BOHR International Journal of Advances in Management Research
2026, Vol. 5, No. 1, pp. 22–27
DOI: 10.54646/bijamr.2026.44
www.bohrpub.com

RESEARCH

Impact of Pradhan Mantri Fasal Bima Yojana - a comparative study

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Received: 03 February 2026; **Accepted:** 26 February 2026; **Published:** 13 April 2026

The Pradhan Mantri Fasal Bima Yojana (PMFBY), introduced in 2016, represents a major policy intervention by the Government of India to enhance agricultural risk management by providing comprehensive crop insurance coverage against yield losses arising from natural calamities, pests, and diseases. This study evaluates the performance of PMFBY across Kharif and Rabi seasons and undertakes a comparative assessment with its predecessor schemes, namely the National Agricultural Insurance Scheme (NAIS) and the Modified National Agricultural Insurance Scheme (MNAIS). Relying on secondary data spanning five agricultural years from 2018 to 2022, the analysis examines trends in coverage, farmer participation, and scheme effectiveness. The findings indicate that PMFBY has significantly expanded insurance coverage across diverse crop categories, including food crops, oilseeds, and horticultural crops, through the provision of subsidized premium rates, thereby strengthening farmers' financial resilience. Seasonal analysis reveals a consistently higher level of farmer participation during the Kharif season compared to the Rabi season, reflecting greater risk exposure during the monsoon-dependent cropping cycle. Furthermore, comparative results demonstrate that PMFBY outperforms NAIS and MNAIS in terms of outreach, adoption, and risk mitigation capacity. The study concludes that PMFBY has emerged as the most effective crop insurance framework in India, contributing substantially to income stabilization and reinforcing institutional mechanisms for agricultural risk management.

Keywords: PMFBY, NAIS, crop insurance, Kharif and Rabi, financial support

Introduction

India is an agriculture-oriented country and is also called the backbone of the Indian economy. For the reason of protecting the farmers from the huge loss of crops, the Indian government introduced a new scheme called Pradhan Mantri Fasal Bima Yojana (PMFBY), which protects the farmers from their huge loss of their crops by paying a small amount as a premium. PMFBY is an innovative scheme for the benefits of farmers, which comes under the domain

of the general insurance sector of the insurance industry. This scheme is implemented by empaneled general insurance companies. An implementing agency (IA) is selected by the respective state government through the process of bidding. PMFBY is essential for farmers availing the crop loan facility or opening a Kisan Credit Card (KCC) account for notified crops. PMFBY is being administered by the Ministry of Agriculture. PMFBY is a scheme that comes under the purview of the general insurance sector of the insurance industry. The recently launched scheme is the PMFBY, which is a kind of a "one nation, one scheme" launched in the year 2016. PMFBY provides a widespread insurance cover against failure of the crops and helps in stabilizing the income of the insured farmers.

The purpose of this paper is to analyze the conceptual framework of the scheme and identify the benefits of PMFBY in the country. The purpose of this descriptive research is to underscore the unique characteristics of the scheme and its potential impact on enhancing the welfare of Indian farmers. The PMFBY was launched on 18th February 2016 by Prime Minister Shri Narendra Modi. The scheme was executed by 21 states in Kharif 2016, while 23 states and 2 UTs executed it in Rabi 2016–2017, and 21 states were involved in the implementation. Approximately 3.7 crores farmers have been insured in the Kharif 2016 for 3.7 crore hectares of land at a premium of Rs 16,212 crore for a sum insured of Rs 1,28,568.94 crore as per figures available on 31.03.2017. PMFBY provides a comprehensive insurance cover for crop failure, which assists in stabilizing the income of farmers by providing a comprehensive insurance cover against crop failure. The scheme covers all food & oilseeds crops and annual commercial/horticultural crops for which past yield data is available and for which the requisite number of Crop Cutting Experiments (CCEs) are conducted, being under the General Crop Estimation Survey (GCES). Empaneled general insurance companies implement the scheme through their respective insurance companies.

