and providing an institutional framework for the agricultural insurance market (Iturrioz 2009). Under certain conditions, the support of insurance can be regarded as a Green Box measure within the WTO agreements (OECD 2009).

The first chapter introduces the concept of crop insurance with the background information of evolution of crop insurance in India, major problems faced by this sector which includes limited financial services, alternatives available to farmers in the absence of insurance are generally inefficient especially in India, market and regulatory impediments, informational asymmetry which is key factor in the insurance sector etc. In the second chapter methodology of the research has been described which consists of literature review, mentor discussion and the experiences gained from the field visits. In the third chapter various current government crop insurance policies has been described like NAIS, WBCIS etc. In the fourth chapter results from the literature and field visits along with their impact on theoretical impact has been discussed. Fifth chapter comprises of the recommendations of the report. Sixth chapter talks about scope for the future work in this area while the seventh chapter concludes the report.

The benefit of linking credit with the crop insurance as in case when insurance purchase is made compulsory for the loanee farmers under NAIS/mNAIS/WBCIS is that in case of a bad agricultural year the farmer will be in a better position to pay the loan of the bank to the extent of the claim he receives from the insurance scheme. Also it reduces the probability of non-repayment of loans to the lending institutes when the crop of the farmer is insured. Thus credit linked insurance scheme achieves their objective of stabilizing farmer's income and incentivizes farmers for active participation in capacity building.

The potential of crop insurance market has remained untapped in the country. There has been a significant growth in the weather based insurance market year by year since 2008 both in number of farmers availing insurance as well as premium collection. Still the premium for the insurance is considered to be very higher making it unaffordable for the farmers. Thus there is a strong need to encourage private sector so that increase in number of farmers insured can help in reducing the premium rates and their by increasing the uptake along with encouraging the R&D in the insurance products.

The **major findings** of the report are:

- Even there has been improvement in irrigation, information and communication in agriculture over the years, the risk in agriculture has

increased .The states in which sources of irrigation is reliable the risk is less but the states which faces dual problems of low productivity along with less reliable sources of irrigation, suffers the most.

- The private sector has not participated in the crop insurance market to the extent it should have given the vast potential of insurance market in India which comprised of a large farming community base and highly uncertain agricultural venture
- The penetration rate of agriculture insurance especially crop insurance is abysmally low. 80% of the farming community is still out of the ambit of the institutional credit and trapped in the vicious circle of moneylenders, poverty, underinvestment in agriculture and thus sustaining this circularity.

1. Introduction

1.1 Background Information

India is at a juncture where to achieve greater efficiency and productivity in agriculture for sustainable growth further reforms is urgently required. There is need to have stable and consistent policies where markets play a deserving role and private investment in infrastructure is stepped up. An efficient supply chain should establish the linkage between retail demand and the farmer. Rationalization of agricultural incentives and strengthening of food price management need to be coupled with skill development and better research and development with improved delivery of credit, seeds, risk management tools, and other inputs ensuring sustainable and climate-resilient agricultural practices.

India accounts for about 2.4% of the world's geographical area and 4% of its water resources. On the other hand it has to feed 17% of the world's population and 155 of the livestock. Share of agriculture sector in India's GDP is about 14% while contributes around 11% to the export sector along with being a major source of employment and income for half of the population. Therefore it is necessary to accelerate growth rate agricultural production to achieve the target of GDP growth rate of 8% in 12th Plan and meet the food requirement of growing population along with making growth process an inclusive one by increasing income of those dependent on agriculture.¹

The main source of growth in long-term agricultural output must be improvement in yield given the limitation of expansion of acreage. As the growth of irrigated agriculture has reached a plateau and the ground water sources are shrinking very fast, agricultural development in the rain fed areas is seen as the route for equitable development and as a solution to the current imbalance in development. Agriculture is an uncertain business in India, since it is highly dependent on the weather, leaving farmer households vulnerable to serious hardship. By providing claim payments to farmers in the event of crop failure, agricultural insurance can directly improve the welfare of risk-averse farmers, particularly 'small and marginal Indian farmer households operating less than two hectares.

For a comprehensive medium-term strategy for food and nutrition security in the country over time we need to work out the methods of enhancing the productivity, profitability, stability and sustainability of the major farming systems and harness the synergy between technology and public policy and recommend measures for

¹ <http://164.100.47.132/paperlaidfiles/AGRICULTURE/State%20of%20Indian%20Agriculture%202012-13%20%28English%29%20with%20cover.pdf> 14 June 2013

enhancing income and employment potential in rural areas through diversification, application of appropriate technology including IT for information on market, weather, credit facilities and e-commerce, training and market reforms.

The traditional ways to cope up with the agricultural risks includes accumulation of buffer stock as precautionary saving, varying crop practices like planting various crops like drought resistant varieties, planting in different fields and staggered over time etc. diversifying the sources of incomes, distress sales of farm assets etc. But they may prove to be costlier at times than the other available income opportunities which farmers are likely to lose. This is where the existence of a perfect capital and insurance markets can provide a better management of agricultural risks.

A comprehensive policy reforms needs to be designed to substantially increase the flow of rural credit to farmers linked with the crop insurance including small and marginal, triggering agricultural growth led economic progress, which can lead to opportunities for a healthy and productive life to rural families.

Crop insurance can provide a necessary hedge to the farmers and can prove to be an efficient way of intervention by government with minimum distortionary effects since it limits the financial liability of the government in case of a bad agricultural year and also gives the liberty to the farmers while they make production decisions. It could also help in empowerment of women, taking into consideration the increasing feminization of agriculture and the proposed conferment of right to land ownership.

Crop insurance in India has emerged as a concept of risk mitigating tool since the beginning of the twentieth century. However on implementation side it has evolved gradually but continuously through the century. It is still evolving in terms of its scope and methodologies.

India being an agrarian country has agricultural sector which provides income to the majority of its population. Unfortunately crop production largely is dependent on the weather and severely impacted by attack of pests and diseases leaving Indian agriculture an extremely risky enterprise. In this backdrop crop insurance plays a pivotal role in providing a stable growth of this sector.

As early as 1915, **Shri J.S. Chakravarthi** of Mysore State had proposed a rain insurance scheme for the farmers so as to ensure them against drought. He devised the area approach and published several papers in the Mysore Economic Journal promoting the concept of Rainfall Insurance. In 1920 Shri Chakravarthi published a book titled "*Agricultural Insurance: Practical Scheme suited to Indian Conditions*".

Certain princely states like Madras, Dewas, and Baroda, apart from this also made attempts to introduce crop insurance relief in various forms, but with little success².

After Independence in 1947, the concept of crop insurance gradually started to find more space. The Central Legislature in 194 discussed as well as examined the potential possibility of the subject of crop and cattle insurance followed by conducting a special study for this purpose in 1947-48.

Regarding the modalities of crop insurance the important thing which find greatest mention was whether it should be on an Individual approach or on Homogenous area approach. By the former approach it was understood as seeking the indemnity by the purchaser of insurance here the farmer, to the full extent of the losses where the premium, to be incurred by him, is determined with reference to his own past yield and loss experience. The '*individual approach*' basis requires the reliable and accurate data of the yields of insured crops of individual farmers for a sufficiently long period, for the estimation of premium on actuarially sound basis. However, when market is marred because of moral hazard problem and reliable data is either scanty or not available then the best available approach is the *Homogeneous area approach* which means a reference unit is created comprising of homogeneous villages having similar crop production and annual variability of production etc. as the basic unit unlike the individual farmer in the individual approach.

During the early seventy's decade a number of experiments on crop insurance although on an ad-hoc and scattered scale were undertaken. The 'General Insurance' Department of Life Insurance Corporation of India introduced in 1972-73 on **H-4 cotton** in Gujrat expanding it involving various other crops like Groundnut, Wheat and Potato. This scheme was further implemented in the states of Gujarat, Andhra Pradesh, Karnataka, Maharashtra, Tamil Nadu, and West Bengal.

Professor V. M. Dandekar, known as the "Father of Crop Insurance in India, gave an alternative in the form of "Homogeneous Area approach" for crop insurance in the middle 1970s. General Insurance Corporation of India (GIC) used this approach and introduced a pilot crop insurance scheme (PCIS) from 1979. Under this scheme participation by the state Govts was voluntary. The scheme covered cereals, millets, oilseeds, cotton, potato, gram and barley. However the risk was shared by GIC and the respective State Govt. in the ratio of 2:1 while the insurance Premium ranged from 5 to 10 per cent of the sum insured. This scheme continued till 1984-85 and 13 states participated under this scheme. It covered 6.27 lakh farmers where premium collected was Rs 1.97 crore against claims of Rs 1.57 crore.

Having learnt from PCIS, Govt of India launched **Comprehensive crop insurance scheme (CCIS)** on 1st April 1985 with the active participation of state governments.

² <http://www.aicofindia.com/AICEng/Pages/evolution.aspx> 14June2013

The Scheme was optional for the State Governments and was implemented on Homogeneous Area approach linking it to short-term crop credit, that is, all crop loans given for notified crops in notified areas were compulsorily covered under the CCIS. It involved Government of India, Departments of State Governments, Banking Institutions and GIC and thus it was a multi-agency scheme. During the tenure of Kharif 1985 to Kharif 1999, 15 states and 2 UTs participated. It covered 7.63 crores farmers and the area covered was 12.76 crores hectares for the sum insured was Rs 24,949 crore while premium collection was Rs 403.56 crores.

CCIS was eventually terminated after Kharif 1999 and was replaced by a more expanded and improved scheme known as **National Agricultural Insurance Scheme (NAIS)** which is still operational.

Attempts were made to modify CCIS when demanded by states. A new scheme as **Experimental Crop Insurance Scheme (ECIS)** was introduced during Rabi 1997-98 season in 14 districts of 5 states. This scheme was mainly meant for small and marginal farmers only with 100% subsidy on the premium. However due to administration and financial problems this scheme was discontinued after one year of operation.

Since existing insurance scheme NAIS covers only yield risk and do not provide any hedging against price fluctuations but farmer's income is a cumulative function of yield and prices both as a bumper harvest puts downward pressure on prices. Therefore government to protect the income of the farmers as well to reduce the government expenditure on procurement at Minimum Support Price (MSP) has introduced a pilot scheme named as farm Income Insurance Scheme (FIIS) during Rabi 2003-04. The scheme remained operational only during two seasons viz. Rabi 2003-04 in 18 districts of 11 states and was applicable for only wheat and rice.

1.2 Main problems, their scope and impact on the society

1.2.1 The Problem of limited access to financial services

Formal financial services would enable rural people to maximize returns on their surplus and at the same time smooth their consumption while reducing their vulnerability to risk. However, their financial service needs—which include consumption credit and cash savings (*Duggal, 2002*)— are seldom met due to systemic problems in the financial sector and monsoon risk.

A dominant feature of rural credit institutions representing the supply side, they are unwilling to extend adequate credit to small farmers because of information and enforcement problems. On the demand side, small and marginal farmers do not hold adequate land or other assets which could be used as collateral and consequently face the situation of inadequate availability of credit. Actions of both farmers and credit institutions are affected by agricultural risks. Farmers may find themselves reluctant to the adoption of new technology example: high yielding seeds because uncertainty of income implies they might not be able to meet their subsistence cost in some years. On the other hand rural lending institutions might face the problem of poor recovery of loan and hence financial loss. Thus it results into sacrifice of equity and efficiency as these institutes try to lend to safe customers, for example large farmers.

