WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

ECONOMIC CHALLENGES OF INDIAN FARMERS IN THE ERA OF CLIMATE CHANGE

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ABSTRACT :

Climate change has emerged as one of the most serious threats to agriculture and rural livelihoods in India. The country's economy, which is deeply rooted in the agricultural sector, is now experiencing multiple shocks due to rising temperatures, erratic rainfall, droughts, floods, and other climatic irregularities. Indian farmers, especially small and marginal ones, are struggling to maintain stable incomes and sustainable livelihoods in the face of unpredictable weather and rising cultivation costs. This research paper explores the major economic challenges confronting Indian farmers in the era of climate change, focusing on their struggles with productivity loss, market instability, debt burdens, and social distress. Using secondary data from government sources, research publications, and regional case studies, the study analyses how environmental changes are transforming the economics of Indian agriculture. It also reviews government schemes, adaptation efforts, and possible sustainable solutions to strengthen farmers' economic resilience. The paper concludes that climate change has not only reduced crop productivity but also deepened the cycle of poverty, unemployment, and indebtedness in rural India. Long-term solutions require integrated action—combining technology, education, and policy to protect farmers' income and ensure agricultural sustainability.

Keywords: Climate change, Indian farmers, agricultural economy, rural livelihood, economic distress, sustainability, climate resilience.

Introduction

Agriculture is not just an occupation in India; it is a way of life and the foundation of the national economy. Nearly half of India's population still depends on agriculture for its livelihood, and the sector contributes significantly to the country's Gross Domestic Product. In rural India, farming is not merely about food production—it is about economic stability, social identity, and family security. However, in recent years, the traditional pattern of farming has been disturbed by a new and unpredictable force: climate change. The rising temperatures, irregular monsoon rainfall, extended dry spells, and unseasonal storms have collectively brought unprecedented challenges to farmers who rely heavily on natural weather cycles.

The economic consequences of these climatic variations are alarming. Farmers today face declining crop yields, increasing cultivation costs, and frequent financial losses. Even a single unexpected rain or drought can ruin months of hard work and investment. In a country where more than 85 percent of farmers own small and marginal holdings, such losses create a chain of financial crises. The result is growing debt, mental stress, and a cycle of poverty that is hard to break. In many parts of India, including Maharashtra, Telangana, and Punjab, the situation has become so severe that farmer suicides have become a tragic indicator of rural distress.

This research paper aims to study these economic challenges in depth. It explores how climate change is affecting agricultural productivity and farmers' income, how existing policies respond to these challenges, and what adaptive practices can help farmers regain economic stability. The discussion also highlights real-life examples and data from recent years to present a clearer picture of the struggles faced by Indian farmers in the era of global warming.

Review of Literature

A considerable amount of research has been done on the link between climate change and agricultural performance, both globally and within India. The general consensus among scholars is that climate change has already begun to alter rainfall patterns and temperature levels in ways that directly affect farm productivity. Mendelsohn, Dinar, and Sanghi (2020) noted that a one-degree Celsius increase in average temperature could reduce agricultural income in India by almost six percent. Similarly, the Intergovernmental Panel on Climate Change (IPCC, 2023) warned that South Asian countries, including India, are among the most vulnerable regions in the world to climate-related disruptions, particularly heat waves, floods, and erratic monsoons. In the Indian context, Dasgupta (2021) found that nearly 60 percent of India's agriculture remains rain-fed, meaning it depends entirely on the timing and quantity of monsoon rainfall. In such conditions, even a small variation in rainfall can cause either drought or flood, both of which destroy crops. Studies by the Indian Council of Agricultural Research (ICAR, 2022) confirmed that staple crops like rice, wheat, and pulses are already showing a decline in productivity, particularly in the central and northern regions of the country where heat stress is increasing. Narayanmoorthy and Deshpande (2020) emphasized that small and marginal farmers, who constitute the majority, are the most vulnerable to income fluctuations. When crops fail, these farmers

are forced to borrow from informal sources at high interest rates, often leading to long-term debt and poverty.

