



CROP INSURANCE: THE THEORETICAL PERSPECTIVE AND THE POLICY APPLICATION IN INDIA

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ABSTRACT

Agriculture being a risky venture is subjected to various uncertainties in production and volatility in prices. Since the market will not provide coverage against the production risk, therefore government has come up with crop insurance programme. Although government of India initiated crop insurance way back in 1970s they met with limited success as the coverage of most of the schemes remained very low. To overcome the shortcomings of previously initiated schemes, government has now come up with the ambitious PMFBY.

KEYWORDS- *Agricultural risk, Crop Insurance, Claim-Premium Ratio, Sum Insured*

I. INTRODUCTION

Despite high rate of growth of GDP of the Indian economy, the agriculture sector has faced many challenges since the middle of 1990s. Often described as the agrarian crisis, the acute challenges has forced many farmers to recourse to the extreme step of committing suicide. Policy response of the government in the last few years can be seen in the shift of emphasis from farm production to farmers' income and wellbeing. One of the components of government policies in this regard is to promote crop insurance for mitigating uncertainties of farmers. However crop insurance is not as easy as insuring of several other risks such as accident death, sickness and fire. The present paper is an attempt to discuss the challenges of providing crop insurance in the background of theory of insurance and review government's effort for wider and deeper crop insurance for farmers in the backdrop.

The present paper is organised in four section. The theoretical perspective of crop insurance is presented in second section. The third section provides a review of crop insurance schemes of Government of India. The last section gives the concluding comments of the paper.

II. ECONOMICS OF INSURANCE: THE THEORETICAL PERSPECTIVE WITH FOCUS ON CROP INSURANCE

2.1 Economics of Insurance

Introspection and observed behaviour suggests that most people are risk-averse in most of their dealings. A risk-averse person facing an uncertain prospect will be prepared to pay premium for a guarantee of certainty equivalence income. These two facts are indeed the basis of insurance business. Insurance is the substitution of premium rate for the possibility of an uncertain loss which will be compensated through indemnification. The insurance business thrives on the fact that while many people run risks and buy insurance

policies, in reality only a handful of them actually suffer the loss and therefore need to be compensated.

2.1.1 Demand for Insurance

A risk-averse person facing an uncertain prospect will be prepared to pay premium for a guarantee of certainty equivalence income. There is a theorem concerning the demand for insurance. The theorem states that if fair insurance is available, a risk-averse person would insure fully, i.e. the person would go for full coverage of his risk (Hands 2004: pp.162-163). A fair insurance is insurance at a premium which leaves the insurance provider with zero expected profit.

In real life, completely fair insurance is unlikely to be available. After all, an insuring firm is required to cover its administrative expenditures to remain in business. Yet, if insurance is available at not too 'unfair' price, most people would buy full or partial insurance cover. Only those whose risk aversion is very close to zero, i.e., those who are very nearly risk neutral may opt out of the insurance market.

2.1.2 Supply of Insurance

Insurance is not provided for all kinds of risks to which people are exposed. For supply of insurance to be available the following two conditions need to be met.

- a) Risk pooling
- b) Risk sharing

Supply of insurance is available only if risk pooling is possible. For risk pooling to be successful risks must be repeated to which many agents are exposed. In addition risk must be independent, i.e. those who have pooled their risk should not fall into the adverse state of nature at the same time. Otherwise risk pooling will fail and so insurance will not be available. For large and lumpy projects such as launching of satellite, football match and so on, insurance is available if it is possible for the insurer to reinsure with other insurance companies. This is the case of sharing the risk in which risk is

being shared effectively (Layard and Walters 1987: pp.362-363).

In case of idiosyncratic source of uncertainties those who are well off would pay those who suffer damage from the uncertainty with a common fund. But sources of uncertainties whose realization affects all in the same way, no insurance would be possible.

2.1.3 Moral Hazard and Adverse Selection

There are two problems associated with insurance market because of asymmetric information and therefore, the insurance business is often exposed to market failure. These two problems are moral hazard and adverse selection, which prevent insurance providers from offering fair insurance. Moral hazard occurs when the individuals has an incentive to engage in more risky behaviour because he or she is insured. Formally, moral hazard occurs when the probability of a bad state of nature is a function of the level of care or safety taken by the individual (Hands 2004: p.164).

