

Research Paper

# Crop Insurance in Odisha – Progress, Deficit and Scope

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## ABSTRACT

Crop insurance intends an inclusive insurance protection policy in the situation of crop failure and facilitates stabilizing the earnings of the farmer. An attempt has been made to analyze the progress of crop insurance schemes in Odisha with special insights into the *Pradhan Mantri Fasal Bima Yojana* (PMFBY). The growth and performance of crop insurance of both loanee and non-loanee farmers on different indicators have been estimated to draw a logical inference from the findings. The results revealed that among the earlier schemes, National Agricultural Insurance Scheme (NAIS) performed better in terms of penetration, area coverage along with many other monetary indicators like premiums paid, claims settled, etc. The penetrations of the NAIS were also found to be significantly positive among physical and financial indicators during the *kharif* seasons. However, there were a few shortcomings, which led to evolving a novel scheme namely PMFBY replacing earlier schemes. The analysis of various indicators shows that PMFBY covered a higher area under paddy crops, the share of farmers benefited as a percent of farmers insured also witnessed the highest (41.26% in 2017), highest coverage of area as a percentage of gross cropped area (22.12% in 2019). Recently the scheme has been revamped and made voluntary for the cultivators, hence, to make the present scheme (PMFBY) more efficient, it is suggested to provide an active awareness campaign and establish a customer grievance cell at the local level, which would bring in more number of farmers under crop insurance.

## HIGHLIGHTS

- ① Among earlier crop insurance schemes, the National Agricultural Insurance Scheme (NAIS) has functioned quite satisfactorily during *kharif* season both for loanee and non-loanee farmers.
- ② *Pradhan Mantri Fasal Bima Yojana* (PMFBY) evolved replacing all earlier schemes that covered higher areas under paddy crops and revamped recently making it's voluntary for both loanee and non-loanee farmers.

**Keywords:** Crop insurance, National Agricultural Insurance Scheme (NAIS), Odisha, Pradhan Mantri Fasal Bima Yojana (PMFBY)

Crop insurance was conceptualized in India during the pre-independence era in the year 1915, initiated by Mr. J.S. Chakravarthi, who was Ex-Officio Financial Secretary to the Government of Mysore with an intent to safeguard farmers against drought (Rajaram and Chetana, 2016; AIC, 2021). Various management tools are employed for risk mitigation and amongst that crop insurance instruments play a vital role in agriculture. The major crop insurance scheme like National Agricultural Insurance Scheme

(NAIS) came into existence in 1999 and functioned based on the area approach, which would offer insurance facilities to all farmers, irrespective of the size of their holdings (Reddy *et al.* 2004). Based on the suggestions of the Joint Group, a Modified

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NAIS (MNAIS) was put into practice on a trial basis in 50 districts during the 11<sup>th</sup> plan period from *rabi* 2010-11 for wider coverage as well as to make hassle-free and farmers' responsive (Anonymous, 2010). To bring more farmers under the umbrella of crop insurance, a weather-based crop insurance scheme (WBCIS) was introduced on a pilot basis in *kharif/rabi* in 2007 in 20 states. The NAIS was decided to be discontinued simultaneously, as it was possessing some problems like delay in the settlement of claims, non-coverage of post-harvest losses areas other than coastal areas, *etc.* (Poddar, 2020).

By considering the delineations from states/UTs, particularly because of an upsurge in the rate of premium and farmers' share therein, shrinking in sum assured, *etc.*, NCIP/NAIS has been reassessed, which results in the evolution of the *Pradhan Mantri Fasal Bima Yojana* (PMFBY) during 2016 replacing all the earlier schemes of crop insurance. The PMFBY functions on account of an area approach basis i.e., well-defined regions for every notified crop for prevalent calamities (AIC, 2021; PMFBY, 2021). The PMFBY aimed to achieve to cover 50 per cent of India's farmers in the crop insurance net and support to shorten the existing distress in the crop growing sector (Nair, 2018). It safeguards all cereals, millets, pulses, and oilseeds in both the *kharif* and *rabi* seasons. The notified crops protected during the *kharif* season were paddy, groundnut, cotton, ginger, turmeric, maize, red gram, and ragi, while during the *rabi* season paddy, mustard, groundnut, black gram, green gram, potato, onion, sunflower, and sugarcane were protected. Different crop insurance schemes and their major traits are presented in Table 1.

