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Environmental Economics

# Climate Change: Causes and Consequences

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# Climate Change: Causes and Consequences

The atmosphere is the essential physical and chemical environment for life. Changes, anthropogenic or otherwise, to the physical and chemical properties of the atmosphere have the potential of affecting directly the quality of life and even the very existence of some form of life. During the four and a half billion years of our planet history, the parameters that determine the Earth's climate are changing naturally at their own pace, but presently; climate change has gained momentum due to inadvertent anthropogenic activities.

- Climate or weather is defined as a state of atmosphere at a particular place at a particular period of time. Weather is short term phenomenon. It refers to the short term (daily) changes in temperature, precipitation, wind and humidity of a region. Climate on the other hand, is the sum of the weather trend over a long period of time (Say a century or so).
- **Climate change refers to significant changes in global temperature, precipitation, wind patterns and other** measures of climate that occur over several decades or longer.
- **Various factors are responsible for it (causes of climate change)**  
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**Natural Factors:** such as continental drift, volcanoes, ocean currents, the earth's tilt, and comets and meteorites. The natural factors affect the climate change in long term and persist for thousand to millions of years.

- **Anthropogenic (Human Caused) Factors:** includes greenhouse gases, aerosols and pattern of land use changes etc.
- Industrialization, urbanization, deforestation, agriculture change in land use pattern etc. lead to enhanced emission of greenhouse gases such as Carbon dioxide, methane, nitrous oxide, hydro fluorocarbons (HFCs), per fluorocarbons(PFCs), Sulphur Hexafluoride in the environment causing the global temperature to increase.

- These gases trap the solar radiation and do not allow the solar heat to escape from the environment of earth which leads to global warming.
- The enhanced emission of greenhouse gases (GHGs) in atmosphere are responsible behind the drastic change in climate.

## **Impact of Climate change:**

Climate change is no more an environmental concern. It has emerged as the biggest developmental concern for the planet. The global economy is adversely being affected very frequently due to extreme events such as droughts and floods, cold and heat waves, forest fires, landslides etc.

- Climate change resulted in playing a major role in shrinking of ice sheet. The melting of ice results in the rise of sea levels and that endangers many islands to disappear completely.
- Climate change and its variability may cause the agriculture production to decline because of recurring drought, uneven rainfall, and other weather related extreme events.
- It may leads to emergence of new type of health issues and diseases.

## **Climate change with respect to the world**

- **Warmest years: The past four years—2015, 2016, 2017 and 2018**-taken together are the four warmest years on record. In contrast to the other top warmest years, **2018 began with La Niña conditions, which are typically associated with lower global** temperatures.

Average global temperature reached approximately 1 °C above pre-industrial levels.

- **CO2 concentration and mean sea level continued to increase in 2018.** A new record high of fossil CO2 emission – 36.9 (+/-1.8) billion tons of CO2 was reached in 2018.
- **Ocean acidification: In the past decade, the oceans absorbed** around 25% of anthropogenic carbon dioxide emissions and the **decrease in global ocean oxygen has continued. More than 90% of the energy trapped by greenhouse gases, goes into the oceans.**

- **Natural Hazards: In 2018, weather and climate events accounted** for most of nearly 62 million people affected by natural hazards. **The report identified the floods in Kerala as one of the main indicators of extreme weather events due to climate change.**
- **Population Displacement and Human Mobility: Out of the 17.7 million IDPs (Internally Displaced People),** over 2 million people were displaced due to disasters linked to weather and climate events as on September 2018.
- **Ozone: Ozone hole was 24.8 million km<sup>2</sup> as against 28.2 million km<sup>2</sup> in 2015.**
- **Glaciers and sea ice: Arctic sea-ice extent was well below average** throughout 2018. The Greenland ice sheet has been losing ice mass nearly every year over the past two decades.

## Climate change with respect to India:

- According to the 2017-18 Economic Survey, extreme temperatures and droughts **shrink farmer incomes to the tune of 4-14%** for key crops. The Survey had estimated the loss in **agriculture production every year due to climate** change is US\$ 10 billion, or Rs 70,000 crore.
- 171 million people live in coastal districts who are at risk due to **sea level rise, which** is about 14.2% of India's population pushing the rural to urban migration.
- In 2018-19, as many as 2,400 Indians lost their lives to **extreme weather events** such as floods and cyclones, according to the environment ministry.

- According to World Bank report in January 2019, by 2050, 148 million Indians will be living in severe **climate change hotspots**. Melting of glaciers in the Hindukush Himalayas will add to this apocalyptic scenario, making the entire Gangetic plains with Its 300 million people unliveable by 2100.

### **India's Climate Actions**

India has continuously demonstrated its responsibility towards acknowledging the emerging threats from climate change and implementing the climate actions on the basis of the **principles of Equity and Common but Differentiated Responsibilities for improving efficiency of the economy and its engines of growth**. The major policies and plans include:

- **National Action Plan on Climate Change (NAPCC)**, launched in 2008, formulated in the backdrop of India's voluntary commitment to reduce emission intensity of its GDP by 20 to 25 per cent by 2020 over 2005 levels.

- It was also meant to focus on key adaptation requirements and creation of scientific knowledge and preparedness for dealing with climate change.
- **State Action Plans on Climate Change (SAPCC) in line with the NAPCC taking into account State's specific issues** relating to climate change. So far, 33 States/ UTs have prepared their SAPCCs.
- **Climate Change Action Programme (CCAP) has been launched in 2014 with the objective to build and support** capacity at central and state levels, strengthening scientific and analytical capacity for climate change assessment, establishing appropriate institutional framework and implementing climate related actions in the context of sustainable development.

- **National Adaptation Fund on Climate Change was established in 2015 to meet the cost of adaptation to climate change for the State and Union Territories that are particularly vulnerable to the adverse effects of climate change. The Scheme will continue till 31 March 2020.**
- **Till date, 30 adaptation projects have been approved at a total cost of 847 crore covering vulnerable sectors such as Water, Agriculture and Animal Husbandry, Forestry Ecosystems and Biodiversity.**

### **Measures on Ozone reduction**

- **Ozone has been classified and monitored as one of the eight pollutants under National Air Quality index. System of Air Quality and Weather Forecasting (SAFAR): ozone is monitored as one of the pollutants.**

- Environmental Pollution (Prevention and Control) Authority enforce **Graded Response Action Plan (GRAP) for Delhi and the NCR region, which comprises the graded measures for each source framed** according to the Air Quality Index categories.

# Study Material References

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