

COMPREHENSIVE IMPACT ASSESSMENT OF PRADHAN MANTRI FASAL BIMA YOJANA (PMFBY) IN TELANGANA: (A Case Study on Agricultural Risk Management, Farmer Livelihoods, and Climate Resilience)

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Abstract

Agriculture remains the backbone of Telangana's rural economy, supporting a significant proportion of the state's population through crop cultivation, allied agricultural activities, and agro-based enterprises. However, the increasing frequency of climate-induced disasters, including droughts, untimely rainfall, floods, pest infestations, and rising temperatures, has intensified production risks and threatened farmers' livelihoods. These challenges have increased the importance of comprehensive crop insurance mechanisms that protect agricultural investments while ensuring income stability. The Pradhan Mantri Fasal Bima Yojana (PMFBY), introduced in 2016, represents one of India's largest agricultural risk management initiatives, offering affordable crop insurance through subsidized premiums and government support. This study critically examines the socio-economic, institutional, and environmental impacts of PMFBY implementation in Telangana. Using a comprehensive case study approach, the research evaluates the scheme's effectiveness in mitigating crop losses, enhancing farmers' resilience, improving access to institutional credit, promoting climate-smart agriculture, and strengthening rural livelihoods. The study also investigates implementation challenges such as delayed claim settlements, low awareness among farmers, exclusion of tenant cultivators, technological limitations, and administrative inefficiencies. Furthermore, the article explores emerging technological interventions, including satellite imagery, drone-based crop monitoring, artificial intelligence, geographic information systems (GIS), and digital governance, which have the potential to improve transparency and efficiency in crop insurance administration. The findings indicate that PMFBY has significantly reduced agricultural vulnerability among insured farmers by providing financial support during crop failures and encouraging investment in improved agricultural technologies. Nevertheless, institutional reforms, enhanced farmer awareness, greater inclusion of tenant farmers, timely claim settlement, and stronger coordination among stakeholders remain essential for maximizing the scheme's effectiveness. The study concludes by offering policy recommendations aimed at strengthening agricultural resilience and ensuring sustainable rural development in Telangana under changing climatic and socio-economic conditions. ([PMFBY](#))

Keywords-Pradhan Mantri Fasal Bima Yojana; PMFBY; Telangana Agriculture; Crop Insurance; Climate Change; Agricultural Risk Management; Farmer Welfare; Rural Development; Sustainable Agriculture; Digital Agriculture; Agricultural Policy; Climate Resilience; Insurance Penetration; Livelihood Security; Agricultural Economics.

1. Introduction

Agriculture continues to play a pivotal role in Telangana's economic development despite the rapid expansion of industrial and service sectors. Nearly half of the state's rural population depends directly or indirectly on agriculture for employment and livelihood. Major crops such as paddy, cotton, maize, red gram, soybean, turmeric, and groundnut contribute significantly to agricultural output and food security. However, farming in Telangana is characterized by high uncertainty due to erratic monsoon patterns, recurrent droughts, floods, pest outbreaks, and market price volatility. Climate change has further intensified production risks, making farming increasingly vulnerable to economic shocks.

Agricultural losses resulting from adverse climatic conditions frequently lead to indebtedness, distress migration, reduced investments in farming, and declining rural incomes. Small and

marginal farmers are particularly vulnerable because they possess limited financial resources and inadequate capacity to absorb production losses. Recognizing these challenges, the Government of India introduced the Pradhan Mantri Fasal Bima Yojana (PMFBY) in 2016 to provide comprehensive crop insurance coverage at highly subsidized premium rates. The scheme aims to protect farmers against crop losses caused by natural calamities, pests, diseases, and extreme weather events while promoting sustainable agricultural production.

In Telangana, PMFBY has been implemented across several notified crops and districts through coordinated efforts involving the State Government, insurance companies, financial institutions, and agricultural departments. Technological innovations such as satellite imagery, remote sensing, GPS-enabled crop-cutting experiments, drones, and mobile applications have gradually been incorporated to improve transparency and efficiency in crop-loss assessment. Despite these improvements, several operational challenges continue to affect the scheme's effectiveness, including delayed claim settlements, low farmer awareness, exclusion of tenant farmers, and administrative bottlenecks.