For the paddy crop, the *gram panchayat* is the unit of insurance and for other notified minor crops, it is block. Every loanee and non-loanee farmer including tenant farmers and sharecroppers are allowed to cover under this scheme. The maximum premium to be paid by the cultivators is 2 per cent of the sum assured for *kharif* and 1.5 per cent of the sum assured for crops grown in the *rabi* season and 5 per cent of the sum assured for commercial crops (Tiwari, 2020; PMFBY, 2020). The government was very eager to expand the scheme and well-timed claim settlement was the imperative focus. The PMFBY had a higher basket of risk coverage from

pre-sowing catastrophes to post-harvest fatalities and delivered identical support to farmers all over the country. Even though crop insurance in India, to its credit, is leading in the world in terms of farmers covered, conversely, the country also encountered the maximum number of uninsured farmers in the context of the world (Mahul and Verma, 2010). The literature on crop insurance studies in India is growing promptly, but only a few studies have been conducted so far in the state of Odisha on it. Therefore, the present study has been carried out with a specific objective to analyze the progress of crop insurance schemes in Odisha state.

## METHODOLOGY

### Locale and Data

The present study covers the whole of Odisha state, which comprises thirty districts, and secondary data regarding crop insurance *viz.* category-wise farmers covered and benefited, the area covered, premium, sum-insured and claims *etc.* were collected from sources like District Agriculture Offices, Agriculture Insurance Company of India Limited, Directorate of Agriculture and Food Production, Cooperation Department, Odisha Agriculture Statistics, District Agriculture Strategy Committee, District Statistical Hand Book and official websites like PMFBY portal, AIC India Limited portal, *etc.*

### Analytical tools employed

#### Estimation of growth rates by exponential trend equation

The data were analyzed by fitting exponential functions to study the growth over multiple time periods. Accordingly, Compound Growth Rates (CGR) of different performance indicators were computed using the exponential function.

The exponential function form:  $Y = ab^t$

$$\text{or, } \ln y = \ln a + t \ln b$$

Compound Growth Rate (CGR) was computed by using the formula:

$$CGR = \text{Antilog} (b - 1) \times 100$$

Where,  $y$  = time series data on different performance indicators;  $b$  = regression coefficient;  $t$  = time in years

**Table 1:** Different crop insurance schemes and their major traits

Sl. No.	Insurance schemes	Phases	Functional approach	Coverage of Crops	Prominent traits	Shortcomings
1	Crop Insurance Scheme	1972-78	Individual	H-4 cotton, groundnut, wheat, potato	Voluntary scheme & implemented only in 6 states	<ul style="list-style-type: none"> <li>♦ Non-viability due to high claims ratio and administrative costs.</li> <li>♦ Non-popularity.</li> </ul>
2	Pilot Crop insurance scheme (PCIS)	1979-85	Area	Cereals, millets, oilseeds, cotton, potato, chickpea	Confined to loanee farmers as a voluntary scheme. Covered 12 states on a pilot basis.	<ul style="list-style-type: none"> <li>♦ Small farmers couldn't participate-poor access to institutional credit.</li> </ul>
3	Comprehensive Crop Insurance Scheme (CCIS)	1985-99	Area	Food grains and oilseeds	Compulsory for loanee farmers.	<ul style="list-style-type: none"> <li>♦ Coverage capped at ₹ 10000/ farmer.</li> </ul>
4	National Agricultural Insurance Scheme (NAIS)	1999-00	Area	All notified crops	Available to all farmers. Premium subsidy- 10% to small farmers.	<ul style="list-style-type: none"> <li>♦ Private companies are not involved.</li> <li>♦ Prevented sowing and post-harvest losses not considered.</li> </ul>
5	Weather-Based Crop Insurance Scheme (WBCIS)	2008-15	Individual	All notified crops	Available to all farmers. Depends on rainfall received at the IMD/ block rain gauges.	<ul style="list-style-type: none"> <li>♦ Distance of the field from weather stations.</li> <li>♦ Basis risk is high due to the poor density of weather stations.</li> </ul>
6	Modified National Agricultural Insurance Scheme (MNAIS)	2010-15	Area	All notified crops	Unit area cut down to village <i>panchayat</i> level. Private companies are involved.	<ul style="list-style-type: none"> <li>♦ Less coverage of farmers.</li> <li>♦ Delay in settlement of the claim.</li> </ul>
7	Pradhan Mantri Fasal Bima Yojana (PMFBY)	2016 onwards	Area	All notified crops	Season-wise fixed premium rates. Smart technologies used for conducting CCEs.	<ul style="list-style-type: none"> <li>♦ Delay in claim settlement owing to delayed payment of premium subsidy to insurance companies by the government.</li> <li>♦ Lack of adequate awareness.</li> <li>♦ Less coverage of tenant farmers.</li> </ul>

