

ANALYSIS AND FINANCIAL EVALUATION OF THE PRADHAN MANTRI FASAL BIMA YOJANA IN JHALAWAR DISTRICT, RAJASTHAN (2018–2023)

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ABSTRACT

Agriculture is the backbone of the Indian economy. With the aim to double the income of farmers the Government of India initiated several schemes. One of them is the PMFBY which was introduced in 2016, to safeguards the farmers against various natural disasters and risks. It also provides farmers with income stability and supports risk management. This research paper evaluates the physical and financial performance of PMFBY in Jhalawar district of Rajasthan, during the period 2018 to 2023. For this purpose, secondary data were collected from the official government website of PMFBY (<https://pmfby.gov.in/>). The findings reveal that the scheme achieved widespread expansion in Jhalawar district between 2018 and 2023. The years 2020 and 2021 marked the highest progress in achieving the scheme's objectives, whereas the growth rate slowed between 2022 and 2023. Several recommendations were made on the basis of the findings to enhance the effective implementation of PMFBY among farmers.

Keywords: Crop Insurance, PMFBY, Income Stability, Risk Management.

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1. INTRODUCTION

Among largest emerging economies in the world, India has already carved its name on stone. Since 2000, it has been among the top ten agricultural exporting countries globally (Bhatia et al., 2021). But agricultural activities have always been exposed to the impact of climate change. To limit the impact of climate change on agriculture and economy as well insurance has emerged as an important economic instrument. Agricultural insurance ensures income stability and security. It is also enabling the use of high-quality inputs and increased investment in agriculture. There has always been a need for government-supported policies to expand agricultural insurance coverage in India (Singh & Agrawal, 2020). Agricultural insurance in India was first introduced in 1972–73 as a pilot project. Subsequently, in 1985, the first national insurance scheme “Comprehensive Crop Insurance Scheme” (CCIS), was launched which

was based on an individual rather than area. This resulted in payment of comparatively high claim amount in relation to premium collected. Outcome of which is substantial losses for both the government and the insurance companies. To address this issue government launched “The National Agricultural Insurance Scheme” (NAIS) in 1999, in which area-based approach instead of an individual-based approach. This scheme had two major shortcomings firstly it did not cover pre-sowing losses and secondly awareness of this scheme among non-loanee farmers was limited. In 2010 this scheme was revised. Meanwhile, in 2008, the “Weather-Based Crop Insurance Scheme” (WBCIS) was also implemented (Nair, 2010).

The Government of India announced the subsidy-based PMFBY on 18 February 2016 which replaced all existing schemes and was effective from the Kharif season of the same year. Under this

scheme, the farmers bear a premium of 1.5%, 2% and 5% for Rabi crops, for Kharif crops and for commercial and horticultural crops. The remaining premium is equally shared by the governments (central and state). The scheme covers situations like “sowing cannot be undertaken due to natural calamities”, “crops are damaged at any stage from sowing to harvesting”, “destruction of standing crops”, and even for “post-harvest losses”. It also offers protection to farmers against various local respective state government notified risks. This research paper evaluates the performance of PMFBY in Jhalawar district from 2018 to 2023. Jhalawar district is situated in the south-western part of Rajasthan. Due to heavy rainfall in the region, it is generally referred as “Cherrapunji of Rajasthan”. Along with this it is also famous as “Nagpur of Rajasthan” because of its orange production capability. According to the 2011 Census, the district has a total population of 1,411,129. In 2018–19, the total sown area in the district was 6,50,802 hectares, of which 3,19,102 hectares were under Rabi crops and 331,700 hectares under Kharif crops. Due to lack of industrialization district’s major population depends on agriculture for their livelihood. The objective of this study is to assess whether the implementation of scheme results in reducing farmer’s income instability risk in Jhalawar district.

Objectives of The PMFBY Scheme

1. To protect farmers from losses arising out of unforeseen events through financial assistance.
2. To ensure stability in farmers’ income and maintain continuity.
3. To encourage farmers to innovative ideas and modernize agricultural technologies.
4. To improve farmers credibility through promoting crop diversification.
5. To protect against production risks and pave the way for competitiveness and growth in the agricultural sector.