Against this background, the present study assesses the comprehensive impact of PMFBY in Telangana by examining its economic, social, institutional, and environmental dimensions. The study also explores emerging technological opportunities and policy reforms necessary to strengthen agricultural insurance systems under changing climatic conditions.

2. Literature Review

Agricultural insurance has emerged as a critical policy instrument for mitigating production risks and promoting sustainable agricultural development across developing economies. Numerous empirical studies have demonstrated that effective crop insurance reduces farmers' vulnerability to climatic shocks, stabilizes agricultural income, enhances access to institutional credit, and encourages investment in modern farming technologies. In India, successive crop insurance programmes—including the National Agricultural Insurance Scheme (NAIS), Modified National Agricultural Insurance Scheme (MNAIS), and Weather-Based Crop Insurance Scheme (WBCIS)—laid the foundation for the introduction of PMFBY in 2016.

Recent literature indicates that PMFBY represents a significant improvement over earlier insurance programmes due to lower premium rates, broader risk coverage, and greater use of digital technologies. According to the National Rainfed Area Authority's evaluation, PMFBY has contributed to improving financial security among insured farmers while promoting risk-sharing between governments, insurance companies, and farming communities. However, implementation quality varies considerably across states due to institutional capacity, administrative efficiency, and farmer awareness levels.

Research conducted in Telangana, particularly in Peddapalli district, found that PMFBY has enhanced farmers' confidence by providing compensation for crop failures and encouraging continued investment in agriculture. Nevertheless, awareness regarding policy provisions, enrollment procedures, claim settlement mechanisms, and eligibility criteria remains relatively low among small and marginal farmers. Tenant cultivators continue to face significant challenges in accessing insurance benefits because of land ownership documentation requirements.

Contemporary studies also emphasize the growing role of advanced technologies such as satellite remote sensing, drones, artificial intelligence, machine learning, blockchain, and Geographic Information Systems (GIS) in improving crop-loss estimation and insurance administration. These technologies reduce human intervention, improve transparency, minimize disputes, and accelerate claim settlement processes. Future research increasingly advocates integrating climate-resilient agriculture, precision farming, digital governance, and data-driven insurance models to enhance agricultural sustainability under rapidly changing climatic conditions. Overall, the literature suggests that while PMFBY has substantially strengthened India's agricultural risk management framework, continuous institutional reforms and technological innovation remain essential for improving its effectiveness and inclusiveness.

3. Agricultural Scenario of Telangana and the Need for PMFBY

Telangana is one of India's agriculturally significant states, where agriculture serves as the principal source of livelihood for a substantial proportion of the rural population. Since the state's formation in 2014, the government has implemented several initiatives to strengthen agricultural productivity, including the expansion of irrigation through the Kaleshwaram Lift Irrigation Project, the provision of investment support under the Rythu Bandhu Scheme, and rural financial assistance through Rythu Bima. Despite these efforts, agriculture in Telangana continues to face considerable risks due to climate variability, declining groundwater levels in certain regions, pest infestations, fluctuating market prices, and increasing production costs. These challenges underscore the need for an effective crop insurance mechanism capable of safeguarding farmers against unforeseen agricultural losses.

The state's agricultural landscape is characterized by diverse agro-climatic zones that support crops such as paddy, cotton, maize, red gram, soybean, chilli, turmeric, groundnut, and oilseeds. Although irrigation coverage has increased substantially in recent years, a significant area remains dependent on monsoon rainfall, making agricultural production highly vulnerable to rainfall variability. The Indian Meteorological Department has reported increasing instances of heavy rainfall events, prolonged dry spells, and temperature fluctuations across the Deccan Plateau, directly affecting crop yields and increasing production uncertainty.