Source: Author's compilations.

Compound growth rates particularly for different parameters of WBCIS, where very limited years' information was available have been calculated by using the following formula:

$$R = [\{(V_n/V_0)^{1/n} - 1\} \times 100]/n$$

Where,  $R$  = Compound growth rate in per cent per annum

$V_n$  = Values in the current year;  $V_0$  = Values in the base year;  $n$  = Number of years

### Estimation of performance of crop insurance schemes

Crop insurance coverage under PMFBY on different performance indicators in the state were categorized as following:

(a) Coverage of loanee farmers =

$$\frac{\text{Loanee farmers}}{\text{Total insured farmers}} \times 100$$

(b) Coverage of non loanee farmers =

$$\frac{\text{Non loanee farmers}}{\text{Total insured farmers}} \times 100$$

(c) Claims settled =  $\frac{\text{Claims paid}}{\text{Gross premium}} \times 100$

(d) Beneficiary farmers =  $\frac{\text{Farmers benefitted}}{\text{Total insured farmers}} \times 100$

(e) Premium paid =  $\frac{\text{Farmers premium}}{\text{Gross premium}} \times 100$

(f) Area insured =  $\frac{\text{Area covered}}{\text{Gross cropped area}} \times 100$

$$(g) \text{ Claims settled} = \frac{\text{Claims paid}}{\text{Sum insured}} \times 100$$

$$(h) \text{ Share of premium} = \frac{\text{State share of premium}}{\text{Gross premium}} \times 100$$

## RESULTS AND DISCUSSION

### Year-wise progress of NAIS for loanee farmers in Odisha

#### *Progress during kharif seasons*

The functioning of NAIS for loanee farmers during *kharif* season pertains to the year 2000 to 2015 in Odisha state has been presented in Fig. 1. Year-wise progress of the number of insured farmers (in thousands), area coverage (in thousand ha), sum insured (in crores rupees), gross premium paid (in crores rupees), amount of claims (in crores rupees) and the number of farmers benefited (in thousands) were observed to be substantial. The number of farmers covered under NAIS during the *kharif* seasons has increased manifolds over the period from about 600 thousand in 2000 to 1981 thousand in 2015. Similarly, area coverage also increased significantly from 672 thousand ha to 1689 thousand ha during the same period. Hence, it can be inferred that the penetration of NAIS was quite impressive during the functioning period of this scheme in Odisha. In terms of benefits, a substantial number of farmers, from about 274 thousand in 2000 to 993 thousand in 2015 received the compensation. Similar results were also reported by Kumar and Phougat (2021) on the performance evaluation of crop insurance schemes in Haryana during the *kharif* season.

