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Crop Insurance In India: Evolution, Issues And Way Forward

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Abstract

India has achieved self-sufficiency in food grain production through the advancement of modern technologies. The incomes of the farmers have not improved much and are unstable because of natural catastrophes and price fluctuations. Farmers primarily face yield risk due to weather variability. The resource-poor farmers and landless agricultural labourers who have extremely limited means and resources are vulnerable in the absence of insurance mechanisms. Therefore, crop insurance is needed to address the issue of yield risk in the farm sector. The history of crop insurance in the pre-independence period goes back to the Dashuri tax introduced by the Mughal emperor Akbar. Few schemes were operated from 1920 to 1947 and were discontinued due to financial constraints. After independence, pilot crop insurance schemes were tried during 1972-78. Since then various schemes like Comprehensive Crop Insurance, Experimental Crop Insurance Scheme, Pilot Scheme on Seed Crop Insurance, National Agricultural Insurance Scheme, Weather-based Crop Insurance Scheme, Modified National Agricultural Insurance Scheme, Other crop-specific insurance schemes, National Crop Insurance Programme were tried till 2016. From 2016, the "Pradhan Mantri Fasal Bima Yojana" crop insurance scheme is in operation. This research presents the evolution of crop insurance in India and the challenges encountered in each scheme from pre-independence times to the present day. Finally, based on the shortcomings reported and experiences learned, suggestions for effective implementation of the crop insurance schemes are presented.

Introduction

India, an agrarian economy with one third population depending on the agriculture sector directly or indirectly has 116 million farm holdings covering an area of 163 million hectares of which small and marginal farmers (with holdings of 2 hectares or less) make up 80 percent of the producer population. Farming is an inherently risky business and farmers face many types of risks. About 60 percent of the net sown area of the country is rain-fed and 65 percent of Indian farmers depend on rain-fed irrigation. The growth of crops and realisation of output are determined by the quantum of rainfall and its distribution during the Monsoon Season which at times is uncertain. Rainfall pattern affects the irrigated crops also. Nearly two third of the cropped acreage in India is vulnerable to drought in different degrees. This leads to

operating risk in cultivation of different crops. On an average 12 million hectares of crop area is affected annually by these calamities severely impacting the yields and total agricultural production[1].

Agricultural production and farm incomes in India are frequently affected by natural disasters such as droughts, floods, cyclones, storms, landslides and earthquakes. Susceptibility of agriculture to these disasters is compounded by the outbreak of epidemics and man-made disasters such as fire, sale of spurious seeds, fertilisers and pesticides, price crashes, etc. All these events severely affect farmers through loss in production and farm income, and are beyond the control of farmers. With growing commercialization of agriculture, the magnitude of loss due to unfavourable eventualities is increasing. In recent times, mechanisms like contract farming and futures trading have been established which are expected to provide some insurance against price fluctuations directly or indirectly. But, agricultural insurance is considered an important mechanism to effectively address the risks to output and income resulting from various natural and manmade events[2]. The first crop insurance programme was introduced in 1972 to 1973 by the "General Insurance" department of Life insurance corporation of India on H-4 cotton in Gujarat. Later, the newly set of general insurance corporation of India took over the experimental scheme and subsequently included groundnut, wheat and potato and implemented in the state of Gujarat, Maharashtra, TamilNadu, Andhra pradesh, Karnataka and West Bengal[3].

What is Crop Insurance?

Crop insurance is an arrangement of pooling risk based on the principle of „large number". The insurance company collects premiums from all policyholders and compensates for the persons who incurred loss. Thus, the risk is managed in two ways. One through distribution across space that means the losses of farmers in one area is compensated by the farmers in other areas. Second, distributing across time by compensating with the reserves of the insurance company that are accumulated through premiums collected in normal years. The corpus fund is created by the government and is supplemented by the insurer through the interest income accrued by investing the resources gainfully.

Need for Crop Insurance

Extreme temperature and rainfall shocks caused a decline in crop yield during both Kharif and Rabi seasons. Climate change affects agricultural productivity. Two types of risks are common in Indian agriculture – yield risk (uncertainty of crop yield) due to weather variability and price risk. Even though farmers practise traditional risk management methods by diversifying less risky and less profitable crops by The resource-poor farmers and landless agricultural labourers who have extremely limited means and resources are vulnerable in the absence of insurance mechanisms. The compensations in the form of relief packages given by the government during natural calamities suffered severe limitations. Therefore, crop insurance is needed to address the issue of yield risk in the agricultural sector.