Adverse selection occurs when the individual has more information about the probability of a loss than the insurance provider does. If individuals know their own risks, those with low risks may not be willing to take out any insurance policy. The policy in that case, will be attractive to the high-risk people, which will drive up the premium. Eventually, only high-risk people will be left in and there will be no insurance policies for the low-risk people.

2.1.4 Agricultural Risk and Crop Insurance

Agricultural production and farm income in India are very often affected by various risks such as weather risks arising from floods, droughts, cyclone, hailstorm etc., biological risks due to pest attack and disease, and market risks in the form of fluctuations of input / factor and output prices. Resulting instability of farm output and income often affect a farmer's wellbeing. Crop insurance is one of the mechanisms to mitigate production and market risks which results in instability in income resulting from various uncertain events. Crop insurance is a risk transfer mechanism that transfers the production risk from the insured to the insurer.

Theoretically supply of insurance against crop failure is not easy to be available. From the insurance perspective, most of the agricultural risks are covariate in nature which

cannot be pooled and market is unlikely to naturally ensure supply of crop insurance. Hence, state intervention becomes an imperative for a crop insurance to be available to farmers.

As in case of general insurance, agricultural insurance market also faces the problem of adverse selection and moral hazard. Higher premium rates discourage majority participation and only high risk individuals purchases the insurance, leading to adverse selection. Again, an insured farmer hardly takes care in preventing the loss or takes more risk at the expense of the insurance provider because he or she would be indemnified if he/she faces uncertain events that results in damage. The asymmetric information and hidden action on the part of the insured party discourages private participation in the crop insurance market. Therefore, government subsidy is essential for such insurance to be available.

III. REVIEW OF GOVERNMENT PROMOTED CROP INSURANCE SCHEMES

3.1 Crop Insurance Schemes in India

The first ever crop insurance scheme was introduced in Gujarat during 1972-78. It covered H-4 cotton variety initially, though subsequently other crops were also brought under its ambit. From time to time Government of India has initiated various crop insurance schemes but these schemes met with limited success. In this section, a detail of some of the important crop insurance schemes and their performance has been provided.

3.1.1 The National Agricultural Insurance Scheme (NAIS) 1999

The National Agricultural Insurance Scheme (NAIS) was introduced in the country from the *rabi* season of 1999-2000. This scheme was available to both loanees and non-loanees. The premium rates in the *kharif* season for Bajra and oilseeds were 3.5 per cent of sum insured and 2.5 per cent of sum insured for other crops. For wheat premium rate was 1.5 per cent and 2 per cent for other *rabi* crops.

The coverage of NAIS in some of the states of the country is produced in Table 1. As can be seen from Table 1, Bihar had highest beneficiary ratio followed by Karnataka, Tamil Nadu, Maharashtra and Rajasthan. For Assam the coverage as well as the beneficiary ratio is far below than the rest.

Table 1: Coverage, Number of Farmers Benefitted and Beneficiary Ratio of NAIS Across the States

States	Farmers covered (cumulative up to 2014-15)	Number of Farmers Benefitted	Beneficiary Ratio
Andhra Pradesh	30018565	6876533	22.91
Madhya Pradesh	38247033	7476038	19.55
Maharashtra	40094326	14960115	37.31
Gujarat	14992011	5137321	34.27
Chhattisgarh	10519336	1712134	16.28
West Bengal	13124709	2880357	21.95
Karnataka	13149944	5223118	39.72
Tamil Nadu	7193200	2828760	39.33
Jharkhand	6341386	2188050	34.50
Uttar Pradesh	23426016	4517617	19.28
Rajasthan	15058674	5200566	34.54
Bihar	7616212	3269864	42.93
Kerala	461282	85470	18.53
Assam	420342	65963	15.69

Source: Agricultural Statistics at a Glance 2015

Table 2 presents sum insured per hectare of gross crop area (GCA), claim-premium ratio under NAIS. The claims paid by the scheme was more than 5 times the premium collected in the States of Tamil Nadu, Bihar, Jharkhand and Rajasthan. In Karnataka claim-premium ratio was 4.02 implying claims paid by the scheme is 4 times the premium

collected. But in Assam the claim-premium ratio is even less than unity. Sum insured per hectare of gross crop area was highest for Andhra Pradesh followed by Tamil Nadu, Gujarat, Madhya Pradesh, Bihar, Jharkhand, Chhattisgarh and West Bengal. For Assam these figures are far below than that of the rest of the States.

