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Performance of Crop Insurance Scheme – A Case Study of PMFBY

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Abstract

Agriculture, crucial to India's economy, engages 58% of the population and contributes 18% to the GDP. The sector faces significant risks from weather, pests, and market fluctuations, leading to financial distress for farmers. The Pradhan Mantri Fasal Bima Yojana (PMFBY), launched in 2016, aims to mitigate these risks through subsidized crop insurance, enhancing farmers' income stability and encouraging modern practices. This research paper evaluates PMFBY's penetration and performance, analyzing enrollment, claim settlements, and regional adoption disparities. Data from diverse regions highlight implementation challenges and impact on farmer welfare. The study also projects PMFBY's future, emphasizing advanced technology integration, customized risk assessment, and climate-resilient agriculture. Findings reveal substantial benefits, though operational issues persist. The research offers evidence-based recommendations for policymakers to improve PMFBY, ensuring it effectively safeguards farmers and bolsters agricultural productivity in India.

Keywords:Agriculture. Risk Management, Premium, and Risk Mitigation

1. Introduction

Agriculture is the pillar of the Indian economy, engaging nearly 58% of the country's population and contributing approximately 18% to the nation's Gross Domestic Product (GDP). Despite its critical role, the sector remains vulnerable to various risks, including erratic weather patterns, pest infestations, and market fluctuations. These uncertainties have historically exposed farmers to significant financial distress, often leading to debt and socio-economic instability. In response to these challenges, the Government of India has introduced several crop insurance schemes over the decades, with the Pradhan Mantri Fasal Bima Yojana (PMFBY) being the mostcurrent and wide-ranging initiative launched in 2016.

The PMFBY was designed to provide a robust risk mitigation mechanism to protect farmers against the loss of crops due to non-preventable natural risks. It aims to stabilize farmers' income, guarantee the movement of credit to the agrarian sector, and cheeragronomists to adopt advanced and recentagronomic practices. Under this scheme, the premium burden on farmers is significantly reduced, with the government subsidizing a major portion of the premium, making crop insurance more affordable and accessible to farmers across the country.

This research paper aims to evaluate the penetration and performance of the PMFBY, focusing on its impact on farmers' livelihoods, its effectiveness in risk mitigation, and the challenges encountered

in its implementation. By conducting a case study approach, we will analyze data from various regions, considering factors such as enrollment rates, and claim settlement processes. This study will also explore the discrepancies in scheme adoption in farming communities, highlighting the barriers to its widespread acceptance and effectiveness

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Understanding the penetration and performance of the PMFBY is crucial for policymakers, insurance providers, and stakeholders in the agricultural sector to refine and improve the scheme. This research will provide valuable insights into the strengths and weaknesses of the PMFBY, offering evidence-based recommendations to enhance its efficiency and ensure that it serves the intended purpose of safeguarding the interests of the farming community in India.

Pradhan Mantri Fasal Bima Yojana – An Overview

The main objective of India's extensive Crop Insurance Scheme, the Pradhan Mantri Fasal Bima Yojana, is to give farmers financial security if their crops are lost or damaged. It covers all farmers, including tenants and sharecroppers, as well as those who have taken loans for cultivation, encompassing various crops such as food crops, oilseeds, and horticultural crops. The scheme offers subsidized premiums, keeping rates low to encourage broad participation. In circumstances of crop loss due to natural catastrophes like droughts, floods, or pests, farmers are entitled to compensation as per scheme guidelines, with a transparent and swift claim settlement process ensuring timely assistance. Implemented by the MoA&FWin collaboration with state governments and insurance companies, PMFBY not only protects farmers against financial risks but also facilitates access to credit and enhances overall agricultural productivity through continuous reforms, including technological advancements and improved transparency in operations.