For these reasons, in credit market both demand as well as supply is reduced and hence results in lower investment in agriculture, lower output and consequently lower incomes especially to small farmers. But if insurance is somehow is connected to credit mechanism to the farmers availing that insurance then it might act as collateral for these farmers. Now farmers assured of a guaranteed income because of the crop insurance might adopt high yielding options rather than confining themselves with the risk-reducing strategies. Perhaps even more importantly, affordable agricultural insurance can in effect act as collateral against loans, increasing the creditworthiness of farmers and allowing them the opportunity to invest in appropriate inputs to increase agricultural productivity (*Hazell1992*). Insurance may be a more attractive channel for government support to rural livelihoods and risk mitigation than ex-post disaster transfers, which offer no ex-ante guarantee to farmers and may therefore have limited impact on ex-ante decisions, or loan waiver or input subsidy programs, which may adversely distort behaviour.

1.2.2 Risk mitigating strategies adopted by farmers on their own in the absence of insurance may prove to be costlier

Agriculture has always been a risky venture. In recent years, natural disasters, particularly climate-related ones, have increased both in frequency and magnitude. Broadly risks in agriculture can be classified in three categories namely output risk, Marketing risk and capacity failure. Output risks includes failure in production due to natural calamities, pest infestations etc. Marketing risk consists of failure to realize the total value of production because of plummeted prices or in absence of support of market infrastructure. Capacity failure mainly occurs because of failure to produce due to illness of family members or death/illness of draught animals etc.

Some production risks can be avoided .For example: not planting more risky crops. But the associated cost for this mitigating strategy is decreased production (revenue loss). Some risks may be prevented by taking advanced actions.

For example: risk of yield loss can be prevented by following preventive pest control. Again the cost comes in the form of cost of procurement of preventive pest control. Sharing risk is another strategy available to farmers popularly known as share-cropping. This alternative is very common in India. For example: share lease of land to tenants. Cost then has to come in the form of decline in income as the landowner shares the output with the tenant. Transferring risk can be thought of as another way under which risk is transferred from one entity to the other .For example marketing risk can be transferred to buyer through forward contracts. Premium paid by the farmer is the major cost.

For a section of farming community, the minimum support prices for certain crops provide a measure of income stability. But as it is known that most of the crops and in most of the states, MSP is not implemented. In recent times, mechanisms like contract farming and future trading have been established which are expected to provide some hedging directly or indirectly against price fluctuations. But, agricultural insurance is considered an important mechanism to effectively address the risk to output and income resulting from various natural and manmade events. Agricultural Insurance is a means of protecting the agriculturist against financial losses due to uncertainties that may arise agricultural losses arising from named or all unforeseen perils beyond their control (AIC, 2008). According to the *National Agriculture Policy 2000*, “Despite technological and economic advancements, the condition of farmers continues to be unstable due to natural calamities and price fluctuations”. Contract farming is alleged to have benefitted large farmers and agro-marketing companies at the expense of small and marginal farmers. In the light of inadequate infrastructure, futures trading have not evolved as a major hedge against marketing risk across a major chunk of farming community.

Agricultural insurance can stabilize farm income and investment and provides hedging against disastrous effect of losses due to natural hazards or marketing risks. Crop insurance stabilizes the farm income and helps the farmers to start production activity after a bad year of agriculture. It provides farmers with a minimum amount of protection and cushions the losses incurred by them after crop loss. It spreads the crop losses over space and time and helps farmers make more investments in agriculture and forms an important component of safety-net programs run by the respective governments in both developed as well as developing countries. However, one should be cautious that crop insurance should be part of overall risk management strategy and not the only solution to the systematic risks faced by farmers in this risky venture. Insurance comes towards the end of risk management process. As a generalization, production yield risks are the only insurable risks covered by crop credit insurance, although insurance administration and design may help reduce other risks Insurance is just the redistribution of cost of losses of few among many, and therefore cannot prevent the overall economic loss.

1.2.3 Market and Regulatory impediments

Market and regulatory impediments are often stated to justify public intervention in the provision of agricultural insurance. Governments should identify as well as address these impediments to help farmers complement their risk management activities with potentially cost-effective financial tools such as insurance.

For the successful implementation of any programme it is very vital to have a constant and continuous monitoring. Monitoring helps to measure the outcome of a programme and unravel problems in its implementation.

There is evidence that the lack of regulation or the existence of inappropriate regulation can impede the progress of crop insurance, although there has as yet not been any analysis of the impact of existing regulation on agricultural micro insurance and evidence of regulatory impediments to the spread of agricultural micro insurance is mostly anecdotal. By and large there is a distinct lack of information regarding this area and more studies need to be allocated to examine either what regulations need to be put into place or what changes could improve current regulations.

1.2.4 Systematic Risk

One of the arguments for government intervention is the presence of systematic risk in the market of crop insurance where systematic risk is defined as the risk which

affects large economic units like farmers and herders simultaneously. This can generate large economic losses in the portfolios of many agricultural insurers.

Since the risks like this are difficult to diversify and consequently the losses involved are huge and not possible for private insurers to afford such a large liability, thus government intervention is justified in agriculture insurance market.

1.2.5 Informational Asymmetry

Another problem of insurance market is that it suffers from the problem of informational asymmetries majorly adverse selection and moral hazard.

Adverse selection is a situation in which potential insurance purchasers know more about their risks than the insurer does, leading to the participation by high risk individuals and non-participation by low risk individuals. Insurers react by charging higher premiums or not insuring at all.³

Moral hazard on the other side arises because of the problems generated when the insured's behavior can influence the extent of damages that qualifies for insurance payouts. Examples of such are carelessness and irresponsibility on the part of the buyer of the insurance. Governments have a major role to play in reducing in the presence of informational asymmetry. The development and maintenance of agricultural and weather databases as public goods can help insurers properly design and price agricultural insurance contracts, thus reducing adverse selection. Whereas public extension services assisting and supervising farmers in the management of their production risks before and after the occurrence of a loss can help reduce moral hazard.

1.2.6 Supply and Demand side constraints in the crop insurance market

An important supply side constraint especially in developing countries is the lack and inadequacy of market infrastructure to support for agricultural insurance. In the absence of reliable database on weather and agricultural database, it is difficult for the insurance companies to design actuarially sound agricultural insurance products.

Farmers tend to be very aware of their production risks but at the same time they may underestimate the likelihood or severity of catastrophic events. The awareness

³

<https://openknowledge.worldbank.org/bitstream/handle/10986/2432/538810PUB0Gove101Official0Us e0Only1.pdf?sequence=1> 14june, 2013

among farmers is abysmally low in relation to the risks involved in agriculture and thus is a major hurdle in promoting insurance programs in the farming community.

One another major problem is that farmers do not consider agriculture insurance as a viable investment option because indemnity is offered less frequently while premium is paid each year. Thus insurance culture is missing among farmers. Lack of affordability is also one of the biggest reasons for farmers not going for the purchase of insurance. Lack of awareness among farmers about the benefits of insurance and along with non-affordability hits hard the insurance sector especially in poor and developing countries. Even if agriculture insurance is affordable still preference is often given to the life insurance and health insurance because agriculture insurance is considered as an unnecessary expenditure. Thus there is a dearth of insurance culture among the farming community.

Therefore the conclusion in light of the above major problems present in the agriculture insurance market is that the penetration rate of agriculture insurance especially crop insurance is abysmally low in the country. 80% of the farming community is still out of the ambit of the institutional credit and trapped in the vicious circle of moneylenders, poverty, underinvestment in agriculture and thus sustaining this circularity.

Crop insurance seems to affect **Production decisions** in three major ways:

- Subsidies raise the net revenue per acre and thereby raise incentive to plant eligible crops and plant more of crops with higher subsidy rates
- Encourages planting insured crops on the fields that would otherwise not be considered for that crop because of the potential for significant losses
- Creates incentives for the growers to undertake fewer other risk mitigating strategies and therefore focus more on raising average productivity

The use of crop insurance can generate a trade-off between insuring farmer's welfare through income support in the case of a natural calamity and the adverse effects on their decisions if the economic and environmental effects of Agricultural Insurance programs overpowers the positives associated with the insurance schemes. Incentives to expand onto more environmentally sensitive lands, incentives to use more inputs as the average returns rise, incentives to shift across crops that may have more negative environmental effects and whether it is benefitting disproportionately more risky areas of production. Thus the net output of such programs needs to be judged judiciously.

1.3 Goals and objectives of the project

- To examine the performance of earlier and existing national agricultural policies in India

- To analyse the efficacy of government intervention in crop insurance market and study the prospects of privatization of crop insurance market in India
- To suggest new innovative ways of intervention in the market to bring about efficiency and effectiveness in insurance market
- Development of the forward looking strategy to promote the crop insurance access for the farmers especially small and marginal.

2. Methodology

2.1 Literature Review

The farmer faces uncertainties from weather, spurious inputs, pests and diseases, and market shocks among other risks and thus he is a risk-taking entrepreneur. In the absence of formal credit or assistance farmers rely on conventional methods to deal with the production risks. Walker and Jodha 1986 observed that the availability and effectiveness of these risk management strategies depend on public policies as well as the demand for crop insurance. However Binswanger (1980) studied the risk in agricultural investments and risk averting tendencies along with the available strategies for shifting risk, concludes that farmers' own mechanisms for loss management or risk diffusion are very expensive in arid and semi-arid regions.

The philosophy of insurance market is based on large numbers where the incidence of risk is distributed over individual. According to *Ahsan et al., 1982* Insurance shifts the possibility of risks over the insurer and makes it profitable for the farmers to undertake certain activities which they certainly would not have undertaken in the absence of insurance. Indeed agricultural insurance is one of the financial tool that agricultural producers can potentially use.

According to *Mishra 1996*, crop insurance if linked with credit may help in solving the problem of collateral by substituting the collateral (may be partially) thus exhibit the collateral effect. It could help in changing the behaviour of both farmers in modifying their production decisions as well as suppliers of credit as they become assured of their recovery. This increases both the demand as well as the supply of credit thus moving towards a win-win situation for both the parties in the contract. Now farmers do not have to seek loans from private moneylenders and sell their assets under distress.

A well prepared and properly implemented insurance program will protect numerous marginal and small farmers from the vagaries of uncertainty, bring in stability in the income of farmers and boosts up production and investment (*Bhende2002*).

Bhende (2005) found that the income of farmers in semi-arid regions is predominately related to the risk level. Crop insurance can provide farmers to undertake more risky production decisions which results in their higher incomes.

The paper by Spörri, M., Baráth, L., Bokusheva, R. and Fertő, I. analyses the actual impact of insurance products on the economic performance of cropping farms by linking the economic performance model with the insurance demand model. Their estimations show a negative impact of insurance on the economic performance indicators namely farm profit, labour productivity and land productivity.

The research by Mishra (1994) shows that after the introduction of comprehensive crop insurance scheme (CCIS) of India in Gujrat, share of small farmers (with land holdings of 2 ha or less) in the total loan increased from 19 per cent to 27 per cent and a significant increase in the repayment of loan in absolute terms-repayment per farmer and repayment per hectare.

The study by *S.B. Goudappa, B. S. Reddy and S.M. Chandrashekhara* studied the farmer's perception and awareness of crop insurance in North Eastern parts of Karnataka. Agriculture Department is not implementing scheme properly as expressed by more than 80 % of respondents. Further, they don't know any procedural and other information about Crop Insurance. Hence, there is need to create awareness about Crop Insurance.