Table 2: Sum Insured Per Hectare of Gross Crop Area & Claim-Premium Ratio Under NAIS (Up to 2014-15)

States	Sum Insured/Hectare of GCA	Claim-Premium Ratio
Andhra Pradesh	45744	2.74
Tamil Nadu	36782	5.57
Gujarat	36326	3.48
Madhya Pradesh	34283	2.39
Bihar	22206	5.87
Jharkhand	21766	5.96
Chhattisgarh	20565	1.32
West Bengal	17137	1.53
Karnataka	14032	4.02
Uttar Pradesh	12999	1.70
Rajasthan	6779	5.73
Odisha	5727	2.91
Assam	2144	0.66

Source: Author's calculation based on data taken from Agricultural Statistics at a Glance 2015

3.1.2 Modified National Agricultural Insurance Scheme (MNAIS) 2010

The Modified National Agricultural Insurance Scheme came into effect from Rabi 2010-11 seasons. The MNAIS has been introduced based on the reviews of the existing NAIS, which was implemented since 1999. From *rabi* 2010-11 to *kharif* 2014, a total of 98,61,000 number of farmers were insured under MNAIS.

The coverage, beneficiary ratio, claim-premium ratio and sum insured/hectare of GCA is shown in Table 3. Andhra Pradesh had the highest number of farmers insured under

MNAIS followed by other states like Uttar Pradesh, Bihar, Karnataka and Rajasthan. The beneficiary ratio was highest for the State Uttar Pradesh followed by Andhra Pradesh, Karnataka, Rajasthan, and Bihar. The beneficiary ratio of Assam was 11.09 which shows a very small proportion of farmers were benefitted out of the insurance scheme. Claim-premium ratio was found to be highest for Uttar Pradesh and it was 1.86. For other States the claim-premium ratio was less than unity except Andhra Pradesh. For Assam, the claim-premium ratio is only 0.28.

Table 3: Farmers Covered, Benefitted, Claim-premium Ratio and Sum Insured to GCA under MNAIS (Up to 2014-15)

States	Farmers Covered (up to 2014-15)	Farmers Benefitted	Beneficiary Ratio	Claim-Premium Ratio	Sum Insured/Hectare of GCA
Andhra Pradesh	1444400	581915	40.28	1.38	45744.5
Bihar	1382947	269128	19.46	0.32	22140.9
Karnataka	1564498	443615	28.35	0.59	14032.5
Uttar Pradesh	2511528	1102097	43.88	1.86	12989.08
Rajasthan	7780846	1909272	24.53	0.70	6765.3
West Bengal	1943422	317960	16.36	0.47	16964.2
Assam	19929	2211	11.09	0.28	2144.15

Source: Author's Calculation Based on data taken from Agricultural Statistics at a Glance 2015

3.1.3 Weather Based Crop Insurance Scheme (WBCIS) 2003

This scheme was introduced during 2003-04 which was based on weather parameters aims to mitigate the hardship of the insured farmers against the likelihood of financial loss on account of anticipated crop loss resulting from adverse weather conditions. Crop loss due to vagaries of weather (i.e. excess or deficit rainfall, aberrations in sunshine, temperature and humidity, etc.) could be covered on the basis of weather index. If the actual index of a specific weather event is less than the threshold, the claim becomes payable as a percentage of deviation of actual index.

The coverage of this scheme across the states is produced in Table 4. Under this scheme, the beneficiary ratio is found to be highest for Maharashtra followed by Bihar, Kerala, Himachal Pradesh, Assam and Andhra Pradesh. The claim-premium ratio is found to be highest for Maharashtra and sum insured per hectare of GCA is highest for Bihar. For Assam the claim-premium ratio and sum insured per hectare of GCA were 0.12 and 563 respectively, far below from other states.

