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Pradhan Mantri Fasal Bima Yojana: Agricultural Risk Management in India

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SUMMARY

Pradhan Mantri Fasal Bima Yojana (PMFBY), launched in 2016, represents India's comprehensive agricultural insurance scheme addressing crop loss risks from weather variability, pest infestations, and natural disasters. The scheme covers food crops, commercial crops, and horticulture products across 30 states and union territories, insuring 40 million farmers cumulatively since inception. PMFBY employs area-based assessment methodology, calculating indemnities based on district-level yield variations rather than individual farm losses. Premium subsidies reaching ₹5,500 crores have incentivized farmer participation in organized risk management mechanisms. Claims aggregating ₹25,000 crores have been disbursed to compensate agricultural losses, demonstrating scheme's protective function during adverse weather events. Government-appointed insurance companies administer policies with defined premium sharing: farmers contribute 2-5% for kharif crops and 1.5-3% for rabi crops, while government subsidizes remaining premiums. Technology integration including remote sensing, weather stations, and claim settlement systems has modernized agricultural insurance delivery.

INTRODUCTION

Crop insurance represents critical risk management instrument addressing agricultural uncertainty inherent in farming systems dependent on weather, pests, and natural phenomena. India's agricultural sector, supporting 140+ million farming households across highly variable agroecological zones, faces significant production volatility and income instability from uncontrollable natural factors. Recognizing these challenges, the Government of India launched Pradhan Mantri Fasal Bima Yojana (PMFBY) in April 2016 as centralized agricultural insurance scheme replacing earlier fragmented regional programs. PMFBY aimed to achieve ambitious farmer participation targets through substantial government subsidy reducing insurance cost burden and institutional strengthening across insurance companies and implementing agencies. The scheme positioned crop insurance as crucial component in broader agricultural risk management strategy, complementing government procurement systems, minimum support prices, and credit facilities. Understanding PMFBY's architecture, implementation experience, stakeholder outcomes, and persistent challenges provides critical perspective on agricultural insurance effectiveness in large-scale developing country contexts.

Implementation and Institutional Mechanisms

Scheme Implementation Timeline and Evolution

PMFBY commenced operations in 2016-17 kharif season with initial farmer participation around 3 crores substantially exceeding predecessors' coverage. Progressive expansion characterized subsequent years, with participation reaching 5-6 crore (50-60 million) farmers annually during peak implementation period. The scheme underwent strategic modifications to address operational challenges and enhance effectiveness. In 2020, government introduced PMFBY 2.0, making premium payment discretionary for farmers while maintaining government subsidy for enrolled participants. This modification aimed to address participation decline resulting from premium payment burden, particularly among marginal and small farmers. Feature modifications included enhanced claim settlement speed, reduced documentation requirements, improved mobile application accessibility, and strengthened technology integration. These evolutionary adjustments reflected learning from implementation experience and stakeholder feedback, demonstrating scheme's adaptive management approach.

Role of Insurance Companies and Implementing Agencies

Four general insurance companies designated as nodal agencies rotating annually administer PMFBY policies: Agricultural Insurance Company of India (AICI), Bajaj Allianz General Insurance, HDFC ERGO General Insurance, and ICICI Lombard General Insurance. Insurance companies manage premium collection, policy issuance, claim assessment, and indemnity disbursement across assigned states. State governments play critical implementing role including farmer registration and enrollment facilitation, data collection and documentation, yield estimation through crop-cutting experiments, and grievance redressal. District-level administrative

machinery including agriculture departments, revenue authorities, and mandis constitute ground-level implementing structure. Insurance company field teams, numbering in hundreds across states, manage enrollment campaigns, premium collection, and claim documentation. This multi-institutional arrangement distributes implementation responsibilities while maintaining coordination across administrative hierarchy, though coordination challenges persist in several states.

Technology Integration and Digitalization

PMFBY incorporates multiple technology platforms enhancing operational efficiency and transparency. Digital payment mechanisms including Direct Benefit Transfer (DBT) enable transparent claim disbursement directly into farmer bank accounts, reducing intermediation and leakage. Remote sensing and satellite imagery application for yield estimation has progressed, with crop-cutting experiments increasingly supplemented by satellite-based area estimation and vegetation index analysis. Weather station networks providing real-time precipitation and temperature data support yield loss correlation analysis. Digital documentation systems have reduced paperwork requirements and accelerated claim processing. However, technology integration faces implementation challenges including connectivity limitations in remote areas, digital literacy gaps among older farming populations, and inconsistent portal functionality across states.

Coverage Expansion and Stakeholder Participation

Geographic and Demographic Expansion

PMFBY's geographic expansion has systematized and expanded crop insurance availability across previously underserved agricultural regions. From initial 2016 launch covering select states, the scheme now operates in 30 states and union territories, encompassing approximately 85% of cultivated area. Expansion efforts particularly targeted eastern India (Bihar, Odisha, Jharkhand) where farmer participation in organized insurance was historically minimal. Participation patterns demonstrate regional variation, with states like Rajasthan, Maharashtra, and Karnataka showing high farmer enrollment while participation remains modest in some northeastern states. Demographic analysis reveals participation concentration among medium and large farmers with better credit linkages, superior digital access, and superior documented landholding. Marginal and small farmers, constituting 85% of farming population, demonstrate lower participation despite scheme's pro-poor design, reflecting affordability concerns and limited awareness despite subsidized premiums. Gender-differentiated participation shows women farmers' participation increasing progressively, reaching approximately 30-35% of total enrollees by 2023-24, reflecting deliberate promotion through women farmer collectives and dedicated enrollment camps.

