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CLIMATE CHANGE AND ITS IMPACTS ON AGRICULTURE IN INDIA



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To face the challenges of food security and climate change, the country needs to reorient its land use and agriculture with the state-of-the-art technologies and policy initiatives. Impact of climate change on gender is another area that needs to be concentrated. There is a need to develop policy framework for implementing the adaptation and mitigation options so that the farmers are saved from the adverse impacts of climate change. According to Inter-government panel on climate change (IPCC) the global average emission from agriculture is only 13.5%. Emissions from agriculture are primarily due to methane from rice fields (23%).

Introduction

'Climate change' is a defining issue currently. A lot of significant long-term changes are happening in global climatic system which are visible all over the world. Specifically, the carbon mono oxide levels are at peak and its concentration has reached up to 410 ppm at present, which is a principal cause of warming effect. Agriculture represents a core part of the Indian

economy and provides food and livelihood activities to much of the Indian population. In India, almost 70% of the population depends on agriculture for their livelihood. 23% of India's Gross National Product (GNP) representing agriculture sector alone, which plays a major role in the country's development and shall continue to hold an important place in the national economy (Khan et al., 2009) causing climate change but also contributing to the irregular rainfall patterns. Climate change scenarios include higher temperatures, changes in precipitation, and higher atmospheric CO₂ concentrations. Agriculture sector in India contributes to 28% of the total green house gas emissions.

What's driving climate change?

The primary focus of the accommodations is on carbon dioxide, a hothouse gas that's released when fossil energies — coal, canvas and natural gas — are burned, as well as by timber fires, land use changes and natural sources.

The Industrial Revolution of the late 1800s started an enormous increase in the burning of fossil energies. It powered homes, diligence and opened up the earth to travel. That same century, scientists linked carbon dioxide's eventuality to increase global temperatures, which at the time was considered a possible benefit to the earth. Methodical measures started in themid-1900s and have shown a steady increase in carbon dioxide, with the maturity of it directly traceable to the combustion of fossil energies.

Economic Losses of Climate Change in Agriculture

Critical challenges that agriculture sector would face in the event of climate change are:

- (i) water availability as result of changing rainfall patterns, alteration in stream flow and increase in crop water demand.
- (ii) deterioration of water quality due to sea water intrusion, transport of salts from the deeper soil layers as a result of over exploitation of aquifers and faulty irrigation practices.
- (iii) Increased frequency and intensity of extreme weather events such as droughts, floods and cyclones and these would affect the production levels more than the impact of mean changes in the climate.
- (iv) heat stress due to higher temperature at critical stage of the crop growth.
- (v) unpredictable change in pest and disease load. There is also possibility of minor pest becoming major pest with changing climatic condition.

Mitigation and Adaptation Strategies

Adaptation of Indian Agriculture to Climate Change Potential adaptation strategies to deal with the impact of climate change are developing cultivars tolerant to heat and salinity stresses and resistant to flood and drought, modifying crop management practices, improving water management, adopting new farm techniques such as resource conserving technologies (RCTs), crop diversification, improving pest management, better weather forecasts and crop insurance and harnessing the indigenous technical knowledge of farmers. Some of these strategies are discussed below. Similarly, it is essential to develop tolerance to multiple abiotic stresses as they occur in nature. In addition, it is important





to improve the root efficiency for the uptake of water and nutrients from soil. Examination of relatively recent weather of the last century at many parts of the country indicates warming trends although statistically may not be significant, but there are enough indicators to suggest a modest increase in CO₂ and temperature. In spite of the uncertainties about the precise magnitude of climate change on regional scales due to scenarios and crop models on impact assessment, an assessment of the possible impacts of climate change on India's agricultural production under varying socioeconomic conditions is important for formulating response strategies, which should be practical, affordable and acceptable to farmers.

Migration in India has been constrained by a number of factors, including:

- a. A crisis in creating new urban formal-sector livelihoods in an era of globalization.
- b. Dismal living and working conditions for the poor in cities.

- c. High urban poverty levels driven by high costs of living.
- d. Poor improvements in rural education until the late 1990s.
- e. A slow process of social transformation.

India's new climate targets

India's commitment to achieve Net Zero Emigrations by 2070 is akin to not just walking the talk on the climate extremity, but running the talk. At the 26th Conference of Parties (CoP26), Indian Prime Minister Narendra Modi declared a five-fold strategy nominated as the **panchamrita** to achieve this feat. These five points include:

1. India will get its non-fossil energy capacity to 500 giga watt (GW) by 2030.
2. India will meet 50 per cent of its energy conditions from renewable energy by 2030.
3. India will reduce the total projected carbon emigrations by one billion tonnes from now onwards till 2030.

4. By 2030, India will reduce the carbon intensity of its frugality by lower than 45 percent.
5. So, by the time 2070, India will achieve the target of Net Zero.

India's climate change targets are estimable and put the ball forcefully in the court of the formerly rich world to now show that they mean business. This is because, India has not been a literal contributor to the hothouse gas emigrations — from 1870 to 2019, its emigrations have added up to a miniscule 4 per cent of the global aggregate.

Conclusion

Global climate change isn't a new miracle. Climate is the primary determinant of agrarian productivity which directly impact on food product across the globe. Agriculture sector is the most prone sector as it'll have a direct bearing on the living of 1.2 billion people. India has set a target of halving hothouse gas emigrations by 2050. The future of climate change and its associated impacts is largely changeable, which makes planning for mitigation and adaption a bit complex. This necessitates the expression of climate-flexible technologies involving an interdisciplinary approach according to the region.

