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Potential Role of Agriculture Insurance Schemes in raising productivity in India

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Abstract
Agricultural insurance is a critical safety net for farmers, and India has implemented several policies to improve their access to such coverage. Nevertheless, achieving widespread availability continues to pose a significant challenge for policymakers. Multiple schemes have been introduced to strengthen the agricultural sector and enhance farmers' financial stability. This paper explores India's agricultural insurance programs, which, despite being an essential risk mitigation tool, remain out of reach for many. The sector is still developing in terms of coverage, scope, and accessibility. Farmers' discontent with existing schemes has further fueled negative perceptions, while low awareness and a preference for direct relief payments have limited adoption. Additionally, inefficient state-level implementation has reduced the effectiveness of crop insurance programs. As a result, only a small fraction of farmers have reaped the benefits. Greater government involvement is necessary to improve outreach and ensure that farmers can avail themselves of these schemes. Key challenges include effective execution in remote regions and ensuring aid reaches the most marginalized farming communities.

Keywords:
Crop insurance, Government Schemes, India**.**

Introduction
India possesses vast arable land, divided into 15 agro-climatic zones, enabling the cultivation of diverse crops. As the backbone of the economy, agriculture employs more than 50% of the workforce and makes a substantial contribution to GDP. However, the sector struggles with low productivity, small and fragmented landholdings, climate volatility, and inadequate access to modern technology and markets. A major challenge is India’s heavy reliance on monsoons, with 60% of cultivated area being rain-fed. Since about 75% of annual rainfall occurs between June and September, the success of Kharif crops hinges largely on the Southwest monsoon, making farming highly vulnerable to weather fluctuations. Farming community in India, thus, remain at the mercy of rain-Gods (Shailendra Kumar 2019). Despite India's vast agricultural potential, crop productivity remains below optimal levels for many key crops. Farmers continue to face financial instability due to rising input costs, erratic weather conditions, and low market prices for their harvests (Kumar & Praveen, 2024). In this challenging environment, agricultural insurance serves as a vital financial mechanism, helping farmers mitigate risks related to crop losses and stabilize their incomes (Rao, 2002). Agricultural insurance plays a crucial role in rural development, particularly in rain-fed regions vulnerable to droughts (Dandekar, 1976), by mitigating weather-related risks in farming (Narayanan & Saravanan, 2011). Since climatic uncertainties are a leading cause of crop failure (Odening & Shen, 2014), insurance serves as a key protective measure (Singh & Agarwal, 2020). Despite its importance, persistent challenges hinder progress in the sector, prompting the

Indian government to continuously refine policies and schemes to support farmers. However, farmers struggle with unpredictable rainfall, soil degradation, and depleting groundwater, severely affecting productivity. Additionally, rising input costs, volatile weather, and low crop prices keep farmers in financial distress. While India hosts the world's largest agricultural insurance program, covering 25 million farmers (Bhushan et al., 2016), around 95 million remain uninsured due to flaws in policy design and delays in claim settlements (Mahul et al., 2012). Currently, the Pradhan Mantri Fasal Bima Yojana (PMFBY) and Restructured Weather-Based Crop Insurance Scheme (RWBCIS) are the two major schemes operating under a public-private partnership (PPP) model. The government controls policy design, subsidies, and insured amounts, with these programs specifically addressing climate-related production risks (Singh et al., 2018; Singh & Agarwal, 2020). This review evaluates the government's initiatives, identifies gaps in implementation, and proposes potential solutions to enhance agricultural resilience and farmer welfare.

Objectives:

1. To be aware of the several programs and schemes that the Indian government offers to farmers.
2. To investigate the necessity and significance of agricultural schemes.

Methodology:

This research has been carried out through an extensive review and analysis of secondary data sources. A wide range of materials including peer-reviewed research articles, academic journals, doctoral and institutional newsletters, credible websites, and newspaper publications have been systematically examined and incorporated. The integration of these diverse and authoritative sources has provided a strong foundation for the study, enabling a comprehensive understanding of the research topic and ensuring a thorough and well-informed investigation.