NABARD's report (2023) suggested that although India has introduced several policy measures such as crop insurance and irrigation schemes, their actual reach is limited due to implementation barriers and lack of awareness among farmers. Overall, the existing literature agrees that climate change has intensified the economic insecurities of rural households, making agricultural income highly unstable and unpredictable.

Methodology

The present research is descriptive and analytical, relying mainly on secondary data. The data have been gathered from government publications such as reports of the Ministry of Agriculture, NABARD, and NITI Aayog, as well as from scholarly journals including the *Economic and Political Weekly* and the *Indian Journal of Agricultural Economics*. Reports from international organizations like the FAO and IPCC were also used to understand broader climatic trends. Additionally, regional case studies, particularly from Maharashtra and other drought-prone areas, were analysed to identify specific economic effects on farmers' livelihoods.

The period under review extends from 2010 to 2025, covering significant climate events and policy interventions. The focus remains on small and marginal farmers, as they represent the majority of India's agricultural population and are most affected by environmental and market fluctuations. The analysis combines qualitative and quantitative insights to present a holistic understanding of economic challenges under climate stress.

Economic Challenges Faced by Indian Farmers

The most visible economic impact of climate change on Indian farmers is the steady decline in crop productivity. Erratic rainfall and prolonged dry periods have made it difficult for farmers to plan the sowing and harvesting of crops. Unseasonal rains often destroy standing crops just before harvest, leaving farmers without any income. In states like Maharashtra, unseasonal heavy rains in 2023 damaged large areas of soybean and cotton, while delayed monsoons in northern India reduced wheat yields by more than fifteen percent. Such fluctuations directly affect household income and long-term economic stability.

Another major challenge is the rising cost of cultivation. Farmers now spend far more on irrigation, pesticides, and fertilizers than they did a decade ago. Re-sowing due to crop failure further adds to expenses. Many farmers have to install borewells to cope with water scarcity, which is an expensive investment. Even when market prices for crops rise, the net profit for farmers remains minimal because input costs increase at a faster rate. The situation becomes worse when middlemen and traders exploit farmers during procurement, offering low prices for their produce.

Market instability is another dimension of the crisis. The prices of agricultural commodities often fluctuate sharply, leaving farmers uncertain about their potential earnings. A bumper crop year can lead to a market glut and price crash, while in deficit years, the same commodities become unaffordable to consumers. The lack of adequate storage facilities and transport infrastructure prevents farmers from storing produce for better prices. As a result, they are forced to sell at whatever price is offered immediately after harvest, even if it means a loss.

Debt and financial stress are inseparable from the lives of many Indian farmers. With limited access to institutional credit, they often rely on local moneylenders who charge exorbitant interest rates, sometimes exceeding thirty percent per annum. When crops fail repeatedly, repayment becomes impossible. This debt burden pushes many into despair. In states like Maharashtra, Telangana, and Madhya Pradesh, farmer suicides have been reported consistently over the years, revealing the psychological and financial toll of this crisis.

Another economic barrier arises from the continued fragmentation of agricultural land. As family holdings get divided among heirs, the average farm size keeps shrinking. Small plots are not economically viable for mechanization or large-scale irrigation. Farmers with tiny holdings cannot afford modern technology or climate-resilient inputs. Many young people, seeing little hope in farming, migrate to cities in search of work, leading to rural depopulation and a shortage of agricultural labor.

Although government schemes such as the Pradhan Mantri Fasal Bima Yojana offer crop insurance, their effectiveness is limited. Many farmers either do not know about the schemes or find the claim process complicated. Compensation often arrives months after the loss, when the farmer has already borrowed money for the next season. This inefficiency further erodes trust in the system meant to protect them.