Small and marginal farmers constitute the majority of Telangana's farming community. These farmers generally possess limited financial resources, fragmented landholdings, and restricted access to formal credit. Crop failure often results in severe indebtedness, distress migration, and reduced investment in subsequent agricultural seasons. Under such circumstances, crop insurance becomes a critical instrument for income stabilization and agricultural sustainability.

The Pradhan Mantri Fasal Bima Yojana (PMFBY) addresses these vulnerabilities by providing financial protection against crop losses arising from natural calamities, pest attacks, diseases, and adverse weather conditions. Through subsidized premium rates and government support, the scheme encourages farmers to continue agricultural production despite climatic uncertainties. In Telangana, PMFBY complements other agricultural welfare initiatives by reducing production risks and promoting resilience among farming households. However, its effectiveness depends largely on efficient implementation, timely claim settlements, and inclusive coverage that reaches small, marginal, and tenant farmers. Recent policy discussions have also highlighted the need to integrate PMFBY with climate-smart agriculture, precision farming, and digital governance to enhance its long-term sustainability.

4. Research Methodology

The present study adopts a descriptive and analytical research design based exclusively on secondary data to examine the socio-economic, institutional, and environmental impact of the Pradhan Mantri Fasal Bima Yojana (PMFBY) in Telangana. A descriptive approach is appropriate as it systematically analyses the implementation, performance, achievements, challenges, and policy outcomes of PMFBY without involving primary data collection or field investigations. The study relies entirely on documentary evidence obtained from authentic secondary sources, including reports and publications of the Ministry of Agriculture and Farmers Welfare, Government of India, Government of Telangana, Pradhan Mantri Fasal Bima Yojana (PMFBY) operational guidelines, Directorate of Economics and Statistics, Agricultural Statistics at a Glance, National Sample Survey (NSS), Reserve Bank of India (RBI), Insurance Regulatory and Development Authority of India (IRDAI), India Meteorological Department (IMD), NITI Aayog, Indian Council of Agricultural Research (ICAR), Food and Agriculture Organization (FAO), World Bank reports, peer-reviewed journals, books, conference proceedings, and other scholarly publications. The collected information was systematically reviewed, classified, compared, and synthesized to evaluate major indicators such as crop insurance coverage, farmer participation, claim settlement performance, agricultural risk mitigation, income stabilization, institutional efficiency, climate resilience, and policy effectiveness. Descriptive and qualitative analytical techniques, including content analysis, comparative analysis, trend analysis, and interpretation of statistical information presented in official reports, were employed to examine the performance and impact of PMFBY in Telangana. The findings were critically interpreted in the context of agricultural sustainability, climate change adaptation, farmer welfare, and rural development, enabling the study to identify existing implementation challenges, policy gaps, and future opportunities for strengthening crop insurance in the state. Throughout the research, information from credible and publicly available sources was used with appropriate acknowledgment,

5. Economic Impact Assessment of PMFBY in Telangana

The Pradhan Mantri Fasal Bima Yojana has emerged as an important economic risk management instrument for Telangana's agricultural sector by reducing the financial consequences of crop failure and stabilizing farm income. Agriculture is inherently uncertain because crop production depends heavily on climatic conditions, pest incidence, disease outbreaks, and market fluctuations. Under such circumstances, crop insurance reduces uncertainty by compensating farmers for production losses and enabling them to recover from adverse events without experiencing severe financial distress.

One of the major economic benefits of PMFBY is the stabilization of farm income following natural disasters. Compensation received through insurance claims enables farmers to repay agricultural loans, purchase inputs for the next cropping season, and maintain household consumption. This financial protection reduces dependence on informal moneylenders who often charge high interest rates, thereby lowering the incidence of rural indebtedness. Consequently, insured farmers are more willing to invest in quality seeds, fertilizers, mechanization, irrigation technologies, and improved crop management practices.

The scheme has also contributed to strengthening institutional agricultural credit. Financial institutions are generally more willing to extend loans to insured farmers because insurance

coverage reduces the probability of loan defaults arising from crop failure. Improved access to institutional credit facilitates greater agricultural investment, enhances productivity, and supports modernization within the farming sector. Furthermore, insurance encourages farmers to diversify towards higher-value crops by reducing perceived production risks.