Government of India Schemes in Agriculture

Pradhan Mantri Fasal Bima Yojana - Its launch in 2016, the Pradhan Mantri Fasal Bima Yojana (PMFBY) has been implemented successfully, demonstrating notable progress in transparency, accountability, and the timely disbursement of insurance claims. As a centrally sponsored initiative, the scheme is designed to offer financial protection to farmers in the event of crop loss or damage. It features standardized premium rates without any upper ceiling on government subsidies or premium limits. Advanced technologies are utilized to streamline the claim settlement process and reduce dependence on traditional crop-cutting experiments. PMFBY is accessible to all farmers, with mandatory enrollment for those who have taken crop loans or possess Kisan Credit Cards. Implemented in partnership with state governments, the scheme aims to ensure income stability and foster sustainable agricultural practices by offering a 75–80% subsidy on premiums. In 2023–24, PMFBY set a global benchmark by covering the highest number of farmers worldwide. Farmers contribute a subsidized premium of 2% for Kharif crops, 1.5% for Rabi crops, and 5% for commercial or horticultural crops, with certain states offering complete premium waivers. The remaining cost is equally borne by the central and state governments, with special provisions for northeastern states. In 2020, PMFBY was made optional for farmers. For the 2024–25 fiscal year, the government allocated ₹14,600 crore to the scheme, marking a 3% reduction from the revised estimate of ₹15,864 crore for 2023–24. This decrease is a significant contributor to the overall cut in the Department of Agriculture and Farmers Welfare's budget, which has been reduced by ₹3,905.05 crore. The department's total budget stands at ₹1,27,290.16 crore for 2024–25, down

from ₹1,31,195.21 crore in the revised 2023–24 estimates and ₹1,22,528.77 crore in the previous financial year. Despite government claims of increased state participation in the scheme, the PMFBY's budget for 2025–26 has further declined to ₹12,242.27 crore.

Amount of Central Government Premium Subsidy Provided to Insurance Companies under Pradhan Mantri Fasal Bima Yojana (PMFBY) in India

Year	Central share in premium subsidy (Rs. in Crore)
2016-2017	8652
2017-2018	10103
2018-2019	12311
2019-2020	13523
2020-2021	13022
2021-2022	12422
2022-2023	12411

Source: Indiastats

In the initial years of the Pradhan Mantri Fasal Bima Yojana (PMFBY), the Central Government's premium subsidy showed a consistent upward trend, rising from ₹8,652 crore in 2016–17 to a peak of ₹13,523 crore in 2019–20. Following this growth, the subsidy levels stabilized, averaging approximately ₹12,400 crore annually between 2020 and 2023. This pattern indicates the government's continued commitment to supporting agricultural risk mitigation through sustained funding of the crop insurance program. However, one of the major financial bottlenecks in the effective implementation of PMFBY has been the delay by state governments in disbursing their share of the premium subsidy. While insurance companies are generally required to settle valid claims within two months after the completion of crop-cutting experiments or the harvest period, timely payment depends on the prompt transfer of the state's subsidy share. In several instances, claim disbursements have been delayed due to late release of state contributions, delayed submission of yield data, unresolved yield-related disputes between state authorities and insurers, and the lack of complete bank account details for some farmers. A study conducted by the National Institute of Agricultural Extension Management, under the Ministry of Agriculture and Farmers Welfare, identified several operational challenges in the scheme's implementation. Survey findings highlighted limited awareness and outreach, especially among small and marginal farmers in rural regions. According to the 2015–16 Agriculture Census, about 68% of farmland holdings in India are marginal (up to one hectare), and 18% are small holdings (between one and two hectares). Despite this, many farmers remain unaware of the scheme's benefits. In numerous cases, enrollment in crop insurance is mandatory for those seeking agricultural loans or financial aid, with the premium amount often deducted directly at the source. Consequently, many farmers are unaware

of the premium rate or the amount deducted. Additionally, the study found that crop damage assessments are often not conducted accurately or are deliberately mishandled to avoid claim payouts, further undermining the effectiveness of the scheme.