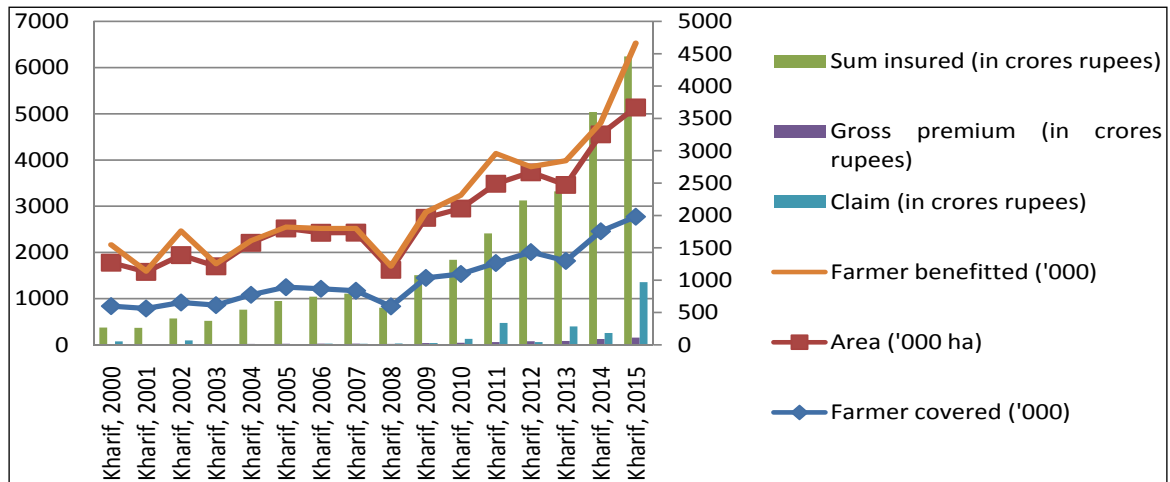
The functioning of NAIS for non-loanee farmers during *kharif* seasons in the state of Odisha has been presented in Fig. 2. The annual growth rate (in percentage) of sum insured, gross premium and amount of claims were positive except, for the number of farmers covered, area insured and the number of farmers benefited, which were found to follow negative growth over the years. It is to be noted that the number of farmers covered and area coverage under NAIS during the *kharif* seasons has shown an unusual growth pattern or functioning from 2000-2015. There is a rise and fall in the number of farmers covered, area coverage and the

number of farmers who benefited throughout the period, during which the scheme was in operation. This tends to be a negative performance about the pattern in the area, farmers covered and benefited. For these reasons, it is said that the dissemination of NAIS for non-loanee farmers was not satisfactory in the state.

#### *Progress during rabi seasons*

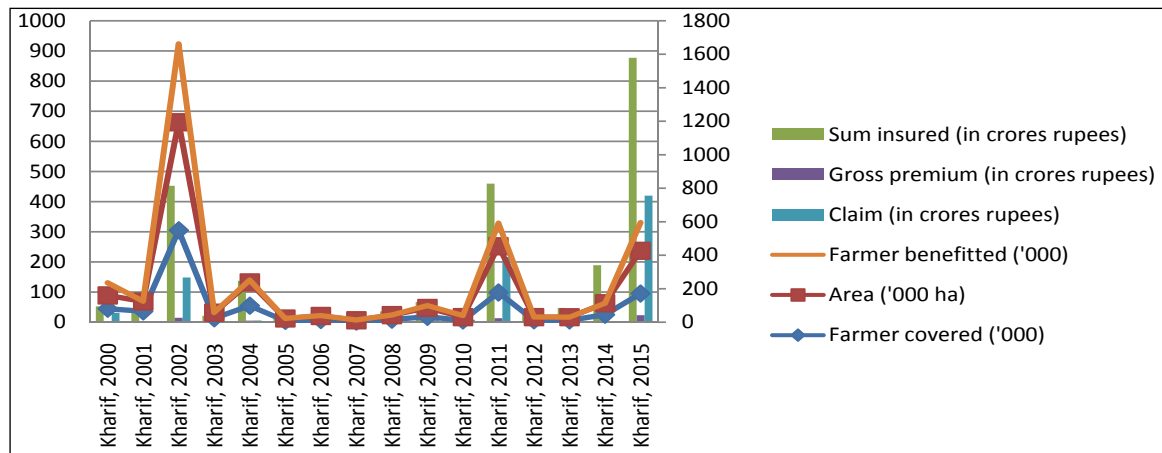
The functioning of NAIS for loanee farmers during *rabi* season in Odisha state has been presented in Fig. 3 using the data from 1999-2000 to 2014-15. The total number of farmers insured and area coverage under NAIS during *rabi* seasons showed a negatively significant trend over the period. The total farmer insured under NAIS has dropped from 233 thousand during 1999-2000 to 106 thousand during 2014-15. Similarly, during the same period, the area coverage has been reduced from 165 thousand ha to 103 thousand ha. This might be due to the reasons like during *rabi* seasons farmers were not growing the crops notified under the scheme. The unavailability of irrigation facilities causes more losses and farmers are averse to cultivating rice during the *rabi* season. Therefore, it can be said that the dissemination of NAIS during the *rabi* seasons remained relatively mediocre during the operational period of this scheme in the state. Fluctuations in the number of farmers covered and farmers who benefitted from NAIS in Haryana state were reported by Kumar and Phougat (2021).