Socio- economic characteristics of the farmers play a significant role in making decisions about the purchase of insurance. In the research paper by Sarthak Gaurav it was found that percentage adoption among farmers who get agriculture related information from friends is nearly twice of that among farmers who do not get the same information from friends. The estimates indicate that farmers with social interaction are 29 per cent more likely to participate in the market for rainfall insurance compared to those who do not interact with friends regarding agriculture related information.

2.2 Discussions

Mentor Discussions:

- Discussed the concept of crop insurance in general and particularly in India. Indian agriculture suffers from the vagaries of weather. The traditional coping strategies used by the farmers at times may prove costlier than the adoption of crop insurance as a risk mitigating strategy.
- Why is there a **need** for crop insurance in first place in India? Who are the stake holders in the crop insurance program? These include various insurance providing companies, financial institutions, banks etc. who

provide crop credit to the farmers, the beneficiaries of insurance program i.e. farmers, state and central government and various international lending and development institutions. The interests of all the stakeholders are interlinked because if there is a problem in one sector, it will adversely affect the interests of the others as well.

- In India agriculture insurance majorly focuses on the crop insurance and under crop insurance it mainly provides insurance against yield loss. But income of the farmers is a cumulative function of both prices as well as yield. Even in years of bumper harvest, the income of farmers might plummet as high supply in the market puts a downward pressure on the prices of the crops.
- What different kinds of risks are involved in agriculture? These are basically the output risk when the yield of the farm falls below the threshold yield; Market risk by which we mean when the farmer is unable to get the market price of the crop because of sudden crash in the price of the crop in the market because of some reason and the third risk includes the capacity risk which implies the inability of the farmer to achieve the potential output from the farm in case of illness or for example the death of any draught animal.
- Research question in any research could be found in two ways: either it could be generated by the researcher or it can be given to him/her from outside
- How review of literature helps in finding the answer to the research question? By observing and reading the literature it helps us in better understanding of the problem at hand and enables us to critically analyse the viability of our recommendations.
- One of the risk mitigating strategy in the absence of crop insurance is that farmers leave agriculture altogether. This is an immiserizing strategy. By leaving agriculture farmers generally migrate to the cities and join as industrial labourers. Although their condition has deteriorated further but they have removed the risk associated with the agriculture.
- Nature of agriculture has changed in recent years from traditional to the technical approach. Now technology is such that farmers are compelled to buy the inputs from the market afresh in every crop season as compared to the traditional methods where farmers used to use the stored crops as the seeds for the next cropping seasons. Thus this has increased the cost of production for the farmers.
- Also the growing commercialization of the agriculture is causing farmers to produce more which increases the problems of plummeting crop prices in the market as well as the growing storage of the food grains concerns in the absence of storage infrastructure
- Then he discussed various credit linked models which could be when credit giving institutions provides loans in collaboration with the insurance

company and both of them bear the risks or in another model credit lenders do not link with the insurance companies and In third case the farmers form a group themselves and pool the resources to pay back the credit institutions in case of failure.

2.3 Field visits

During the field visits, it was found that the major source of cost which private players need to incur is that of automated weather stations. According to the heads of the respective departments in certain private crop insurance companies, e.g. IIFCO-TOKIO, the non-availability of reliable and good quality data and that's also over a sufficiently long time period is a major obstacle. In this case it becomes really difficult for the estimation of break-even premium charges under different actuarially sound insurance models. Thus if government could assist the private players in setting up these automated weather stations and made available timely and accurate time data over a sufficient time horizon, this could greatly incentivize them and hastened the new private players in crop insurance industry.

3. Current government programs for crop insurance

3.1 National Agricultural Insurance Scheme

NAIS is in operation since Rabi 1999-2000 and is being implemented by 23 states and 2 UTs. So far, 624.37 lakh farmers have been covered under the scheme. NAIS has replaced the *Comprehensive Crop Insurance Scheme (CCIS)*, which was in operation in the country since 1985. Its main objective are to provide insurance coverage and financial support to the farmers if there is any failure of any of the notified crop because of natural calamities, pests & diseases so as to provide them assistance and maintain credit worthiness for the ensuing year. It's another objective is to encourage farmers for the adoption of progressive farming and higher technology and help them stabilizing their income especially in the bad agricultural year.

The small and marginal farmers are entitled to a subsidy of 50% of the premium charged. This scheme provides for compulsory coverage in respect of loanee farmers whereas it is optional for the non-loanee farmers.

At present there are 35 different crops during Kharif and 30 different Rabi season are being insured under National Agricultural Insurance Scheme in the country.

The scheme operates on the basis of Area Approach i.e. defined areas for each notified crop for widespread calamities and individual assessment is done on experimental basis for localised calamities, such as, hailstorm, landslide, cyclone and flood in certain pre-notified areas. The size of unit area varies from State to State and crop to crop. Presently, the defined area is Block/Mandal/Taluka / Patwari halka / Nyayapanchayat/ Gram Panchayat/ Village, etc.

3.2 Weather Based Crop Insurance Program (WBCIP)

The objective of Weather Based Crop Insurance is to mitigate the distress of the insured farmers against the likelihood of occurrence financial loss on account of anticipated crop loss resulting from incidence of adverse conditions of weather parameters like temperature, rainfall, humidity etc. It uses weather as a proxy for computing the compensation to be given to the farmers. It works on the "Area

Approach” for the purpose of the compensation which is deemed to a homogeneous unit of insurance.

All farmers growing the insured crops in the reference pilot area are eligible for the scheme. However it is mandatory for all the farmers who take loans from the banks/ financial institutions who have sanctioned loans to the farmers for the particular crops whereas it is optional for other farmers. Premium rates depend on the ‘expected losses’ calculated on the basis of patterns of weather parameters of historical period of about 25 to 100 years in the context of ideal weather requirements of a crop. The premium rate could vary with each Reference Unit Area and with each Crop but the premium rates are capped for the cultivator and if the premium rate exceeds to that of the cap then it is shared on 50:50 basis by the central government and the concerned state governments.

The benefit under WBCIS is that it assures insurance pay-out within the 45 days from the end of the insurance period whereas in the case of traditional crop insurance scheme claim settlement may take longer time as the compensation depends on then estimation and verification of the yield.

AIC insured 5.96 lakh hectares of cultivable land in respect of 52.63 lakh farmers for a sum insured of 8341 crore, earning a premium of 837.01 crore during Kharif 2011 and about 38.49 lakh hectares of land sown by about 31.10 lakh farmers for a sum insured of 6684 crore, for a premium of 564.22 crore during Rabi 2011-12.

3.3 Modified National Agricultural Insurance Scheme (mNAIS)

In order to make the existing NAIS more farmer friendly a modified NAIS has been launched as a pilot in selected states/UTs. It uses area yield approach for the claim settlement. But the reference unit has been reduced to the level of village/ village panchayat for the major crops. Under this scheme private players have also been allowed to compete along with AICI. It is a move from a social insurance program with ad-hoc funding from the government of India to a market based crop insurance program. Insurance products are actuarially designed and rate making is based on the statistically robust models using experiment based approach.

This scheme is expected to generate more benefits to farmers through coverage of prevented sowing/planting risk and post-harvest losses, higher indemnity level of minimum 70%, more precise calculation of threshold yield.

The benefit of linking credit with the crop insurance as in case when insurance purchase is made compulsory for the loanee farmers under NAIS/mNAIS/WBCIS is that in case of a bad agricultural year the farmer will be in a better position to

pay the loan of the bank to the extent of the claim he receives from the insurance scheme. On the other hand if insurance is not available then the hardships of farmers get multiplied as if he default on his loan then he will not be able to get fresh loans from the bank. Thus credit linked insurance scheme achieves their objective of stabilizing farmer's income and incentivizes farmers for active participation. It also increases the flow of credit to the farmers for production purposes as crop insurance provides additional security to the farmer and in turn encourages financial institutions to come forward and provide credit. This scheme is expected to be the important instrument in the field of development of crop production, providing financial support to the farmers in the face of crop failure. An independent evaluation of Pilot Modified NAIS may be carried out through study for assessing the impact and success of the scheme with respect to the set objectives and based on the findings; possibility to extend the scheme to implement in all the districts in place of NAIS during 12 the Five Year Plan would be examined.

3.4 Varsha Bima (Rainfall Insurance)

This scheme provides protection from the adverse deviation in rainfall during South-West Monsoon (both excess and deficit). Maximum liability is linked to the cost of cultivation and accordingly varies from crop to crop. This scheme is voluntary for each class of cultivators. The procedure for claim settlement is automated and claim is settled within 45 days from the end of indemnity period

4. Results and Discussions

4.1 Findings from the literature

Agriculture is a critical sector of the Indian economy. Over time it has experienced a structural transformation which is the part of **economic cycle**. Its share in the overall GDP has reduced all the way from 30% during 1990-91 to as low as 14% in 2011-12. But this reduction in share of GDP has not accompanied by an equivalent reduction in the share of employment provided by this sector. Given the importance of agriculture as the source of livelihood and food security for the larger portion of the population, it cannot be looked merely in terms of its contribution to the national income.

Even there has been improvement in irrigation, information and communication in agriculture over the years, the risk in agriculture has increased. The risk is all the more in the form of farm income as compared to the level of risk in production. The states in which sources of **irrigation** is reliable the risk is less but the states which faces dual problems of low productivity along with less reliable sources of irrigation, suffers the most. Crop insurance is therefore expeditiously needs to be extended as strong need has been felt to devise new insurance products to cater to the need of distress farming community.

In India the coverage of crop insurance is abysmally low both in terms of the area covered and the number of farmers insured. On the **supply side** there are not enough insurance products available in the market which can protect the farmers against different kinds of risks faced by them given the diversified agricultural geography of India.

The private sector has not participated in the crop insurance market to the extent it should have given the vast potential of insurance market in India which comprised of a large farming community base and highly uncertain agricultural venture.

Ray (1960) in his paper reviewed the need and importance of crop insurance and also examined the countries operating crop insurance programmes. The author analysed the major factors which seem to stand in the way of quick progress of the schemes for crop insurance. Priority should be given for the improvement of various technical and physical factors affecting agriculture while linking the economic side with it i.e. more attention should be given to greater flow of the credit.

Singh (1972) studied the effects of crop insurance in Uttar Pradesh. He found that during the period of 1951-71 the degree of variability was highest in bajra. Although

diversification of agriculture is also a way to mitigate the risk under agriculture but crop insurance is a much better way to deal with these risks than diversification.

Farming community consists of about 121 million farmers of which only about 20% avail crop insurance from financial institutions. The remaining 80% (96 million) are either self-financing or depending upon informal sector for their financial requirements. Most of the farmers are illiterate & do not understand the procedural requirements & thus remains shy away from formal institutions. The country is geographically large & has world's second largest population but it has one of the lowest penetration rates for crop insurance as a percentage of GDP. This is quite indicative that there exist an enormous insurance potential for addressing the needs of farming community & improving overall efficiency of agriculture sector. Tremendous potential of research studies on agriculture insurance which can mitigate adverse impacts of uncertain events on Indian farmers.

Weather based crop insurance was formally introduced in 2003 as a pilot and by 2007 the government adopted it as an alternative to existing yield index insurance. Around 40 crops are insured under the category for various climatic phenomenon like deficit rainfall, dry spell, excess rainfall, low temperature, high temperature, high humidity & high wind⁴. Under this insurance trigger events like adverse weather can be independently verified and measured. Insured is not required to submit claim form & other documents as proof for loans & hence allows speedy settlement of claims.