Literature review

Parthiban and Anjugam (1) focused on evaluating the performance and number of farmers benefited and number of claims paid during 2016–2017, which were collected. Estimated the comparison through regression analysis. Also provided overall knowledge about various crop insurance schemes of India since the implementation of crop insurance as a tool for decreasing agricultural risk.

Kaur and Raj (2) focused on risk regarding the production, and market risk affect farmers and food security. and to analyze the PMFBY impacts on Indian farmers. conducted a multiple regression analysis, and a model was developed to estimate the effects of insurance characteristics on farmer coverage for the years 2017–2018 and 2018–2019. The study also accessed the awareness of farmers about the scheme.

Rai (3) studied the Indian gross domestic product (GDP), moreover, depending on the agriculture sector and launching the Pradhan Mantri Pasal Bhima crop insurance scheme. This paper made an assessment of the performance of the PMFBY in terms of adaptability and the achievement of the objective of "one nation, one scheme."

Kumar and Rani (4) assessed the performance of PMFBY in India. The prime objective of this paper was to analyze the performance of PMFBY state-wise and season-wise from 2016 to 2020. And to analyze the overall farmers benefited by the Pradhan Mantri Pasal Bhima Yojana. The study concludes that the scheme is far away from the objectives set at the time of the implementation of this scheme, but participation has been increased constantly.

Objectives of the study

- To study the performance and growth in the last 5 years.
- To study the benefits of Phasal Bhima Yojana scheme.
- To study the adaptability and the achievement of PMFBY.

Research methodology

The present study is based on secondary data. This study is descriptive in nature. The data is extracted from the official website of PMFBY. Other information is collected through various websites, journals, and articles. To find out the correlation of a few schemes, we have used correction techniques that are done through the statistical package for the social sciences (SPSS).

Overview of Rabi and Kharif crops

Rabi crops are harvested in the spring season while they are sown in winter. The rabi crops are sown around mid-November, preferably after the monsoon rains are over, and harvesting begins in April / May. The crops are grown either with rainwater that has percolated into the ground or using irrigation. A good rain in winter spoils the rabi crops but is good for Kharif crops, for examples, barley, gram, rapeseed, mustard, oat, wheat, bajra, etc.

Kharif crops are monsoon crops that consist of plants such as rice. Ideally, the Kharif crops are harvested in the monsoon season, which begins as early as May in some parts of the Indian subcontinent. Kharif crops are generally harvested from the 3rd week of September to October, for examples, bajra, jowar, maize (corn), millet, rice (paddy and deepwater rice), soybean, etc.

Result analysis

Table 1 indicates the data related to crops covered under PMFBY during the Kharif season. During the year 2018, 22 states with 475 districts got registered for the PMFBY scheme with the insurance unit of 1,47,836, for 38 agriculture crops and 57 horticulture crops. During the year 2018, 20 states with 463 districts got registered in the PMFBY scheme with the units of 1,56,488. In the year 2020, 19 states had the insurance units of 1,27,553. In the year 2020, 19 states had 1,21,733. During the year 2022, 20 states with 409 districts got registered under the PMFBY crop insurance scheme (5).

Table 2 shows the data on the Rabi season. The terms respect the states, districts, insurance units, agriculture crops, and horticulture crops. First, the term states that the leading years 2022 and 2019 are 21. The lowest registration in the year is 2020 (18). The term "districts" is considered the highest in the year of 2018 (486) after 2019 (445), followed by 2022 (441), 2021 (410), and 2020 (389). In terms of the insurance units, the leader in the year 2018 (1,35,020) was followed by the lowest in the year of 2020 (1,12,539), and after 2022 (1,27,036). In respect to agriculture, the crops highest in the year 2022 (46), after 2018 and 2019 are 40; the lowest in the year 2020 is 36. The term "horticulture" shows the data, highest in the year 2022 (94), after it declined in the year 2018 to 82.