In totality, during the *kharif* seasons, the NAIS has functioned quite satisfactorily in terms of farmers covered, area coverage and benefits extended to the farmers both for loanee and non-loanee farmers. Whereas the progress of NAIS for loanee farmers during *rabi* seasons was found to be diminishing for farmers insured and area covered. It is quite understandable that during the *rabi* season, the adoption of NAIS was found to be less, as farmers during this period grow more vegetable crops than paddy. Insurance products were available for all thirty districts of the state for paddy crops. Furthermore, this study omitted the non-loanee farmers during the *rabi* season, due to the unavailability of a sufficient data set or irregular patterns of data. Several earlier studies (Sinha, 2004; Kalavakonda and Mahul, 2005; Vyas and Singh, 2006) indicated that this scheme has



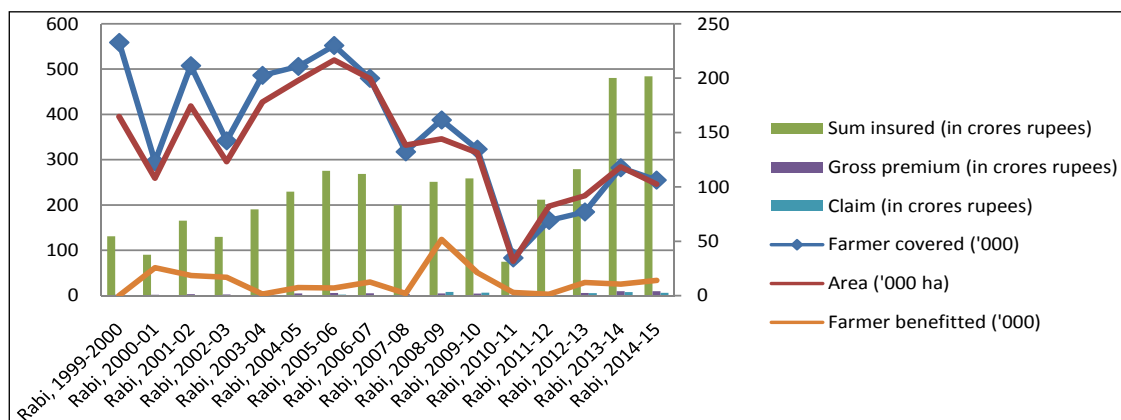
**Note:** X-axis: season and year; Y-axis (primary): sum insured, gross premium and claims paid; Y-axis (secondary): farmers covered, farmers benefitted and area covered

**Fig. 1:** Performances of NAIS during *kharif* 2000-15 for loanee farmers



**Note:** X-axis: season and year; Y-axis (primary): sum insured, gross premium and claims paid; Y-axis (secondary): farmers covered, farmers benefitted and area covered

**Fig. 2:** Performances of NAIS during *kharif* 2000-15 for non-loanee farmers



**Note:** X-axis: season and year; Y-axis (primary): sum insured, gross premium and claims paid; Y-axis (secondary): farmers covered, farmers benefitted and area covered

**Fig. 3:** Performance of NAIS during *rabi* 1999-2000 to 2014-15 for loanee farmers



remained unsuccessful to attain its purposes due to its less coverage, inadequate economic operation and minimal efficacy.

