

General Studies – 3; Topic: Major crops – cropping patterns in various parts of the country,

Impact of Climate Change on Indian 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.
- Increased anthropogenic activities such as industrialization, urbanization, deforestation, etc. lead to emission of greenhouse gases due to which the rate of climate change is much faster.
- From ancient times India's agriculture has been dependent on monsoons. Any change in monsoon trends drastically affects agriculture.

2) Indian Agriculture

- Large country with diverse climate
- Two thirds area rain dependent
- High monsoon dependency
- 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) Weather Impacts on Agriculture

- Crops are impacted by rainfall variability and heat stress.
- Milk yield in livestock to be impacted during heat waves
- Changes in breeding season in marine fisheries with shift in seasonal catch
- Significant negative impact on commercial poultry due to heat stress
- High rainfall leads to greater loss of top soil due to erosion
- Rise in sea level may lead to loss of farmland by inundation and increasing salinity of groundwater in coastal areas.
- The major impacts of climate change will be on rain fed or un-irrigated crops, which are cultivated on nearly 60 percent of cropland.
- Increase in the mean seasonal temperature can reduce the duration of many crops and hence reduce final yield.
- Climate change has a direct impact on crop evapotranspiration.

4) Consequences

- Higher temperatures and changing precipitation patterns will severely affect the production patterns of different crops.
- All these changes will increase the vulnerability of the landless and the poor.
- In many parts of India Farmers committed suicide from stress-related issues arising from the vagaries of monsoon.
- The World Bank report warned that by the 2040s, India would see a significant reduction in crop yields because of extreme heat.
- 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 for 63 million people.

5) Government Initiatives

- Subsidies for micro-irrigation
- Drought Prone Areas Programme and the Desert Development Programme
- National watershed development project for rain fed areas
- The present government has brought all watershed management programmes under the ambit of the Pradhan Mantri Krishi Sinchai Yojana (PMKSY).
- Pradhan Mantri Fasal Bhima Yojana along with unified package insurance scheme and restructured weather based crop insurance scheme.
- National Mission for Sustainable Agriculture under National Action Plan on Climate Change (NAPCC)

6) Strategy to Adapt to Climate Change

- Strategic research to address long term climate change
- Farmers can adapt to climate changes by shifting planting dates, choosing varieties with different growth duration, or changing crop rotations.
- Capacity building of different stakeholders for greater awareness and community action
- Interventions related to soil health, water harvesting, improved drainage in flood prone area, artificial ground water recharge and water saving irrigation methods.
- Drought / temperature tolerant varieties, water saving paddy cultivation methods (SRI, aerobic, direct seeding),
- An Early warning system should be put in place to monitor changes in pest and disease outbreaks.
- Preventive measures for drought that include growing of pulses and oilseeds instead of rice
- Investment in R&D is needed to spur innovations in sustainable climate-friendly and climate-proof productivity, and the private sector can help.
- Financial incentives can encourage farmers to adopt measures that have high costs, or that are socially beneficial but costly at the private level.
- Develop climate-smart agriculture practices
- 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.