The data describes the Kharif season in Table 3. The application and coverage of the insurance are increased. In the year 2018, the number of farmers who applied for insurance was 3,07,29,650. The application was increased year to year. In the year 2022, a total of 6,72,94,835 are covered under PMFBY (6). But the area insured in the year 2018 was 27,802.65 hectares and also in the year 2019 it was 29,298.90; in the following years it declined from 2020 to 2022. We can see in the year 2022, the total area insured in PMFBY was 24,914.03. When PMFBY is compared to restructured weather based crop insurance scheme (RWBCIS), the number of areas insured is very low. RWBCIS in the year 2018 is 1554.89 hectares. In the year 2019, it increased to 2,141.90. Further years, the frequency declined, and in the year 2022 it was 185.21 area insured under RWBCIS.

TABLE 1 | States, districts, number of insurance units, and number of agriculture and horticulture crops covered under PMFBY – Kharif season.

	2018	2019	2020	2021	2022
States/UTs	22	20	19	19	20
Districts	475	463	391	404	409
Insurance units	1,47,836	1,56,488	1,27,553	1,21,733	1,41,103
Agriculture crops	38	37	36	26	33
Horticulture crops	57	48	46	47	52

Source: https://pmfby.gov.in/.

TABLE 2 | States, districts, number of insurance units, and number of agriculture and horticulture crops covered under PMFBY – Rabi season.

	2018	2019	2020	2021	2022
States/UTs	21	19	18	19	21
Districts	486	445	389	410	441
Insurance units	1,35,020	1,26,843	1,12,539	1,14,585	1,27,036
Agriculture crops	40	40	36	38	46
Horticulture crops	82	83	89	92	94

Source: https://pmfby.gov.in/.

Table 4 shows the performance of PMFBY in the Rabi season. The term "leading the performance of the number of loanee farmers' applications, the number of non-loanee farmers' applications, the total area insured, the total sum insured, and the total number of farmers who benefited against claim payment." Terms of the total number of loanee farmers' applications were highest in 2022 (3,43,16,597), lowest in the year 2019 (1,31,33,651), and 2020 (1,23,87,563). In terms of the total number of non-loaned farmers' applications, found that season 2018 (94,09,334) is leading among all the seasons after 2021 (87,18,953) and it declined in the year 2019 to 52,74,633. In terms of total area insured under Kharif, seasons have the highest in 2018 (19,793.86) after 2020 (15,730.27). In the term RWBCIS, we found that season 8,720.35 after it was decreased from 2019 to 2021 (6,703.30).

Table 5 shows the performance of PMFBY in terms of farmers' share in premium, the government of India's share in premium, the state government's share in premium, gross premium, approved claims, and sum insured to the farmers. The performance is measured in terms of farmers' share in premium and found that season 2018 (2,61,102) has the highest among all season followed by 2019 (2,48,348), 2020 (2,43,797), 2022, and 2021. Secondly, the performance is measured in terms of state premiums and found that season 2019 (9,09,111) has the highest, followed by 2020(8,43,211), 2020 (8,04,632), and the lowest in 2018 is 7,44,378. The performance is measured in terms of GoI premium. We found that season 2019 (8,18,688) is leading; after the year 2021 (7,35,873), it declined. The gross premium was highest in 2019 (19,76,147); further, it declined in the year of 2021 (17,18,148). In the end, the sum assured is highest in the year 2019 (1,34,23,193) after 2018 (1,23,98,143).

Table 6 shows the performance of the Rabi season. The terms leading the performance of farmers' premium, state premium, and GoI premium gross premium and sum insured. Firstly, the farmer's premium was highest in 2018 (1,61,533) after 2022 (1,43,170) and lowest in the year of 2019 (1,33,650). Secondly, the term "state premium" was considered; it was leading in the year 2022 (5,36,829) after 2020 (5,34,426) and lowest in the year 2019 (3,25,103). Further need to consider the GoI premium, highest in the

TABLE 3 | Coverage of PMFBY - Kharif.