## Year-wise progress of WBCIS in Odisha

### Progress during kharif seasons

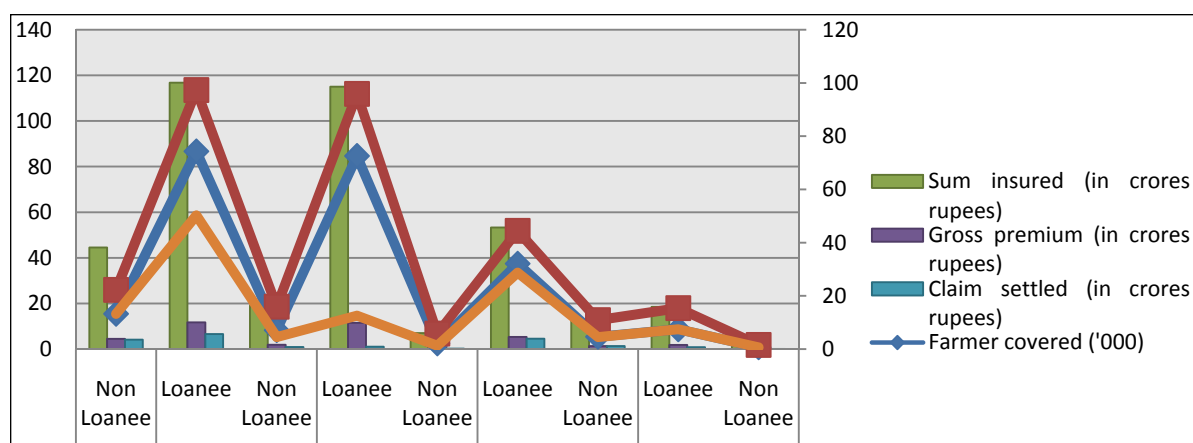
During the year 2008, the scheme was offered to only non-loanee insure farmers, thus all the growers who purchased insurance products were belonging to non-loanee categories (Fig. 4). It was found that the inclusion of loanee farmers under WBCIS started in 2009 and 74 thousand numbers of farmers were covered during the year. Under WBCIS, during the year 2013, the maximum number of farmers around 9 thousand farmers were covered and nearly 8.5 thousand benefited (Kumar and Phougat, 2021). However, the number dipped close to 7 thousand only during the year 2012. The number of farmers who benefited during the year 2009 was nearly 50 thousand, while in 2012, close to 7 thousand farmers only got benefited from the scheme. The compound growth rates (CGR) of the number of insured farmers, coverage of the area, claims and the number of farmers benefited, amount of sum insured and gross premiums were found to be negative in growth rate.

An important point to be noted here is that the WBCIS guards only paddy crops for the period, both during *kharif* and *rabi* seasons. Further, NAIS was protecting all types of production menaces consisting of many natural catastrophes, pests and

diseases, etc. But, the WBCIS safeguarded crop damages owing from rainfall shortage or excess only. The data revealed that WBCIS has functioned below average, due to less adoption rate, fewer numbers of farmers' benefits and a higher premium amount. However, the data were analyzed for a few years with its availability; the outcomes may not be taken into account significantly from generalization. The WBCIS have considered an advanced version of NAIS since rainfall as an indicator is simple to calculate without bias in contrast to the output of crops (Clarke *et al.* 2012).