The National Initiative on Climate Resilient Agriculture (NICRA)

The National Innovations in Climate Resilient Agriculture (NICRA), initiated by the Indian Council of Agricultural Research (ICAR), is a comprehensive project aimed at advancing research, promoting technological innovations, providing grants, and building capacity in climate-resilient agriculture. Its primary objective is to develop and disseminate adaptive strategies, technologies, and practices that enable farmers to better cope with the impacts of climate change while strengthening the resilience of agricultural production systems. NICRA supports research and innovation through targeted grants and policy recommendations that facilitate the integration of climate-resilient approaches into broader agricultural planning. The project emphasizes interventions in 100 climate-vulnerable districts across India that are frequently affected by extreme weather events such as droughts, floods, and cyclones. The initiative promotes sustainable and resource-efficient farming methods, focusing on optimal water and input usage across crops, livestock, and fisheries. At the village level, Climate Risk Management Committees play a critical role in prioritizing local interventions and overseeing the use of resources such as Custom Hiring Centers (CHCs), which support the widespread adoption of climate-resilient practices. Several successful interventions under NICRA include land shaping for enhanced rainwater harvesting, adoption of drought-tolerant rice varieties, and the use of direct-seeding techniques in rice cultivation, all of which have contributed to higher yields and cost efficiency. Additional innovations promoted through the program include crop diversification, integrated farming systems, and improved irrigation methods like zero-till sowing and drum seeding. To address water scarcity, practices such as constructing check dams and community ponds have been implemented with notable success. These strategies, demonstrated across various agro-climatic zones, have led to improved agricultural productivity, increased farm incomes, and greater resilience to climate stressors. Given that smallholder farmers form the backbone of India's agricultural sector, scaling up climate-smart agricultural practices is essential for ensuring food security and enhancing rural livelihoods in the face of escalating climate risks.

Financial Asssistance Provided by Government under National Innovations in Climate Resilient Agriculture (NICRA) Project in India

Year	Budget (Rs in Lakh)
2015-2016	6284
2016-2017	6889
2017-2018	3628
2018-2019	4161
2019-2020	4058
2020-2021	4983

Source: Indiastats

Between 2015 and 2021, the financial assistance allocated by the Indian government for the National Innovations in Climate Resilient Agriculture (NICRA) project exhibited noticeable

fluctuations. The funding varied from a low of ₹3,628 lakh in 2017–2018 to a high of ₹6,889 lakh in 2016–2017. Following the peak in 2016–2017, there was a sharp decline in the subsequent year. However, funding levels gradually improved in the following years. By 2020–2021, the allocation had reached ₹4,983 lakh, marking a moderate increase compared to the preceding two years. This pattern highlights inconsistent but continued financial commitment towards fostering innovations in climate-resilient agriculture over the six-year period.

National Mission for Sustainable Agriculture (NMSA) - Since its inception in 2014–15, the aims to increase agricultural productivity while ensuring sustainability and climate resilience. The mission focuses on integrated farming systems, soil and moisture conservation, enhancing soil health, efficient water use, and promoting suitable technologies for rainfed agriculture. A significant component introduced with NMSA in 2014–15 was On-Farm Water Management (OFWM), which seeks to improve water-use efficiency by encouraging micro-irrigation techniques like drip and sprinkler irrigation. In 2015–16, these initiatives were integrated into the 'Per Drop More Crop' (PDMC) program under the Pradhan Mantri Krishi Sinchayee Yojana (PMKSY), which has since expanded micro-irrigation coverage to 30.69 lakh hectares. The Rainfed Area Development Programme under NMSA supports Integrated Farming Systems (IFS) to enhance productivity and mitigate risks from climate variability. Additionally, the Soil Health Management (SHM) sub-program promotes balanced nutrient management by combining organic and chemical fertilizers. Supporting this effort, the Soil Health Card Scheme launched in 2015 offers farmers comprehensive soil nutrient analysis and customized recommendations to boost soil fertility and farm productivity.

Funds Allocation for National Mission for Sustainable Agriculture (NMSA)

Year	Funds Allocation (Rs. in crore)
2018-2019	5529
2019-2020	4759
2020-2021	4785
2021-2022	5279

Source: Indiastats

The budgetary allocation for the National Mission for Sustainable Agriculture (NMSA) under the Ministry of Agriculture & Farmers Welfare in India exhibited a variable trend between 2018 and 2022. The highest allocation during this period was ₹5,529 crore in 2018–2019. This was followed by a reduction to ₹4,759 crore in 2019–2020. In 2020–2021, the funding experienced a slight increase to ₹4,785 crore, and then rose more significantly to ₹5,279 crore in 2021–2022. This pattern reflects the government's periodic reassessment of financial support for promoting sustainable agricultural practices.