4.2 Impact on the theoretical focus of the project

Throughout the research the topic has been analysed with a broad perspective. A comprehensive study brought about a big picture which helped in understanding the synergies as well as the interests of different stakeholders in the insurance market. Various stakeholders in the insurance industry are the beneficiaries- farmers; the lending banks and other financial institutions, different governments including state, central and local governments; international lending agencies like ADB, World Bank etc. and the international insurance and re-insurance markets.

Agriculture sector is very crucial as well as critical to the Indian economy. For a sustainable growth in the long run and to achieve the 9% rate of GDP growth we need a strong & thriving agricultural sector. Besides the traditional disadvantages that small agricultural producers India have faced, like poor market linkages and

⁴ http://articles.economictimes.indiatimes.com/2012-07-30/news/32942129_1_weather-insurance-icici-lombard-premium-collection

low productivity, the large exposure of agriculture production to the variability of weather parameters has made agriculture a very risky proposition for the vast majority of small and marginal agricultural producers in India.

Indian crop insurance market is marred with inefficiencies as well as inadequacy both on the demand as well as supply side. Various determinants of demand consists of low affordability of the insurance schemes on the part of farmers; lack of awareness for different insurance products and policies; social factors like receiving information about the insurance from other fellow farmers ;lack of insurance culture among the others. On the supply side inadequacy of insurance products which could match with the needs of the farmers; lack of competition in the industry as private sector participation is still in its nascent stage and the lack of infrastructure including actuarially sound insurance models, technology etc.

Government is incurring losses year by year on providing premium subsidies. It puts a huge burden on the exchequer. To make the insurance program sustainable and economically viable in the long run the solution has to come in the introduction of the research and development in the development and delivery of the insurance products.

4.3 Gap analysis

There has been a large gap between policy designing and implementation of various crop insurance policies. The uptake of insurance by the farmers and ranchers in India is very low. Indian agriculture accounts for about 13% of the nation's gross domestic product. Over 80% of agricultural land is highly rainfall dependent and farmers constantly battle against crop failures caused by weather vagaries, rising costs of cultivation, pest attacks and other factors. In view of the significance of agriculture in the Indian economy and its vulnerability, the need for evolving an adequate, sustainable risk management system has been duly recognised. However, the uptake of crop micro insurance is low, considering the large population in need of such products.

This is like seeing the tip of an iceberg in the crop insurance market in India. Conscious effort towards planning, designing and implementation of relevant crop insurance products at the grass root level are an immediate requirement. The very fact that this will affect and transform the lives of farm households in India is reason enough for sustained work in this area.

Given the large and diversified geography of India, it is required to design differentiated insurance products. It could also solve the problem of insurance companies located in small and geographically concentrated areas as spreading

throughout the country would reduce the exposure because of the low level of correlation between different kinds of risks like cyclone, floods, drought, fire etc.

Domestic insurers do not have much scope to diversify their activities and have limited financial capacity to deal with the catastrophic disasters. Current insurance products are not geared towards the need of small farmers. Government assistance is not geared towards providing assistance to the insurers to expand the services to the small and marginal farmers.

For a sound agricultural insurance system central focus needs to be given on the development on the actuarially sound insurance products. The cost of insurance program can vary according to the various insurance products for example multi-peril index based insurance products and single peril index based products.

Even when the best practices are followed in the delivery of insurance products still costs are likely to be higher especially for the small farmers because of high transaction costs. But government has a role to reduce the costs by providing necessary risk management infrastructure. Losses in excess of the premium collection need to be shared through public-private partnership and not solely by government.

There is a strong need to make farmers aware of the benefits from the insurance products. Insurance culture needs to be inculcate among the farmers so as to raise the uptake of insurance by farmers. Socio economic reasons have emerged to be the main determinants of the demand for crop insurance in the farming community. As mentioned in the literature review according to the estimates in one of the study it was found that estimates indicate that farmers with social interaction are 29 per cent more likely to participate in the market for rainfall insurance compared to those who do not interact with friends regarding agriculture related information.

One tailor made solution will not fit all the problems given the great diversity of the agriculture in India. Each region needs to be separately dealt with and a mix of different index insurance products like weather based index insurance; area yield insurance product and different insurance products need to be developed. Also to raise the economic affordability of farmers, credit linked insurance should be provided to them based on a more market based structure.

5. Recommendations, Scope and Strategy for Implementation

5.1 Recommendation & Scope

5.1.1 Recommendation1:

5.1.1.1 Linking Credit with the crop insurance

In the insurance sector to handle the problem of **informational asymmetry**, limited financial liability and enforcement problems, collateral is generally used as a device. Crop insurance schemes needs to be linked with the credit provision for the farmers to raise the welfare of farming community. This can act as a collateral for the small and marginal farmers and consequently leads to the greater flow of credit by the financial institutions to the farmers in terms of credit available per farmer as well the number of borrowers. In case of a bad agricultural year the farmer will be in a better position to pay the loan of the bank to the extent of the claim he receives from the insurance scheme. On the other hand if insurance is not available then the hardships of farmers get multiplied as if he default on his loan then he will not be able to get fresh loans from the bank. Thus credit linked insurance scheme achieves their objective of stabilizing farmer's income and incentivizes farmers for active participation. It also increases the flow of credit to the farmers for production purposes as crop insurance provides additional security to the farmer and in turn encourages financial institutions to come forward and provide credit. This scheme is expected to be the important instrument in the field of development of crop production, providing financial support to the farmers in the face of crop failure.

This can be backed by the research paper by Mishra in which he analysed the impact of linking insurance schemes with the institutional credit in Gujrat. The purpose of this paper was to analyse whether there has been any collateral effect of such scheme meaning thereby whether crop insurance scheme has led to the significant increase in the flow of credit to the farmers and at the same time whether there has been any improvement in the repayment of the loans. The findings of the paper were same as was expected.

Now there is a need to critically analyse whether this scheme can also help in the other parts of the country.

Scope of the recommendation:

Analysing the statistical results based on the comparative analysis between the selected states of Rajasthan, because it has been relatively successful in running the program, on the basis of the following parameters:

- Has there been any increase in the number of borrowers and flow of credit to the farmers after linking the crop insurance products with the credit scheme?
- This can result into solving the major problems of the credit institutions and give the incentives to link crop insurance with the credit loan for those particular crops. There might be the low probability of non- repayment on the part of the farmers, low cost of recovery and high is the level of available funds for the credit institutions for the further loans
- Similarly this can also have impacts on the demand side as greater availability of credit can enhance input use and consequently the output. Binswanger and Khandker (1992) estimate an elasticity of 0.042 for aggregate crop output with respect to overall agricultural credit (compared with 0.063 for cooperative credit). By this we means that if there is a percentage increase in the agricultural credit it will increase the aggregate crop output by 4.2%. Hazell and Haggblade (1991) estimate a multiplier of 1.37 (without feedback) and 1.54 (with feedback) for rural non-farm income with respect to agricultural income. This means that there are evidences that if rural farm income can be increased by some mechanisms than it will have a greater impact on the rest of the economy as compared to the equivalent increase in rural non- farm income.

The empirical evidence suggests that there has been greater flow of credit to the farmers after linking crop insurance with the credit giving institutions. *Pomareda* (1986) took this research focussing on the Development Bank of Panama where he analysed the duration of insured and uninsured loans between 1974 and 1980. In each year it was found that the duration of the loans in case of insured loans was smaller than the uninsured loans. This shows better recovery of loans when the loan is insured and hence reduce the recovery and the bookkeeping cost and also improves the recovery performance of the banks. He also found out that the insured loans in general have slightly better net returns as compared to the uninsured loans and the former has relatively stable returns than the latter.

Therefore both the normative and the empirical evidence suggests that the there is a potential to increase the profitability of credit giving institutions. The analysis suggests that this comes generally through the reduction in the collection costs, more prompt repayment by the loanee farmers, greater turnover of the banks and more efficient use of physical along with the human resources.

5.1.1.2 Strategy for Implementation and its impact on the society:

Flow chart for credit linked crop insurance scheme:

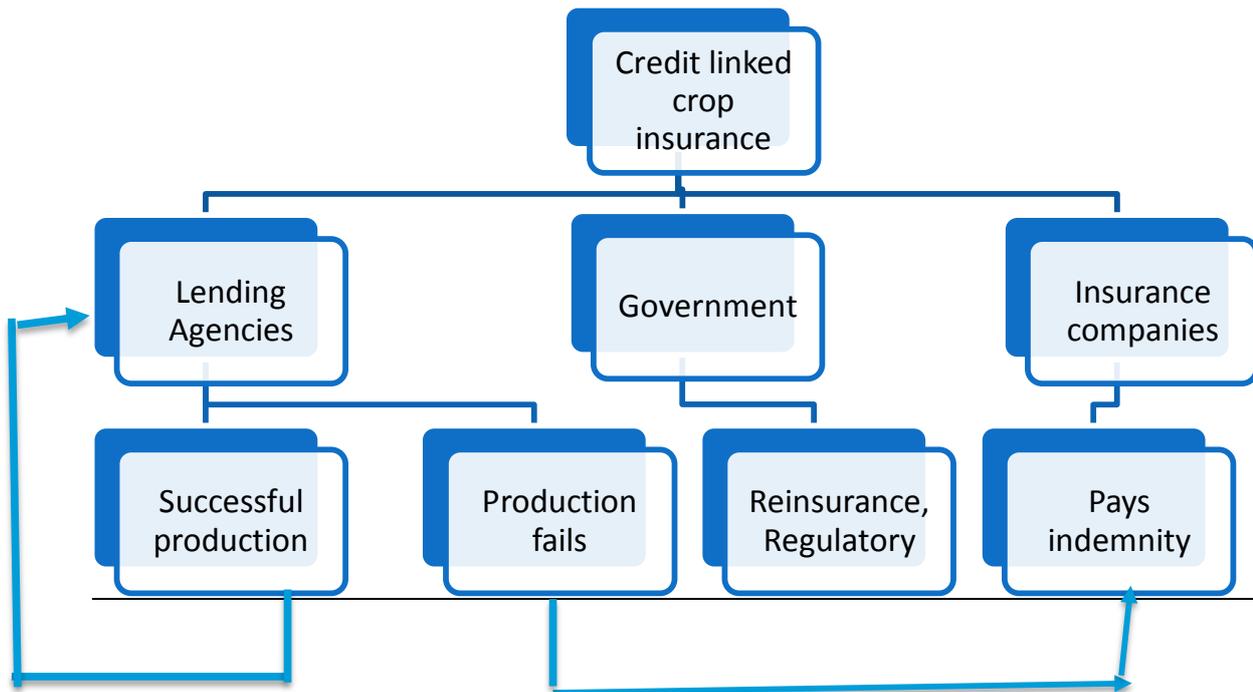


Figure 1: Flow chart for the credit linked insurance scheme

Table 1: Strategy for the credit linked crop insurance program

Policy Holders	Sales or distribution model	Potential benefits
Farmers	Farmers buy a product package(e.g. credit and other financial services) or occasionally as a standalone product	<ul style="list-style-type: none"> • Allow farmer to avoid default and restart production • Provide income support in lean periods • Encourage investment in higher quality inputs

Policy Holders	Sales or distribution model	Potential benefits
Lending Institutions and Insurance providers	Provide various packages e.g. products such as credit along with the insurance or standalone product ranging from single peril, multi-peril indexed to weather like excessive rainfall, deficit rainfall, consecutive dry/ wet days as well as yield based products.	<ul style="list-style-type: none"> • It opens access to a new client base remained untapped hitherto. • It will develop innovative linkages along the supply chain to help manage their risk and open market opportunities • Reduces recovery and book keeping cost.