Table – 1: Comparison of PMFBY with NAIS and MNAIS

Features	PMFBY	NAIS	MNAIS
Premium rate	Low	Low	High
One season-one premium	Yes	Yes	No
Coverage of Insurance amount	Full	Full	Capped
On account payment	Yes	No	Yes
Coverage of localized risk	Hailstorms, landslides, inundation.	No	Hailstorm, landslide
Coverage of post-harvest losses	All India	No	Coastal areas
Prevented sowing coverage	Yes	No	Yes
Technology Usage	Mandatory	No	Intended
Insurance companies	Government and Private Companies	Only Government	Government and Private Companies

Source: PIB, Ministry of Agriculture and Farmers Welfare

2. Research Gap

Despite the extensive implementation of the Pradhan Mantri Fasal Bima Yojana (PMFBY) as a key policy measure for mitigating agricultural risks, there is a lack of comprehensive studies that critically assess its performance at the regional level. Existing literature often focuses on broad national-level trends, overlooking specific regional disparities in enrollment, claim settlements, and farmer satisfaction. Furthermore, while some studies analyze financial metrics like premiums and claims, limited research investigates the efficiency ratios (e.g., Claim-to-Premium Ratio and Claim-to-Sum Insured Ratio) and their implications for the scheme's financial sustainability. Additionally, the adoption of advanced analytical tools such as CAGR and farmer-centric evaluations using primary data remains underexplored. The gap also extends to assessing the impact of delayed claim settlements and reduced insured area on farmer trust and participation. This study addresses these gaps by combining statistical analysis with farmer perspectives in a specific regional context, providing actionable insights for improving the scheme's design and implementation.

3. Statement of the Problem

Agriculture in India is highly vulnerable to climatic risks such as droughts, floods, and cyclones, which often lead to significant crop losses, adversely affecting the livelihood of millions of farmers. To mitigate these risks, the Pradhan Mantri Fasal Bima Yojana (PMFBY) was introduced as a flagship crop insurance scheme aimed at providing financial support to farmers and ensuring agricultural sustainability. Despite its ambitious objectives, the scheme has faced numerous challenges, including low claim-to-premium ratios, delays in claim settlements, regional disparities in coverage, and a growing trust deficit among farmers. Additionally, while the scheme has witnessed increasing enrollment, the shrinking area insured and declining claim ratios raise questions about its effectiveness in fulfilling its core purpose. This study seeks to investigate the performance of PMFBY by analyzing its operational efficiency, financial sustainability, and farmer satisfaction, focusing on identifying gaps and providing actionable insights for improvement.

4. Research Objectives

The primary objective of the present study is to evaluate the performance of PMFBY, to achieve the primary objective the following secondary objectives were formulated and presented below.

1. To analyze the trends in farmer enrollment, premium collection, and claim settlements under PMFBY.
2. To evaluate the financial and operational efficiency of PMFBY.

5. Research Methodology

The research methodology for this study adopts a mixed-method approach, primarily relying on secondary data collected from government reports, PMFBY performance data, and agricultural statistics to analyze the scheme's effectiveness. Statistical tools such as annual growth rate (AGR) and Compound Annual Growth Rate (CAGR) are employed to assess trends in farmer enrollment, premiums collected, claims settled, and area insured over time. Efficiency ratios like the Claim-to-Premium Ratio (CPR) and Claim-to-Sum Insured Ratio (CSIR) are used to evaluate the financial performance and operational efficiency of the scheme. These metrics help measure the adequacy of claims concerning premiums collected and the insured sum.

Challenges in the Implementation of Pmfby

Low awareness

Many farmers, especially in rural and remote areas, lack awareness about the scheme's features, enrollment process, and benefits. Insufficient financial literacy and the absence of effective grassroots-level outreach programs prevent farmers from understanding how the scheme can mitigate risks associated with crop losses. As a result, enrollment rates remain suboptimal, defeating the purpose of universal coverage

Delayed claim settlement

A significant challenge in PMFBY is the delay in claim settlements. The process of crop loss assessment, approval by stakeholders, and claim disbursement is often prolonged, leaving farmers waiting for months or even years. This delay is primarily due to inefficiencies in the manual procedures, late submission of data by banks and insurers, and slow communication between state governments and insurance companies.

