



Food, Economic, and Livelihood Security of Farmers under PMFBY in Kolar, Karnataka

Imrankhan Jiragal^{1*}, S. Ganesamoorthi², Mehnaj Khatoon³, T. L. Mohankumar⁴ and C. Narayanaswamy⁵

¹Research Associate, ³Project Associate, ICAR-National Institute of Veterinary Epidemiology and Disease Informatics, Ramagondanahalli, Yelahanka New town, Bangalore, Karnataka, India

^{2,5}Professor, Department of Agricultural Extension, ⁴Assistant Professor, Department of Agricultural Statistics, University of Agricultural Sciences, GKVK, Bangalore, Karnataka, India

*Corresponding author email id: imrankhanjiragal@gmail.com

HIGHLIGHTS

- PMFBY beneficiaries demonstrated better livelihood security than non-beneficiaries in Kolar, Karnataka.
- Beneficiaries achieved greater economic stability and food security through PMFBY.
- Delayed insurance payouts remained a concern for non-beneficiaries.

ARTICLE INFO

Keywords: Livelihood security, Food security, Economic security, PMFBY, Agricultural Insurance, Crop insurance and farmers welfare.

<https://doi.org/10.48165/IJEE.2025.61208>

Conflict of Interest: None

Research ethics statement(s):

Informed consent of the participants

ABSTRACT

Indian agriculture faces multiple risks that threaten farmers livelihoods. The Pradhan Mantri Fasal Bima Yojana (PMFBY) was introduced to mitigate these risks through crop insurance. This study evaluates the impact of PMFBY on the food and economic security of farmers in Kolar district, Karnataka, during 2021–2022. A total of 200 farmers (150 beneficiaries, 50 non-beneficiaries) were surveyed across five taluks. Food and economic security were assessed using specific indicators. Findings indicate that PMFBY beneficiaries experienced slightly better livelihood security than non-beneficiaries. Beneficiaries prioritized year-round food access (mean: 4.63), while non-beneficiaries relied more on the adequacy of Public Distribution System (PDS) grains (mean: 4.48). Economic security was primarily associated with optimal resource utilization (beneficiaries: 4.61; non-beneficiaries: 4.52). Overall, 53.5 per cent of beneficiaries reported improved food security and 57 per cent experienced enhanced economic stability. The results suggest a modest positive impact of PMFBY on farmer resilience. However, challenges such as delayed insurance payouts and awareness gaps persist. Strengthening implementation, improving claim processing, and increasing outreach efforts could enhance the scheme's effectiveness. Continuous evaluation is essential to optimize PMFBY's role in promoting sustainable agricultural livelihoods.

INTRODUCTION

India's agrarian economy is a cornerstone of its rural livelihood system, supporting millions who depend on agriculture for sustenance. Agriculture, being an open-field activity, is directly affected by climate change and is also the most vulnerable to this query (Saxena & Kumar, 2019). However, this sector faces significant vulnerabilities due to recurrent natural calamities such

as droughts, floods, and unseasonal rainfall (Kumar & Swami, 2021). These events often result in devastating crop losses, adversely affecting farmers' incomes and their ability to secure credit for subsequent cropping seasons (Ghosh et al., 2021; Todmal, 2022; BIRTHAL & Hazrana, 2019). This cyclical vulnerability underscores the pressing need for effective mechanisms to protect farmers' livelihoods and foster resilience (Dev & Mahajan, 2020). In February 2016, the Government of India introduced the Pradhan