Beneficiaries and Enrolment Process under the Scheme

The scheme is comprehensive in nature as it is applicable to all loanee, non-loanee, tenant, and sharecropper farmers. At the time of its inception in 2016 it was mandatory for all loanee farmers to enrol under the scheme but from 2020 participation in the scheme is voluntary. The

scheme offers both online and offline application processes. For online registration and enrolment farmers can go to <http://pmfby.gov.in>. Under the offline mode, interested applicants are required to submit the prescribed documents along with the application at the nearest participating bank or insurance office. Generally, enrolment in the scheme can be done within two weeks of sowing.

Coverage

In the year 2016–17, a budget provision of Rs. 5,501.15 crore was made for the PMFBY scheme, which increased by 1,163.66% to Rs. 69,515.71 crore in 2025–26. This scheme boasts largest number of farmer’s enrolment for agricultural insurance in the world. During 2025 scheme covered 23 states and union territories and since implementation till February 2025, 23.22 crore farmers’ application forms have been received. By February 2025, insurance claims worth more than Rs. 1,75,000 crore have been paid. In remarkable achievement share of non-loanee farmers in total coverage has also increased up to 55%. By February 2025, an insured amount of Rs. 17,29,395 crore had been recorded under the scheme.

2. REVIEW OF LITERATURE

In a study of Hyderabad and Karnataka regions during 2016–2017 it is found that out of net sown area only 29 percent (Karnataka) was covered under the scheme. Study suggested flexible insurance units and premium discounts to small and marginal farmers will make the scheme more effective (**Kariyappa et al., 2018**). Study of sample of 120 insured farmers in Madhya Pradesh revealed that 90 percent had only general knowledge of the PMFBY scheme and were unaware of its process. Among them, satisfaction was reported by only 10 percent of loanee farmers and 23.3 percent of non-loanee farmers; the recommendation was to expand coverage to include more crops (**Niranjan et al., 2019**). In Jammu district of Jammu & Kashmir, the scheme has raised farmers’ awareness however, in remote areas crop insurance knowledge remains limited, highlighting technological efforts requirement for widespread promotion (**Mathur & Gupta, 2020**). In Tamil Nadu, the restructured PMFBY scheme has proven effective against crop losses for paddy farmers, enhancing awareness, satisfaction levels, claim settlement processes, and livelihood

impact. However, about 25 percent of farmers reported delays in claim payments (Polraj & Eswaran, 2020). The PMFBY scheme has performed better than previous schemes, though effective implementation requires greater cooperation between the central and state governments (Pandey, 2022). An evaluation of the scheme among 200 farmers in Kolar, Karnataka, including 150 beneficiaries and 50 non-beneficiaries for comparative analysis, revealed that 53 percent of beneficiaries reported improved food security, and 57 percent stated increased economic stability compared to earlier (Jiragal et al., 2025).

3. RESEARCH METHODOLOGY

Study is conducted using secondary data on the scheme in Jhalawar district, collected from the dashboard of the Government of India's official website, <http://pmfby.gov.in>. The objectives of study are:

- Assess the outreach of PMFBY in Jhalawar district.
- To evaluate the physical implementation and financial performance of the PMFBY scheme in Jhalawar district.
- Study the applicants and beneficiaries of PMFBY among Kharif and Rabi seasons.
- Study of premium paid and total insured amount in Jhalawar district.
- Assess the effect of insured amount on farmer participation in PMFBY among Kharif and Rabi seasons.

H_{0a}: There is no statistically significant positive/negative effect of insured amount on

overall participation in Kharif crop.

H_{1a}: There is statistically significant positive/negative effect of insured amount on overall participation in Kharif crop.

H_{0b}: There is no statistically significant positive/negative effect of insured amount on overall participation in Rabi crop.

H_{1b}: There is statistically significant positive/negative effect of insured amount on overall participation in Rabi crop.