	2018	2019	2020	2021	2022
Applications (loanee farmers)	2,04,61,718	2,38,09,296	2,70,05,500	3,73,71,384	5,30,12,860
Applications (non-loanee farmers)	1,15,33,307	1,68,45,059	1,42,92,540	1,23,97,265	1,46,15,459
Applications (PMFBY)	3,07,29,650	3,83,07,869	4,09,57,397	4,94,99,672	6,72,94,835
Applications (RWBCIS)	12,65,375	23,46,486	3,40,643	2,68,977	3,33,484
Area insured PMFBY (thousand hector)	27,802.65	29,298.90	27,181.44	23,921.11	24,914.03
Area insured RWBCIS (thousand hector)	1,554.89	2,141.90	227.6	178.27	185.21

Source: https://pmfby.gov.in/.

TABLE 4 | Coverage of PMFBY - Rabi.

	2018	2019	2020	2021	2022
Applications (loanee farmers)	1,33,68,281	1,31,33,651	1,23,87,563	2,41,67,866	3,43,16,597
Applications (non-loanee farmers)	94,09,334	52,74,633	78,34,546	87,18,953	80,78,614
Applications (PMFBY)	2,20,45,537	1,76,66,946	1,98,29,538	3,25,02,434	4,18,14,643
Applications (RWBCIS)	7,32,078	7,41,338	3,92,571	3,84,385	5,80,568
Area Insured PMFBY (thousand hector)	19,793.86	15,420.93	15,730.27	14,823.41	14,766.78
Area insured RWBCIS (thousand hector)	8,018.00	8,376.22	6,920.25	6,703.30	8,720.35

Source: https://pmfby.gov.in/.

TABLE 5 | Premium and sum insured under PMFBY - Kharif (amount in lakhs).

	2018	2019	2020	2021	2022
Farmers premium	2,61,102	2,48,348	2,43,797	2,13,478	2,29,289
State/UTs premium	7,44,378	9,09,111	8,43,211	7,68,797	8,04,632
GoI premium	7,17,705	8,18,688	8,05,346	7,35,873	7,37,098
Gross premium	17,23,185	19,76,147	18,92,354	17,18,148	17,71,019
Sum insured	1,23,98,143	1,34,23,193	1,10,27,044	96,32,173	1,18,89,575

Source: https://pmfby.gov.in/.

TABLE 6 | Premium and sum insured under PMFBY - Rabi (amount in lakhs).

	2018	2019	2020	2021	2022
Farmers premium	1,61,533	1,33,650	1,42,260	1,38,638	1,43,170
State/UTs premium	3,32,096	3,25,103	5,34,426	5,29,393	5,36,829
GoI premium	3,21,600	3,18,554	4,30,997	4,40,604	4,15,749
Gross premium	8,15,229	7,77,307	11,07,683	11,08,635	10,95,748
Sum insured	92,60,432	71,86,703	84,41,027	78,66,166	85,71,789

Source: https://pmfby.gov.in/.

year (2021) 4,40,604 after 2020 (4,30,997) and lowest in the year 2019 (3,18,554). The gross premium leading 2021 (11,08,635), after 2020 (11,07,683), is the lowest in the year 2019 (7,77,307). In the end, the sum insured benefit more in the year 2018 (92,60,432) after 2022 it decreased to 85,71,789 followed by 2019 (84,41,027) and the lowest in the year 2019 (71,86,703).

Table 7 shows a comparison between the three popular crop insurance schemes, which shows the terms on the basis of premium rates, coverage of insurance, account payment risk coverage, post-harvest coverage, prevented sowing coverage and use of technology. The term premium indicating the PMFBY is a more satisfying premium rate for farmers because it provides a lower premium rate, compared to National Agricultural Insurance Scheme (NAIS) and Modified National Agricultural Insurance Scheme (MNAIS). PMFBY is providing one season one premium payment facility to the farmers and insurance amount coverage

TABLE 7 | Comparison of PMFBY features with other agricultural insurance.

