

Climate Change and its Impact on Agriculture in India

Anishkumar P T¹, Dr.Suresh M V²

¹ *Research Scholar, PG and Research Department of Economics, Marthoma College Thiruvalla*

² *Research Guide, PG and Research Department of Economics, Marthoma College Thiruvalla*

Abstract-Climate change is affecting Indian agriculture. Major adverse impacts of climate change on agriculture are owing to increases in temperature; changes in rainfall patterns; weather hazards, and decline in soil and water quality. This paper discusses the adverse effect of climate change on the Indian agriculture sector.

Keywords: Population, Food, consumption, Crop, Agriculture

INTRODUCTION

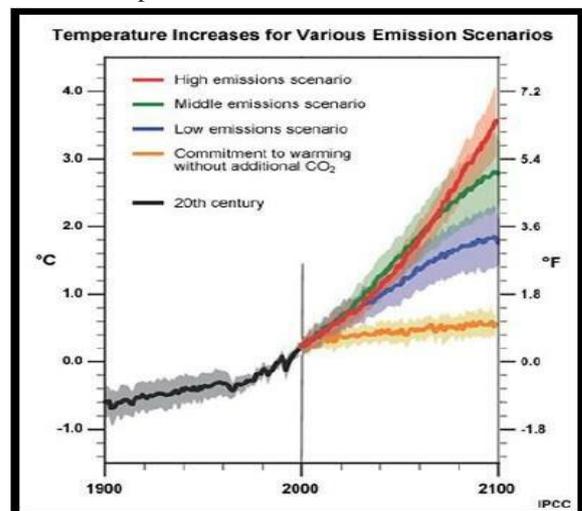
Agriculture is one of the largest and most important sectors of the Indian economy. The contribution of agriculture to India's GDP was about 19.9 percent in 2020–21. Moreover, this sector employs 42.6 percent of the Indian population. By 2100, the mean global sea levels are projected to rise from 18 cm to 140 cm (IPCC, 2007). The government of India's economic survey (2018) estimated that the annual loss of US\$ 9-10 billion was due to the adverse effects of climate change. The uncertain weather, especially drought, may affect production loss and the quality of fruits as large areas of agriculture are still rainfed. The UNFCCC is a 'Rio Convention' that came into existence in 1994 and aimed to prevent all hazardous activities of humans that interfere with the global climate. It has a Universal Membership of about 197 countries to act against climate change issues in the interest of human safety by stabilizing the greenhouse gas concentration in the atmosphere.

IMPACT OF CLIMATE CHANGE ON AGRICULTURE IN INDIA

Come to agriculture, a sector crucially dependent on climate for its production, the effects are often grave and far-reaching. The 2030 Agenda for Sustainable Development and the Paris Agreement (PA) call for a profound transformation of our food systems as well as our modalities of operation: we can no longer consider food, livelihoods, and natural resources management separately. Allowing predominantly agro-intensive countries to pursue a development trajectory that is manageable, renewable, and sustainable, in line with the aspirations of the 2030 Agenda, calls for better-informed policy frameworks. Heavy rains in September in Andhra Pradesh, Karnataka, and Kerala led to floods and

thus the year 2007 was declared as the flood year in India. Climate change is projected to reduce wheat yield by 19.3% in 2050 and 40% in 2080 scenarios towards the end of the century with significant spatial and temporal variations. Climate change reduces crop yields and lowers the nutritional quality of produce. Extreme events like droughts affect food and nutrient consumption and its impact on farmers.

The IPCC has examined the published results from many different models and on the basis of the evidence has estimated that by 2100- 1) The global average surface warming (surface air temperature change) will increase by 1.1 - 6.4 °C. 2) The sea level will rise between 18 and 59 cm. 3) The oceans will become more acidic. 4) It is very likely that there will be more precipitation at higher latitudes and it is likely that there will be less precipitation in most subtropical land areas. 5)It is likely that tropical cyclones (typhoons and hurricanes) will become more intense, with larger peak wind speeds and heavier precipitation associated with ongoing increases in tropical sea surface temperatures. Rice, wheat, maize, sorghum, soybean, and barley are the six major crops in the world grown in 40% cropped area and contribute to 55% of non-meat calories and over 70% of animal feed (FAO, 2006). Increased atmospheric CO₂ levels have led to higher crop yields but have also resulted in reduced nutritional value of crops.