[1] Concept note on Farm Income Insurance: Issues and Way Forward (www.vibrantgujarat.com)

[2] National Centre for Agricultural Economics and Policy Research (NCAEP), Policy Brief on 'Problems and Progress in Agricultural Insurance in India' by S.S. Raju and Ramesh Chand, 2009, p.1

[3] Agriculture insurance company of India limited

Evolution of Crop Insurance in India

S.no	Crop Insurance Name	Year	Salient Feature	Reason for Discontinuance/Is sues noticed
1.	Rain Insurance Scheme	1920	Area-based; Compensation based on rainfall data	Resource constraints
2.	Compulsory Insurance Scheme	1943	Compulsory for all	---
3.	Crop Insurance Scheme*	1946	To solve the problem of indebtedness	Financial constraints
4.	Two Pilot Schemes for Crop and Cattle*	1948	---	Resource constraints
5.	Model Scheme of Crop Insurance*	1965	---	Financial burden
6.	Experimental Crop Insurance Scheme	1972 - 1979	First Individual approach scheme	Loss-making; Financial performance not satisfactory; Individual approach not suitable on the national level
7.	Pilot Crop Insurance Scheme (PCIS)	1979 - 1984	First Area approach scheme; Participation was voluntary for loanee farmers	Crop insurance was integrated with crop loans and available only to loanee farmer
8.	Comprehensive Crop Insurance Scheme (CCIS)	1985 - 1999	Pioneer crop insurance scheme implemented nation-wide scale; Compulsory for loanee farmers; Homogeneous area basis approach	Integrated with short-term credit; Available to only loanee farmers

9.	Experimental Crop Insurance (ECIS)	1997 - 1998	Small and marginal farmers were eligible with a 100% subsidy on premium	Administrative and financial difficulties
10.	Pilot Scheme on Seed Crop Insurance	1999 - 2000	To cover the risks involved in seed production	---
11.	National Agricultural Insurance Scheme (NAIS)	1999 - 2007	Both area-approach for widespread calamities & individual-approach for localised calamities were adopted	Financially not viable. Issues of adverse selection and area discrepancy were noticed
12.	Weather Based Crop Insurance Scheme (WBCIS)	2007 to till date	Insurance covered weather triggers	High premium rate. Complex computational exercise. A low density of weather stations
13.	Modified National Insurance Scheme (MNAIS)	2010 - 16	The unit area was shrunk to the village panchayat level. Private sector participation encouraged. The immediate partial payment system was introduced	High premium rate. Capping on premium rate and amount assured
14.	National Crop Insurance Program	2013	Compulsory for loanee farmers. Three components viz., WBCIS, MNAIS, and Coconut Palm Insurance Scheme were included.	Lack of scientific evidence to relate weather to crop productivity. Overburden of India Meteorological Department. Lack of proper maintenance of rain gauges

Other Insurance Schemes				
15.	Farm Income Insurance	2003 - 2004	Crop income protection to farmers by combining the system of insuring the crop yield and market risks	Discontinued on the recommendations of joint-group
16.	KBS Pilot Scheme for Soya Farmers	2003	Linked insurance to bank loans. Interest payment relief based on rainfall index deficit	Farmers have to pay high-interest rate on crop loans
17.	Rajasthan Government Insurance for Orange Crop	2004	Rainfall-indexed insurance. Only for orange tree planters	---
18.	Drought Risk Insurance (Sookha Smaksha Kavack)	2005	Threshold deficiency percentage of the weighted actual rainfall index was used against normal rainfall index	---
19.	Wheat Insurance (Weather and Biomass)	2005	Combined crop vigor/biomass and weather parameter	Huge costs incurred on the procurement of historical satellite images and their processing. Lack of clear guidelines in the computation of NDVI
20.	Potato Crop Insurance	2005	Insured against the cost of inputs	---
21.	Poppy Insurance	2005	Only for poppy growers	---
22.	AIC Coffee Rainfall Index and Area Yield Insurance	2005	Rainfall index and yield parameters are blended during critical stages of crop growth	---

23.	BioFuel Tree or	2005	Insured in respect of the	---
	Plant Insurance		cost of inputs	
24.	Coconut Insurance	---	To help small and medium coconut growers	---
25.	Rubber Plantation Insurance	---	Compensation is estimated considering the replacement cost of the plant and the present value of the future returns	---
26.	Mango Insurance	---	Insured against excessive and unseasonal rain, temperature and high wind during the critical periods	---
27.	PulpWood Tree Insurance	2013	Cost of inputs per unit area was considered in determining the amount of insurance	
28.	Rabi Weather Insurance	2015	Provided protection against adverse weather parameters during a particular period. The insured was compensated against the diminished crop output/yield due to adverse weather parameters[4]	---
29.	Pradhan Mantri Fasal Bima Yojana	2016 – to date	Reduction in the cost of the premium (Government contribution is five times that of the	---