Challenges in crop loss assessment

The scheme heavily relies on manual Crop Cutting Experiments (CCEs) to determine yield loss, which is time-consuming and prone to human errors. Additionally, the limited adoption of advanced technologies like satellite imagery, drones, and AI-based assessment tools has hindered the timely and accurate evaluation of crop damage, leading to disputes and delays in payouts.

High Premium and Subsidy Burden

Although the scheme aims to make crop insurance affordable, the premium rates, especially for commercial and horticultural crops, remain high for small and marginal farmers. While the government subsidizes premiums, the financial burden on state governments to contribute their share of the subsidy often causes delays in fund release, impacting the scheme's implementation.

Lack of Co-ordination among stakeholders

Effective implementation of PMFBY requires close collaboration among multiple stakeholders, including farmers, banks, insurance companies, and state governments. However, poor coordination and communication among these entities often lead to issues like incomplete data, delayed claim processing, and dissatisfaction among farmers.

Limited Private Sector Participation

Private insurance companies involved in PMFBY are often reluctant to expand coverage to high-risk areas due to concerns about profitability. This has created regional imbalances, with certain regions being underserved, leaving farmers in those areas vulnerable to crop losses without adequate insurance protection.

Impact of Pmfby On Farmer Welfare

Financial Protection: Farmers are financially protected by PMFBY from crop losses brought on by pests, illnesses, and natural disasters. Farmers who get paid for their crop losses are more resilient to financial setbacks, have less income fluctuation, and can safeguard their livelihoods.

Risk Mitigation: To reduce agricultural hazards, PMFBY offers insurance coverage for crop production. As a result, farming becomes less unpredictable and farmers are encouraged to invest in agricultural technologies and inputs, which raises productivity and stabilizes revenue.

Social Well-being: By lowering the stress and worry brought on by crop failure,

PMFBY improves the social well-being of farmers and their families. Farmers have better mental and general well-being because they feel more assured and confident about their future possibilities lowering their reliance on unofficial sources of funding and support during difficult times, PMFBY empowers farmers. The general well-being and empowerment of farmers are enhanced by their independence and self-sufficiency.

Inclusive Growth: PMFBY fosters inclusive growth by guaranteeing that small and marginal farmers, who are frequently the most susceptible to crop losses, have

Empowerment: By offering farmers more autonomy over their farming choices and access to insurance coverage. This lessens income inequities and promotes equity in agricultural grow.

Penetration and Performance of Pmfby

To evaluate PMFBY's performance, farmers' enrollment, area insured, premium, sum insured, and claim paid have been considered. The following table also presents a few operational statistics.

Table – 2: Farmers'Enrollment and Area Insured

Year/ Season	Kharif				Rabi			
	No. of Farmers Enrolled	AGR (%)	Area Insured (In thousand Hectares	AGR (%)	No. of Farmers Enrolled	AGR (%)	Area Insured (In thousand Hectares	AGR (%)
2018	30738153	-	27831.35	-	22045537	-	19793.86	-
2019	38307869	0.12	29263.46	0.03	17666946	-0.10	15420.93	-0.12
2020	40957383	0.03	27181.19	-0.04	19829538	0.06	15730.37	0.01
2021	49496833	0.10	23920.29	-0.06	32502173	0.28	14816.10	-0.03
2022	67409459	0.17	24938.99	0.02	42214335	0.14	14868.96	0.00
2023	84972983	0.12	30528.63	0.11	50694959	0.10	16695.47	0.06
Total	**311882680**	**-**	**163663.91**	**-**	**184953488**	**-**	**97325.69**	**-**
CAGR	**18.5**	**-**	**1.6**	**-**	**14.9**	**-**	**-2.8**	**-**

