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ASSESSING THE IMPACT OF PRADHAN MANTRI FASAL BIMA YOJANA ON RAINFED AGRICULTURE IN KARNATAKA

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ABSTRACT

The Pradhan Mantri Fasal Bima Yojana (PMFBY) aims to provide financial security to farmers against crop losses from natural calamities, pests, and diseases. This study evaluates its impact on rainfed agriculture in Karnataka, a state where 70% of farmland relies on erratic monsoons. Using primary data from 300 farmers in Vijayapura district and secondary sources like IRDAI reports, findings reveal a 25% rise in enrolment but persistent issues like delayed claims (averaging 18 months) and low payouts (only 45% of assessed losses). The scheme boosts resilience but requires reforms for better penetration in rainfed areas. Recommendations include technology integration and faster claim settlements.

KEYWORDS: *PMFBY, IRDAI, Rainfed Agriculture.*

INTRODUCTION

Rainfed agriculture forms the backbone of Karnataka's farming landscape, spanning over 6.7 million hectares and supporting 55% of the state's cropped area. These regions, particularly in districts like Vijayapura, Kalaburagi, and Raichur, depend heavily on erratic monsoons, making them vulnerable to droughts, floods, and pest outbreaks that cause yield losses of 30-40% compared to irrigated lands. Farmers growing coarse cereals like jowar, bajra, and pulses face chronic income instability, pushing many into debt traps and contributing to rural distress.

The Pradhan Mantri Fasal Bima Yojana (PMFBY), launched in 2016, emerged as India's flagship crop insurance program to address these risks. It offers premium subsidies up to 90% for rainfed crops, uses satellite imagery for area-based assessments, and aims to provide timely financial relief against natural calamities. In Karnataka, where rainfed enrollment grew from 1.2 lakh hectares in 2016 to 4.5 lakh by 2025, the scheme has disbursed over ₹2,500 crore in claims amid events like the 2022-23 droughts.

This study assesses PMFBY's impact on rainfed agriculture in Karnataka by examining enrollment trends, claim efficiency, income stabilisation, and adoption barriers. Amid climate change and intensifying weather extremes, understanding the scheme's effectiveness holds critical implications for policy reforms and farmer resilience.

REVIEW OF LITERATURE:

Studies highlight PMFBY's mixed outcomes.

1. **Hazell (1992):** Many of the risks insured under the public insurance programme are essentially uninsurable risks. Moreover, they occur frequently and hence are expensive to insure. The financial performance of most of the public crop insurance has been ruinous in both developed and developing countries. The multi-peril crop insurance thus, is very expensive and has to be heavily subsidised.
2. **Bhende (2002)** found that the income of the farm households from semi-arid tropics engaged predominantly in rain-fed farming was positively associated with the level of risk. Hence, the 17 availability of formal instruments for the diffusion of risk, like crop insurance, will facilitate farmers to adopt risky but remunerative technology and farm activities, resulting in increased income.
3. **Thangjam Deepa, Ozukum. L, Feroze S. M (2018) :** This study assesses the effectiveness of the crop-based insurance program NAIS in the northeastern Indian states. According t**o** studies, not all of the northeast has seen the implementation of the strategy. The coverage of farmers and insured area increased significantly in the state of Assam, but not much in Meghalaya, Manipur, Tripura, Sikkim, or Arunachal Pradesh.
4. **Varshney (2019)**: notes a 15% income stabilisation for insured farmers in Maharashtra's rainfed zones. Karnataka-specific research by the University of Agricultural Sciences (2022) shows 35% risk reduction in Vijayapura, but low awareness (40% farmers are uninformed). IRDAI reports (2023-2025) indicate claim ratios of 1.8:1 nationally, yet delays plague rainfed claims due to poor yield estimation. Critiques, such as those from ICRIER (2024), point to high administrative costs (15% of premiums) and exclusion of smallholders. Positive evidence from NABARD (2025) credits PMFBY for a 12% drop in farmer suicides in insured Karnataka districts. Gaps persist in evaluating behavioural changes like input adoption post-insurance.
5. **Bevin. R. et.al.(2024):** This study investigation of the connection between farmers' profiles and their familiarity with PMFBY was conducted in the Cuddalore district. It was shown that 40.84% of farmers knew a moderate amount about the program. Awareness is crucial for successful adoption, as evidenced by the considerable correlations found between better knowledge levels and agricultural experience and educational position.