Table 4: Farmers Covered, Claim-Premium Ratio and Sum insured to GCA under WBCIS (Up to 2015-16)

States	Farmers covered	Farmers Benefitted	Beneficiary ratio	Claim-premium ratio	Sum insured/ ha of GCA
Andhra Pradesh	3616815	2374595	65.65	0.78	11082
Bihar	12885954	10712377	83.13	0.56	39127
Chhattisgarh	1287074	843828	65.56	0.75	7791
Himachal Pradesh	390329	275904	70.68	NA	14949
Kerala	162894	128796	79.06	0.74	19658
Maharashtra	2908194	2546865	87.57	1.15	3581
Rajasthan	44835969	29405090	65.58	0.86	20074
West Bengal	123335	75297	61.05	0.68	217
Assam	67634	46988	69.47	0.12	563

Source: Author's calculation based on data taken from Agricultural Statistics at a Glance 2016

3.1.4 Pradhan Mantri Fasal Bima Yojana (PMFBY) 2016

Pradhan Mantri Fasal Bima Yojana (PMFBY) was introduced in 2016 with an aim to support sustainable production by providing financial support to farmers suffering crop loss/damage arising from unforeseen events. The emphasis has now shifted from increasing farm production to increasing farm income. The main objective of this initiative is to double farmers' income by 2022. The scheme also aims at encouraging farmers to adopt innovative and modern agricultural practices.

All farmers including sharecroppers and tenant farmers growing the notified crops in the notified area are eligible for coverage under the scheme. As per the guidelines of the scheme efforts shall be made to ensure maximum coverage of SC/ ST/ Women farmers under the scheme.

The premium rates for Food Crops and Oilseeds (FCOS) is fixed at 2 percent of the Sum Insured or Actuarial rate for the *kharif* season and 1.5 percent for *rabi* season. For commercial/horticulture crops, premium rate of 5 percent is fixed to be paid by the farmer.

To address the problem of moral hazard and adverse selection in insurance contract, government has implemented a shorter duration of purchase deadline of 30 days before scheduled crop cycle under the PMFBY. The PMFBY considers 10 crop cycles in estimating guaranteed yield to ensure efficacy in designing the policy for sorting out risky participants under its coverage.

Table 5 presents the coverage of PMFBY across the states of India. Except Haryana and Jharkhand where number of farmers insured has increased by 1.17 and 14.59 percent during 2016-17 to 2017-18 respectively, the other states has registered a fall in the number of farmers covered

Table 5: Farmers Insured Under PMFBY During 2016-17 to 2017-18

States	Year 2016-17	Year 2017-18	Percentage change
Andhra Pradesh	1771557	1698672	-4.11
Assam	60265	26593	-55.87
Bihar	2713178	2277220	-16.06
Chhattisgarh	1549164	1498009	-3.30
Gujarat	1975192	1233614	-37.54
Haryana	1335984	1351619	1.17
Himachal Pradesh	379053	190578	-49.72
Jharkhand	877754	1005871	14.59
Karnataka	3116434	1445535	-53.61
Kerala	77405	41942	-45.81
Madhya Pradesh	6993127	6898636	-1.35
Maharashtra	12006332	9812628	-18.27
Rajasthan	9287936	8017589	-13.67
Tamil Nadu	1450136	1380666	-4.79
Uttar Pradesh	6670254	5425058	-18.66
West Bengal	4135189	2544648	-38.46

Source: Ministry of Agriculture and Farmers Welfare

In Assam the coverage has decreased by 55.87percentage during 2016-17 and 2017-18. Although the number of farmers insured has decreased in most of the states, the number of

non-loanee farmers insured has increased in Chhattisgarh, Gujarat, Jharkhand, Uttar Pradesh and Assam as shown in table 6.