Source: The researcher compiled the data from the PMFBY website

The data highlights the growth trajectory and challenges of crop insurance adoption across *Kharif* and *Rabi* seasons from 2018 to 2023. The total number of farmers enrolled has shown remarkable growth, particularly in the Kharif season, which witnessed a Compound Annual Growth Rate (CAGR) of 18.5%, compared to 14.9% for Rabi. This growth reflects increasing farmer awareness and government efforts to promote insurance schemes. However, the insured area tells a different story. While Kharif registered a modest CAGR of 1.6%, indicating slower expansion of insured land, Rabi experienced a concerning decline with a negative CAGR of -2.8%, despite increasing enrollment. This disparity suggests that while more farmers are participating, the average insured land area per farmer is shrinking, particularly in Rabi, possibly due to smaller landholdings, affordability issues, or lack of trust in the schemes. Notably, Kharif's insured area grew consistently after a contraction in

2021, with a significant recovery of 11% in 2023, whereas Rabi's insured area stagnated around 14,800 thousand hectares between 2021 and 2022 before marginally increasing. Overall, the data underscores the success of farmer outreach but points to critical gaps in land coverage, necessitating policy interventions to ensure alignment between enrollment and insured area growth, especially in the Rabi season.

Table – 3:Status of Premium, Sum Insured and Disbursement ofClaim

Year / Season	Kharif					Rabi				
	Farmers Premium (in Lakh)	Sum Insured (in Lakh)	Amount of Claim Paid (in Lakh)	Claim to Premium ratio	Claim to Sum Insured Ratio	Farmers Premium (in Lakh)	Sum Insured (in Lakh)	Amount of Claim Paid (in Lakh)	Claim to Premium ratio	Claim to Sum Insured Ratio
2018	261310	12406740	1449925	5.55	0.12	161533	9260432	837740	5.19	0.09
2019	248145	13413087	2000960	8.06	0.15	133650	7186703	547727	4.09	0.07
2020	243795	11026982	1343871	5.51	0.12	142248	8440864	587732	4.13	0.06
2021	213471	9631843	1312806	6.14	0.14	138520	7860758	493129	3.55	0.06
2022	229183	11896272	1026399	4.48	0.08	142922	8669867	526366	3.68	0.06
2023	161450	16044690	281575	1.74	0.02	141193	9405007	6448	0.05	0.00
Total	**1357354**	**74419614**	**7415536**	**-**	**-**	**860066**	**50823631**	**2999142**	**-**	**-**

Source: The researcher compiled the data from the PMFBY website

The data illustrates the financial performance of crop insurance schemes for Kharif and Rabi seasons from 2018 to 2023, focusing on farmers' premiums, sums insured, and claims paid, along with two critical efficiency metrics: the Claim-to-Premium Ratio (CPR) and the Claim-to-Sum Insured Ratio (CSIR). Across six years, farmers paid total premiums of ₹13,57,354 lakh (Kharif) and ₹8,60,066 lakh (Rabi), while the total sums insured were ₹74,41,961 lakh (Kharif) and ₹50,82,363 lakh (Rabi). The amount of claims paid, however, starkly contrasts between the two seasons, with ₹74,15,536 lakh (Kharif) and ₹29,99,142 lakh (Rabi), reflecting a higher payout volume in Kharif.

The Claim-to-Premium Ratio in Kharif started high (5.55 in 2018) but fluctuated significantly, reaching a concerning low of 1.74 in 2023, indicating that claims have decreased drastically relative to premiums paid. Similarly, the Claim-to-Sum Insured Ratio has declined over time, from 0.12 in 2018 to an abysmal 0.02 in 2023, suggesting that only a minuscule proportion of the insured value is being reimbursed as claims. Rabi shows a similar pattern, with the Claim-to-Premium Ratio dropping from 5.19 in 2018 to just 0.05 in 2023, and the Claim-to-Sum Insured Ratio shrinking from 0.09 to 0.00, indicating near-total inadequacy in claim payouts.