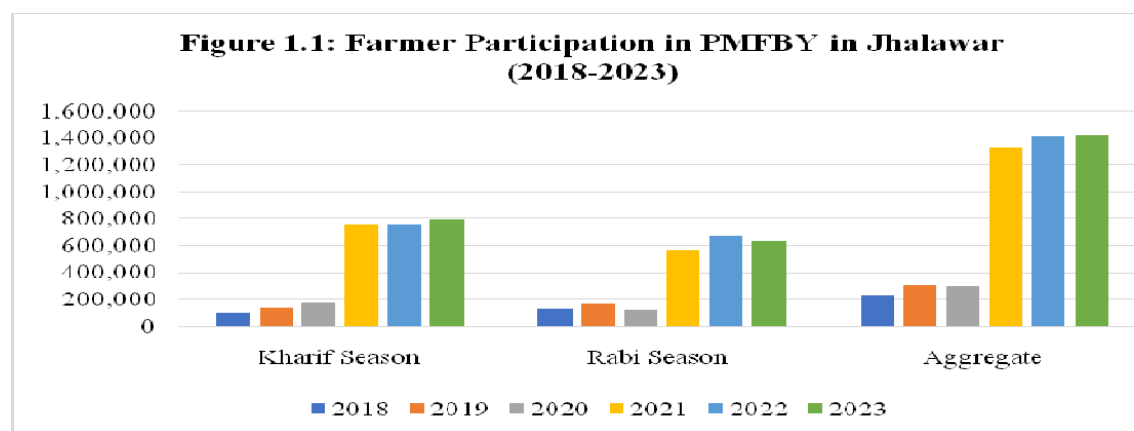
Study used descriptive statistical tools such as percentages, ratios, charts, and growth rates along with econometric tools including time series graphs, time series regression, heatmap analysis, Durbin Watson test, Breusch Pagan test and VIF test.

4. OUTREACH OF PMFBY SCHEME IN STUDY AREA

Following data representation will help assess the outreach of PMFBY in Jhalawar district.

4.1 Participation of Farmers

A total of 4,991,978 farmers applied under the scheme in the district during 2018 to 2023. In 2018, a total of 1,00,398 applications were received during the Kharif season and 1,25,690 during the Rabi season. In 2019, the total number of applicants increased by 33.44 percent compared to 2018. In 2020, due to COVID-19, applicants decreased by 2 percent in comparison to previous year. The year 2021 was significant from the perspective of scheme implementation, with the highest growth recorded more than 348 percent in the total number of applicants compared to 2020.



Source:- <https://pmfby.gov.in>

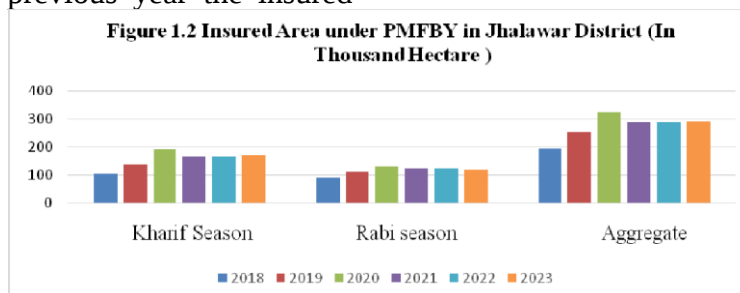
In 2022 and 2023, positive growth continued, albeit at a slower pace. Over these six years, the number of applications during the Kharif season

increased more than in the Rabi season. Figure 1.1 provides details of farmer participation under the scheme from 2018 to 2023.

4.2 Insured Area (In Thousand Hectare)

A total of 1,641.29 thousand hectares of area was insured under the PMFBY scheme between 2018 and 2023. A sum of 1,04.77 thousand hectares during the Kharif season and 90.98 thousand hectares during the Rabi season were brought under insurance coverage in 2018. From 2019 to 2020, the insured area witnessed double-digit growth. In 2019, in comparison to previous year the insured

area increased by 27.57 percent. Growth rate peaked in year 2020 at 30.07 percent, with the total coverage area expanding to the highest level of 324.70 thousand hectares. In 2021, the coverage area saw a decline of around 11 percent. In year 2022 and 2023 insured area increased marginally. Figure 1.2 presents the seasonal details of the area covered under PMFBY scheme during 2018 to 2023.

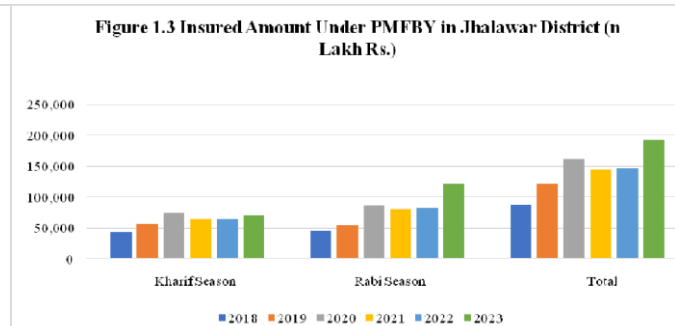


Source:- <https://pmfby.gov.in>

4.3 Insured Amount (In Lakh Rupees)

A total crop insurance value of Rs. 8,47,148 lakh was recorded in the district under PMFBY scheme between 2018 and 2023. In 2019, there was a notable increase of 27.09 percent compared to the previous year, followed by a significant rise of