Mantri Fasal Bima Yojana (PMFBY), a comprehensive crop insurance scheme designed to mitigate agricultural risks and provide financial security to farmers. The PMFBY replaced earlier initiatives like the National Agricultural Insurance Scheme (NAIS) and Modified NAIS, addressing their limitations with a streamlined, farmer-centric approach. The scheme offers subsidized premiums—2 per cent for Kharif crops, 1.5 per cent for Rabi crops, and 5 per cent for annual commercial and horticultural crops—ensuring affordability and encouraging broader participation. Initially mandatory for loanee farmers, the scheme was made optional from Kharif 2020, providing farmers greater autonomy in decision-making (Ministry of Agriculture & Farmers Welfare, 2020; Sharma, 2021). The PMFBY seeks to stabilize farmers' income by mitigating crop losses caused by natural calamities, pests, and diseases. It also aims to promote modern agricultural practices by reducing the financial risks associated with experimentation. Moreover, the scheme facilitates credit flow to the agricultural sector, enhancing food security, promoting crop diversification, and fostering economic growth (Desai et al., 2022; Kumar et al., 2020). Despite these ambitious objectives, its implementation has encountered challenges such as delayed claim settlements, low awareness among farmers, and inconsistent regional outcomes (Nain et al., 2017; Meena et al., 2021; Kumar et al., 2023). Given the PMFBY's national importance and potential to impact rural livelihoods, localized research is essential for understanding its effectiveness. While existing studies provide broad overviews of the scheme's implementation, detailed regional analyses are scarce, particularly in Karnataka. This state, with its diverse agricultural landscape and varying levels of vulnerability, offers a valuable context for evaluating the PMFBY's impact. This study aims to address the gap by conducting a comparative analysis of PMFBY beneficiaries and non-beneficiaries in Karnataka, focusing on their levels of food and economic security. By examining these dimensions, the research seeks to provide deeper insights into the scheme's outcomes and its role in enhancing livelihood resilience at the grassroots level.

METHODOLOGY

This study employed a quantitative research approach to assess the implementation and effectiveness of the Pradhan Mantri Fasal Bima Yojana (PMFBY) and identify barriers to its operationalization. The research was conducted in Kolar district, Karnataka, during the 2021–2022 fiscal year. Kolar was purposively selected due to its diverse farming systems, progressive agricultural practices, and suboptimal PMFBY utilization within the Eastern Dry Zone-5, making it a suitable case for evaluating the scheme's adoption and impact. A multi-stage random sampling method was used to ensure representativeness. From each of Kolar's five taluks, 30 PMFBY beneficiaries and 10 non-beneficiaries were randomly selected, yielding a total sample of 200 farmers (150 beneficiaries, 50 non-beneficiaries). This sample size was determined based on prior studies on agricultural schemes, ensuring adequate statistical power for meaningful comparisons (Desai et al., 2022; Meena et al., 2021). A semi-structured questionnaire was developed to align with PMFBY objectives. The questionnaire included indicators related to food security (year-round access, affordability, nutritional adequacy) and economic security (income stability, savings, risk

mitigation). Questionnaire validity was ensured through expert validation from agricultural economists and extension professionals. Data were analyzed using IBM SPSS 26.0. Descriptive statistics (mean, standard deviation, percentages) summarized livelihood security indicators. A Two-sample z-test for proportions was used to assess significant differences in food and economic security between beneficiaries and non-beneficiaries. The z-test was chosen as it effectively compares proportions between independent groups (Kumar et al., 2023) and is appropriate for large sample sizes with categorical outcomes, unlike t-tests, which are suited for continuous variables.

Food security of livelihood in present study is defined as the condition where individuals have reliable access to sufficient quantities of affordable, nutritious food to lead a healthy life secured through participation in the PMFBY scheme, whereas, the economic security of livelihood is the degree to which the farmers have monetary stability between income, expenditure and savings at a given point of time protected through participation in the PMFBY scheme. Similarly, livelihood security, is operationally defined as the extent of livelihood security derived by the farmers through enrollment/participation into PMFBY scheme in terms of food, social, economic, and psychological securities so as on to protect their capabilities, assets, and activities which are essential for their livelihood.

RESULTS

The analysis of livelihood security among both beneficiaries and non-beneficiaries is presented in Tables and Figures. The results indicate that a significant proportion of beneficiaries exhibited higher levels of livelihood security across various elements, as reflected in the individual statements. Conversely, the majority of non-beneficiaries showed a lack of awareness, possibly due to their limited interest in the PMFBY scheme. Regarding food security, distinct differences emerged between PMFBY beneficiaries and non-beneficiaries (Table 1). Beneficiaries placed the highest value on the consistent “availability of food throughout the year,” achieving a mean score of 4.63, indicating a strong sense of food security. They also highly rated the “adequacy of food grains provided through the public distribution system” (mean score: 4.59), suggesting that even with insurance coverage, the PDS remains an essential component of their food security strategy. In contrast, non-beneficiaries prioritized “adequacy of food grains provided through the public distribution system” as their primary source of food security, with a mean score of 4.48. While they also valued “availability of food throughout the year” and “affordability of providing balanced food to family members,” these aspects received slightly lower mean scores of 4.44. This suggests that non-beneficiaries rely more heavily on government-provided food resources and may face greater challenges in ensuring consistent access to diverse and nutritious food.