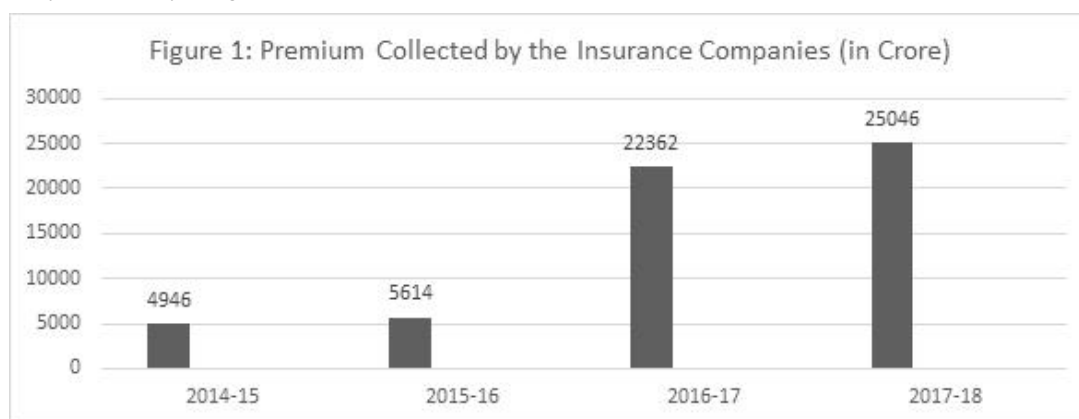
Table 6: Percentage Change In Non-Loanee Farmers Insured During 2016-17 to 2017-18

States	Year 2016-17	Year 2017-18	Percentage Change
Andhra Pradesh	133670	61594	-53.92
Assam	36	65	80.55
Bihar	40551	37408	-7.75
Chhattisgarh	196731	218224	10.92
Gujarat	4685	1231067	26176.78
Haryana	3062	2987	-2.44
Himachal Pradesh	60411	1647	-97.27
Jharkhand	677073	847592	25.18
Karnataka	1526672	791593	-48.14
Kerala	24194	3471	-85.65
Madhya Pradesh	509137	280540	-44.89
Maharashtra	7916713	7698713	-2.75
Rajasthan	45610	359	-99.21
Tamil Nadu	1123438	994725	-11.45
Uttar Pradesh	21594	68875	218.95
West Bengal	1346117	546732	-59.38

Source: Ministry of Agriculture and Farmers Welfare

After the implementation of the PMFBY, the number of farmers insured by the crop insurance has increased by only 0.42 percent. On the other hand, premiums paid to insurance companies has gone up by 350 percent according to data provided by the Ministry of Agriculture and Farmers Welfare.

The insurance companies- both public and private- collected a gross premium of Rs.47,408 crore for the two seasons (2016-18) under the PMFBY. Total claims paid as on October 10, 2018 was 31,613 crore.



Source: Ministry of Agriculture and Farmers Welfare

As in the case of number of farmers insured, the coverage area also declined between 2016-17 and 2017-18. The target of bringing 100 million hectare under the PMFBY by 2018-19 remain as far as it was when the scheme was initiated. Against the target of 50% coverage of cropped area for 2018-19, the coverage stands at less than 26% in 2017-18.

Delay in claim settlement is one of the issues on the part of the farmers with the crop insurance schemes. To address this problem government announced that it would impose a penalty of 12 percent interest rate per annum on insurance companies which delay payments beyond 10 days of prescribed cut-off date for payment of claims under PMFBY.

Although there is a fall in the number of farmers insured under PMFBY, it may be noted that it is loanee farmers who exited the scheme in most of the states, while there is not much fall in the number of non-loanee farmers. The drop is significantly noted in big States like Maharashtra, Uttar Pradesh and Karnataka who have announced huge farm loan waivers around 2017-18. This means that the decline in the total number of farmers has been due to a decline in the forced buyers in the form of loanee farmers. It is indeed a healthy sign that the voluntary buyers of crop insurance has in fact

consolidated. The number of such buyers can be expected to increase in the coming years as government is initiating tweak the PMFBY to make crop insurance attractive to voluntary buyers.

IV. CONCLUSION

The market forces will not automatically ensure adequate insurance in the event of crop failure. The state intervention are needed for crop insurance to be supplied. In India, government initiated crop insurance way back in 1970s. After several not to successful schemes, the government has come up with the ambitious PMFBY. Insuring farmers' income by broadening and deepening of crop insurance is still a work in progress. The Fasal Bima Yojana implemented by the NDA government since 2016 strives to overcome the shortcomings of earlier programmes. However, even this programme is still being fine-tune. The coming years will show whether this programme can effectively perform its role in stabilising farmers' income.

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