Crop-Specific Participation Trends

Participation across crop categories reflects economic incentives and regional agricultural patterns. Food crops, particularly wheat and rice, constitute largest participation share owing to government procurement linkages and farmers' familiarity with minimum support price framework. Commercial crops including cotton and sugarcane demonstrate significant participation in specialized cultivation regions (cotton in Maharashtra/Karnataka, sugarcane in Maharashtra/Uttar Pradesh), reflecting high-value crop characteristics and farmer risk consciousness. Horticultural crops participation remains substantially lower despite government expansion efforts, reflecting inadequate yield data, variable cropping systems, and limited awareness among horticulture farmers. Pulse crops participation has expanded significantly following government emphasis on pulses production, enabling farmers' participation in pulses insurance through scheme. These participation patterns suggest that crop insurance adoption responds to crop economics, farmer familiarity with government programs, and availability of reliable yield estimation data.

Scheme Performance and Farmer Outcomes

Claims Disbursement and Loss Compensation

PMFBY's claims disbursement record demonstrates scheme's protective function during adverse agricultural periods. Cumulative claims exceeding ₹25,000 crores have been paid since scheme inception, benefiting approximately 30-35 million farmers. Claims disbursement increased substantially during agriculturally adverse years 2015-16 exhibited severe drought affecting large farmer populations, triggering substantial indemnity payments. Subsequent years witnessed variable claims depending on weather patterns, with kharif 2019 and rabi 2020 producing elevated claims following unfavorable rainfall and pest incidences. Claims payment has strengthened rural liquidity during periods of agricultural loss, enabling farmers' debt servicing and production

investments for subsequent seasons. However, claims disbursement analysis reveals temporal variation some years witnessed substantially lower claims despite farmer expectations, reflecting area-based methodology's limitation in capturing micro level losses and individual farm variation.

Premium Subsidy Effectiveness and Fiscal Impact

Government's cumulative premium subsidy exceeding ₹5,500 crores since 2016 has created substantial fiscal commitment to crop insurance. Premium subsidy effectiveness in enhancing farmer participation has been significant but variable. In states with stronger agricultural administration and awareness campaigns, premium subsidies have stimulated farmer enrollment. However, in several states, farmer participation remains limited despite favorable subsidy structure, reflecting awareness gaps and preference for traditional risk management mechanisms (credit relationships, informal mutual assistance). The subsidy's fiscal sustainability remains subject to debate while claims payments have demonstrated scheme's protective utility, cumulative subsidy amount raises questions regarding long-term fiscal viability and potential need for premium adjustments. Analysis of premium adequacy in certain years revealed underestimated premiums relative to actual losses, creating insurance company losses and necessitating government support. This experience suggests that premium adequacy and periodic actuarial review remain critical for scheme's financial sustainability.

Farmer Income Stabilization and Production Impact

Econometric analysis of PMFBY's impact on farmer welfare presents mixed evidence regarding income stabilization. Beneficiary farmers receiving substantial claim payments experience immediate income augmentation and improved debt repayment capacity. Longitudinal studies tracking multi-year participation demonstrate that insured farmers undertake higher-risk agricultural activities and increased capital investment compared to uninsured counterparts, suggesting risk mitigation confidence. However, farmers experiencing non-triggering adverse years (where losses exceed area-based threshold requirement to activate claims) report insurance cost burden without compensatory benefits, creating perception of scheme's limited utility.

CONCLUSIONS

Pradhan Mantri Fasal Bima Yojana represents substantial government commitment to agricultural risk management, providing indexed insurance protection to more then 40 million farmers across 30 states since 2016 inception. The scheme's architecture incorporating area-based yield assessment, technology-enabled administration, and significant government premium subsidies has created systematic crop insurance coverage addressing historical absence of organized risk management mechanisms. Claims disbursement exceeding ₹25,000 crores demonstrates scheme's protective function during adverse agricultural periods, stabilizing farm household incomes and enabling continued agricultural investment following weather-induced losses. Institutional strengthening through insurance companies, technology integration, and state-government coordination has modernized agricultural insurance administration significantly compared to predecessor schemes. However, persistent implementation challenges including delayed claim settlements, incomplete farmer awareness, premium affordability barriers, and area-based methodology limitations constrain scheme's optimal functioning and farmer satisfaction. Participation remains concentrated among medium and large farmers with superior documentation and credit linkages, while marginal and small farmers constituting majority farming population demonstrate lower participation despite scheme's pro-poor design. Technological innovations including satellite-based yield estimation, block chain-enabled transparency, and village-level assessment offer significant potential for addressing current limitations and enhancing scheme precision and efficiency. Future PMFBY strengthening requires multiple strategic interventions: accelerating digital infrastructure deployment for claim settlement efficiency, expanding awareness campaigns with enhanced farmer accessibility, addressing premium affordability through enhanced subsidies or discretionary participation arrangements, refining yield assessment through satellite technology and village-level calibration, ensuring insurance company financial sustainability through adequate actuarial pricing, and integrating insurance with broader agricultural development programs. These interventions, requiring sustained government commitment, inter-agency coordination, and technology investment, can position PMFBY as genuinely inclusive agricultural insurance mechanism supporting farmer welfare and agricultural stability across India's diverse farming systems. PMFBY's continued evolution represents critical component in India's agricultural development agenda, enabling risk management that encourages farmers' participation in market-oriented agriculture and commercial crop cultivation. The scheme's long-term impact on agricultural transformation, farmer prosperity, and rural development will depend on addressing current operational constraints while strengthening institutional mechanisms supporting effective insurance delivery across all farming communities.

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