4 MoS and PI (Ministry of Statistics and Programme Implementation), (2019) Available at: http://mospi.nic.in/sites/default/files/press_release/Presss%20note%20for%20first%20advance%20estimates%202018-19.pdf.

			farmer)[4]	

At present, four insurance schemes are being implemented namely by the government to support farmers.

1. Pradhan Mantri Fasal Bima Yojana (PMFBY)
2. Weather Based Crop Insurance Scheme (WBCIS)
3. Coconut Palm Insurance Scheme (CPIS)
4. Pilot Unified Package Insurance Scheme (UPIS)

List of Companies Providing Crop Insurance

Many countries are involving private insurance companies in crop insurance. Ifft recommended the Government of India to include private companies in the implementation of crop insurance programs. In India, the imperfect information (high cost in information collection) and natural calamities severely damaging crops over a very vast area discouraged the participation of private agencies of regional nature in the crop insurance market because it will go bankrupt by paying huge compensations.

The following insurance companies are involved in issuing crop insurance in India which includes private insurance companies too. Besides government agencies like Agriculture Insurance Company of India Ltd, State Bank of India, private companies like Reliance General Insurance Co. Ltd., Cholamandalam MS General Insurance Co. Ltd., IFFCO-Tokio General Insurance Co. Ltd., HDFC ERGO General Insurance Co. Ltd., ICICI Lombard General Insurance Co. Ltd., Future General India Insurance Company Limited., Bajaj Allianz General Insurance Co. Ltd., Universal Sompo General Insurance Company Limited are serving the farmers in crop insurance.

Review of Literature

The Indian crop Insurance system has been analysed in several studies by various researchers with the intention of giving appropriate protection from agricultural risk to the farmer.

- According to Dandekar (1976) agriculture is at the mercy of the vagaries of monsoon and it is the main source of income of the majority of India's population. Since various natural calamities hurting agriculture are beyond the control of the farmers. He also pointed out that crop insurance is a vital technique to protect the farmer from crop loss. He suggested crop insurance policy is compulsory for all farmers.

[4] National Agriculture Policy (2000). Available at: http://agropedia.iitk.ac.in/content/national-agricultural-policy

- lftt (2001) analyzed the true story of crop insurance in India in the paper "Government vs. Weather". In India widespread crop insurance scheme started by introducing the Comprehensive Crop Insurance Scheme (CCIS) in 1985.The said scheme suffered from a lot of problems-a) high percentage of claims to premium; b) high administrative cost (5-7%) typically; c) mandatory for loanee farmers; d) acting as "bank insurance"; e) 22 states/ union territories participate in the CCIS. In order to solve these problems, in 1999 it was replaced by the National Agricultural 42 Insurance Scheme (NAIS)

- Sinha (2004) undertook a study of interstate comparison with respect to the effect of crop insurance policy. He has explained the agricultural insurance system in India and expressed the views, which are different to a great extent from those of the previous authors. In India the General Insurance Corporation (GIC) managed crop insurance, which was delivered through rural financial institutions. But later the newly formed Agriculture Insurance Company (AIC) of India has taken over the role of the implementing agency (IA) from the . General Insurance Corporation (GIC). In India different types of crop insurance schemes have been introduced one by one. These schemes are National Agricultural Insurance Scheme (NAIS) replacing Comprehensive Crop Insurance Scheme (CCIS) and Firm Income Insurance Scheme (FilS) replacing NAIS. Besides, the Calamity Relief Fund (CRF) and the Rain Fall Insurance (RFI) also are introduced in agriculture.
- Kalavakonda and Mahul (2005) analysed the activity of crop insurance of India's second largest driest state Karnataka and pointed out the weakness in product design, implementation challenges and operational problems. From the analysis they have found that the running crop insurance scheme failure to attain both of its explicit (risk management) or implicit (safety net and containment of both the central and share governments' contingent liability) hypothesis, as a result the insured coverage acreage and number of insured farmer and also the financial activities were not satisfactory. Therefore, they provide a crop insurance design on the basis of cost effective risk management technique. Finally, they provide new ideas to imp of the crop 44 insurance scheme and sketch the alternative-crop insurance scheme on the basis of an area -yield approach.