The trends highlight growing imbalances in the financial performance of these schemes. While premiums and insured sums have generally increased, the declining claim payouts suggest challenges in policy execution, claim settlement efficiency, or coverage alignment. Particularly alarming is the drastic drop in claims in 2023, with Kharif and Rabi ratios falling to their lowest points, raising questions about the effectiveness of the schemes in mitigating risks for farmers. This calls for urgent policy revisions to restore trust and ensure that the schemes fulfill their purpose of providing

financial relief in times of agricultural distress.

6. Suggestions and Policy Implications

1. Enhance Awareness

Conducting widespread awareness campaigns is crucial to educate farmers about the scheme's benefits, enrollment procedures, and claim processes. This can be achieved through village-level workshops, mass media outreach, and collaborations with agricultural extension officers. Empowering farmers with knowledge about PMFBY will encourage greater participation and help them understand the role of insurance in mitigating agricultural risks.

2. Leverage Technology

The adoption of advanced technologies like satellite imagery, drones, and artificial intelligence can revolutionize crop loss assessments. These tools enable accurate and timely evaluation of crop damage, reducing dependence on manual Crop Cutting Experiments (CCEs). Additionally, real-time data sharing through mobile apps and digital platforms can enhance transparency and expedite the claim settlement process.

3. Streamline processes

Simplifying the claim and premium payment processes is essential to reduce delays and improve efficiency. Introducing user-friendly digital platforms for enrollment, premium payments, and claim tracking will enable farmers to interact directly with the system. Automation of routine tasks can further minimize errors and accelerate claim disbursements, ensuring farmers receive timely support.

4. Strengthen Grievance Mechanism

Establishing a robust grievance redressal system will build farmer trust in the scheme. This can involve setting up dedicated helplines, regional grievance centers, and online portals where farmers can report issues and track the resolution status. Transparent and time-bound handling of complaints will address farmer concerns and improve the scheme's credibility.

5. Improve Co-ordination

Effective implementation of PMFBY requires seamless coordination among stakeholders, including farmers, banks, insurance companies, and government agencies. Regular meetings, standardized data-sharing protocols, and the use of integrated IT platforms can facilitate better communication and collaboration. This will help in resolving bottlenecks and ensuring timely implementation.

Concluding Remarks

The Pradhan Mantri Fasal Bima Yojana (PMFBY), launched in 2016, has been a crucial policy initiative to stabilize India's agricultural sector by offering a safety net against crop losses. The scheme's notable increase in farmer enrollment, with a CAGR of 18.5% for Kharif and 14.9% for Rabi seasons, reflects its growing acceptance. However, inconsistencies in insured area trends, especially during the Rabi season, underscore the need for addressing seasonal and regional risk perceptions. Financial data highlights PMFBY's substantial insurance coverage, with fluctuations in premiums and sums insured indicating variable engagement levels and insurance needs. The high claim-to-premium ratio, particularly for Kharif crops, signifies effective claim disbursement. Still, the low claim-to-sum insured ratio suggests either effective risk management or gaps in claim processing and coverage adequacy. Despite these successes, PMFBY faces challenges, including low awareness and participation among small and marginal farmers, bureaucratic delays in claim settlements, coverage limitations,

premium affordability, data accuracy issues, and a one-size-fits-all approach. Looking ahead to 2047, advancements in technology integration, customized risk assessment, promotion of weather-resilient agriculture, expanded coverage, integrated risk management, and international collaborations could significantly enhance PMFBY's impact. These measures could improve precision, efficiency, and accessibility, addressing current limitations and adapting to evolving agricultural challenges. PMFBY has made significant strides in improving farmer welfare by providing financial protection, mitigating risks, enhancing social well-being, empowering farmers, and promoting inclusive growth. To maximize its benefits, continuous refinement and technological adoption are crucial. By doing so, PMFBY can further stabilize and empower India's agricultural sector, ultimately contributing to the socio-economic development of rural India

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