Concerning economic security, both beneficiaries and non-beneficiaries recognized the importance of “optimal utilization of economic resources by the farming system adopted.” Beneficiaries, however, demonstrated a higher mean score of 4.61, suggesting that participation in PMFBY enables them to manage their resources more effectively, likely due to reduced financial risks associated with

Table 1. Assessment of Food Security Among PMFBY Beneficiary and Non-beneficiary Farmers

S.No. Statements		Beneficiaries (n1=150)	Non-Beneficiaries (n=50)
		Mean Score	Mean Score
1	Food in some kind is available for me throughout the year	4.63	4.44
2	Food grains provided through public distribution system is adequate in meeting food & nutritional security of my family.	4.59	4.48
3	Providing balanced food to family members is affordable for me	4.49	4.44
4	The quality of food available to my family is good	4.36	4.08
5	The farming system adopted by me provides a broad range of food items for my family	4.35	4.16
6	The quantity of the food items consumed by the household members is insufficient for physiological needs	2.69	3.14

crop losses. They also placed importance on “the possibility of making reasonable savings from farm earnings given their farming conditions” (mean score: 4.56), implying that PMFBY contributes to their financial stability and ability to save. Non-beneficiaries, while also valuing optimal resource utilization (mean score: 4.52), prioritized “assurance of higher income generation through marketing of various produces in different seasons given their farming condition” as their second most important aspect of economic security (mean score: 4.50). This suggests that non-beneficiaries focus more on direct income generation through market activities

as a means of achieving economic security, potentially due to the absence of the financial buffer provided by PMFBY (Table 2).

Examining overall livelihood security, a notable disparity emerged between the two groups. A significant proportion of beneficiaries (51.30%) reported “better” food security towards the PMFBY scheme, while only 14 per cent of non-beneficiaries reported the same. Conversely, a substantial majority of non-beneficiaries (70%) reported “poor” food security towards the PMFBY scheme, compared to only 19.30 per cent of beneficiaries. Similarly, in terms of economic security, 48 per cent of beneficiaries

Table 2. Itemized Assessment of Economic Security among PMFBY Beneficiary and Non-beneficiary Farmers

S.No. Statements		Beneficiaries (n1=150)	Non-Beneficiaries (n=50)
		Mean Score	Mean Score
1	The farming system adopted by me optimally utilizes my economic resources	4.61	4.52
2	With my farming condition it is possible to make reasonable savings out of farm earnings	4.56	4.18
3	My farm provides variety of income from products of agriculture and allied enterprises	4.47	4.28
4	My farm enables me efficient utilization of land	4.39	4.34
5	My farm enables to get higher benefit- cost ratio possible	4.45	4.30
6	My farming condition assures higher income generation through marketing of various produces in different seasons	4.44	4.50
7	Overcoming financial stress condition is prevailing with my farming situation	4.43	4.24
8	My farm conditions adequately protects me against risk and uncertainties of farming	4.41	4.34
9	In my farm I am able to achieve maximum farm productivity and income	4.33	4.10
10	Components of my farming system doesn't stabilize my farm income (-)	2.80	3.44

Table 3. Overall food security and economic security status of farmers under the PMFBY scheme

	Beneficiary (n ₁ = 150) (%)	Non-Beneficiary (n ₂ = 50) (%)	Overall (n=200) (%)
Category (Food security)			
Poor (<180.13)	19.30	70.00	32.00
Average (180.13-193.87)	29.30	16.00	26.00
Better (>193.87)	51.30	14.00	42.00
	Mean = 186.47	Mean = 176.84	Mean=187.05
	SD = 10.23	SD = 18.98	SD = 13.75
	Z value = 3.427**		
Category (Economic security)			
Poor < 144.40	22.70	66.00	33.50
Average 144.40-156.68	29.30	26.00	28.50
Better >156.68	48.00	8.00	38.00
	Mean = 146.49	Mean = 143.78	Mean = 150.54
	SD = 6.81	SD = 20.35	SD = 12.28
	Z value = 3.227**		

reported “better” economic security, whereas only 8 per cent of non-beneficiaries did so. A large majority of non-beneficiaries (66%) reported “poor” economic security compared to 22.7 per cent of beneficiaries (Table 3). These findings indicate that PMFBY participation is strongly associated with improved perceptions and experiences of both food and economic security.