Sl. no	Feature	National Agricultural Insurance Scheme (NAIS) (1999)	Modified National Agricultural Insurance Scheme (MNAIS) (2010)	PMFBY
1	Premium rate	Low	High	Lower than even NAIS (Govt to contribute five times that of farmer)
2	One season – one premium	Yes	No	Yes
3	Insurance amount cover	Full	Capped	Full
4	On account payment	No	Yes	Yes
5	Localized risk coverage	No	Hail storm, Land slide	Hail storm, Land slide, Inundation
6	Post harvest losses coverage	No	Coastal areas - for cyclonic rain	All India – for cyclonic + unseasonal rain
7	Prevented sowing coverage	No	Yes	Yes
8	Use of technology (for quicker settlement of claims)	No	Intended	Mandatory

Source: https://pmfby.gov.in/.

TABLE 8 | Paired t-test.

Paired differences					t	Df	Sig. (two-tailed)
Mean	Std. deviation	Std. error mean	95% confidence interval of the difference				
			Lower	Upper			
34,08,802.2	16,92,139.5	7,56,747.8	13,07,733.5	55,09,870.9	4.50	4	0.011

Source: authors compilation.

provided in both the PMFBY as well as NAIS insurance scheme. An on account payment benefit is provided in PMFBY & NAIS. By considering localized risk coverage, PMFBY & MNAIS schemes are providing coverage on hailstorm, landslide, and inundation. But NAIS was not provided any localized risk coverage. Post-harvest losses coverage was provided on coastal areas for cyclonic rain by the MNAIS scheme; PMFBY provides coverage in all of India for cyclonic as well as unseasonal rain. NAIS was not providing coverage on post-harvest losses. The term prevented sowing coverage in both PMFBY & MNAIS. But not provided for by the NAIS scheme. By looking at the use of technology, PMFBY was made mandatory. MNAIS is intended. There is no usage of technology in the NAIS scheme. By observing all the comparisons of data and information, PMFBY looks like a good choice for farmers to take crop insurance. PMFBY provides wide benefits to the farmers by considering all forms of data (7, 8).

Table 8 exhibits a paired t-test between the sum insured of the Rabi season and the Kharif season. Here, we found there is a significant difference between the sum insured in the Rabi season and the Kharif season.

Findings

- The data of state and district numbers were leading compared to the Rabi season. Insurance units declined year to year slightly in both seasons. Agricultural crops were leading in the Rabi season, and horticultural crops increased from the year 2018 to 2022 in the Rabi season.
- The total application of farmers is more in the Rabi season, which is increased from year to year. In the Kharif season, the total number of applications in year 2018 was 3,07,29,650; it was increased to 6,72,94,835 in the year 2022. The area insured decreased 10.38% in the Kharif season from 2018 to 2022. In the Kharif season, it was declined 25.39%.
- Farmers' premium was declined in both Kharif and Rabi seasons. The state premium was increased in both seasons; comparing them, the Kharif season is leading in state/UT premiums. The Sum assured is 4.11% of the changes in the years 2018–2022. But, in the Rabi season, 7.43% of chances are situated.

- PMFBY was providing wide benefit to the farmers, compared to other crop insurance schemes, like NAIS and MNAIS. The variety of features in PMFBY includes a lower premium rate compared to other schemes; it provides the full insurance amount, localized risk coverage is included, post-harvest losses coverage, prevented sowing coverage, and use of technology is mandatory in PMFBY.

Conclusion

The comparison of both the seasons shows that in the kharif season, a number of farmers were taking out insurance on their crops. The coverage in the Kharif season is leading compared to the Rabi season and exhibits a paired t-test between the sum insured of the Rabi season and the Kharif season. Here, it was found that there is a significant difference between the sum insured in the Rabi season and the Kharif season. In the term sum, insured data shows that, in the kharif season, more farmers are covered in the PMFBY scheme. While comparing the PMFBY with the other crop insurance scheme under the study, it was revealed that PMFBY provides a wide range of coverage to all kinds of crops, which are included in the seasonal crop.

Funding

I would like to state that this research received no specific funding from any funding agency in the public, commercial, or not-for-profit sectors.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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