- Goodwin (1993) analyses the demand for multiple peril crop insurance of the Iowa Corn Producers by taking 99 Iowa counties for the period 1985 tol990. There are several factors such as yield, loss risk, characteristics of the farm operation, land values, premium rate etc., which affect the soundness and profit of crop insurance.

- Williams, Carriker, Barnaby and Harper (1993) have studied the "crop insurance and disaster assistance design for wheat and grain Sorghum" (name of the crop). In this study, they have compared the effectiveness of two crop insurance designs, two disaster assistance designs, a linked crop insurance and a government commodity programmed for reducing net returns risk. These insurance policies are evaluated by using primary farm level data for wheat and grain sorghum enterprises in a uniform production region in 45 south central Kansas land for wheat enterprises in a less uniform production region in 36 northwest Kansas. They employ the stochastic dominance analysis of the net returns distribution to identify the preferred design(s) over several risk preference intervals. For this reason they have examined six strategies- (a) participation in the government commodity program only (GCP);(b) participation in the government commodity program and purchase of individual crop insurance (GCP+CI);(C) participation in the government commodity

program and purchase of area crop insurance (GCP+ACI); (d) participation in a linked government deficiency payment/crop insurance program (LDC);(e) participation in the government commodity program and receipt of assistance under an individual disaster assistance program (GCP+DIS); and (f) participation in the 53 government commodity program and receipt of disaster assistant under an area disaster assistance program(GCP+ADIS).

- Chhikara K.S. & kodan A.S (2012), National agriculture insurance scheme (NAIS) in India. As assessment, management & labour studies

Aim and Objectives of the study

1. To explain the concept of crop insurance.
2. To discuss the various crop insurance schemes prevalent in India over the year.
3. To provide insurance coverage & financial support to the farmers in the event of preventing sowing failure of any of notified crops as a result of natural calamities, pests & diseases.
4. To encourage the farmer to adopt progressive farming practices, high value inputs & better technology in agriculture.
5. To help stabilise farm incomes, particularly in disaster years.

Research Methodology

1. The researcher will adopt an analytical research methodology to critically analyse the crop insurance schemes available in India, while also conducting a comparative analysis of crop insurance schemes in other countries.
2. This research can be applied as research since it aims to identify a suitable solution to address the existing crop insurance problem in the current scenario.

Hypothesis

1. H1: Need for crop insurance to the farmer depends upon the weather conditions.
   HO: Need for crop insurance does not depend upon weather conditions.

2. H1: Cost of crop insurance policies drastically affect the insured person (farmers).
   HO : Cost of crop insurance policy does not affect the insured person.

3. H1: Delay in settlement affects the farmers in turn to opt crop insurance policy.
   HO: Delay in settlement does not affect the farmers in turn to opt the crop insurance policy.

Research questions

1. What are the vulnerabilities faced by farmers and the need & rationale for crop insurance?
2. How does the PMFBY function? What is the operational process? What are the design and operational needs of these schemes in particular?
3. What is the Socio demographic profile of enrolled farmers vs non enrolled farmers?
4. What are the farmer's expectation forms and experiences of PMFBY and other crop insurance schemes?
5. What is the budget allocation made towards this scheme? What does it reveal in terms of the budgetary priorities of the state?
6. Are insurance claims settled to the farmers?
7. What are the roles & responsibilities of govt, officials, banks and other financial agencies such as the insurance companies?

Issues related to crop insurance in India

1. The primary reason for low coverage was unaffordable high premium rates.
2. The assessment of damage was based on the traditional system of crop cutting experiment which took 6 to 12 months. The settlement of the claim took an undue long time and it extended beyond the next cropping season.
3. Discrepancy in area insured. [e.g., the area insured for a particular crop being more than the crop area sown]
4. Delay in receiving crop – cutting data and quality and reliability of such data.
5. Weather data, particularly from private automatic weather stations.
6. Non-compliance with the provision of compulsory insurance for loanee farmers, multiple loans on the same land, lack of seasonality discipline.
7. Affordability of crop insurance premium for farmers and transparency in determining premium rate.
8. Delay in settlement of claims.
9. Role of Banks and Agricultural Insurance Companies in the operation of schemes and
10. Awareness of farmers regarding various features of the Schemes.