Pradhan Mantri Krishi Sinchayee Yojana (PMKSY), Launched in 2015–16, the Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) aims to enhance farmers' access to water, expand the area under irrigation, improve water-use efficiency, and encourage sustainable water conservation practices. The scheme is structured around two primary components: the Accelerated Irrigation Benefit Programme (AIBP) and Har Khet Ko Pani (HKKP). HKKP is further divided into four

sub-components—Command Area Development & Water Management, Surface Minor Irrigation, Repair, Renovation and Restoration of Water Bodies, and Ground Water Development. Additionally, PMKSY includes the Watershed Development Component (WDC) and the Per Drop More Crop (PDMC) initiative, although the latter is now being implemented independently. In 2021, the Government approved the continuation of PMKSY with a total financial outlay of ₹93,068.56 crore for the 2021–2026 period. While West Bengal has not submitted project proposals under AIBP, Surface Minor Irrigation, or Ground Water Development components, it has benefited from the PDMC initiative, which has brought 66.5 thousand hectares under micro-irrigation between 2015 and 2022. Under the Watershed Development Component, from 2015 to 2023, a total of 14,966 water harvesting structures were created, and irrigation was extended to 18,033 hectares, contributing to improved water availability and agricultural productivity in targeted areas.

Central Assistance Released and Area covered under Micro Irrigation through Per Drop More Crop (PDMC)

Year	Central Assistance Released (Rs. in crore)	Area Covered under Micro Irrigation (In lakh Hectare)
2015-2016	1556.73	5.73
2016-2017	1991.24	8.4
2017-2018	2819.39	10.49
2018-2019	2918.38	11.59
2019-2020	2700.02	11.73
2020-2021	2562.19	9.37
2021-2022	1796.12	10.15
2022-2023	1901.37	11.02
2023-2024	2103.11	11.4
2024-2025	1436.24	4.47

Source: Indiastats

The Per Drop More Crop (PDMC) component of the Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) experienced fluctuating levels of central financial assistance and micro-irrigation coverage between 2015–16 and 2024–25. Central assistance peaked at ₹2,918.38 crore in 2018–19 but declined noticeably in subsequent years, reaching ₹1,436.24 crore by 2024–25. Meanwhile, the area brought under micro-irrigation steadily expanded from 5.73 lakh hectares in 2015–16 to a high of 11.73 lakh hectares in 2019–20, before experiencing some variations. By 2024–25, micro-

irrigation coverage had dropped considerably to 4.47 lakh hectares. This data reflects a strong initial emphasis on scaling up micro-irrigation, followed by a marked decrease in both funding and area coverage in recent years.

Soil Health Card (SHC) Scheme - Launched in 2014–15, the aims to equip farmers with detailed information on the nutrient status of their soil, along with recommendations to enhance soil health and fertility. Recent developments include the integration of the SHC portal with Geographic Information System (GIS) technology, enabling spatial mapping of soil test data. A dedicated mobile application now supports efficient soil sample collection, featuring automatic location capture, QR code generation, and seamless uploading of test results to the central portal. This upgraded system has been in operation since April 2023, accompanied by training programs for state-level officials. From 2022–23 onwards, the SHC Scheme has been merged into the Rashtriya Krishi Vikas Yojana (RKVY) under its "Soil Health & Fertility" component. In June 2023, new guidelines were issued for establishing Village Level Soil Testing Labs (VLSTLs), encouraging rural youth, Self-Help Groups (SHGs), Farmer Producer Organizations (FPOs), and others to set up these labs. Eligible entrepreneurs between 18 and 27 years of age can apply through district agriculture offices. Training is provided for soil testing procedures and SHC generation, with a focus on educating farmers about crop-specific fertilizer recommendations. Additionally, high-resolution soil mapping at a 1:10,000 scale is being undertaken using satellite imagery and field surveys. This initiative aims to generate geo-spatial Soil Resource Information, which is distinct from the data collected under the SHC Scheme, further enhancing the scientific basis for soil and crop management.

Funds Allocation, Released and Utilised under Soil Health Cards Scheme in India (Rs. In crore)

Year	Allocation	Released
2016-2017	263.46	133.66
2017-2018	142.85	152.77
2018-2019	302.25	237.4
2019-2020	137.22	99.89
2020-2021	171.93	123.55

Source: Indiastats

Between 2016 and 2021, the Soil Health Card (SHC) Scheme in India saw variable trends in both fund allocation and actual disbursement. The highest allocation during this period was ₹302.25 crore in 2018–19, followed by a notable drop to ₹137.22 crore in 2019–20. Similarly, fund releases mirrored these changes, reaching a peak of ₹237.4 crore in 2018–19 and falling to a low of ₹99.89 crore the following year. These shifts indicate a flexible funding strategy aligned with the evolving requirements and implementation priorities of soil health management initiatives.