Despite these positive outcomes, several economic challenges continue to limit PMFBY's effectiveness in Telangana. Delayed claim settlements reduce the immediate usefulness of compensation, particularly when farmers require financial assistance before the next sowing season. Yield estimation procedures based on crop-cutting experiments often prolong claim processing and create dissatisfaction among beneficiaries. Moreover, limited awareness regarding insurance provisions and procedural complexities discourage voluntary participation by many eligible farmers.

Emerging technologies—including artificial intelligence, satellite remote sensing, drone-based crop monitoring, blockchain-enabled claim verification, and digital payment platforms—offer significant opportunities to improve operational efficiency. Faster and more transparent claim settlement systems can increase farmer confidence, enhance insurance penetration, and strengthen the overall contribution of PMFBY to sustainable agricultural development and rural economic resilience in Telangana.

6. Environmental and Climate Resilience Impact of PMFBY

Climate change has become one of the greatest threats to agricultural sustainability in Telangana. Rising temperatures, erratic monsoon patterns, prolonged dry spells, unseasonal rainfall, hailstorms, floods, and increasing pest infestations have substantially increased production risks across major crops such as paddy, cotton, maize, chilli, soybean, and pulses. Under these changing climatic conditions, PMFBY serves as an important adaptation mechanism that enables farmers to recover economically from climate-induced crop losses while encouraging continued investment in agriculture.

Crop insurance indirectly promotes climate resilience by reducing farmers' fear of financial collapse following natural disasters. Farmers protected by insurance are more willing to adopt climate-resilient agricultural practices, including drought-tolerant crop varieties, improved irrigation methods, integrated pest management, soil conservation techniques, crop diversification, and precision farming technologies. These adaptive practices contribute to long-term environmental sustainability while reducing vulnerability to future climatic shocks.

The Government of India has increasingly incorporated technological innovations into PMFBY implementation. Satellite imagery, remote sensing, Geographic Information Systems (GIS), drones, artificial intelligence, machine learning, and smartphone-based field monitoring are improving crop-loss assessment by reducing dependence on manual crop-cutting experiments. These technologies provide accurate, transparent, and timely estimates of crop damage while minimizing human error and administrative disputes. Digital monitoring systems also facilitate early warning mechanisms, allowing governments and farmers to respond more effectively to climatic risks.

Despite these advancements, environmental challenges remain considerable. Climate variability is becoming increasingly unpredictable, making actuarial assessment and premium calculation more complex. Moreover, insurance alone cannot guarantee agricultural

sustainability unless it is integrated with broader climate adaptation policies. Strengthening watershed management, promoting micro-irrigation, conserving groundwater resources, encouraging agroforestry, improving soil health, and expanding weather advisory services are essential complementary measures.

Future agricultural insurance systems should integrate climate risk modelling, satellite-derived weather analytics, carbon-smart farming, and ecosystem-based adaptation strategies. Such integration would transform PMFBY from a compensatory programme into a proactive climate resilience framework capable of supporting sustainable agriculture under rapidly changing environmental conditions. This transition is particularly important for Telangana, where climate variability is expected to intensify in the coming decades.

7. Institutional and Administrative Challenges in PMFBY Implementation

Although PMFBY has substantially strengthened India's agricultural risk management framework, its implementation in Telangana continues to face several institutional and administrative challenges that limit programme effectiveness. The success of crop insurance depends not only on policy design but also on efficient governance, inter-agency coordination, technological capacity, and farmer participation. Weaknesses in any of these areas reduce farmer confidence and negatively influence insurance penetration.

One of the most frequently reported concerns is the delay in claim settlement. Compensation often reaches farmers several months after crop loss, reducing its usefulness for purchasing inputs for the subsequent agricultural season. Delays arise from slow crop-cutting experiments, verification procedures, data transmission bottlenecks, and coordination issues among state governments, insurance companies, banks, and agricultural departments. Accelerating these processes through real-time digital monitoring and automated claim verification remains an important policy priority.