44.68 percent in 2020. In 2021, a negative growth rate of 9.71 percent was observed, while in 2022, the growth turned positive at a modest rate of 0.95 percent. In 2023, compared to 2022, the insured value rose by a substantial 31.42 percent.

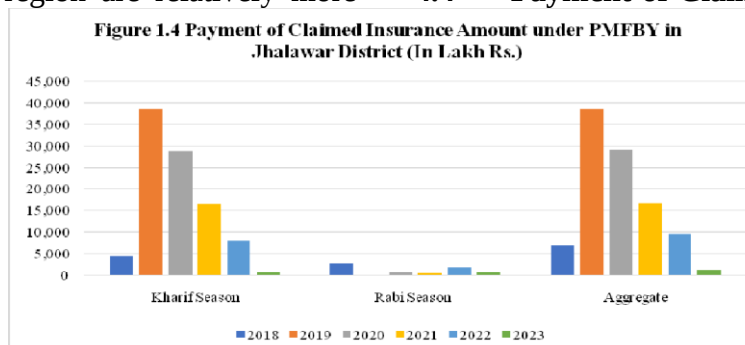


Source:- <https://pmfby.gov.in>

The value of insured crops was higher in the Rabi season compared to the Kharif season, indicating that Rabi crops in the region are relatively more

valuable. Table 1.3 presents the value of insured crop amounts under PMFBY during 2018–2023.

4.4 Payment of Claimed Insurance Amount:



Source:- <https://pmfby.gov.in>

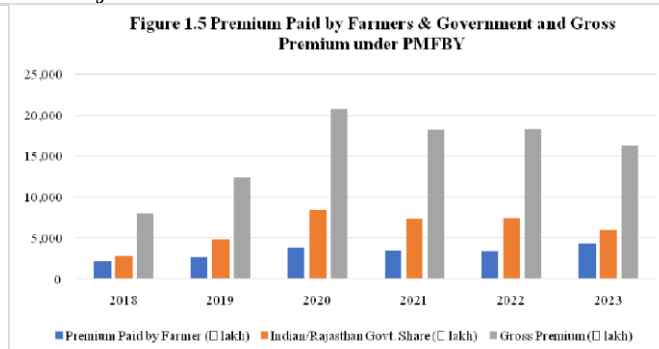
Between 2018 and 2023, under PMFBY, a total of

Rs. 1,01,892 lakh was paid by insurance companies

in the district. Out of this, Rs. 96,138 lakh was paid to farmers during the Kharif season, and Rs. 5,754 lakh during the Rabi season over the six years included in the study. In 2019, farmers received 4.64 times more claim amount compared to 2018. However, over the next four years, the claim amount consistently declined by 24.3%, 42.7%, 42.5%, and 87.7%, respectively. The claim amount

paid in 2018 was Rs. 6,823 lakh, which rose to Rs. 38,429 lakh in 2019, but dropped sharply to only Rs. 1,179 lakh in 2023. Over time this trend indicates decrease in payment of insurance claims, possibly due to a reduction in disaster occurrences in the region. Table 1.4 presents the value of claim amounts paid under PMFBY from 2018 to 2023.

