

General Studies-3; Topic-Indian Agriculture: Issues

Climate Change and Agriculture

1) Introduction

- Climate change is any significant long-term change in the expected patterns of average weather of a region (or the whole Earth) over a significant period of time.
- India's agricultural sector faces a significant threat from climate change and directly impacts the daily lives of farmers.
- From ancient times India's agriculture has been dependent on monsoon. Any change in monsoon trends drastically affects agriculture.

2) Indian Agriculture

- Large country with diverse climate.
- Two thirds area rain dependent. India gets around 70 percent of its annual rainfall during the monsoon season.
- Agriculture contributes 16% of India's GDP.
- Diverse seasons, crops and farming systems.
- Close link between climate and water resources.
- Small holdings, poor cropping mechanisms and low penetration of risk management products.
- Agriculture is also contributing a significant share of the greenhouse gas (GHG) emissions that are causing climate change.

3) Impact of Climate Change on Agriculture

- Climate change affects all the three aspects of food security: availability, access and absorption.
- Agricultural productivity is sensitive to climate-induced effects like changes in temperature, precipitation and carbon dioxide concentrations in the atmosphere.
- The major impacts of climate change will be on rain fed or un-irrigated crops, which are cultivated on nearly 60 percent of cropland.
- The World Bank report warned that by the 2040s, India would see a significant reduction in crop yields because of extreme heat.
- Rising levels of atmospheric carbon dioxide reduce the concentrations of protein and essential minerals in most plant species, including wheat, soybeans, and rice.
- It can also impact fisheries. Some marine disease outbreaks have also been linked with changing climate.
- Heat waves could threaten livestock by increasing their vulnerability to disease, reducing fertility, and declining milk production.
- Significant negative impact on commercial poultry due to heat stress.
- Study found that climate change could have contributed to the deaths of more than 50,000 farmers or farm workers over the last 30 years.
- Rise in sea level may lead to loss of farmland by inundation and increasing salinity of groundwater in coastal areas.
- Depleting water availability due to changes in precipitation levels and falling groundwater tables
- Water for agricultural production in the river basins of the Indus, the Ganges, and the Brahmaputra will shrink further and may impact food adequacy.

4) Consequences

- Climate change hits poor the most.
- As agriculture contributes 16 per cent to India's GDP, climate change causes about 1.5 per cent loss in GDP.
- By 2030, rice and wheat are likely to see about 6-10 per cent decrease in yields.
- Poor agricultural performance can lead to inflation, farmer distress and unrest, and larger political and social disaffection
- According to 2018 Economic Survey, India incurs losses of about \$9-10 billion annually due to extreme weather events.
- It also noted farmers' income losses from climate change would be between 15 % and 18 % on an average.
- All of which can hold back the economy.

5) Way Forward

- To cope with the impact of climate change on agriculture and food production, India will need to act at the global, regional, national and local level.
- Enhancing the resilience of agriculture to cope with the climate change and the climate variability.
- Increasing area under permaculture from current 108 million acres to 1 billion acres by 2050 could result in a total reduction of 23.2 gigatons of CO₂, from both sequestration and reduced emissions.
- Applying Farm yard Manure, compost or by practising organic farming to improve the soil organic matter which can help in improvement of soil health.
- Develop climate-smart agriculture practices.
- Adoption of Zero Budget Natural Farming (ZBNF)
- Building on the current crop insurance program, weather-based models and technology need to be used to determine losses and compensate farmers within weeks (Kenya does it in a few days).
- Farmers, especially smallholder farmers, need advance warning of emergent weather conditions at local level.
- Farmers can adapt to climate changes by shifting planting dates and choosing varieties with different growth duration.
- Interventions related to soil health, water harvesting, improved drainage in flood prone area, artificial ground water recharge and water saving irrigation methods.
- An Early warning system should be put in place to monitor changes in pest and disease outbreaks.
- Promoting Drought / temperature tolerant varieties and water saving paddy cultivation methods (System of Rice Intensification (SRI)).
- Investment in R&D is needed to spur innovations in sustainable climate-friendly and climate-proof productivity, and the private sector can help on this.