Policy Holders	Sales or distribution model	Potential benefits
Government or relief agencies	Provides reinsurance	<ul style="list-style-type: none"> Government limits its financial liability following disasters, international or national reinsurance agency is able to fund operations

5.1.2 Recommendation 2:

5.1.2.1 Incentivise the private sector for the entry in the insurance sector

Product development and product delivery are the key functions in the insurance sector. In order to cover all the small and marginal farmers' differentiated products namely multi-peril and name peril products needs to be designed. Government needs to provide necessary infrastructure in the sector which might be in the form of technology, knowledge, database which in turn provides the synergy between private and government sector and encourages the private sector for more and more involvement in the sector.

Greater cooperation among government and private players is needed integrally in particular areas like – reinsurance support, installing weather stations and micro irrigation projects. Financial losses in excess of the premium collection needs to be shared on the basis of the public- private partnership as well as re insurance in the international insurance markets which currently is shared by central and state governments in the ratio 50:50

Scope of the Recommendation:

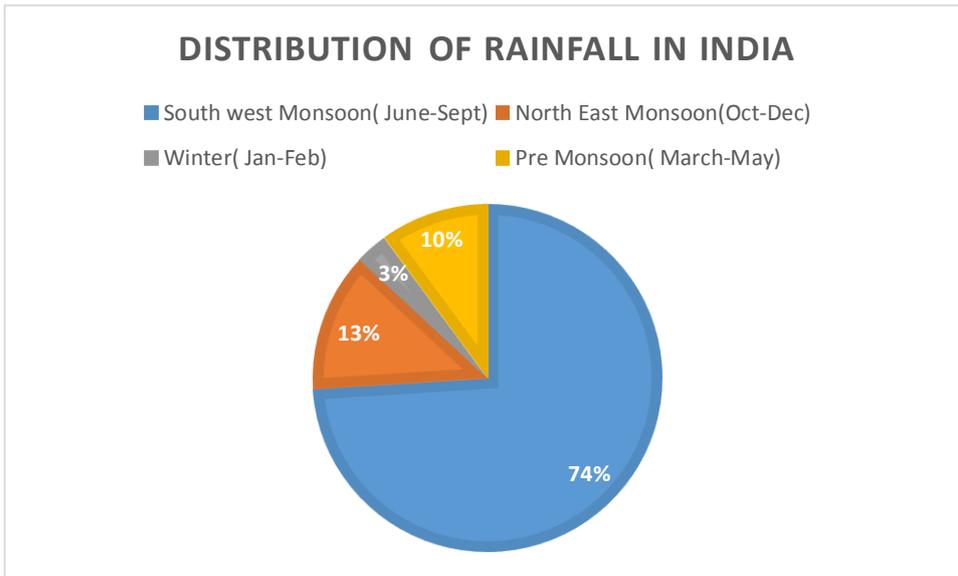


Figure 2: Distribution of rainfall in India

Source: Facts-About-India.Com

Summary of Rainfall in India since 1871

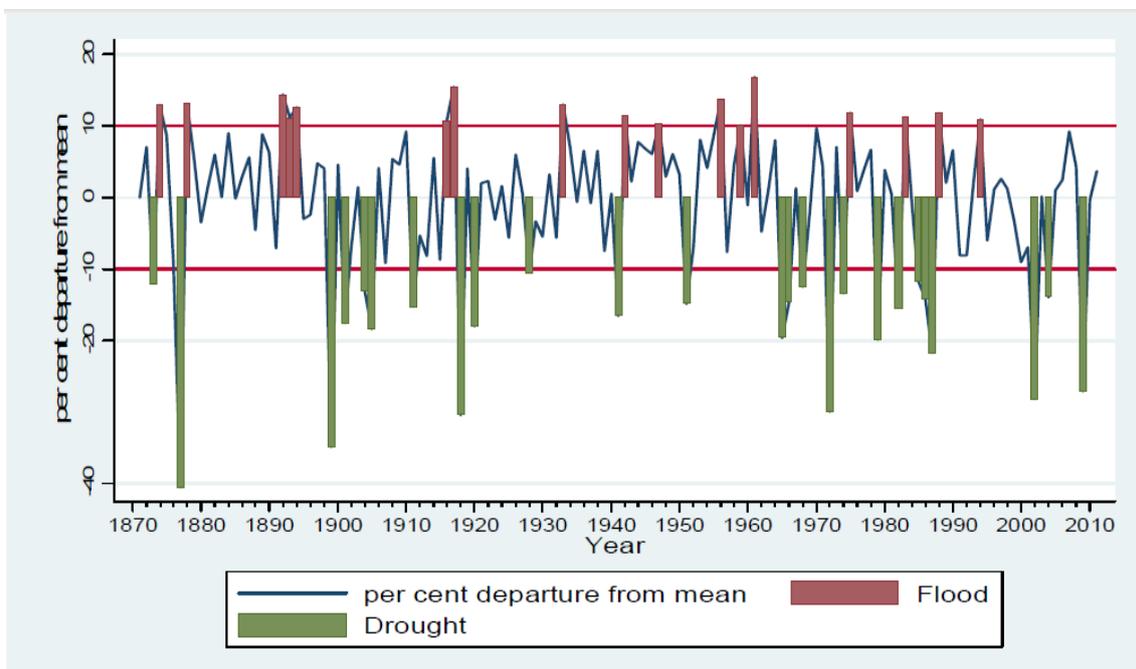


Figure 3: Summary of Rainfall in India since 1871

Source: All India Summer Monsoon Rainfall (AISMR) Anomalies during 1871-2010

Farming community consists of about 121 million farmers of which only about 20% avail crop insurance from financial institutions. The remaining 80% (96 million) are

either self-financing or depending upon informal sector for their financial requirements. Most of the farmers are illiterate & do not understand the procedural requirements & thus remains shy away from formal institutions. The country is geographically large & has world's second largest population but it has one of the lowest penetration rates for crop insurance as a percentage of GDP

This is quite indicative that there exist an enormous insurance potential for addressing the needs of farming community & improving overall efficiency of agriculture sector. Thus in India there is a tremendous potential of research studies on agriculture insurance which can mitigate adverse impacts of uncertain events on Indian farmers. Therefore the synergies between the private sector and the government can be reaped in order to grab this huge growth potential.

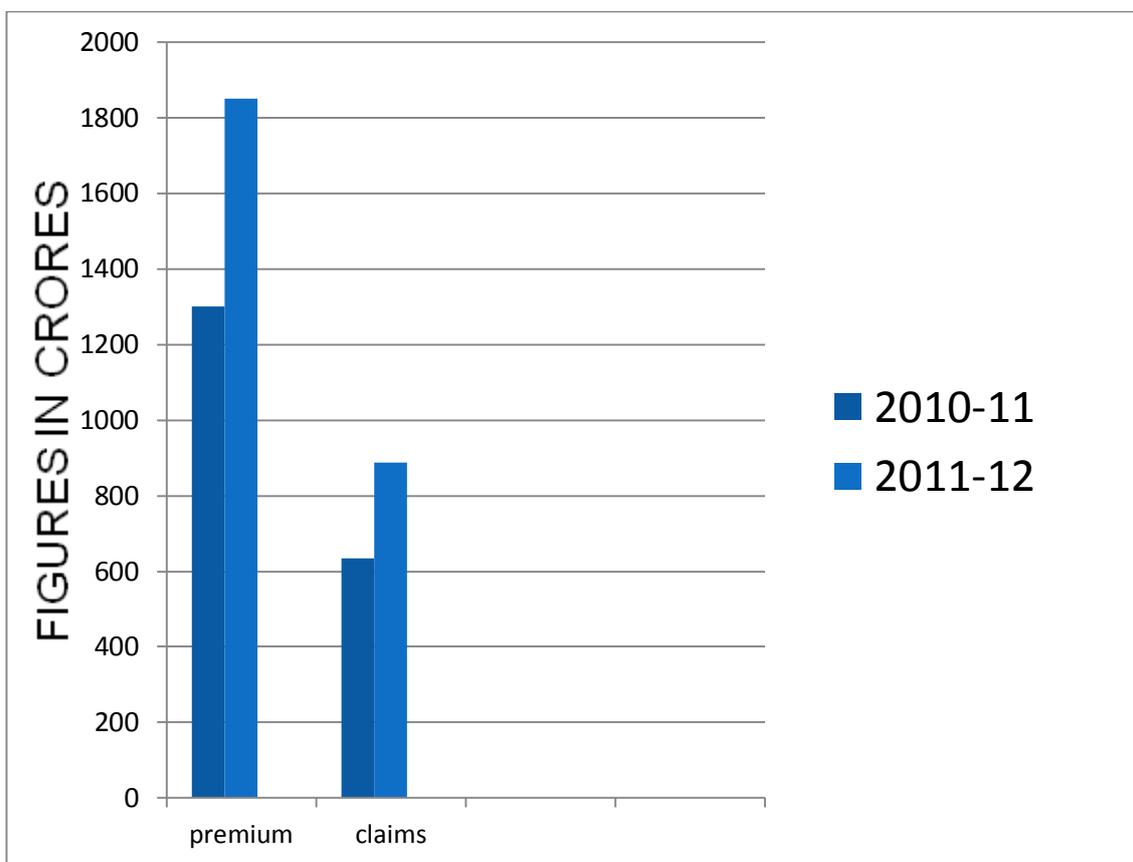


Figure 4: There has been significant growth in premium and claim collection in recent year

Source: *The Economics Times*, 30 July, 2012

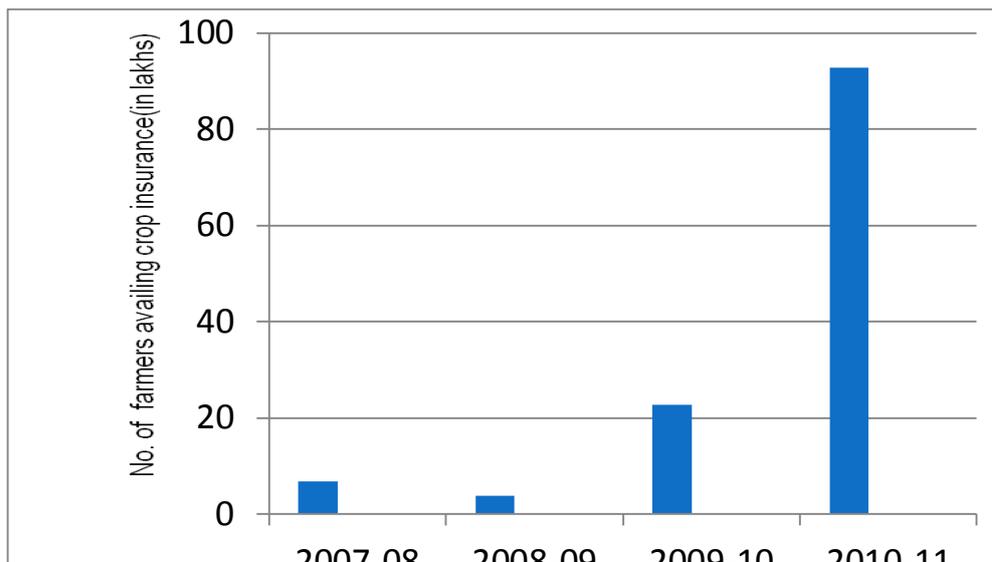


Figure 5: growth in number of farmers availing crop insurance

Source: knowledge for markets, India the largest based crop insurance newsletter, Volume 2-52-Mar12-2012

NAIS Vs. WBCIS

There is an enough potential of privatization of insurance market in the India. In the preceding years it has observed a significant growth rate. Thus government needs to incentivize the private sector and make available the necessary infrastructure in risk management market so as to reap the synergy between different stakeholders in the insurance market.

