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THE ROLE OF EDUCATION, GENDER, AND REGIONAL FACTORS IN PMFBY PARTICIPATION: INSIGHTS FROM MADHYA PRADESH

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ABSTRACT

This study provides a comprehensive demographic analysis and evaluates key insights into the implementation of the Pradhan Mantri Fasal Bima Yojana (PMFBY). Focusing on gender, age, education, farmer categories, and claim trends, the study identifies critical barriers and opportunities for enhancing participation and effectiveness of the scheme. Correlation and regression analyses shed light on awareness, enrollment, and claims predictors, offering actionable policy recommendations.

***Keywords**: PMFBY, Agricultural Insurance, Demographic Analysis, Logistic Regression, Probit Model, Madhya Pradesh, Farmer Participation.*

Introduction

The Pradhan Mantri Fasal Bima Yojana (PMFBY) is a government-initiated agricultural insurance scheme in India that provides financial support to farmers in the event of crop failures due to natural calamities. It seeks to stabilise farmers' incomes, encourage the adoption of innovative farming practices, and reduce their dependence on informal credit.

This study focuses on Madhya Pradesh (MP), a state with a significant agricultural sector. MP is known for its diverse climatic conditions and prominent crop patterns. The survey was conducted in four districts: Rajgarh, Seoni, Burhanpur, and Dewas. These districts were selected based on cluster analysis of agricultural characteristics.

Rajgarh has a population density of 251 people per square kilometre and cultivates crops such as soybean, wheat, and maize. It relies on canals and dug wells for irrigation. Seoni, known for its rich forest cover and rice cultivation, has a population density of 157 people per square kilometre, with agriculture primarily dependent on rainfed sources and canals. Burhanpur is located along the Tapti River, with black cotton soil supporting wheat, maize, and banana cultivation and a population density of 221 people per square kilometre. Dewas, characterised by diverse cropping patterns including soybean and pulses, has a population density of 223 people per square kilometre and faces challenges related to rainfed agriculture and accessibility.

The selected crops for the study were soybean (Kharif season) and wheat (Rabi season), which represent key staples in the region's agricultural profile.

Literature Review

Adopting and implementing agricultural insurance schemes, such as PMFBY, encounter numerous challenges and opportunities. Farmer awareness and trust are essential for the success of these schemes. Studies (Kumar & Singh, 2021; Sharma & Verma, 2020) have shown significant gaps in knowledge about PMFBY and scepticism regarding claim settlement processes, necessitating targeted campaigns and the use of local influencers to bridge the trust deficit.

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Socioeconomic barriers, such as gender disparities and limited access for marginal farmers, further constrain participation. Women and sharecroppers often face logistical and financial constraints, underlining the need for tailored policies and gender-sensitive outreach. Education plays a complex role; while it improves access, scepticism among highly educated farmers about insurance efficacy persists (Sharma & Verma, 2020).

Global experiences, as documented by the World Bank (2021), highlight the importance of robust institutional frameworks and technological integration to enhance transparency and streamline processes. Examples from countries like Kenya and Mexico demonstrate the effectiveness of digital tools in improving accessibility.

Despite these insights, district-specific analyses remain scarce. This study aims to address this gap by focusing on Madhya Pradesh and analysing demographic factors such as age, gender, and landholding size. The study provides actionable insights to enhance awareness, participation, and equitable outcomes of PMFBY using advanced modelling techniques.

Methodology

This research adopts a mixed-method approach, combining quantitative data analysis with logistic regression and probit modelling. Data was collected through structured surveys targeting 688 respondents across the four selected districts. Key demographic variables, PMFBY awareness, enrollment status, and claim receipt data were analysed.

Objectives of the Study

The primary objectives of this research are:

- To analyse the demographic and socio-economic factors influencing awareness and enrollment in PMFBY.
- To evaluate the role of education, gender, and farm size in shaping awareness about the scheme and its premium details.
- To assess the voluntary enrollment patterns and identify key barriers to participation.
- To understand regional disparities in claim settlement processes and trends.

Logistic Regression Model

The logistic regression model was employed to identify factors influencing PMFBYenrollment. It predicts the probability of a binary outcome, such as enrollment or non-enrollment, based on independent variables. The model specification for PMFBYenrollment is:

$$\text{logit}(P) = \ln\left(\frac{P}{1-P}\right) = \beta_0 + \beta_1 \cdot \text{Age} + \beta_2 \cdot \text{Gender} + \beta_3 \cdot \text{Education Level} + \beta_4 \cdot \text{Occupation} + \beta_5 \cdot \text{Agricultural Experience} + \beta_6 \cdot \text{Awareness about PMFBY} + \beta_7 \cdot \text{Farmer Type}$$

Where:

- P: Probability of enrolling in PMFBY.
- 1−P: Probability of not enrolling in PMFBY.
- Age: Respondent's age in years.
- Gender: Binary variable (Male = 0, Female = 1).
- Education Level: ordinal variable representing the respondent's highest level of education.
- Occupation: categorical variable indicating the respondent's primary occupation.
- Agricultural Experience: Farming experience in years.
- Awareness about PMFBY: Binary variable (Aware = 1, Not Aware = 0).
- Farmer Type: categorical variable (Owner, Tenant, Sharecropper).

