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CLIMATE CHANGE AND ITS ECONOMIC IMPACT ON INDIAN AGRICULTURE: A BURNING ISSUE IN AGRICULTURAL ECONOMICS

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Abstract

Climate change is emerging as one of the most critical challenges facing Indian agriculture today. With rising temperatures, erratic rainfall, frequent floods, and droughts, the sector is increasingly vulnerable to climatic disturbances. Since agriculture supports nearly 60% of India's population and contributes significantly to the country's GDP, the economic impact of climate change is profound. This article explores the relationship between climate variability and agricultural productivity, input cost escalation, income instability, and policy gaps. It also outlines the economic implications and the urgent need for climate-resilient agricultural strategies.

Keywords: *Climate change, country's GDP, economic impact etc.*

INTRODUCTION

Agriculture remains the backbone of the Indian economy, supporting nearly 60% of the rural population. However, in recent years, the sector has been under growing pressure due to the far-reaching effects of climate change. From unpredictable monsoons to increasing temperatures and frequent extreme weather events, climate change is no longer just an environmental concern—it has become a burning issue in agricultural economics. Agriculture forms the foundation of the Indian economy, providing employment, food security, and raw materials to industries. However, over the last few decades, India's agricultural performance has become increasingly uncertain due to climate change, which has evolved into a major concern not only for environmentalists but also for agricultural economists. Extreme weather events, such as unseasonal rains, prolonged droughts, and intense heatwaves, are no longer rare

occurrences. The frequency and severity of these events have increased, disturbing traditional farming calendars and lowering crop productivity. Economic indicators like gross value added (GVA) in agriculture, farm incomes, and market stability are being adversely affected. This has turned climate change into a burning issue that demands immediate attention from researchers, policymakers, and practitioners in the field of agricultural economics.

CHANGING CLIMATE PATTERNS AND AGRICULTURAL PRODUCTIVITY

Unpredictable weather patterns such as droughts, floods, and heatwaves lead to lower crop yields, which in turn reduce the overall agricultural output. This affects food supply, drives up prices, and leads to inflation in food commodities. Farmers, reacting to climate patterns, may also shift resources (land, labour, capital) from one crop to another, leading to inefficiencies in resource allocation.

Climate change is deeply intertwined with the field of economics, especially agricultural economics, because it directly affects both the production and distribution of resources, goods, and incomes in the agricultural sector. In India, where agriculture contributes about 17-18% of GDP and employs over 50% of the workforce, any disturbance in climate conditions has significant economic consequences. India's agriculture is largely rain-fed and highly dependent on the Southwest Monsoon. With climate variability, farmers are now facing either drought-like situations or excessive rainfall, both of which drastically affect crop yields. A drop in productivity leads to lower farm incomes, directly impacting rural livelihoods and food supply chains.

For example:

- In Punjab and Haryana, heatwaves during the wheat-growing season have reduced yields.
- In Maharashtra and Karnataka, erratic rainfall has damaged pulses and oilseeds.

RISING INPUT COSTS AND RESOURCE DEPLETION

To cope with climate variability, farmers spend more on irrigation, seeds, fertilizers, and pesticides, leading to a sharp rise in the cost of cultivation. When output doesn't increase proportionately, profit margins shrink, and net farm incomes decline, especially for small and marginal farmers.

To adapt to climate changes, farmers are forced to spend more on irrigation, fertilizers, pesticides, and climate-resilient seeds. This raises the cost of cultivation significantly. At the same time, groundwater levels are depleting rapidly due to over-extraction, increasing long-term production costs.

CROP INSURANCE AND RISK MANAGEMENT

With rising uncertainty, schemes like PMFBY (Pradhan Mantri Fasal Bima Yojana) have been introduced to protect farmers. However, low awareness, delays in compensation, and poor implementation reduce the effectiveness of these programs. Economists are now pushing for better-designed weather-index-based insurance models that ensure timely and fair payouts.

MARKET VOLATILITY AND FARMER DISTRESS

Climate-induced supply shocks lead to price fluctuations, especially in perishable commodities like fruits and vegetables. Farmers are often unable to benefit from higher prices due to distress sales at harvest time and lack of storage facilities, while consumers face inflation. This mismatch leads to income instability for producers and food insecurity for consumers.

Climate change intensifies economic disparity among farmers. Those with access to irrigation, credit, and technology can adapt better, while poor and rain-fed farmers suffer crop losses and fall into debt traps. This widens the income inequality in rural areas and contributes to agrarian distress, migration, and in extreme cases, farmer suicides.

UNCERTAINTY AND RISK MANAGEMENT

The increased frequency of extreme climate events adds economic uncertainty to agriculture. This affects credit availability, investment decisions, and crop insurance mechanisms. Traditional risk management approaches fail, pushing economists to develop new climate risk models and adaptive policy frameworks.

POLICY AND ECONOMIC INTERVENTIONS NEEDED

To address the economic challenges posed by climate change in agriculture, the following steps are essential:

- Promotion of climate-resilient cropping systems.
- Investment in irrigation infrastructure and water harvesting.
- Development of real-time weather advisory services for farmers.
- Strengthening agricultural credit and insurance mechanisms.

- Encouraging agroforestry, mixed farming, and organic practices.
- Linking farmers to remunerative markets through FPOs and digital platforms.

Here are the key ways in which climate change is linked to economics in Indian agriculture:

CONCLUSION

Climate change is not just an environmental problem but a major economic threat to Indian agriculture. Its impacts are visible in reduced yields, rising costs, and increased rural distress. As agricultural economists and policymakers, there is a growing need to integrate climate resilience into every economic model and development strategy. Ensuring sustainable and inclusive agricultural growth is no longer an option—it is an urgent necessity.

Climate change is no longer a distant threat—it is a present-day economic reality for Indian farmers. Its effects are deeply felt across the agricultural value chain, from sowing to selling. The growing instability in farm incomes, rising input costs, and increased vulnerability are affecting rural livelihoods and national food security. Immediate policy attention, climate-resilient technologies, and farmer-centric economic models are essential to ensure sustainable agricultural growth. Agricultural economists must now play a critical role in designing adaptive strategies that are scientifically informed, economically viable, and socially inclusive. In essence, climate change affects every economic dimension of Indian agriculture—from production and prices to income and investment. It is no longer just an environmental concern but a core economic issue that demands data-driven, inclusive, and adaptive economic policies. Agricultural economics, therefore, plays a crucial role in understanding and addressing the economic impact of climate change on farming communities

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