Way forward

Most of the farmers considered insurance as an investment mechanism. They did not know that it is meant for risk reduction. Therefore, large scale awareness should be created on the benefits of crop insurance among farmers using various outreach methods. It is revealed from the experiences so far that either PMFBY or WBCIS would not be sufficient to cover all the pure risks arising from agricultural activities. Instead, a total insurance package should be designed and offered for farmers‟

There is a scope for manipulation of crop yield data assessed through crop cutting experiments by the private insurance companies for profit sake. Therefore, to avoid this manipulation of yield data large scale use of remote sensing, drones, satellite imagery and digitization of land records should be encouraged at all levels for the successful execution of the PMFBY.

Private insurance companies invested huge money in the scheme reaped and continue to earn a profit. There should be transparency in claims processing and compensation settlement. A specific insurance company was assigned the responsibility of selling insurance at the cluster level. At present, the situation is a monopoly due to lack of competition. Therefore, there is little or no chance to improve or upgrade their products and introduce competitive pricing.

Time lag in settlement of claims was due to the delay in transmission of yield data by the concerned department, not timely transfer of premium subsidy by the state governments, disagreements over yield-data between insurance companies and the state governments, missing of bank account details of farmers due to miscommunication to credit the compensation amount, and NEFT related issues, etc. Specific changes in the operational guidelines should be framed to avoid delay in claim settlement so that the compensation to farmers is paid in time.

The latest technologies such as remote-sensing, simulation modelling, 3D imaging, and ICT tools should be used to improve accuracy and objectivity while estimating the crop loss based on weather index parameters. A solitary information storehouse ought to be made with all insurance-related information on weather and crop yield for quick access by all agencies involved in crop insurance. The farmers who adopt climate-smart agricultural practices should be incentivized by insurance companies through designing insurance products at affordable rates and providing access to them.

The risks in crop insurance schemes are spatial, temporal, and crop-specific. This cannot be eliminated by a area approach; the individual approach is best suitable but economically infeasible. The “utmost good faith” in the compliance mechanism of material information disclosure by the insurance companies to the insured farmers did not always happen in agriculture insurance. The true reasons were the heterogeneity in farmers‟ perceived risk attitudes leading to a varying degree of concern to pay for insurance premium, crop choice and income stream from agricultural activities, and level of financial literacy. Hence, multi-agency in insurance product design should be encouraged. The GoI should frame an effective dispute and grievance settlement mechanism immediately for encouraging private insurance companies to actively take part in promoting crop insurance in rural agricultural markets.

Improved identification of losses can undoubtedly be beneficial because most of the farmers were unaware of loss computation methods (including concepts such as threshold yield) and damage assessment mechanisms are not farmer-friendly. Hence, they feel “misled” when they do not receive compensation despite being insured and facing crop losses.

Suggestion and recommendation

- To adopt artificial intelligence (AI) based technology for crop yield assessment.
- Delay in settlement of payment of claim would be reduced.
- To implement more schemes.
- The govt is restructuring the Pradhan Mantri Fasal Bima Yojana (PMFBY) through measures including use of Artificial intelligence based technology for timely assessment of crop yield data for prompt claim settlement/
- To implement competitive bidding for premium quotes from insurers.

- This research recommends widespread use of remote sensing technology in agriculture insurance programs with minimum human intervention in order to assess crop damages & expeditious settlement of claims. Drones could be used to take images of crop affected hail, wind and rainfall. Because they fly at lower heights, such as cloud obstruction can be minimised. As soon as there is information on damage in a particular area, they could be deployed to assess damage in the area accurately. Recently the world's largest corn process or Archer. Daniels Midland co. in the USA received approval from the Federal Aviation Administration (FAA) to use drones to gather data on crop insurance claims. India has also adopted the same technology to help the farmers.

Conclusion

The crop insurance program with ad-hoc funding from the Government of India to a market-based crop insurance program with actuarially sound premium rates and product design is a major step forward. The improved product and active involvement of private sector insurance markets are expected to lead to significant benefits for farmers, including faster claims settlement, a more equitable allocation of subsidies and lower basis risk. For the product to be pro-poor, small and marginal farmers must purchase the MNAIS product voluntarily, and insurers and government must experiment with cost-effective ways of increasing outreach.

Use of latest technology such as GPRS-enabled and Camera fitted Mobile Phones may be used to implement Crop Insurance Schemes more effectively. A comprehensive programme of capacity building – in line with the needs of stakeholders such as State Government functionaries, insurers and Central Government agencies associated with Crop Insurance Schemes should be organised. Programmes of creating awareness and insurance literacy among farmers should be prepared by Insurance Companies and Banks, in collaboration with the concerned State Governments.