The logistic model estimates the odds of enrollment and provides coefficients that represent the change in the log odds of the outcome per unit increase in each predictor variable. The probability of enrolling can be computed as:

Probit Model

The probit model was used to analyse awareness about the scheme, information about premiums, and voluntary enrollment. The probit model assumes a cumulative normal distribution of the probability of the outcome. The specifications for the probit models are as follows:

Awareness about PMFBY

$$Y=\alpha+\beta1\cdot\text{Education Qualification}+\beta2\cdot\text{Age}+\beta3\cdot\text{Area Hectare}+Ui$$

Where:

- Y: Awareness about PMFBY (1 if aware, 0 otherwise).
- Education Qualification: Education level of the farmer.
- Age: Age of the farmer.
- Area Hectare: The size of the farm, in hectares.

Information about Premium

$$Y=\alpha+\beta1\cdot\text{Awareness about PMFBY}+\beta2\cdot\text{Education Qualification}+\beta3\cdot\text{Age}+\beta4\cdot\text{Area Hectare}+Ui$$

Where:

- Y: Information about premium (1 if yes, 0 otherwise).
- Awareness about PMFBY: Awareness about PMFBY (1 if aware, 0 otherwise).
- Education Qualification: Education level of the farmer.
- Age: Age of the farmer.
- Area Hectare: The size of the farm, in hectares.

Voluntary Enrollment in PMFBY:

$$Y=\alpha+\beta1\cdot\text{Awareness about PMFBY}+\beta2\cdot\text{Education Qualification}+\beta3\cdot\text{Age}+\beta4\cdot\text{Area Hectare}+Ui$$

Where:

- Y: Voluntary enrollment in PMFBY (1 if yes, 0 otherwise).
- **Awareness about PMFBY:** Awareness about PMFBY (1 if aware, 0 otherwise).
- **Education Qualification:** Education level of the farmer.
- **Age:** Age of the farmer.
- **Area Hectare:** The size of the farm is in hectares.

By utilising these models, this study ensures robustness in identifying significant predictors and provides nuanced insights into the factors affecting farmer participation, awareness, and engagement with PMFBY.

Results and Discussion

The analysis reveals significant demographic disparities in PMFBY awareness and participation. Male farmers exhibit higher awareness and enrollment rates than females, highlighting the critical need for gender-sensitive outreach. The stark gender disparity reflects socio-cultural barriers and logistical challenges that prevent women from accessing the scheme. Efforts to enhance female farmer engagement through community-driven programs and support systems are paramount.

Age-wise analysis reveals that middle-aged farmers (30–50 years) demonstrate the highest levels of awareness and voluntary enrollment. This age group is typically involved in key decision-making processes related to agricultural operations. In contrast, younger farmers (<30 years) often lack awareness due to reliance on older family members for decisions, while older farmers (>50 years) show reduced awareness, likely due to a preference for traditional farming practices and lower engagement with formal schemes. Tailored communication strategies for these groups, such as digital outreach for younger farmers and village meetings for older farmers, can significantly improve awareness levels.

Educational attainment shows a counterintuitive weak negative correlation with PMFBY awareness. Higher education levels often correlate with scepticism towards government schemes, as educated farmers may prioritise alternative risk management strategies or question the scheme's efficiency. Conversely, farmers with little or no formal education struggle to understand the scheme's complexities. Bridging this gap requires simplified information dissemination in vernacular languages and the involvement of local influencers to build trust and awareness among diverse educational groups.

Ownership patterns significantly influence participation. Owners have the highest awareness levels, as their direct engagement in farming and access to formal networks enhance exposure to government schemes. Tenants and sharecroppers display lower awareness and participation rates, constrained by insecure land tenure and socio-economic barriers. Policy interventions targeting these groups, such as customised subsidies or simplified enrollment processes, are crucial for equitable access.

Regional disparities in claim settlement times were evident, with Seoni district demonstrating relatively efficient claim processing (average settlement time of 3 months) compared to Rajgarh and Burhanpur, where settlement times averaged 4 months. The average settlement time of 3.94 months highlights systemic inefficiencies in claim processing, which can severely impact farmers during critical financial periods. Addressing these inefficiencies through technological interventions, such as real-time claim tracking systems, can enhance transparency and reduce delays.

The study also reveals that awareness strongly correlates with enrollment and claims received. Farmers aware of PMFBY are over three times more likely to enrol and receive claims than unaware farmers. Despite this, 81.5% of respondents reported not receiving any claims, indicating significant gaps in claim accessibility and transparency. Improved grievance redressal mechanisms and proactive follow-ups by implementing agencies can bridge this gap and enhance farmer satisfaction.

Conclusion

This study underscores the importance of addressing demographic disparities and systemic challenges to enhance PMFBY participation. Tailored interventions targeting gender disparities, age-specific outreach, and regional inefficiencies can significantly improve the scheme's impact and accessibility.

Policy Recommendations

- **Gender-Sensitive Outreach**: Empowering female farmers requires multifaceted approaches that address socio-cultural and logistical barriers. Training programs tailored to women farmers, community awareness drives, and partnerships with women-centric organisations can promote their engagement. Establishing female-led farmer cooperatives and providing women-exclusive insurance advisors will foster greater inclusivity and scheme utilisation.
- **Targeted Support for Marginal Farmers and Sharecroppers**: Marginal farmers and sharecroppers often face significant barriers due to limited resources and systemic inequities. Policies should prioritise subsidies for insurance premiums specific to this group, simplifying enrollment processes and increasing accessibility to scheme resources. Mobile-based support systems and local facilitators can help marginal farmers and sharecroppers navigate complex documentation and procedures, ensuring higher participation and equitable outcomes.

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