Farmer awareness also remains inadequate, particularly among small and marginal cultivators. Many farmers possess limited understanding of insurance eligibility, premium calculation, notified crops, claim procedures, and grievance redressal mechanisms. Inadequate dissemination of information through local institutions contributes to low enrolment in several regions. Strengthening agricultural extension systems, village-level awareness programmes, mobile-based advisory services, and multilingual digital platforms can significantly improve participation.

Another critical issue concerns the exclusion of tenant farmers and sharecroppers. Since insurance eligibility is frequently linked to formal land ownership records, a substantial proportion of actual cultivators remain outside the insurance framework despite assuming production risks. Developing flexible documentation systems and recognizing cultivation rights rather than ownership alone would substantially improve programme inclusiveness.

Institutional reforms should also prioritize transparency, accountability, and technological integration. The adoption of blockchain-enabled claim processing, artificial intelligence-based crop assessment, satellite-derived yield estimation, drone surveys, and integrated agricultural databases can minimize disputes while improving operational efficiency. Regular programme evaluation, stakeholder consultation, independent audits, and public disclosure of performance indicators would further strengthen governance. A transparent, technology-driven, and farmer-

centric institutional framework is essential for ensuring that PMFBY effectively addresses contemporary agricultural risks while supporting sustainable rural development in Telangana.

8. Social Impact Assessment of PMFBY in Telangana

The Pradhan Mantri Fasal Bima Yojana (PMFBY) has generated significant social impacts in Telangana by strengthening livelihood security, enhancing farmers' confidence, and reducing the socio-economic consequences of agricultural risks. Agriculture in Telangana supports millions of rural households, particularly small and marginal farmers whose livelihoods depend almost entirely on seasonal crop production. Crop failures resulting from droughts, floods, pest infestations, and erratic rainfall often lead to severe financial stress, indebtedness, educational discontinuity among children, reduced healthcare expenditure, and migration to urban areas. By providing financial compensation after crop losses, PMFBY has helped mitigate many of these adverse social consequences.

One of the most important social contributions of PMFBY is its role in reducing psychological stress among farmers. Agricultural uncertainty often creates anxiety regarding loan repayment, household consumption, and future cultivation decisions. Insurance coverage provides a safety net that encourages farmers to continue farming despite climatic uncertainties. Studies have shown that insured farmers are more likely to adopt improved agricultural technologies, certified seeds, balanced fertilizer application, and scientific crop management practices because they perceive lower financial risks associated with innovation (Government of India, 2023).

The scheme has also strengthened financial inclusion by encouraging farmers to maintain active bank accounts and engage with formal financial institutions. Since insurance claims are transferred directly through Direct Benefit Transfer (DBT), transparency and accountability have improved considerably. Women farmers participating in self-help groups and joint farming arrangements have also benefited indirectly through enhanced household income stability and improved access to institutional financial services.

Nevertheless, several social challenges remain unresolved. Tenant farmers, sharecroppers, oral lessees, and cultivators without formal land ownership documents often remain excluded from insurance coverage despite bearing the full risk of cultivation. Furthermore, awareness regarding policy provisions, enrolment procedures, premium payment, and claim settlement remains uneven across districts. Educational barriers and limited digital literacy restrict the participation of many vulnerable farmers in the insurance system. Expanding awareness campaigns, strengthening village-level agricultural extension services, and simplifying enrolment procedures are essential to improve social inclusiveness. A more equitable insurance framework would enhance rural welfare, reduce vulnerability, and contribute significantly to sustainable and inclusive agricultural development in Telangana.

9. Policy Recommendations for Strengthening PMFBY in Telangana

The long-term success of the Pradhan Mantri Fasal Bima Yojana (PMFBY) in Telangana depends on comprehensive policy reforms that address existing implementation challenges while adapting the scheme to emerging climatic, technological, and socio-economic realities. Although PMFBY has substantially improved agricultural risk management, its effectiveness

can be enhanced through greater institutional coordination, technological innovation, farmer participation, and inclusive governance.