The excessive dependency of Indian agriculture on weather needs a strong mechanism to cope up with this risk. Through a micro analysis of indemnity pay-out of farmers it was found out that the pay-out through weather based insurance schemes was better as compared to the traditional yield based schemes. If certain issues are addressed then this insurance product has the potential to emerge as a sustainable insurance product. Reducing the weather vulnerabilities can go a long way in reducing the risk of farming community and can catalyse the investment economic growth.

Figure 1: Actuarial Performance of NAIS and WBCIS: Season-wise Comparison of Claim Ratio

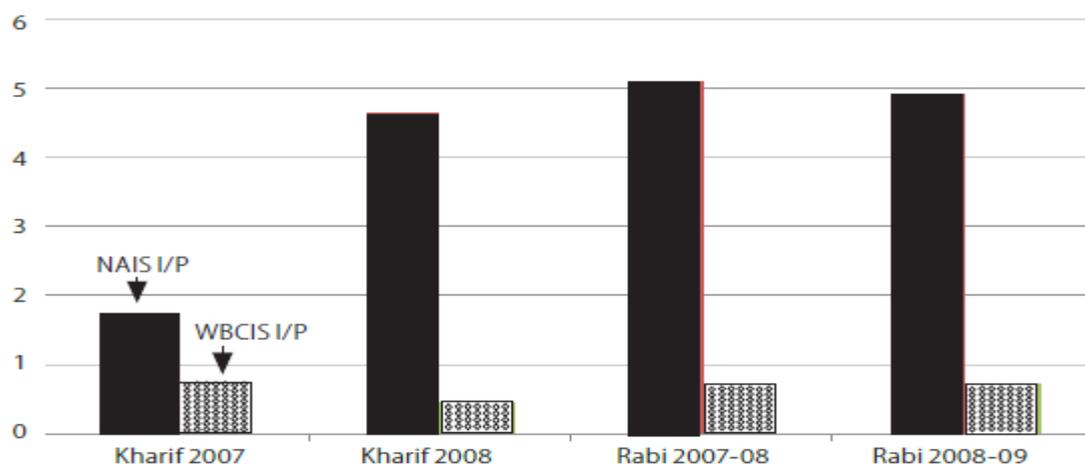


Figure 6: Performance of WBCIS and NAIS

Source: weather based crop insurance in India, By: Reshmy Nair

Scope of the Recommendation and its impact on the Society:

Traditional crop insurance is not possible and very costly when there is a large number of small scale farmers or where crop insurance markets are under developed. Both these conditions are applicable for India. The essential feature of this type of insurance is that the insurance corresponds to an objective parameter for ex. Rainfall or temperature being recorded on the nearest weather station. All policyholders within a defined area receive pay-outs based on the same contract and measurement at the same station, eliminating the need for the time consuming in-field assessments.

The NAIS is considered to be an improvement over the previous scheme i.e. CCIS, but unfortunately it has simply replaced one flawed scheme with another slightly less flawed one. The main loopholes in the NAIS are its goal of financial viability, its mandatory nature, unable to address adverse selection, its arbitrary premiums along with the area approach. Internationally, private crop insurance is not highly developed but varied successful private programs do exist.

Any development process involves various stages. But certainly these stages will vary according to the priorities as well as the agency like banks or authority like any government body or farmers' association involved in the process. Important issues as well as the steps involved in the process can be listed as follows:

- ❖ Assessment of the demand for the product-ensuring that any initiatives are tuned up to the real risk management needs;
- ❖ Identification of the key insured parties; automatic or voluntary cover?
- ❖ Determination of key perils -a key factor in insurance design;

- ❖ Decision on crops to be covered -another key factor in insurance design;
- ❖ Analysis of insurance options, administrative models and loss assessment procedures, together with determination of associated costs;
- ❖ Rating -determining the pure premium required, plus administrative and loss adjustment overheads to derive the initial premium level to be charged; identifying possible complementary
- ❖ Roles for the government and for the private sector.

Since the insurance sector in case of certain risks like systematic risks which affects large areas at the same time causes the significant variations in the gain/ loss portfolio of the insurance companies, private sector is unlikely to enter and provide the schemes alone in the market. Government needs to remain there along with these players providing reinsurance services to keep them incentivize. Government will also benefit from the private sector involvement as it will put a cap on the fiscal exposure in the years of a bad agricultural year or in case of any natural calamity. Therefore PPP in the insurance sector is not only an efficient option but also is the need for the expansion of the program on a sustainable basis.

The resources thus released could be much more efficiently utilized in other development programs which would help the government in earning revenues.

5.1.2.2 Strategy (Flow chart) for the recommendation:

Private sector would be attracted towards the crop insurance industry if proper infrastructure is well in place. During the field visits it was found that the major factor which deters the private players from entering in this market is the cost of automated power stations which they have to incur on their own.

The research done by the GoI, Ministry of Agriculture, Department of Agriculture and Cooperation to evaluate the impact of WBCIS found the factors which causes greatest level of dissatisfaction and satisfaction among the shareholders. The factor which caused greatest dissatisfaction were Location of Weather, Convenience in enrolment along with resolution of Queries and responsiveness etc. However the assignment of approving designs of weather insurance products for their further improvement could be handled in an effective manner according to the flow chart given below.

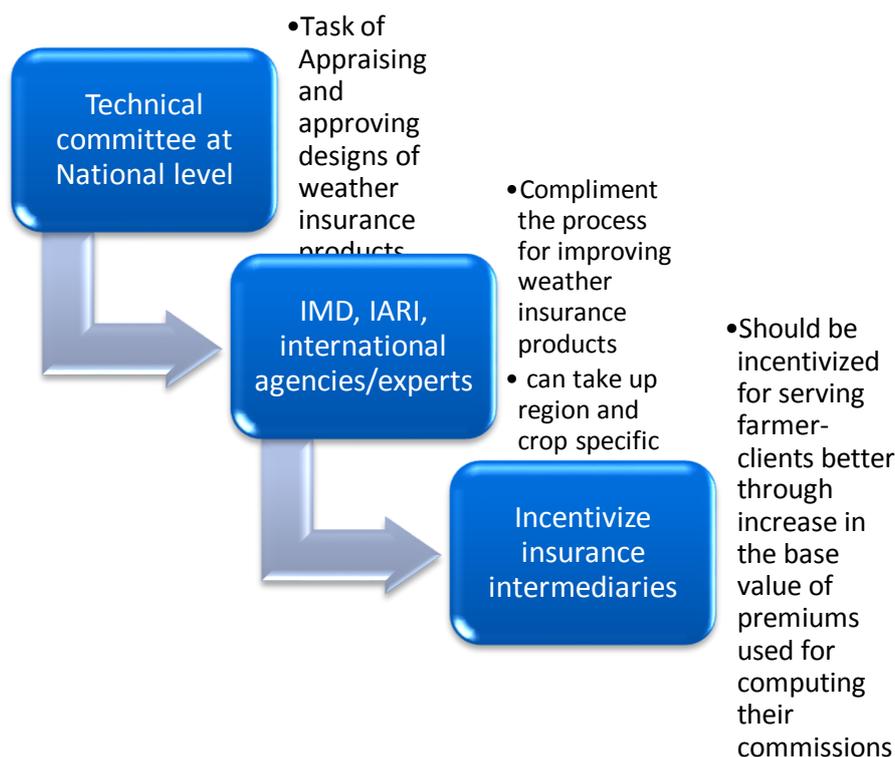


Figure 7: Flow chart for incentivizing private players

A technical committee should be set up at a National level for the task of appraising and approving designs of weather insurance products. For the reliable and timely weather based database IMD, IARI and various international agencies needs to come on the same platform so as to compliment the process. Intensive research needs to be taken up for designing the region as well as the crop specific insurance products. However for boosting up the demand and awareness among farming community there is a genuine need to encourage more and more farmer serving clients. There should be enough incentive for them like increasing the base value of premiums used for computing their commissions. Thus this framework is indeed a supply side model for addressing the dire need of increasing the efficiency of existing ones while design new insurance products.

5.1.3 Recommendation 3:

5.1.3.1 Public Awareness and Capacity Building:

Learning from international experience:

To overcome the grim scenario in India, we have enough to learn from Western countries. In 2012 U.S.A. experienced the worst drought since 1988, but farmers were not as distress as they were during 1988 drought. This is because this time

crop insurance provided them better protection than in 1988. Financial losses from 1988 drought were estimated over \$40 billion. In 1988 only 55.8 million acres of corn, soybean, wheat and other crops were covered by crop insurance. And total of \$1.1 billion in indemnities were paid. In contrast, in 2011, a total of 265.4 million acres of US crops were covered. And pay-outs for 2011 stood at \$10.8 billion. According to estimates, in this year as of 16 July 2012, insurance indemnity for crops stood at around \$446 million as against \$230 million in corresponding period last year. Thus this shows a significant improvement over the years.

Over this time crop insurance has also evolved in western countries. They have started providing price based crop insurance which caters to the sudden fluctuation in prices and not only average yield based product because income of a farmer comprises of price as well as quantity of the product. In this way it is an efficient step towards securing the welfare of the farmers.

Similarly, we need to have a wide spread campaign to reap the potential of crop insurance in India. Presently the penetration rate of crop insurance is abysmally low in India. Around 75% of the farmers do not have any access to the insurance. Mostly Indian farmers are small and marginal who do not have enough resource to hedge against the risks involved in agriculture. In order to empower them in the dearth of institutional support, crop insurance can provide a much needed support to this chunk of population. The biggest reason for the low take up of crop insurance is the lack of awareness and the lack of insurance culture among farmers. They do not understand the benefits of insurance. Given the fact that they lack enough income to purchase the product is not the only reason for their reluctance but their social perceptions also play a crucial role in determining their decision. Even when they have enough money to buy the crop insurance generally they go for life and health insurance. According to the empirical evidence

Hence, it is equally important to spread the awareness of crop insurance among farmers, which is very low, so that they can understand the necessity and the associated benefits of crop insurance. And only when farmers know the significance of crop insurance, they can get protection against these risks by buying such products. To aware farmers about the benefits of crop insurance, there is a need to spread information through different means such as print media, electronic media etc. A comprehensive campaign can be launched by the government throughout the country.

Even though, central government and various state governments are providing subsidies on crop insurance but still very few farmers are availing this facility because there is lack of awareness among them about the benefits of crop insurance.

5.1.3.2 Strategy for implementation and its impact on the Society:

The weak Indian agricultural extension system, marketing channel for the crop insurance along with the abysmally low level of educational attainment and associated awareness to understand the technicalities of the insurance products are the major problems in India. This negates the benefits of a competitive market because the farmers do not understand the difference between the products. Thus there is a need to simplify the procedures to be understood by the farmers.

The possible solution to this could be that the insurance companies design a product which is well suited for a given region. There should be a well evaluated and standardized crop insurance policy across an entire region. But at the same time focus has to be given to the differential needs and communication channels best suited for that region. Thus major focus should be on the delivery mechanism rather than the product per se. The Spanish as well as the US models could be looked upon in this respect.