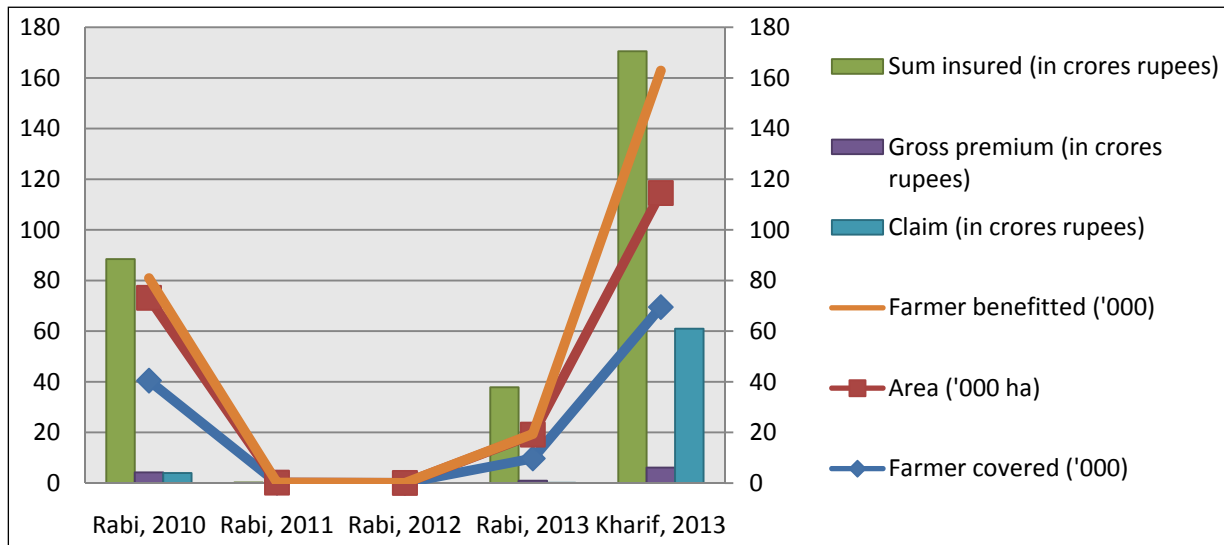
### Performances of MNAIS during 2010-13

The MNAIS was the extension over NAIS, which was introduced in the state during the *rabi* season of 2010-11. Taking into account the availability of data, various performance indicators of MNAIS were calculated and presented in Fig. 5. The result established that the number of farmers covered and area coverage under MNAIS followed the inconsistent pattern of growth or operation over the period. There is a rise and fall in the number of farmers covered, area coverage and the number of farmers who benefited during the period of operations. The highest number of farmers insured, area coverage and the number of farmers who benefited were observed to be 69 thousand, 45 thousand and 48 thousand, respectively during *kharif* 2013. These results are well supported by the findings of Kumar and Phougat (2021), where the maximum number of farmers covered and benefitted during *kharif* 2012-13; and during the



**Note:** X-axis: season and year; Y-axis (primary): sum insured, gross premium and claims paid; Y-axis (secondary): farmers covered, farmers benefitted and area covered.

**Fig. 4:** Performances of WBCIS (2008-12)



**Note:** X-axis: season and year; Y-axis (primary): sum insured, gross premium and claims paid; Y-axis (secondary): farmers covered, farmers benefitted and area covered

**Fig. 5:** Performances of MNAIS in terms of various measurable indicators

*rabi* season too very negligible number of farmers covered and benefitted. Whereas, the minimum numbers were noticed during the *rabi* season of 2012 with only 23 farmers' and 15 ha of the area covered, and no beneficiary was found to get any claims settled. The district which was covered under MNAIS excluded all other schemes like NAIS or WBCIS, and once a district was covered under MNAIS, every insurable crop grown in the district was included under the scheme.

### Crop insurance coverage under PMFBY schemes during 2016-17 to 2020-21

#### Progress during kharif seasons of 2016 to 2020

It has been observed from Table 2, that the percentage of loanee farmers to total insured farmers was higher during the year 2016 (98.26%)

followed by 91.66 per cent in 2017, 86.51 per cent in 2018, 60.46 per cent in 2019 and 80.22 per cent in 2020. Similar trends were identified by Cariappa *et al.* (2018) in their studies, conducted in Karnataka regions. The share of farmers who benefitted as per cent of farmers insured witnessed the highest in 2017 (41.26%), while, the least share was observed during the year 2019 (19.74%). In the case of the area covered as a percentage of gross cropped area (GCA), the highest coverage was 22.12 per cent in 2019, while the minimum coverage was during the year 2020 (13.45%). The above results are well supported by the findings of Roy *et al.* (2018) in West Bengal, which showed that regarding area coverage, this scheme evidenced notable progress to the extent of 29 per cent during the period of *kharif* 2016.