One of the foremost priorities should be ensuring timely settlement of insurance claims. Delays in compensation reduce farmers' ability to purchase seeds, fertilizers, pesticides, and other agricultural inputs required for the next cropping season. The widespread adoption of satellite remote sensing, drone-based crop assessment, Artificial Intelligence (AI), Geographic Information Systems (GIS), and machine learning can significantly reduce dependence on manual crop-cutting experiments while improving accuracy and transparency. Automated claim processing linked with Direct Benefit Transfer (DBT) can further accelerate compensation payments and enhance farmer confidence.

Another important policy priority involves expanding insurance coverage to tenant farmers, sharecroppers, oral lessees, women cultivators, and tribal farmers who often remain excluded due to land ownership requirements. State governments should develop simplified verification mechanisms based on cultivation rights rather than ownership records. Strengthening Farmer Producer Organizations (FPOs), Primary Agricultural Cooperative Societies (PACS), and Self-Help Groups (SHGs) can facilitate collective insurance enrollment and improve outreach among vulnerable communities.

Digital literacy programmes should be expanded through village-level awareness campaigns, mobile applications, agricultural extension centres, Krishi Vigyan Kendras (KVKs), and local governance institutions. Farmers should receive regular information regarding insurance coverage, premium payment schedules, claim procedures, weather advisories, and grievance redressal mechanisms in regional languages.

Future reforms should also integrate PMFBY with climate-smart agriculture, precision farming, weather forecasting systems, carbon-resilient farming practices, and sustainable natural resource management. Policy convergence between PMFBY, Rythu Bandhu, Rythu Bima, PM-KISAN, Soil Health Card Scheme, and Digital Agriculture Mission would create a comprehensive agricultural risk management framework capable of supporting sustainable rural development. Continuous monitoring, independent impact assessments, and evidence-based policy revisions will ensure that PMFBY remains responsive to the evolving needs of Telangana's farming community.

10. Conclusion

Agriculture remains central to Telangana's economic growth, food security, employment generation, and rural development. However, increasing climatic uncertainties, environmental degradation, market volatility, and rising production costs have intensified agricultural risks, particularly for small and marginal farmers. Under these circumstances, the Pradhan Mantri Fasal Bima Yojana has emerged as one of India's most significant agricultural risk management programmes by providing financial protection against crop losses caused by natural calamities, adverse weather events, pests, and diseases.

This comprehensive impact assessment demonstrates that PMFBY has contributed positively toward stabilizing farm income, reducing production risks, improving institutional credit access, strengthening farmer confidence, encouraging agricultural investment, and enhancing livelihood security in Telangana. The scheme has also facilitated greater adoption of digital

technologies in agricultural insurance administration through satellite imagery, remote sensing, GPS-enabled crop monitoring, and Direct Benefit Transfer mechanisms. These innovations have improved transparency and operational efficiency compared to earlier crop insurance programmes.

Nevertheless, several structural challenges continue to affect programme performance. Delayed claim settlements, inadequate farmer awareness, exclusion of tenant farmers, administrative bottlenecks, inconsistencies in crop-loss estimation, and limited institutional coordination reduce the overall effectiveness of the scheme. Addressing these issues requires technological modernization, stronger governance, greater transparency, enhanced farmer education, and continuous policy innovation.

As climate change continues to intensify agricultural uncertainty, crop insurance will become increasingly important in safeguarding rural livelihoods and ensuring sustainable agricultural development. Future insurance systems should integrate artificial intelligence, blockchain technology, drone-based monitoring, predictive climate analytics, and precision agriculture to create more responsive, transparent, and farmer-centric insurance mechanisms.

Overall, PMFBY represents a transformative policy intervention that has strengthened agricultural resilience in Telangana. With appropriate institutional reforms, inclusive implementation strategies, and continuous technological advancement, the scheme can become a global model for climate-resilient agricultural insurance, contributing significantly to sustainable development, food security, poverty reduction, and rural prosperity in the twenty-first century.