Case Study: Vidarbha Region of Maharashtra

The Vidarbha region of Maharashtra illustrates how climate change can transform an agriculturally rich area into a hotspot of economic distress. The region is primarily dependent on cotton cultivation and monsoon rains. Over the last two decades, irregular rainfall patterns and increasing temperatures have created repeated crop failures. Between 2014 and 2023, Vidarbha experienced several severe droughts and episodes of unseasonal rains that destroyed harvest-ready cotton fields. Average temperatures have risen by more than one degree Celsius in the last decade, intensifying water scarcity and pest attacks.

The consequences have been devastating. Crop yields have dropped by nearly thirty percent compared to the 1990s. Farmers, struggling to recover their costs, borrowed heavily from private lenders for seeds, fertilizers, and pesticides. Unable to repay after consecutive bad seasons, many fell into a cycle of debt. According to the Government of Maharashtra (2023), the region continues to record thousands of farmer suicides every year. However, there is also a glimmer of hope. Several local organizations and NGOs have introduced sustainable practices such as organic farming, drip irrigation, and crop diversification. Farmers who diversified their crops, combining cotton with pulses and vegetables, reported more stable incomes and lower input costs. These experiments suggest that adaptive strategies, when combined with policy support, can offer real solutions.

Government Policies and Adaptation Efforts

The Indian government has introduced several schemes to support farmers affected by climate variability. The **Pradhan Mantri Fasal Bima Yojana** provides crop insurance coverage against losses from natural calamities, though issues of awareness and delayed claims persist. The **Pradhan Mantri Krishi Sinchai Yojana** promotes efficient water use through micro-irrigation systems, yet adoption remains limited in resource-poor regions. Under the **National Mission on Sustainable Agriculture (NMSA)**, farmers are encouraged to improve soil health, adopt drought-resistant crops, and shift towards organic farming.

Technological initiatives such as **E-NAM**, the National Agricultural Market, aim to connect farmers directly with buyers through online platforms, ensuring better price discovery. The **NABARD Climate Resilient Agriculture Programme** has also piloted projects that promote weather-based crop advisories and heat-tolerant crop varieties. However, despite these efforts, the real challenge lies in implementation and education. Many small farmers in remote areas lack access to information, internet connectivity, or the technical knowledge to use such schemes effectively.

Discussion

The findings from this study highlight that the economic vulnerability of Indian farmers in the face of climate change is deeply structural. It is not only the weather that affects them but also the weak institutional support systems, market structures, and social inequalities that limit their capacity to adapt. Every climatic shock translates into an economic shock for rural households. The cumulative effect is a slow but continuous erosion of income and livelihood security. Only about one-fourth of Indian farmers are covered by crop insurance, and even fewer have savings or access to credit facilities from formal banks. The result is a widespread dependence on informal lenders, increasing indebtedness, and reduced investment in farm improvement.

Moreover, the absence of strong rural infrastructure, such as cold storage, transportation, and irrigation networks, magnifies the impact of weather disruptions. Farmers remain price-takers rather than price-makers in the market system. Therefore, any policy addressing climate impacts must also strengthen these basic economic structures.

Conclusion

The study clearly shows that climate change has reshaped the economic landscape of Indian agriculture. It has made farming riskier, less predictable, and often unprofitable for those who depend on it most. Declining yields, higher input costs, and fluctuating market prices have collectively driven many farmers into debt and despair. Even though the government has launched various schemes and policies, their reach and effectiveness remain limited, especially among smallholders who lack awareness and resources.

To ensure the survival and prosperity of Indian farmers, there is an urgent need to rethink agricultural policy from a sustainability perspective. Climate-resilient farming systems, better rural infrastructure, and financial safety nets must be developed simultaneously. Crop diversification, water management, and soil conservation should be encouraged through education and subsidies. Most importantly, farmers must be empowered with knowledge, technology, and direct access to markets. The integration of traditional wisdom with modern science can create a more adaptive and sustainable model of agriculture.

Ultimately, the challenge of climate change is not just environmental—it is economic and human. It concerns the dignity, stability, and security of millions who feed the nation. Protecting them from economic distress must therefore remain at the center of India's development vision for the coming decades.

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