**Table 2:** Crop insurance coverage under PMFBY during *kharif* seasons (2016 to 2020)

Particulars/ indicators	2016	2017	2018	2019	2020
Per cent of loanee to total insured farmers	98.26	91.66	86.51	60.46	80.22
Per cent of non-loanee to total insured farmers	1.74	8.34	13.49	39.54	19.78
Claims paid as per cent of gross premium	80.03	209.94	102.42	52.23	—
Farmers benefitted as per cent of farmer insured	36.97	41.26	32.24	19.74	—
Farmer's premium as per cent of gross premium	25.86	17.24	15.00	10.98	—
Area covered as per cent of gross cropped area	14.99	15.76	17.06	22.12	13.45
Claim paid as per cent of sum insured	6.19	24.38	13.69	9.52	—
State share of premium subsidy to gross premium	—	—	42.71	44.51	—

**Source:** Authors' calculations.

**Table 3:** Crop insurance coverage under PMFBY during *rabi* season (2016-17 to 2020-21)

Particulars/ indicators	2016-17	2017-18	2018-19	2019-20	2020-21
Per cent of loanee to total insured farmers	95.63	95.23	83.81	93.13	62.25
Per cent of non loanee to total insured farmers	4.37	4.77	16.19	6.87	37.75
Farmers benefited as per cent of farmer insured	21.40	23.19	14.09	19.00	—
Farmer's premium as per cent of gross premium	—	32.41	77.62	61.12	—
Area covered in '000 ha	71.25	67.68	68.65	66.28	45.12
Claims paid as per cent of sum insured	0.60	10.14	6.89	22.64	—
State share of premium subsidy to gross premium	—	33.80	11.19	19.45	—

*Source:* Authors' calculations.

### **Progress during *rabi* seasons of 2016-17 to 2020-21**

The results showed a gradual increase in per cent of non-loanee farmers to total insured farmers over the years (Table 3). A substantial extent of adoptions by non-loanee farmers was witnessed during the *rabi* season of 2020-21, to the tune of 37.75 per cent, as a result of revamping or structural changes in the existing pattern of the scheme to voluntary for both loanee and non-loanee since 2020 onwards. While it has been observed that the number of farmers who benefited as per cent of farmers insured during the *rabi* season was found to be lower than the *kharif* seasons. A declining trend in area coverage over the years is observed in the state from 71.25 per cent in 2016-17 to 45.12 per cent in 2020-21. Area coverage of PMFBY was nearly 12 per cent during the *rabi* season of 2016-17 in West Bengal reported by Roy *et al.* (2018).

### **CONCLUSION**

There has been an increase in penetration of crop insurance under PMFBY in *kharif* 2016 and 2016-17 as a whole in contrast with earlier schemes. However, every scheme was introduced with certain traits and goals, the physical and financial parameters were found to be performed better under the PMFBY scheme in comparison with previous schemes like NAIS, WBCIS and MNAIS, which were ad-hoc, incomplete in nature, so could not survive for a longer period. On account of the failure of previous schemes, to address the issues of farmers, PMFBY was initiated in a well-planned manner. The penetration, beneficiary ratio and sum insured amount performed better under PMFBY than other schemes. Regardless of better performance, more efforts have to be laid down

to penetrate this scheme in terms of more farmers under insurance.

Hence, it can be inferred that the PMFBY is a better scheme at large. The benefits of PMFBY should be popularized by organizing farmers' fairs, seminar and public meeting at the village level. Likewise, published news in newspapers should be distributed among the farming community for knowing the benefits of the scheme at the time of failure of crops. Since it is a new scheme; it still requires many improvements for the benefit of the farming community, in years to come. There is a need to look into matters like charging lower premiums, and timely payout of compensation, which will improve the efficiency of the scheme.

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