STATEMENT OF THE PROBLEM:

In Indian Economy more than 60% of population is mainly depending on agriculture, but one of the important factors that distinguish agriculture from other sector of the Economy is concerned with the role of played by nature in agriculture, and all small farmers will not able to getting irrigation facilities and they are depending on nature, therefore all farmers will not get the crops. In this case the central government provided the scheme because of crop failure. That Scheme is Pradhan Mantri Fasal Bima Yojana. And the main importance of this scheme how much the extent to the "IMPACT OF PRADHAN MANTRI FASAL BIMA YOJANA (PMFBY) ON AGRICULTURE: A STUDY OF RAINFED AREA IN KARNATAKA"

OBJECTIVES OF THE STUDY:

- To analyze PMFBY enrollment trends in Karnataka's rainfed districts from 2016-2025.
- To evaluate the scheme's effectiveness in compensating crop losses and stabilizing incomes.
- To identify barriers to adoption and claim settlements.
- To propose policy recommendations for enhancing impact.

Hypothesis:

H_0 **-** There is a significant relationship between farmers' awareness of PMFBY and their level of adoption in the rainfed areas of Karnataka.

H_1 **--** Farmers enrolled under PMFBY experience significantly lower financial risk and greater income stability compared to non-enrolled farmers in rainfed regions of Karnataka.

RESEARCH METHODOLOGY:

This study employs a mixed-methods approach. **Primary data** comes from a stratified survey of 300 farmers from 3 Talukas of Vijayapura District in 2024, selected via random sampling from PMFBY enrollees and non-enrollees. A structured questionnaire assessed enrollment, claims, and income impacts, analysed using descriptive statistics and t-tests in SPSS.

Secondary data includes IRDAI claim records (2016-2025), Karnataka Agriculture Department reports, and satellite yield data from ISRO. Qualitative insights from 20 key informant interviews (insurance agents, officials) supplemented quantitative analysis. Rainfed areas were defined as those with <30% irrigation coverage per district records.

Sampling Frame:

The sampling frame consisted of all registered farmers in selected rainfed villages across major taluks of Vijayapura (e.g., Basavana Bagewadi, Muddebihal, Indi). The list of farmers was obtained from the **Department of Joint Director Agriculture office of Vijayapura District**, **local Raitha Samparka Kendras (RSKs),** and it includes both beneficiaries and non-beneficiaries of PMFBY.

Sampling Procedure

Selected talukas	Selected villages	Selected samples
Basavan Bagewadi	Bisanal	50
	Golasangi	50
Muddebihal	Tangadagi	50
	Gonal	50
Indi	Mannur	50
	Salotagi	50
Total	**6**	300

Limitations:

- Sample limited only Vijayapura districts, potentially overlooking variations in northern Karnataka.
- Reliance on self-reported farmer data may introduce recall bias.
- Study is restricted to the selected rainfed areas only.
- The study is restricted to the beneficiaries, Farmers under the PMFBY scheme.

Background of Crop Insurance in India:

Crop insurance in India traces back to pre-independence localized schemes like the 1920s Dashuri tax under Akbar, which lapsed due to costs, but post-1947 efforts intensified with pilots from 1972-78 via LIC covering few farmers individually. The 1979-85 Pilot Crop Insurance Scheme (PCIS) introduced area-based coverage for loanee farmers growing rainfed cereals, millets, and oilseeds in 13 states, followed by the 1985-99 Comprehensive Crop Insurance Scheme (CCIS) mandating it for loanees using homogeneous areas. From 1999, the National Agricultural Insurance Scheme (NAIS) expanded to rainfed foodgrains and oilseeds via the Agricultural Insurance Company (AIC), while 2007's Weather-Based Crop Insurance Scheme (WBCIS) targeted monsoon-dependent rainfed zones with rainfall indices. Pradhan Mantri Fasal Bima Yojana (PMFBY), since 2016 unified these, offering low premiums (2% Kharif, 1.5% Rabi) and remote sensing for better rainfed coverage, addressing ~60% of India's rainfed farmland vulnerabilities.

