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Effect of Climate Change on Food Security of India

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INTRODUCTION

Ending hunger, achieving food security, enhancing nutrition, and promoting sustainable agriculture are the objectives of Sustainable Development Goal (SDG) 2. Food security, however, is still India's unmet development objective. Despite the expansion of the economy, the prevalence of malnutrition is still too high. With its impact on food production, pricing, and security, climate change further complicates issues with food security. Overheating or a lack of water can hinder crop development, lower yields, and have an impact on irrigation, soil quality, and the environment that agriculture depends on. Natural disasters and water scarcity are two elements that affect the risk to food security.

Weather patterns are altering and alarming.

The impact of excessive rainfall leading to floods or no rainfall leading to drought can be very harmful to the nation's agriculture production. Evidence points to a high correlation between increased extreme weather events, such as severe and frequent droughts and floods, and agricultural productivity. The World Bank claims that local food prices have increased in step with increases in international food prices, which have been exacerbated by droughts. Bangladesh, Bhutan, Nepal, and Sri Lanka are just a few of India's neighbours where food prices have increased. The drought-related food shortages brought on by the El Nino weather pattern in 2009 added to the rise in domestic demand in India during the inflationary period of 2008.

According to research, carbon fertilization can counteract the detrimental effects of global warming on India's agricultural output, and rising carbon dioxide levels can increase crop yields. Another study from Karnataka demonstrates the significant impact that severe temperatures can have on crop productivity and yield.

These occurrences are frequently connected to an exponential increase in the prevalence of illnesses and pests. The conclusion that follows is that even as pests and illnesses attack food crops and animals, which ultimately results in decreased food supply, climate change has an induced effect on food security.

Streams, dams, rivers and groundwater resources are also under the condition of stress. In India, 65 percent of the land is used for agricultural, highlighting the industry's vulnerability to water constraint. Due to the decreasing reliance on groundwater for agriculture due to the diminishing levels, several sections of the country are already experiencing water scarcity difficulties. Furthermore, weather-related catastrophes affect the value chain of food production, demanding a multidisciplinary approach to build social capital. Building agricultural and community resilience for current and upcoming agricultural crises requires critical study in this area.

Due to climate change, the output of staple crops like rice and wheat has drastically decreased along with their nutritional value. It is evident that a sizable influence also extends to cattle and pulse production. With crop leftovers and residues meeting a sizable percentage of their energy needs, other agricultural production systems, most notably animal production, are indirectly impacted.

Since agriculture is the primary means of reducing poverty, the projected negative effects of climate change have far-reaching effects. The worldwide food crises of 2007 and 2008 have shown that populations in poor countries that are food insecure will be negatively impacted by any future food crisis made worse by climate change. Crop rotation and mixed cropping over monoculture can help increase farming operations and decrease their vulnerability to extreme weather conditions and unexpected monsoons.

Floods and droughts are also more severe when there is significant inequality and food shortages. In the drought-prone Jalna region of Maharashtra, an analysis of nine villages showed that local agricultural output and farmers' yearly incomes fell by about 60% during the 2012–2013 drought. Another study from Odisha indicates that natural catastrophes and calamities are contributing to a rise in malnutrition. Children exposed to continuous floods who live in flood-prone areas in Odisha's coastal district of Jagatsinghpur are found to have long-term chronic malnutrition.

India's urban food insecurity indicators present a depressing picture. Food security would be directly impacted by any extreme weather event that results in relocation, loss of livelihood, or damage to productive assets because food is the single highest expense for impoverished urban households. Nira Ramachandran claims that hunger frequently causes a spike in urban migration that displaces entire families into slum areas. Most of these migrant workers are employed in the low-wage, informal sector of the urban economy, where there is little job security and pay is below the legal minimum. As a result of the output shocks and decreases that future climate change is anticipated to bring about, the urban poor will end up being the group most susceptible to food inflation.

In order to preserve agricultural production in the face of climate change, farmers need a variety of adaptation strategies.

The demand for land and other natural resources will increase dramatically as a result of population expansion, rising salaries, and changes in consumption and dietary habits. Biodiversity, food security, and environmental and human systems will all be increasingly impacted by global warming.

Way ahead

Both short-term fixes and a long-term plan should be included in the agricultural adaptation toolbox to deal with the varied harsh weather patterns. It is important to create regional models for the Indian subcontinent, as shown by research done in Tamil Nadu's

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Cauvery basin, also known as the "rice bowl of India." In order to downscale climate change scenarios for smaller locations in the near future, the study suggests adaption measures include rice intensification, adopting temperature-tolerant cultivars, and employing green manures/bio-fertilizers to save water and boost rice yield in warmer climes. At the moment, providing emergency assistance to affected households is prioritized over developing long-term adaptive strategies. As a result, public support and training in disaster management are essential, especially in coastal regions, and long-term undernutrition prevention programs are also necessary in disaster-affected communities. In the coming decades, biodiversity loss is projected to be mostly influenced by climate change. The demand for land and other natural resources will increase dramatically as a result of population expansion, rising salaries, and changes in consumption and dietary habits. Biodiversity, food security, and environmental and human systems will all be increasingly impacted by global warming. Therefore, a thorough investigation of how climate change affects food security is urgently needed. To combat the impending danger to India's food security, future research should prioritize identifying and quantifying the impact of climate change on food intake and malnutrition.