National Water Mission: The National Water Mission, a key component of the National Action Plan on Climate Change (NAPCC), is designed to promote integrated water resource management aimed at conserving water, minimizing wastage, and ensuring fair distribution both within and across states. Guided by the principles of the National Water Policy, the mission targets a 20% improvement in water use efficiency through the implementation of regulatory measures, including

differentiated entitlements and pricing strategies. A significant emphasis is placed on addressing urban water requirements, with plans to recycle wastewater and deploy innovative technologies like low-temperature desalination to support water-scarce coastal cities. To manage the challenges posed by climate-induced variability in rainfall and river flows, the mission advocates for basin-level strategies that enhance both surface and subsurface water storage, promote rainwater harvesting, and encourage equitable water governance. The initiative also proposes the establishment of new regulatory institutions to strengthen water management systems. Existing irrigation infrastructure will be modernized, expanded where necessary, and made more efficient. Additionally, incentive-based approaches will promote the adoption of water-efficient and conservation-friendly technologies, including groundwater recharge methods and advanced irrigation systems such as drip, sprinkler, and ridge-and-furrow irrigation.

Revenue and Capital of National Water Mission (NWM) Scheme in India (Rs. In crore)

Year	Revenue	Capital	Total
2018-2019	5.99	0	5.99
2019-2020	3.84	0.5	4.34
2020-2021	5.25	0.19	5.44
2021-2022	10.74	0	10.74
2022-2023	15.71	0	15.71

Source: Indiastats

Between 2018–2019 and 2022–2023, the National Water Mission (NWM) in India saw a progressive increase in total budget allocations, particularly in its revenue component. Revenue expenditure rose from ₹5.99 crore in 2018–2019 to ₹15.71 crore in 2022–2023, highlighting a growing focus on operational and programmatic activities essential to fulfilling the mission's goals. In contrast, capital expenditure remained negligible throughout the period, reaching a maximum of ₹0.5 crore in 2019–2020 and receiving no allocation in several years. This pattern underscores a strategic shift toward revenue-driven spending, reflecting the mission's emphasis on implementation, monitoring, and regulatory initiatives over infrastructure development.

Paramparagat Krishi Vikas Yojana (PKVY): Since 2015–16, the Government of India has actively supported organic farming through two major initiatives: the Paramparagat Krishi Vikas Yojana (PKVY) and the Mission Organic Value Chain Development for North East Region (MOVCDNER). These programs offer end-to-end assistance to farmers, encompassing everything from organic production to market access. Farmers are provided hands-on training in producing organic fertilizers and receive a financial incentive of ₹15,000 per hectare over a three-year period to support the use of bio-fertilizers, compost, and manure. Additionally, the Market Development Assistance (MDA) scheme, introduced under the GOBARdhan initiative, ensures the affordability of organic fertilizers by providing ₹1,500 per metric ton for products such as Fermented Organic Manure (FOM) and Phosphate Rich Organic Manure (PROM). The government has allocated ₹1,451.84 crore for the period 2023–2026 to bolster these efforts, including funding for research and innovation. In a move to modernize agricultural practices, the Namo Drone Didi Scheme empowers women-led self-help groups (SHGs) with drone technology for efficient fertilizer application. As part of the Viksit Bharat Sankalp Yatra, more than 1,094 drones have been distributed, and 1.79 lakh demonstrations have been conducted to raise awareness and build

capacity. To enhance productivity and sustainability, the Indian Council of Agricultural Research (ICAR) has developed a range of bio-fertilizers tailored to specific crops and soils, including long-lasting liquid formulations. These are disseminated through extensive outreach, demonstrations, and training programs facilitated by Krishi Vigyan Kendras (KVKs), promoting wider adoption of organic and climate-resilient practices across the farming community.