On the same lines of the Netherlands' model of **Mutual Income Insurance**, in India too such a model can be very beneficial especially for the non-loanee farmers who are the victims of their inability to access credit from the financial institutes. To educate the poor farmers and making them acquainted to any new insurance scheme, the role of self-help groups and micro insurance agents are really significant. Dhan Foundation has been working appreciable jobs of conceptualizing such models in south India. Many regional NGOs are also aggressively working in educating farmers and motivating them towards more mechanised farming along with making them understand the importance of soil conservation techniques. Therefore there is a strong need to garner their efforts and assist them for their appreciable endeavours.

The benefits of greater penetration of crop insurance would make it possible for the companies to reduce the premium rates on their products as the larger farmers base would make it possible for them to reduce the prices as well as to be break even.

One of the factor which affects the decision of farmers regarding the uptake is the performance of crop insurance policy in the preceding years. Delays in claim settlement after the crop has been ruined by the adverse rainfall or due to some pest or disease attack offsets the very purpose of insurance. This not only make it challenging for the farmers to repay back their loans but also make them increasingly difficult to take loans for the next crops, reducing their chances of plantation and pushing them into the vicious circle of debt and poverty. Since the delay is because of the reason that it is not possible to measure the yield of each of the field given the majority of the farmers are small and marginal. Thus the concept of CCEs are used which uses the average yield of a region.

Since the success of an insurance scheme requires getting quick and reliable data.

The recommendation involves the **use of mobile technology** as this is the most efficient and extensive source of penetration given the widespread use of mobile technology in India.

Flow Chart for the Recommendation:

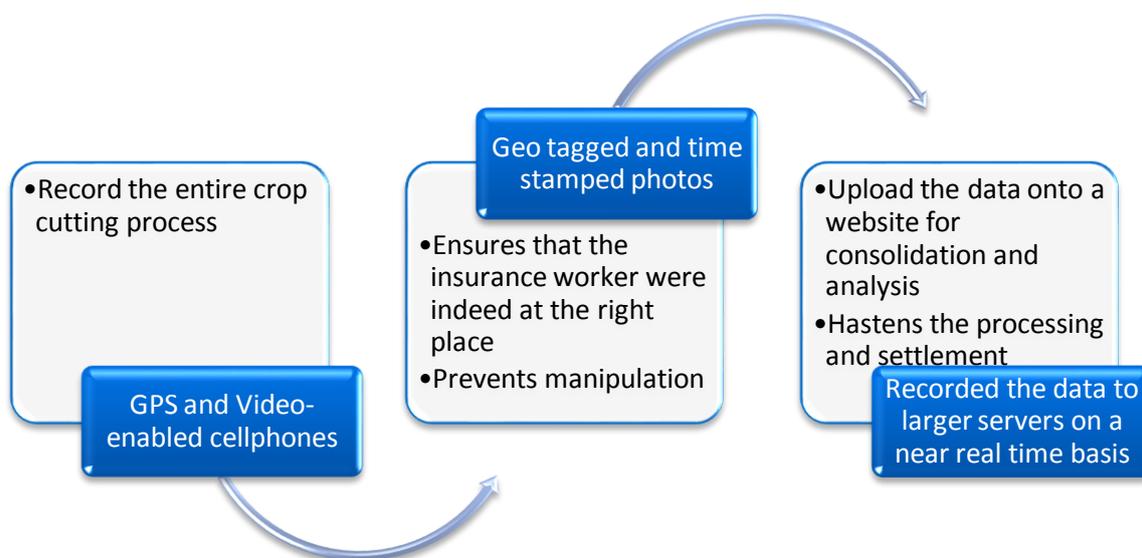


Figure 8: Flow Chart to Implement Mobile App in crop insurance

The GoI has expressed interest in scaling up this initiative since it becomes very difficult to conduct yield verification exercises or CCEs over millions of widespread small and marginal land holdings in such a geographically diverse country. The use of remote sensing technology to concentrate on the regions which have faced a higher incidence of crop failure should be considered. This will help the farmers to compensate the farmers quickly who are in much need and distress.

5.1.4 Recommendation 4:

5.1.4.1 Improving Regulatory Scope:

With the ushering globalisation the importance of agricultural trade and agricultural insurance has gained immense importance. Its usefulness increases in the backdrop of strengthening Food Security and stabilising the income of farmers to protect them against the major risks of production and market risks. Government’s contribution amidst the needs of farmers given the socio-economic nature of their needs is significantly vital.

However the variation in ways of intervention and implementation by the governments in both developed and developing countries draws a distinct line between the two. Measures which were identified as having no or minimal trade distorting effects were to be categorized as Green Box (GB) measures. All the countries try to settle their support within the Green Box criteria under the World Bank mandate but this seems to favour some nations at the cost of others. Developed countries are endowed with heavily mechanised farming, relatively smaller size of farming community, and planned resource management against localized calamities. But on the other hand developing nations are the worst sufferers because of plethora of the problems ranging from poverty, population explosion and inadequate financial resources.

Indian government under the constitutional obligation claims for supporting social assistance to its farming community in the form of crop insurance but the inefficiencies in administration and legal set up makes the benefits of crop insurance inaccessible to the farming community. Although several bodies like judicial and consumer forums have tried to solve few disputes regarding the settlement of claims but still a much larger scope remains left in this arena to make crop insurance farmer friendly by incorporating innovative techniques.

The World Trade Organization's role is enshrined under the Marrakesh Agreement, 1994 in developing the different rules for the subject related to the crop insurance. For crop insurance to come under the ambit of Green Box, national governments need to provide income support to the farmers. The support provided by the US government comes under the amber box while Indian government's support comes under Green Box because of the obvious reasons that Indian government cannot give much financial support because of the administrative bottlenecks. The reintroduction of Farmers' Income Insurance Support can be one of the ways to remain within the confines of Green Box mandate of WTO.

Cross border comparative analysis of crop insurance program

Although India cherishes its claim that it runs the world's largest crop insurance program but there has been much politicization related to the insurance data and implementation. The Indian crop insurance scheme can be compared with the legally regulated Public-Private Partnership with the unique features of US, Spain and Netherlands which can provide some significant learning for India.

The United States of America:

The government made it reform the Federal Crop Insurance reform Act, 1994 making it mandatory for the farmers to participate eligible for deficiency payments

under price support programs which quickly resulted into the greater participation by the farmers. Around the same time government amended the catastrophic risk protection Act compensating marginal farmers for losses exceeding 50% at much subsidized premium. Apart from the implementing agency Federal Crop Insurance Corporation, private insurers under the Standard Reinsurance Agreement also underwrites as well as shares the losses.

Spain:

Spain runs the “Combined Agricultural Insurance System” in the confines of Agricultural insurance Royal Decree 2329/1979. Under this arrangement the agricultural risks are covered by the private sector while the Government subsidizes the premium rates. In this system Annual Agricultural Plans are designed by the Agricultural Ministry while the premium rates are set by the private insurers. Thus this certainly is an example of cooperative task division with suitable organisation plans.

Netherlands:

It operates under the Common Agricultural Policy. Although it started relatively late in 2010 to provide multi-peril insurance but the concept of Mutual insurance coverage schemes under Public- Private framework and the Netherlands government acts as a re-insurer there which makes the program a unique one in the world. Therefore this can be concluded that in Indian scenario, a proper crop insurance legislation, mutual income insurance support and an effective framework of Public- Private Partnership is needed.

Constitutional Relevance of crop insurance in India:

Article 21 of Indian Constitution “Right to life and personal liberty”
Guaranteeing the social security by crop insurance comes under Article 21

DNAIndia has found that ICICI Lombard had cheated government of crores under the WBCIS
In 2010, in Ganganagar district of Rajasthan, at least 2.093 bogus farmers had been enrolled under WBCIS

Company has gained a huge money on fictitious data while the govt. suffered a great setback

Figure 9: Scope of Recommendation

Under Article 21 of Indian Constitution providing Fundamental Right to life and personal liberty has a much wider dimension and guaranteeing the social security

by crop insurance comes undeniably under the purview of the said article. Agricultural Workers Welfare bill, 2011 legitimizes the farmer's basic rights e.g. health insurance, educational facilities, coverage up to rupees two lakh for life insurance.

Judicial Approach to the crop insurance:

Given below are the judicial redressal mechanisms in two cases related to the crop insurance by the consumer forums and High Court.

1.) Sindhu Flowers Pvt Ltd vs. New India Assurance Co Ltd 1999 II CPJ88

Under this case, the complainant requested the insurer to indemnify the loss after a sudden outbreak of hailstorms which spoiled his pre insured crop of flowers after waiting for two months. But the insurance company instead of reimbursing, cancelled the continuing policy. But the complainant was allowed and the insurance company had compensate the loss both in pecuniary value as well as the mental harassment suffered by the complainant.

2.) Suggi Devi and Ors vs State Of Bihar (AIR 2008 Pat 75)

In this case, 34 petitioners filed a PIL in Patna High Court against the general insurance company, which collected heavy amount of premium from the farmers but failed to reimburse the loss. Later the company accepted their liability to compensate the loss after the initial rebuttal.

3.) Gudasi Rajanna vs. the General Manager, Agriculture Insurance Company Ltd

This case is in contrast to the previous cases as in this case the complainant's (farmer) claim was found to be time barred and could not substantiate his claims against the insurer's deficiency in service under the *section 12 of the Consumer Protection Act, 1986*, the complaint stood dismissed. Thus, there lies underlying responsibility among the farmers, insurers and bankers in alleging the claims and substantiating such. However, attention should be paid to the fact that the judicial bodies should handle these cases cautiously and ensure that particularly the farmers are not prejudiced in any manner.

5.1.4.2 Strategy for implementation:

Suggestions for a fruitful crop insurance scheme in India:

Plethora of recommendations and suggestions are available under the subject of crop insurance. Unfortunately because of administrative and implementation bottlenecks, Indian farmers remains deprived of the income assurance benefits of

crop insurance schemes. Therefore in this backdrop India needs strong legislations which would mandate some crucial instructions to be followed by the insurance companies.

✓ **Design a legislation for Crop Insurance Separately**

In India, National and state Agricultural policies have merely mentioned about the crop insurance in theory but their implantation has remained abysmally inefficient. Till date it has been neglected in practice. A proper legal mechanism needs to be put in place at least at the state level. Since the needs of each state in the area of agriculture are distinct given agriculture is location as well as weather specific, therefore, legislations at the state level should be implemented imposing binding norms on the insurance companies in the timely manner. Compensation after a point of times fails the very purpose of having an insurance for the crops for a farmer. Hence what is required is strong legislative mandates for the efficient implementation rather than mere recommendations.

✓ **Strong check on the data provided by insurance companies regarding number of farmer beneficiaries and the claim settlement:**

DNAIndia has found in one of its investigation that ICICI Lombard had cheated the government of crores not just under the Rajiv Gandhi Shilpi Swasthya Bima Yojna, but also under a weather insurance scheme for farmers, a health insurance scheme for weavers and the Rashtriya Swasthya Bima Yojana for poor people.

Also internal control and loss minimisation department of the company had discovered in 2010 that in Ganganagar district of Rajasthan at least 2,093 bogus farmers had been enrolled under WBCIS. The matter came to the fore when Rajasthan Government in October 12, 2010 warned the company of legal action for withholding claims. It was found that in many of these cases (2,093), there was no agriculture activities carried out by the beneficiaries enrolled under the scheme.”