4.5 Premium Contributions by Farmers & Govt. and Gross Premium under PMFBY:



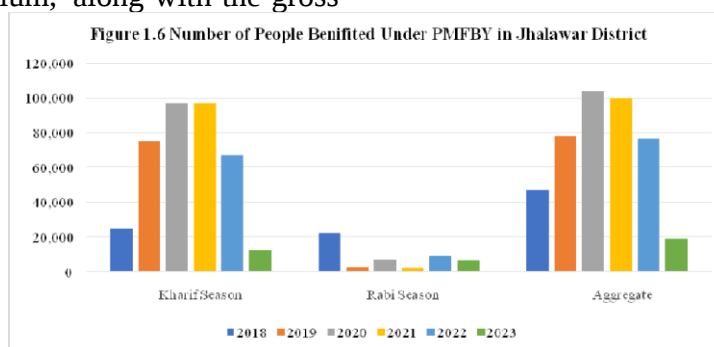
Source:- <https://pmfby.gov.in>

From 2018 to 2023, farmers in the district paid a total premium of Rs. 19,765 lakh under the PMFBY Scheme. During these six years, the Government of India and the Government of Rajasthan jointly bore a total premium cost of Rs. 36,946 lakh was shared equally between them. The gross premium amount over this period stood at Rs. 93,657 lakh. In 2019 and 2020, the gross premium recorded significant growth of 54.9% and 67.9%, respectively. However, in 2021, it declined by 12.2%, followed by a marginal increase in 2022. In 2023, the gross premium again decreased by 10.8%. Between 2018 and 2023, the farmers' share of the total premium remained lower than the government's contribution. However, in 2023, the proportion of the premium paid by farmers increased compared to previous years, indicating that the government has been gradually reducing its proportional share in the total premium. Figure 1.5 presents the details of farmers' and governments' contributions to the premium, along with the gross

premium amount under the scheme during 2018–2023.

4.6 Number of Beneficiary Farmers:

Between 2018 and 2023, a total of 4,27,769 farmers benefited from PMFBY Scheme in Jhalawar district. During these six years, 3,73,764 farmers received crop insurance payouts in the Kharif season, while 51,005 farmers benefited in the Rabi season. This indicates Kharif season accounts for more severe crop losses in the region. In 2019 and 2020 compared to previous year number of payout beneficiaries increased by 64.7% and 33.6%. However, for next three consecutive years, it continuously declined. In 2023, the number of beneficiary farmers dropped by 74.8% compared to 2022. The highest number of beneficiaries was recorded in 2020 at 1,03,969 farmers, which fell drastically to only 19,324 in 2023. Figure 1.6 presents the details of the number of beneficiary farmers under the scheme from 2018 to 2023.



Source:- <https://pmfby.gov.in>

5. FINANCIAL PERFORMANCE OF PMFB SCHEME

Evaluation of the physical implementation and financial performance of the PMFBY scheme in Jhalawar, is done using various ratios (**Kariyappa et al., 2018**). The list of their formulas is as follows —

- **Ratio of Claims Received to Gross Premium** = $\text{Claims Received from Insurance} \div \text{Gross Premium Collected}$
- **Ratio of Claims Received to Sum Insured** = $(\text{Claims Received from Insurance} \times 100) \div \text{Sum Insured}$
- **Ratio of Gross Premium to Sum Insured** = $(\text{Gross Premium Amount} \times 100) \div \text{Sum Insured}$
- **4.Beneficiary Ratio** = $(\text{Total Number of Beneficiary Farmers} \times 100) \div \text{Total Number of Insured Farmers}$

During 2018 and 2023, the financial performance of the PMFBY in Jhalawar district is presented in Table 1.7 through various ratios. The ratio of claims paid to gross premium indicates the extent of profit or loss for insurance companies and farmers. In 2019, this ratio was the highest at 3.12, while in

2023 it declined sharply to only 0.07. A value greater than 1 indicates a loss for insurance companies. It means that the claims paid to farmers by the company exceeded the premium amount collected from them. In 2019 and 2020, insurance companies incurred losses; however, by 2023, this ratio had dropped to 0.07, indicating that insurance companies were making substantial profits. These profits resulted from a reduction in the amount paid to farmers. The ratio of claims paid to the sum insured was highest in 2019 at 34.49 percent and lowest in 2023 at 0.61 percent. Between 2019 and 2021, this ratio remained in double digits, indicating that during these years, farmers received the expected insurance payouts for their losses. In 2023, this ratio declined to only 0.61 percent. It shows that insurance companies have not been adequately settling claims for farmers' losses over time. The ratio of gross premium to the sum insured was highest in 2020 at 12.83 percent and lowest in 2023 at 8.40 percent. The continuous increase in this ratio from 2018 to 2022 reflects the growing premium burden on both farmers and the government.