Biotech-KISAN program - Launched in 2017, It is a farmer-scientist partnership initiative designed to bridge the gap between agricultural research and field-level application. Its primary goal is to transfer innovative technologies and research outcomes directly to farms to enhance productivity and sustainability. To date, 146 Biotech-KISAN Hubs have been set up, covering all 15 agro-climatic zones and 110 Aspirational Districts across India. The program has benefitted over 2 lakh farmers by improving agricultural yields and incomes, and has supported the establishment of more than 200 rural entrepreneurship ventures. In its current phase, the initiative places a strong focus on the North East Region (NER), where approximately 70% of the population depends on agriculture and allied activities for livelihood. Despite this, the region contributes only 1.5% to India's total food grain production and continues to rely on imports to meet its own consumption needs. Recognizing the untapped potential, Biotech-KISAN aims to enhance farm incomes in the NER by promoting region-specific crops, horticulture, plantation agriculture, livestock, and fisheries. In the North East, the program is geared toward empowering small and marginal farmers, particularly women, by integrating cutting-edge technologies into local farming systems. It will operate through collaborative efforts involving scientific institutions, State Agricultural Universities (SAUs), Krishi Vigyan Kendras (KVKs), state extension agencies, and farmer organizations. These partnerships will facilitate targeted demonstrations and customized training programs to address the specific agro-climatic and socio-economic challenges of the region. The Sub-Mission on Agroforestry (Har Medh Par Ped), launched in 2016–17, promotes tree planting on farmland alongside traditional crops, aiming to diversify farmers' income and improve the climate resilience of agricultural systems. The initiative encourages integrating trees within existing cropping patterns to create sustainable and adaptive farming landscapes. The scheme is operational in 20 states, including Andhra Pradesh, Bihar, Chhattisgarh, Gujarat, Haryana, Himachal Pradesh, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Odisha, Punjab, Rajasthan, Tamil Nadu, Telangana, Uttar Pradesh, Mizoram, Meghalaya, and Nagaland, and in two Union Territories—Jammu & Kashmir and Ladakh. Funding is shared between the central and state governments in a 60:40 ratio, except for North Eastern and hilly states (90:10) and Union Territories and national-level agencies, which receive 100% central assistance. Cultivation of economically valuable trees, including fruit trees, tree-borne oilseeds, medicinal and aromatic plants, timber species, and host plants for silk and lac production.These efforts aim to offer farmers both short-term returns and long-term sustainability. For horticulture and orchard development, the Mission for Integrated Development of Horticulture (MIDH), operational since 2014–15, supports the comprehensive growth of the horticulture sector. It covers a wide range of crops including fruits, vegetables, spices, mushrooms, tubers, flowers, coconut, cashew, cocoa, aromatic plants, and bamboo. MIDH is implemented across all states and Union Territories, complementing agroforestry efforts by boosting productivity and income through diversified farming.

Zero Budget Natural Farming

Inspired by Fukuoka's natural farming ideas and spearheaded by Subhash Palekar, Zero Budget Natural Farming (ZBNF) is becoming more and more well-liked in India, particularly in southern states like Andhra Pradesh and Karnataka. Building soil health, crop resilience, and nutrient density is the main goal of ZBNF, which promotes farming without the use of chemicals, credit, or commercial inputs. Mulching (soil cover), Whapasa (maintaining soil moisture), Bijamrita (seed treatment), and Jivamrita (bio-inoculant) are its four primary techniques. Significant adoption has occurred in Andhra Pradesh, where all six million farmers are expected to switch to ZBNF by 2024. Although ZBNF has been shown to lower expenses, boost yields, and enhance the health of soil and ecosystems, there are obstacles to the practice's national expansion. Its widespread adoption is not well supported by legislation, especially when it comes to marketing natural goods, and there are still questions about whether it can truly replace chemical-intensive farming in large-scale food production. Comprehensive policy support addressing ecological, resource, and environmental challenges is necessary for ZBNF to succeed.

National Adaptation Fund for Climate Change (NAFCC) - To aid adaptation initiatives in India's climate-vulnerable states and Union Territories (UTs), the National Adaptation Fund for Climate Change (NAFCC) was founded. With 30 projects approved in 27 states and UTs, it runs in project mode. The Hazard Line for the Indian mainland coast has been established by the Ministry of Environment, Forests, and Climate Change as part of its Integrated Coastal Zone Management (ICZM) project. Protecting coastal habitats and advancing sustainable development are the goals of the 2019 Coastal Regulation Zone Notification. Kerala, Tamil Nadu, and Andhra Pradesh are coastal regions that are the focus of NAFCC projects. For example, integrated farming systems are being promoted in Kerala's coastal wetlands, coastal habitats are being restored in Tamil Nadu, and climate-resilient dairy treatments are being implemented in Andhra Pradesh. Under the NAFCC, Andhra Pradesh has been awarded Rs. 6.36 crore.