During a field survey, it was seen that insured farmlands, in reality, belonged to other farmers. Expectedly, they were angry. They demanded answers from the company. This could be calculated that how much the company gained on fictitious data while the government have lost in premiums.

Therefore these kind of forgeries should be strictly curbed. There needs to be proper legislation for the transparency in the method data collection and publication of data regarding number of farmers availing the crop insurance. There should be a legislative body directing some obligations for the insurance companies for a transparent and healthy insurance culture in India.

6. Future Work

- Pick one or two states and analyse the potential of crop insurance schemes linked with the credit giving institutions
- Collect the data on the duration of loan repayment of loanee farmers and compare them with that of record of non- loanee farmers. Is the period observed in the latter case is significantly larger than the former?
- Promote R&D in various insurance products and focus on the specific needs of the region in which the insurance product is being provided?
- Government should focus on the faster subsidies settlement for the insurance companies. As it was brought out in the notice during field visits that in some states amount of subsidy provided by their respective government is very fast like in Rajasthan but at the same time in Bihar etc. companies get their part on subsidy with a significant delay. This should be made faster to attract more private companies.
- The success of crop insurance can be achieved if the actual losses on individual farm can be analysed and compensated adequately. Thus experiments to evaluate the losses accurately should be hastened. Proper infrastructure in the form of more and more automated weather base stations should be put in place.
- Insurance products needs to be designed with the view of season as well as location specific. For example during Rabi Weather based insurance product generally proves to be profitable for the insurance companies while reverse is the case during Kharif season. Similarly, in Bihar etc. which are often affected by flood, there WBCIS do not work well. Thus specifications of a place and season needs to be kept in mind.
- Although the Weather based insurance is considered to be better over the yield based but it should not be taken as granted. Although much research work has not been done on the efficacy of WBCIS, which generally uses Rainfall as the index to design the weather based product, to capture the losses of farmers and provide them with the genuine compensation but on the basis of one study it was found out that the correlation between WBCIS claim settlement as percentage of sum insured and sub district yield as percentage of average historical yield was only -13%. This could be even lesser given the quality of data on yield available.

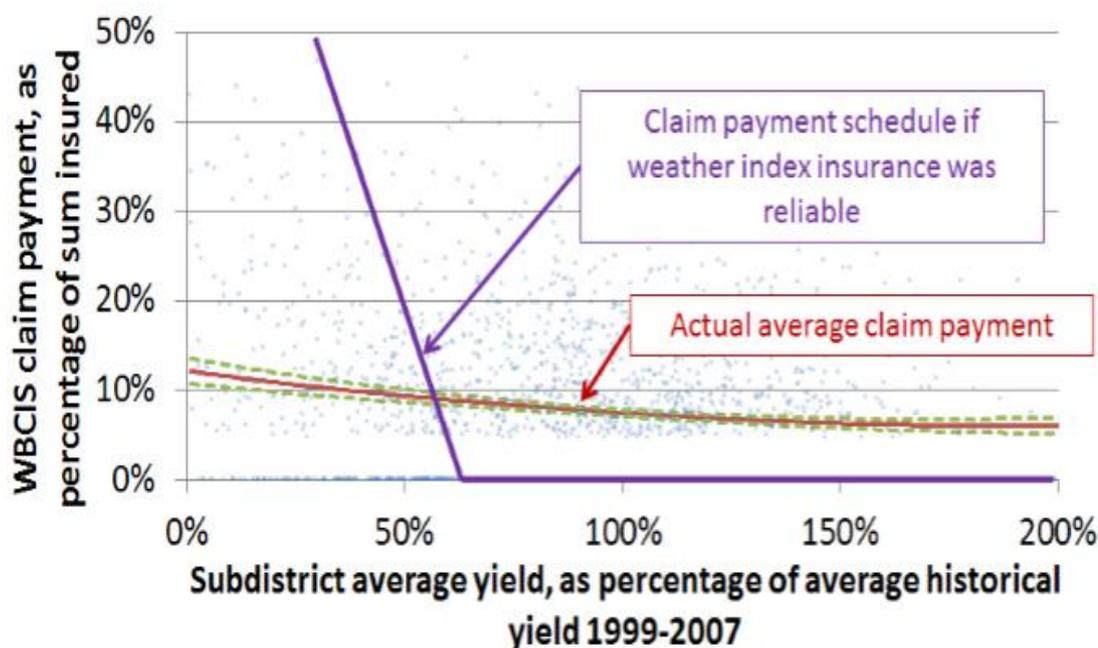


Figure 10: Correlation between claim asked by the farmers as percentage of the sum insured and the sub district yield as percentage of the historical yield

But at the same time this needs to be kept in mind that this insurance in itself is not a panacea for the agricultural crisis which India is facing now. It is well suited only for those risks which are strongly related to the crop yield like rainfall risk and for those risks which are well correlated with the widespread area. It is not suited for the micro weather situations like in mountain regions. Similarly in those types of risks when pest and disease risks are more influential over rainfall risks, weather based insurance is less effective. The three tier strategy for the application of the weather based insurance can be depicted as below:

The micro stakeholders are the beneficiaries i.e. farmers who purchase these insurance schemes. The next level stakeholders are those institutions who also purchase insurance policies but diversify their risks and exposure by reinsuring themselves in the market. The third level of stakeholder is the government or other relief agencies which benefit by capping their exposure to a certain limit during the bad agricultural year or during any natural calamity.

7. Conclusions

Indian agriculture is highly dependent on the vagaries of nature especially dual problems of flood and drought. Indian farming community comprises of majorly small and marginal farmers. In case of a natural calamity farmer bears the burden of crop loss and suffers credit default. Hence need for preserving the dignity of Indian farmer by insuring their crop is inevitable. Since insurance market suffers from the informational asymmetry, government intervention in terms of providing subsidies on the insurance premium is justifiable in countries which faces multi-peril risks in agriculture.

In India government intervenes in the insurance market by providing 50 percent subsidy on the insurance premium to the farmers. Farmers and ranchers purchase the crop insurance to protect themselves against the risk of floods, drought, hailstorm, fire etc. agriculture sector holds a very crucial as well as critical role in Indian economy since it caters to the majority of the population. Thus in order to make agriculture sustainable, efficient and attractive for the current as well as the coming generation it is of utmost importance to upgrade the agriculture. Agricultural insurance can stabilize farm income and investment and provides hedging against disastrous effect of losses due to natural hazards or marketing risks. Crop insurance stabilizes the farm income and helps the farmers to start production activity after a bad year of agriculture.

Predominately rural economy suffers from the credit crunch because of both demand and supply side. Farmers may find themselves reluctant to the adoption of new technology example: high yielding seeds because uncertainty of income implies they might not be able to meet their subsistence cost in some years. On the other hand rural lending institutions might face the problem of poor recovery of loan and hence financial loss. Thus linking credit with the crop insurance can to a large extent solve this problem.

Current crop insurance policies suffers from many deficiencies and are not sufficient to cater to the diverse needs of the farmers. Public policies have been able to reach to the majority of the farming community. The penetration rate is abysmally low in India. There is still an enormous potential remained to be tapped. Therefore private sector's entry through the PPP model needs to be hastened. Some of the policies by private sector has been proved successful. Product development, supporting infrastructure and proper regulatory mechanism needs to be put in place to reap the synergies between private and public sector. Support for design and implementation of technical support unit for crop insurance would incentivise private sector. Weather based insurance scheme's success and sustainability hinges

largely on the availability of good quality data over a sufficient period of time. Thus government should provide good quality data along with supporting private players in setting up various automated weather stations as this is the major cost of operating crop insurance policies for the private players.

Pre sowing as well as post sowing risks should also be incorporated in the policy as failure to sow the fields or loss of harvested crops in the fields are also among the major risks. Regulatory mechanisms should be there in place to prevent forgery as well as promote transparency in claim settlement which encourages farming community to opt for the crop insurance aggressively.

The major reason for the low take up of crop insurance in India is lack of awareness among farmers regarding the insurance products and capacity building at the grass root level. Social factors like the recommendation by some neighbour or friend greatly enhance the decision of farmers whether to buy insurance or not along with the economic reasons. Financial literacy as well as the simplification of insurance products is required to make them aware of the benefits of crop insurance. Simplified but standardised products specific to location and season should be developed systematically so as to increase the uptake of insurance. Government should ensure to reduce the basis risk associated with it which pulls many farmers and ranchers off from purchasing the insurance.

Along with the crop insurance other insurances like livestock insurance, insurance for horticulture and vegetable crops should also be packaged together. Man power should be increased for conducting field surveys while existing staff should be trained so that CCEs could be hastened and farmers could get their genuine compensation in time otherwise the whole idea of insurance goes in vain. Awareness among farmers should be raised through print and electronic media.

In conclusion this needs to be kept in mind that crop insurance is not a panacea but just one of the various possible tools which can be used to reduce the inherent risks associated with the agriculture. Agriculture suffers from the systematic risk which has been accentuated by the adverse climatic changes in the recent periods. Thus more structural steps needs to be taken to hedge against the natural risks associated with the agriculture.

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Appendix

Meetings and Interviews

Date: May 29, 2013

Time: 2:00 PM

Duration of Discussion: 20 minutes

Discussion

1. Mentor asked to focus on the concept of the crop insurance and have a comprehensive view about the problem at hand
2. Mentor suggested me to analyse who are the different stakeholders in the insurance industry namely farmers, lending institutions, insurance companies various levels of governments as well as international lending agencies
3. In India agriculture insurance majorly focuses on the crop insurance and under crop insurance it mainly provides insurance against yield loss. But income of the farmers is a cumulative function of both prices as well as yield. Even in years of bumper harvest, the income of farmers might plummet as high supply in the market puts a downward pressure on the prices of the crops.
4. What different kind of risks are involved in agriculture
5. Research question in any research could be found in two ways: either it could be generated by the researcher or it can be given to him/her from outside
6. How review of literature helps in finding the answer to the research question

DATE: 28th June, 2013

TIME: 3 PM

VENUE: Sharda University, Greater Noida

7. One of the risk mitigating strategy in the absence of crop insurance is that farmers leave agriculture altogether. This is an immiserizing strategy. By leaving agriculture farmers generally migrate to the cities and join as industrial labourers. Although their condition has deteriorated further but they have removed the risk associated with the agriculture.
8. Nature of agriculture has changed in recent years from traditional to the technical approach. Now technology is such that farmers are compelled to buy the inputs from the market afresh in every crop season as compared to the traditional methods where farmers used to use the stored crops as the

seeds for the next cropping seasons. Thus this has increased the cost of production for the farmers.

9. Also the growing commercialization of the agriculture is causing farmers to produce more which increases the problems of plummeting crop prices in the market as well as the growing storage of the food grains concerns in the absence of storage infrastructure
10. Then he discussed various credit linked models which could be when credit giving institutions provides loans in collaboration with the insurance company and both of them bear the risks or in another model credit lenders do not link with the insurance companies and In third case the farmers form a group themselves and pool the resources to pay back the credit institutions in case of failure.

“The highest measure of democracy is neither the
‘extent of freedom’ nor the ‘extent of equality’ but
rather the highest measure of participation.”

- A.D. Benoist

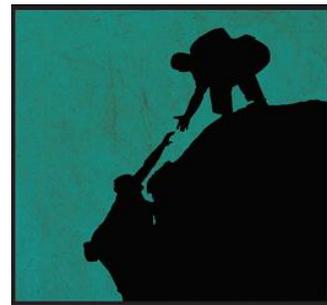
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