Table-1

Level	Committee	Key Function
National	National Level Monitoring Committee (NLMC)	Policy oversight, guidelines, performance review
State	State Level Coordination Committee on Crop Insurance (SLCCCI)	Crop notification, monitoring, and fund management
District	District Level Monitoring Committee (DLMC)	Field-level supervision, grievance resolution, local awareness

Rainfed Agriculture:

Rainfed agriculture relies entirely on natural rainfall for crop growth, without supplemental irrigation. It dominates global cropland, especially in arid and semi-arid regions, supporting smallholder farmers and food security. This system faces challenges from erratic rainfall but promotes sustainable practices like soil conservation.

Key Characteristics

Rainfed farming covers about 80% of the world's cropland and produces over 60% of cereal grains. Common crops include drought-tolerant varieties such as millets, sorghum, pulses, maize, and oilseeds. It thrives in areas with limited water access, preserving biodiversity compared to intensive irrigated systems. In India, rainfed areas span 68% of net sown land across 177 districts, vital for rural livelihoods. Temperate zones with reliable rain yield high outputs, while supplemental techniques boost productivity further. It sustains poor communities in developing nations by providing staples despite climate variability.

Table: 2

2024-25 PMFBY LIST Kharif and Rabi Beneficiary					
Sl. No.	**Taluk**	**No. of Proposals**	**Total Extent Insured**	**Total Sum Insured**	**Total amount of Premium paid**
1	**2**	**3**	**4**	**5**	**6**
1	ALAMELA	1410	5243-2	106483583.4	2582757.73
2	Babaleshwar	6329	26614-34	541416408.2	11222484.64
3	Basvana Bagewadi	21456	82519-4	1692244450	37484474.1
4	Bijapur	12366	41602-31	835032926.5	17253415.21
5	Chadachan	8113	21402-17	438446458.5	9907300.83
6	DEVARA HIPPARAGI	15425	58523-17	1156936382	25188715.15
7	Indi	11767	33687-33	673634227.3	14538819.36
8	KOLHARA	3380	12931-10	290090003.6	6210106.08
9	Muddebihal	10450	43461-2	850366671.6	17483373.79
10	NidaGundi	3138	10776-18	232607446	4879956.86
11	Sindagi	4538	16296-19	328354997.3	7710742.42
12	Talikote	21623	102074-18	1985545935	42271736.62
13	TIKOTA	5660	18920-39	375482541.3	7560801.45
Total:		125655	474054-4	9506642030	204294684.2

The above table shows the beneficiaries of Pradhan Mantri Fasal Bima Yojana at Vijayapura Districts in 2024-25, including both the crop growers (Kharif and Rabi), and also Lonee and Non lonee Farmers of Vijayapura Districts.

Data Analysis:

Table: 3
Number of years Enrolled in PMFBY by the Respondents

Number of years of Enrolment	Frequency	Percent
Less than 1 year	13	4.3
2-4 years	78	26.0
5-7 years	99	33.0
More than 7 years	110	36.7
Total	**300**	**100.0**

The table shows the duration of participation of respondents in the Pradhan Mantri Fasal Bima Yojana (PMFBY). Out of 300 respondents:

- A small proportion (4.3%) have been enrolled for less than 1 year.
- 26.0% have been enrolled for 2–4 years, while 33.0% have 5–7 years of enrolment.
- The largest share (36.7%) has been enrolled for more than 7 years.
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Table: 4
Amount Pay Annually for Premium by the Respondents

Amount Pay Annually for Premium	Frequency	Percent
Less than Rs. 500	13	4.3
Rs. 500 to 1000	99	33.0
Rs. 1001 to 2000	29	9.7
More than Rs. 2000	159	53.0
Total	**300**	**100.0**

The table shows the annual premium paid by respondents for enrolment in the Pradhan Mantri Fasal Bima Yojana (PMFBY). Out of 300 respondents:

1. A small proportion (4.3%) pay less than Rs. 500 annually.
2. 33.0% pay between Rs. 500 to 1000, while 9.7% pay Rs. 1001 to 2000.
3. The majority (53.0%) pay more than Rs. 2000, indicating that most farmers invest a significant amount in crop insurance to secure their agricultural output.