Source: IPCC, 2007

Projected scenarios of global warming indicate that the global average surface temperature could rise by 1.4 to 5.8°C by 2100.

STRATEGIES FOR COMBATING CLIMATE CHANGE

Community-driven programs and village institutions' involvement are critical to adapting to climate change over to those of individuals. Most of the adaptation technologies have co-benefits of mitigation by removing, reducing, or displacing the emissions of atmospheric carbon dioxide, methane, and nitrous oxide with some co-benefits (FAO, 2012). Water management is a critical factor for overall climate change adaptation in India. A three-tier strategy such as better breed, feed, and shelter management is recommended by the ICAR for sustainable livestock production.

Diversifying crops and including livestock on lands can give farmers additional sources of income and reduce the risks to livelihoods caused by climate change and unpredictable weather. The usage of traditional management systems and agroecological management systems, namely biodiversification, soil management, and water harvesting, can help farmers adopt climate-resilient technologies.

Drip irrigation is one of the irrigation techniques being promoted to reduce groundwater overdrafts and shocks induced by climate change. It has the potential to be resilient to climate change and reduce the demand for groundwater for irrigation.

CONCLUSION

Even though there are uncertainties regarding the future climate scenario and its possible impacts, various studies report that climate change will decrease agricultural productivity in the coming years. A number of mitigation and adaptation strategies need to be developed to offset the deleterious impact of climate change on agricultural sustainability.

REFERENCE

- [1] <https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1909206#:~:text=Climate%20change%20is%20projected%20to,2050%20and%202080%20scenarios%2C%20respectively.>
- [2] <https://www.leadconnect.in/how-does-climate-change-affect-agriculture-in-india/>
- [3] IPCC. 2007. Climate Change 2007: Synthesis Report. Contribution of Working Group I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Fourth Assessment Report. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA
- [4] 2018. Economic Survey of India.
- [5] OECD. 2017. Economic Survey of India
- [6] https://naarm.org.in/wp-content/uploads/2020/06/ICAR-NAARM-Policy-on-Climate-Change-and-Agriculture_compressed.pdf
- [7] FAO. 2012. Climate change adaptation and mitigation in agriculture. Course: climate change and food security. Rome.
- [8] https://unfccc.int/portal_espanol/informacion_basica/la_convencion/items/6196.php
- [9] <https://india.mongabay.com/2022/11/in-india-climate-impact-on-agriculture-is-already-a-reality-now/>
- [10] <https://www.preventionweb.net/news/climate-change-poses-biggest-risk-food-security-india>
- [11] Mahato, A. (2014). Climate change and its impact on agriculture. *International Journal of Scientific and Research Publications*, 4(4), 1-6.
- [12] <https://www.downtoearth.org.in/news/agriculture/climate-change-causes-about-1-5-per-cent-loss-in-india-s-gdp-57883>
- [13] FAO, F. (2018). The impact of disasters and crises on agriculture and food security. *Report*.
- [14] <https://www.manage.gov.in/studymaterial/CCA-E.pdf>
- [15] <https://www.wri.org/insights/5-strategies-achieve-climate-mitigation-and-adaptation-simultaneously>
- [16] Altieri, M.A.; Nicholls, C.I. The adaptation and mitigation potential of traditional agriculture in a changing climate. *Clim. Chang.* **2017**, *140*, 33–45
- [17] Sandhu, S.S.; Kaur, P.; Gill, K.K.; Vashisth, B.B. The effect of recent climate shifts on optimal sowing windows for wheat in Punjab, India. *J. Water Clim. Chang.* **2019**, *11*, 1177–1190.
- [18] Birkenholtz, T. Assessing India's drip-irrigation boom: Efficiency, climate change and groundwater policy. *Water Int.* **2017**, *42*, 663–677.
- [19] <https://www.mdpi.com/2071-1050/13/3/1318>
- [20] <https://www.manage.gov.in/studymaterial/CCA-E.pdf>
- [21] <https://www.downtoearth.org.in/blog/agriculture/why-india-needs-climate-resilient-agriculture-systems-75381>

[22] https://en.wikipedia.org/wiki/Effects_of_climate_change_on_agriculture

[23] https://dst.gov.in/sites/default/files/Report_DS_T_CC_Agriculture.pdf