Climate Smart Village (CSV) – This approach, initiated in Haryana and Bihar in 2011, began with a pilot involving 27 villages in Karnal district. Among them, Taraori emerged as a model for climate-smart agriculture, where 80% of farmers adopted zero-tillage practices. This led to an 80–85% reduction in diesel use, improved water and nutrient retention, and a 20% decrease in fertilizer application over three years. The adoption of direct-seeded rice and cultivation of crops like maize and wheat further contributed to up to 35% water savings and a 40% reduction in methane emissions. Encouraged by these results, the CSV model was expanded to 500 villages in Haryana and replicated in other regions of India. Complementing these efforts, the Weather-Based Crop Insurance Scheme (WBCIS), launched in 2007, gained substantial traction, covering around 12 million farmers by 2011–2012. By mitigating weather-related risks, the scheme has boosted farmer confidence to invest in better agricultural inputs. Additionally, the Integrated Agro-meteorological Advisory Service (IAAS) has played a crucial role in improving agricultural outcomes. By offering timely weather and crop advisories, IAAS has helped farmers achieve 10–15% higher yields and reduce costs by 2–5%. Further, ICRISAT has supported climate-smart agriculture through watershed management, digital tools, and climate modeling, enabling farmers to enhance productivity, income, and environmental sustainability.

Crop Area Insured under All Insurance Schemes in India (In Lakh Hectare)

Year	Gross Area Sown	Area Insured	% of Area Insured
2017-2018	1970.54	514.99	26.13
2018-2019	2002.03	524.84	26.22
2019-2020	2002.03	504.84	25.22
2020-2021	2002.03	449.86	22.47

Source: Indiastats

The table presents data on agricultural insurance coverage in India between 2017 and 2021, highlighting trends in gross sown area, insured area, and insurance coverage percentage. During this period, the gross sown area remained largely consistent, ranging from 1,970.54 to 2,002.03 lakh hectares. However, the area insured declined steadily, dropping from 514.99 lakh hectares in 2017–2018 to 449.86 lakh hectares in 2020–2021. Consequently, the percentage of the area insured also decreased from 26.13% to 22.47%, signaling a gradual decline in insurance coverage despite stable agricultural activity.

Conclusion:

The Pradhan Mantri Fasal Bima Yojana (PMFBY) provides financial protection to farmers against crop losses caused by natural disasters, pests, and diseases. However, with the frequency of extreme weather events like heatwaves increasing sharply—India experienced heatwaves on 18% of days compared to just 5% in 2020 and 2021—the scheme faces growing challenges. Despite these rising climate risks, the Union Budget for 2025-26 allocated Rs 12,242.27 crore to PMFBY, a significant 23% decrease from the revised Rs 15,864 crore in 2024-25, marking the lowest funding since 2019-20. This reduction, amid increasing weather-related impacts on agricultural yields and supply chains, raises concerns about PMFBY's effectiveness. Additionally, participation by general insurance companies in the scheme is reportedly declining.

While the government has launched numerous agricultural development programs to boost productivity and farmer incomes, access to these benefits remains limited, especially for farmers in remote and hard-to-reach areas. To enhance implementation, more efforts are needed to ensure marginalized groups—including economically disadvantaged farmers, women, and children—receive adequate support. Long-term sustainability depends on strengthening social mobilization and fostering community involvement. Policymaking should actively include key agricultural stakeholders such as Farmer Producer Organizations (FPOs), farmer groups, agricultural scientists, government officials, and representatives of Panchayati Raj institutions. Recognizing and incentivizing farmers who effectively adopt these schemes could motivate broader participation. Additionally, creating a comprehensive mobile application that consolidates all agricultural and allied sector schemes would improve accessibility. Subsidies for farm equipment, especially targeting women farmers, could reduce labor burdens, while specific initiatives addressing wild boar management are also needed. Awareness campaigns should educate farmers about available schemes, and a structured feedback system must be established to monitor scheme performance and address farmers' concerns.

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