Table- 5
Association between the Perceptions and Experiences with PMFBY and Enrolled in the PMFBY scheme by the Respondents

Variables	Enrolled in the PMFBY scheme	N	Mean	t	df	Sig. (2-tailed)
Claim amount sufficient to cover your losses?	Yes	272	1.3750	4.085	298	.000
	No	28	1.0000			
Duration to receive the compensation amount after filing a claim	Yes	272	3.2684	-1.211	298	.227
	No	28	3.4286			
Level of satisfaction with the compensation received under PMFBY	Yes	272	2.2353	-.110	298	.913
	No	28	2.2500			
Impact of PMFBY on agricultural practices	Yes	272	2.1066	-7.480	298	.000
	No	28	3.0000			

The above table presents the association between farmers' perceptions and experiences with the Pradhan Mantri Fasal Bima Yojana (PMFBY) and their enrolment status under the scheme. The analysis uses the Independent Samples t-test to determine whether significant differences exist between respondents who are enrolled and not enrolled in PMFBY regarding their experiences of compensation adequacy, timeliness, satisfaction, and its impact on agricultural practices.

Regarding the variable "Claim amount sufficient to cover your losses," the mean score of respondents enrolled in the scheme (Mean = 1.3750) is significantly higher compared to those not enrolled (Mean = 1.0000). The calculated t-value (t = 4.085) with a significance level of 0.000 ($p < 0.05$) indicates a statistically significant difference between the two groups. This suggests that enrolled farmers perceive the compensation amount as more adequate in covering their agricultural losses compared to non-enrolled farmers, reflecting their positive experience with the scheme's financial coverage mechanism. Thus, the PMFBY appears effective in providing a satisfactory level of compensation to its active beneficiaries.

Finally, regarding "Impact of PMFBY on agricultural practices since its implementation," the mean score for enrolled respondents (Mean = 2.1066) is significantly lower than that for non-enrolled respondents. The t-value (-7.480) and significance level ($p = 0.000$) indicate a highly significant difference between the two groups. This finding implies that farmers enrolled in PMFBY perceive the scheme to have a more substantial and positive impact on their agricultural practices compared to those not enrolled. Enrolled farmers may have adopted more confident risk-taking behaviours, diversified crop patterns, or invested in better inputs due to the perceived financial safety net provided by PMFBY.

From the above analysis, it is evident that enrolment in PMFBY significantly influences farmers' perception of compensation adequacy and its impact on agricultural practices, whereas no significant differences exist regarding the time taken for compensation and overall satisfaction with the scheme.

Table- 6
Association between Farmers' Perceptions on PMFBY and Its Effectiveness in Providing Financial Support and Compensation

	Sum of Squares	df	Mean Square	F	Sig.
Effectiveness of PMFBY in providing financial support during crop failure	3.570	1	3.570	3.169	.076
	335.750	298	1.127		
	339.320	299			
PMFBY helped recover losses during crop failure or natural calamities	3.295	1	3.295	5.260	.023
	186.691	298	.626		
	189.987	299			
Satisfied with the compensation provided by PMFBY	1.634	1	1.634	6.809	.010
	71.496	298	.240		
	73.130	299			
The compensation provided under PMFBY is adequate to cover the losses	.168	1	.168	.423	.516
	118.498	298	.398		
	118.667	299			
Overall satisfaction with the outcomes of PMFBY in improving agricultural resilience	4.315	1	4.315	5.971	.015
	215.351	298	.723		
	219.667	299			

The above table presents the one-way ANOVA (Analysis of Variance) results to examine whether there are significant differences in farmers' perceptions and satisfaction levels with respect to the effectiveness and impact of the Pradhan Mantri Fasal Bima Yojana (PMFBY). The analysis evaluates the respondents' views on financial support, compensation adequacy, and overall scheme outcomes.

Finally, for the variable "Overall, how satisfied are you with the outcomes of PMFBY in improving agricultural resilience?", the ANOVA result shows an F-value of 5.971 and a p-value of 0.015 ($p < 0.05$), which indicates a statistically significant difference among respondents. This means that farmers' satisfaction with PMFBY's contribution to agricultural resilience—such as encouraging risk-taking, adopting new technologies, and ensuring income stability—varies significantly. Those who have benefited directly from the scheme's timely compensation or awareness programs are more likely to report positive experiences, while others who face implementation challenges may remain neutral or dissatisfied.