Table 1.1:- Financial Performance of the PMFB Yojana in Jhalawar District

Year	Ratio of Claims Received to Gross Premium	Ratio of Claims Received to Sum Insured	Ratio of Gross Premium to Sum Insured	Beneficiary Ratio
2018	0.86	7.77%	9.06%	20.89
2019	3.12	34.49%	11.05%	25.78
2020	1.41	18.04%	12.83%	35.75
2021	0.92	11.44%	12.49%	7.52
2022	0.53	6.51%	12.38%	5.4
2023	0.07	0.61%	8.40%	1.36

Source: Author's analysis

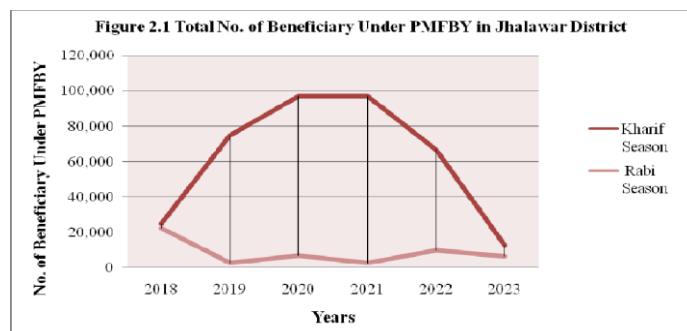
6. STATISTICAL ANALYSIS OF PMFBY IN JHALAWAR DISTRICT

6.1 Time Series Graph

The 2.1 graph depicts the trend in numbers of farmer beneficiaries under the PMFBY Scheme over six years (2018–2023), disaggregated by Kharif and Rabi seasons. The values on the X- axis (1–6) represent the years 2018 to 2023, respectively. Beneficiaries in the Kharif season

consistently outnumber those in the Rabi season, peaking at nearly one lakh in 2020 and 2021 before declining by 2023. In contrast, Rabi season beneficiaries remained comparatively low, ranging between 5,000 and 20,000 annually. This disparity indicates that a larger share of claims originated from Kharif crops, likely due to their greater vulnerability to monsoon-related risks. Overall, the data highlight a distinct seasonal variation in the benefits realized under the scheme, rather than in insurance participation

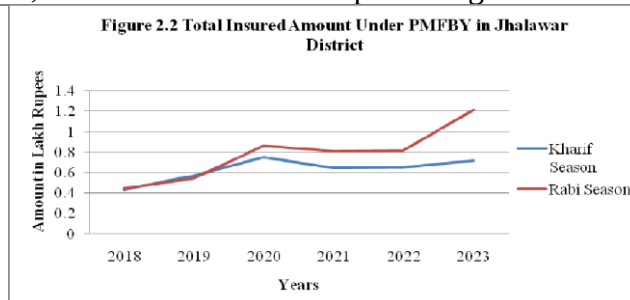
alone.



Source: Author's analysis

The second graph 2.2 illustrates the total insured amount (in lakh rupees) under the PMFBY scheme for Kharif and Rabi seasons from 2018 to 2023. Unlike enrolment trends, the insured amount for Rabi crops shows a steady increase and even surpasses that of Kharif in the later years. For instance, Rabi's insured amount rises from Rs. 44,528 lakh in 2018 to Rs. 1,21,538 lakh in 2023—

a 173% increase. While the insured amount for Kharif crops also grows, the rate of increase is comparatively slower. This pattern suggests that, although fewer farmers insure crops during the Rabi season, their average insured value is higher, potentially due to higher-value crops or larger cultivated areas. Overall, the data indicates a positive growth trend in crop insurance coverage.



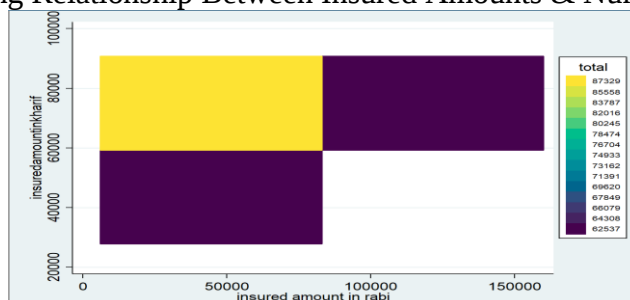
Source: Author's analysis

6.2 Heatmap Analysis:

The 3.1 heatmap illustrates the relationship between insured amounts in the Kharif and Rabi seasons, plotted on the X and Y axes respectively, with the colour gradient representing the total number of beneficiaries. The lighter yellow region indicates the highest beneficiary count (approximately 87,000), corresponding to moderate Kharif insured amounts (about Rs. 60,000–Rs. 90,000 lakh) and

lower Rabi insured amounts (up to Rs. 50,000 lakh). In contrast, dark purple regions denote fewer beneficiaries, occurring when insured amounts are either very high or very low for both seasons. This pattern suggests that maximum participation occurs when Kharif insured amounts are relatively high while Rabi insured amounts remain modest. Overall, balanced coverage between the two seasons appears to attract greater farmer participation.