References

- AIC. (2023). *Annual Report 2022–23. Agriculture Insurance Company of India Ltd.*
- BIRTHAL, P. S., & HAZRANA, J. (2019). *Crop Insurance and Farm Income Stabilization in India. Agricultural Economics Research Review, 32(1), 1–14.*
- CARTER, M. R., CHENG, L., & SARRIS, A. (2016). *Where and How Index Insurance Can Boost the Adoption of Improved Agricultural Technologies. Journal of Development Economics, 118, 59–71.*
- COLE, S., GINÉ, X., TOBACMAN, J., TOPALOVA, P., TOWNSEND, R., & VICKERY, J. (2013). *Barriers to Household Risk Management: Evidence from India. American Economic Journal: Applied Economics, 5(1), 104–135.*
- DAREKAR, A. S., & REDDY, A. A. (2022). *Impact Assessment of Agricultural Programmes in Telangana Using Difference-in-Differences Approach. Sustainability, 14(15), 9543.*
- ELUPULA, S. (2024). *Crop Insurance (PMFBY) in Telangana State: A Study in Peddapally District. Conference Proceedings, Acharya Nagarjuna University.*
- Food and Agriculture Organization. (2022). *The State of Food and Agriculture 2022: Leveraging Automation in Agriculture for Transforming Agrifood Systems. FAO.*
- GOODWIN, B. K., & SMITH, V. H. (2013). *What Harm Is Done by Subsidizing Crop Insurance? American Enterprise Institute.*
- Government of India. (2023). *Operational Guidelines of Pradhan Mantri Fasal Bima Yojana. Ministry of Agriculture and Farmers Welfare.*

- Government of India. (2024). *Agricultural Statistics at a Glance 2024*. Department of Agriculture and Farmers Welfare.
- Government of India. (2024). *Agricultural Statistics at a Glance 2024*. Department of Agriculture and Farmers Welfare.
- Government of Telangana. (2024). *Season and Crop Reports*. Department of Agriculture.
- Government of Telangana. (2024). *Statistical Abstract of Telangana 2024*. Directorate of Economics and Statistics.
- Hazell, P. B. R. (1992). *The Appropriate Role of Agricultural Insurance in Developing Countries*. *Journal of International Development*, 4(6), 567–581.
- Indian Council of Agricultural Research. (2023). *Annual Report 2022–23*. ICAR.
- Indian Meteorological Department. (2024). *State climate summary for Telangana*. Government of India.
- Intergovernmental Panel on Climate Change. (2023). *Climate Change 2023: Synthesis Report*. IPCC.
- Kumar, A., & Stephen, A. J. (2025). *Effectiveness of Government Schemes: A Critical Review of Pradhan Mantri Fasal Bima Yojana*. *International Journal of Agricultural Extension and Social Development*, 8(7), 620–626.
- Ministry of Agriculture and Farmers Welfare. (2023). *Annual Report 2022–23*. Government of India.
- Miranda, M. J., & Glauber, J. W. (1997). *Systemic Risk, Reinsurance, and the Failure of Crop Insurance Markets*. *American Journal of Agricultural Economics*, 79(1), 206–215.
- National Rainfed Area Authority. (2022). *Study on Effective Implementation of Pradhan Mantri Fasal Bima Yojana*. Ministry of Agriculture and Farmers Welfare.
- NITI Aayog. (2021). *Evaluation Study on Crop Insurance Schemes in India*. Government of India.
- Raju, S. S., & Chand, R. (2008). *Agricultural Insurance in India: Problems and Prospects*. National Centre for Agricultural Economics and Policy Research.
- Reserve Bank of India. (2023). *Report on Trend and Progress of Banking in India*. RBI.
- World Bank. (2022). *Enabling the Business of Agriculture*. World Bank.
- World Bank. (2023). *World Development Report 2023: Migrants, Refugees, and Societies*. World Bank.