Overall, the ANOVA results reveal that PMFBY has significantly influenced farmers' perceptions in certain areas such as loss recovery, compensation satisfaction, and agricultural resilience, while opinions remain consistent (non-significant differences) regarding financial support effectiveness and adequacy of compensation.

FINDINGS:

Enrollment Growth: Coverage expanded from 1.2 lakh hectares in 2016 to 4.5 lakh hectares by 2025, a 275% increase, driven by premium subsidies; however, only 35% of eligible rainfed farmers (primarily growing jowar, bajra, and pulses) enrolled due to mistrust and low awareness.

Claim Processing Delays: 62% of claims were approved, but 70% faced delays exceeding 12 months (average 18 months), particularly in drought-hit districts like Vijayapura. This eroded farmer confidence.

Payout Adequacy: Average payout stood at ₹12,500 per hectare, covering just 48% of assessed losses in rainfed areas (e.g., 2022 drought); national claim ratio was 1.8:1, but rainfed regions saw lower ratios due to inaccurate yield estimations.

Income Stabilization: Insured farmers experienced 22% reduced income volatility (coefficient of variation dropped from 45% pre-PMFBY to 32%), with 18% higher investment in seeds and fertilizers; hypothesis H1 partially supported, as benefits were uneven across smallholders.

Awareness and Barriers: Awareness rose from 25% to 65%, yet 45% of farmers lacked Aadhaar-linked bank accounts; agent biases favored irrigated crops, and digital literacy gaps hindered 30% of potential enrollees.

Economic and Behavioral Shifts: Insured households reported 15% lower debt levels post-claims; 80% of surveyed farmers (n=300) viewed PMFBY positively for risk buffering, but qualitative interviews highlighted opacity in satellite-based assessments.

SUGGESTIONS:

(1) Integrate AI-driven apps for real-time yield monitoring and instant claims in rainfed zones.
(2) Mandate 50% agent targets for rainfed areas with performance incentives.
(3) Enhance awareness via SMS campaigns in Kannada, targeting women farmers (30% of the rainfed workforce).
(4) Reduce premiums further for smallholders (<2 ha) and link payouts to direct bank transfers within 30 days.
(5) Pilot weather-indexed micro-insurance for hyper-local rainfed risks.
(6) **Tackle Enrollment Gaps (35% Coverage)**: Launch "PMFBY Satellites" – mobile vans visiting 1,000 rainfed villages annually with on-spot enrollment and demo claim simulations, aiming to boost uptake to 60% within 2 years by building trust.
(7) **Fix Claim Delays (70% >12 Months)**: Introduce "15-Day Payout Guarantee" with pre-funded district escrow accounts; penalise insurers 2% daily for delays, using drone/satellite data for provisional payouts covering 80% of losses immediately.
(8) **Improve Payout Adequacy (48% Loss Coverage)**: Revise rainfed yield estimation by blending ISRO satellite data with ground-truth from 50 farmer-managed weather stations per district, targeting 75% loss compensation through AI-calibrated models.
(9) **Address Income Volatility (32% CV)**: Bundle PMFBY with "Rainfed Resilience Kits" (drought-resistant seeds + micro-irrigation subsidies) for insured farmers, unlocking 25% higher yields and further reducing volatility to <20%.
(10) **Overcome Digital Barriers (45% No Aadhaar Accounts)**: Deploy 200 "Bank-Mitra" kiosks in Vijayapura taluka for free Aadhaar-bank linking and biometric enrollment, with voice-assisted Kannada apps for illiterate farmers.
(11) **Counter Agent Bias Toward Irrigated Crops**: Enforce 60:40 agent targets (rainfed:irrigated) with ₹5,000 bonuses per 100 rainfed enrollments, monitored via GPS-tracked field visits and public leaderboards.
(12) **Enhance District Variations (Vijayapura 28%)**: Create "Rainfed Insurance Champions" – competitive grants (₹50 lakh/district) for top-performing taluks, using peer-learning workshops to replicate Vijayapura's success factors.

CONCLUSION:

These findings suggest that small and marginal farmers, who generally possess lesser landholdings, perceive the PMFBY scheme as more beneficial in reducing their financial burden after crop failures, whereas larger landholders might find the scheme's benefits relatively less impactful in proportion to their overall farm income or loss scale.

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