Figure 3.1:- Heatmap Showing Relationship Between Insured Amounts & Number of Beneficiaries



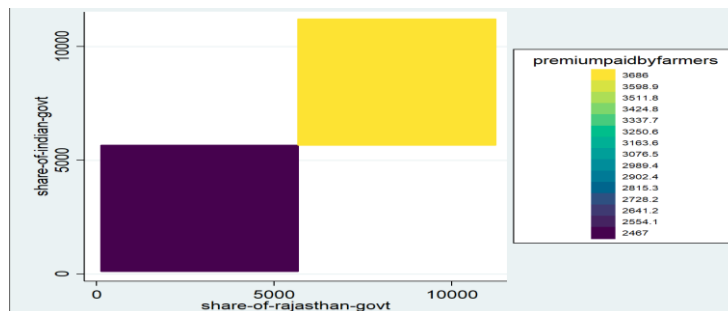
Source: Author's analysis

The 3.2 heatmap depicts how the premium paid by farmers (in lakh rupees) under the PMFBY

scheme varies with subsidy contributions from the Government of Rajasthan (X- axis) and the

Government of India (Y-axis). The brightest yellow zone represents the highest farmer premiums (up to Rs. 3,686 lakh), occurring when both state and central government contributions are relatively high (approximately Rs. 10,000 lakh each). In contrast, the darkest purple regions correspond to lower farmer premiums, which align with lower

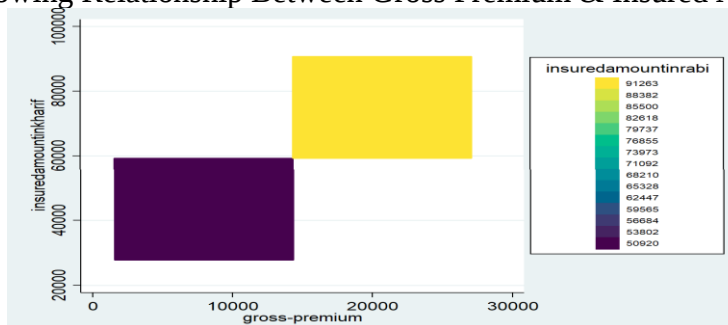
Figure 3.2:- Heatmap Showing Relationship between Premium Paid by Farmers And Government Contribution



Source: Author's analysis

The 3.3 heat plot illustrates the relationship between gross premium (X-axis), insured amount in the Kharif season (Y-axis), and insured amount in the Rabi season (represented by colour intensity). Gross premiums range from Rs. 1,000 crore to Rs. 30,000 crore, while Kharif insured amounts vary from Rs. 20,000 crore to Rs. 100,000 crore. The colour gradient indicates the magnitude of Rabi

Figure 3.3:- Heatmap Showing Relationship Between Gross Premium & Insured Amount



Source: Author's analysis

6.3 Diagnostic Tests: Durbin–Watson Test, Breusch–Pagan Test and VIF Test

The diagnostic tests confirm that the regression model satisfies the key assumptions of the classical Ordinary Least Squares (OLS) framework. The Durbin–Watson statistic (1.95) indicates the absence of autocorrelation, suggesting that the residuals are independent. The Breusch–Pagan test yields a high p-value (0.7861), providing no evidence of heteroskedasticity; thus, the error terms exhibit constant variance. Furthermore, the

mean Variance Inflation Factor (VIF) of 3.38 indicates that multicollinearity between the insured amounts for Kharif and Rabi seasons is not a concern. Collectively, these results validate the reliability of the estimated coefficients, lending strong support to the empirical findings that higher Kharif coverage significantly increases the number of total beneficiaries, whereas Rabi coverage exerts a comparatively mild negative effect. These diagnostic outcomes underscore the robustness of the model and enhance the credibility of the study's conclusions.