DISCUSSION

This study assessed the impact of the Pradhan Mantri Fasal Bima Yojana (PMFBY) on food security, economic stability, and overall food & economic security among farmers in Kolar district, Karnataka. The findings highlight significant differences between PMFBY beneficiaries and non-beneficiaries, providing critical insights into the scheme’s effectiveness and broader implications for rural livelihoods. The results indicate that PMFBY beneficiaries experience a statistically significant improvement in food security compared to non-beneficiaries ($p < 0.05$). Beneficiaries reported greater assurance of year-round food availability, suggesting that crop insurance enhances their ability to maintain consistent food access. This finding aligns with previous studies emphasizing the role of agricultural insurance in stabilizing farm incomes and reducing vulnerability to food insecurity (Mehrabi et al., 2022; Diao & Pratt, 2007; Rose & Charlton, 2001). Additionally, the study highlights the complementary role of the Public Distribution System (PDS) in supporting food security. While both groups rely on PDS, beneficiaries appear to strategically utilize this safety net, indicating that agricultural insurance and food assistance programs work synergistically (Mehrabi et al., 2022; Shwetha et al., 2021). In contrast, non-beneficiaries exhibit higher dependence on PDS due to financial constraints, underscoring the persistent food insecurity risks faced by uninsured farmers. These findings reinforce the importance of expanding insurance coverage to a broader segment of farmers and ensuring better accessibility to both insurance and food security programs.

The study further demonstrates that PMFBY contributes to economic stability by enabling beneficiaries to engage in effective financial planning and resource management. Beneficiaries prioritized “optimal utilization of economic resources” and “reasonable savings,” reflecting an increased capacity for long-term investments in farming. This finding is consistent with prior research highlighting the role of agricultural insurance in improving risk management and resource efficiency among farmers (Jabbar et al., 2020; Tiwari et al., 2020; Shwetha et al., 2022). Moreover, by mitigating financial risks associated with crop failures, PMFBY provides greater confidence to farmers in making investment decisions and adopting modern farming practices. The psychological benefits of financial security, including reduced stress and improved mental well-being, have been well-documented in the literature (Agarwal et al., 2022; Tiwari et al., 2020). However, non-beneficiaries focus more on direct market engagement and income generation through agricultural marketing, which, although crucial, makes them more vulnerable to market price fluctuations and income instability. These insights suggest that while PMFBY plays a vital role in enhancing financial resilience, additional efforts should be made to expand coverage and integrate financial literacy programs for non-beneficiaries.

Overall, the study reinforces the positive association between PMFBY participation and improved livelihood security of food and the economy. Beneficiaries consistently report higher levels of food and economic security, which enhances their overall well-being and resilience. These findings are in line with previous research suggesting that agricultural insurance schemes serve as crucial tools for reducing livelihood risks and fostering sustainable farming systems (Shwetha et al., 2021; Patel et al., 2021). Despite these benefits, key challenges in PMFBY implementation remain, including gaps in insurance coverage, delays in claim settlements, and low farmer awareness. Addressing these issues through policy refinements—such as streamlining claim processing, improving outreach programs, and integrating PMFBY with broader rural development initiatives—can significantly enhance its impact on farmer resilience. Strengthening institutional mechanisms and ensuring timely reimbursements will be crucial for maximizing the effectiveness of agricultural insurance in improving farmer welfare.

CONCLUSION

The study revealed key differences between beneficiaries and non-beneficiaries. Beneficiaries showed significantly higher levels of both food and economic security, demonstrating the scheme’s effectiveness in mitigating crop loss impacts. While non-beneficiaries relied more on the PDS and other income sources, PMFBY provided a financial safety net for beneficiaries, improving resource management and food access. These findings emphasize the need to promote PMFBY adoption, especially among vulnerable farmers. The study also highlights the importance of a combined approach to yield estimation in diverse cropping systems like Kolar’s, balancing accuracy, coverage, and trust. Ensuring timely reimbursements is crucial for enhancing farmer well-being and resilience. This research contributes to agricultural economics by providing regional empirical evidence of PMFBY’s impact on livelihood security, informing policy decisions for stronger agricultural risk management and improved farmer welfare.

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