Table 1.2:- Values of Durbin–Watson Test, Breusch–Pagan Test and VIF Test

Test	Statistic / Result	P-Value	Conclusion
Durbin–Watson Test	1.95	—	No Autocorrelation (Independent Residuals)
Breusch–Pagan Test	Chi ² = 0.07	0.7861	No Heteroskedasticity (Constant Error Variance)
Variance Inflation Factor (VIF)	Mean VIF = 3.38	—	Acceptable Multicollinearity (VIF < 5)

Source: Author's analysis

6.4 Time Series Regression

The regression analysis indicates that the insured amount in the Kharif season exerts a statistically significant positive effect on the total number of PMFBY beneficiaries. Specifically, each additional lakh rupees insured during the Kharif season is associated with an increase of approximately 4,500 beneficiaries. In contrast, the insured amount in the Rabi season exhibits a statistically significant negative relationship with

total enrolment, suggesting that higher Rabi coverage may slightly reduce overall participation, potentially due to substitution effects or overlapping beneficiary groups. The model achieves an R² value of 82.3%, indicating that it explains the majority of the variation in the number of beneficiaries, despite the relatively small sample size. Findings under to study suggest that strengthening Kharif season coverage servers as a key strategy for maximizing the impact and reach of the scheme.

Table 1.3:- Results of Time Series Regression Analysis

Variable	Coefficient	Std. Error	t-Statistic	P-value	95% Confidence Interval
Insured amount in Kharif	4.5201	1.2731	3.55	0.038	[0.4685, 8.5716]
Insured amount in Rabi	-1.9243	0.5332	-3.61	0.037	[-3.6213, -0.2274]
Intercept (_cons)	-63033.1	51000.97	-1.24	0.304	[-225341, 99274.72]

Model Summary	Value
Number of Observations	6
F-statistic (F(2,3))	6.97
Prob > F	0.0745
R-squared	0.823
Adjusted R-squared	0.7049
Root MSE	17,563

Source: Author's analysis

7. CONCLUSION

Analysis of the data indicates that the scheme has achieved effective reach in the study area of Jhalawar district. During the Kharif season, the region experiences water scarcity, and the risk of crop loss is higher compared to the Rabi season. Consequently, under this scheme, the number of applicants and beneficiaries has been higher in the Kharif season. Between 2018 and 2023, the total number of applicants across both seasons increased by more than six times, while the number of beneficiary farmers grew by over four

times. During these six years, the gross premium amount and the total insured amount more than doubled. However, the payment amounts against claims showed considerable fluctuations. In 2023, compared to 2018, the payment amount against claims declined by 82%.

The regression analysis indicates that relationship between the insured amount and total enrolment of PMFBY beneficiaries exerts a statistically significant positive effect in Kharif season and statistically significant negative relationship in Rabi season suggesting that higher Rabi coverage may

slightly reduce overall participation, potentially due to substitution effects or overlapping beneficiary groups.

From 2018 to 2021, the scheme showed notable progress in the region on various parameters. After 2021, the growth rate of the scheme slowed down. Initially, the claim settlement rate was high. This resulted in losses for insurance companies. However, during the period 2021 to 2023 the trend reverses and insurance companies made profits. The payment amounts given to farmers decreased significantly.

8. SUGGESTIONS

The study shows that the implementation of the scheme largely depends on the state government's administration. Therefore, better communication channels should be developed between the state government, farmers, and insurance companies. Findings of study suggests a key strategy for maximizing the impact and reach of the scheme could be strengthening Kharif season coverage to increase total participation in PMFB Scheme. Price volatility should also be brought within the scope of insurance, as fluctuations in prices often result in farmers receiving no more than the cost

price of their produce. Additionally, to promote crop diversification, commercial crops should be brought under insurance coverage. For such crops, the government should provide area-specific premium subsidies. Study shows that from 2021 to 2023, claim payment amounts decreased and profits of insurance companies increased significantly. While the long-term economic viability of the scheme requires the profitability of insurance companies, government must ensure this should justified claim settlements to farmers. Policy measures should mandate insurance companies to invest a fixed portion of their profits back into the agriculture sector of the concerned district. Such investments could be used for objectives such as improving storage facilities, enhancing irrigation infrastructure, and providing financial support for the purchase of technological equipment. Compared to previous insurance schemes, PMFBY has been more effective, with a relatively broader reach. Greater awareness should be promoted to ensure faster claim settlements and to help farmers better understand the technical processes of the scheme.

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