

# Climate Change

## [UPSC Notes]

### What is Climate Change?

Climate change is the long-term change in the weather patterns of a specific geographical location.

- This change in the weather patterns can either be human-induced or due to anthropogenic factors.
- All these factors collectively raise the temperature of the local environment and hence contribute to ecological imbalances in the weather conditions.
- These weather conditions, when hampered for a longer period of time, lead to a substantial change in the climate of that area; i.e., a rise in the temperature; an increased concentration of greenhouse gases; disturbed natural cycles; all of this leads to change in the climatic conditions of the geographical area.

### Causes of Climate change

Below we have mentioned all the causes of Climate Change

#### Natural Factors

Natural factors are the natural events that occur in the environment. Man has no control over these occurrences. These can include the following:

##### Continental drifts

The movement of the tectonic plates has been taking place for millions of years. The movement of these plates leads to changes in the physical features of the landmass and the placement of the water bodies on the earth's surface. This leads to a change in the weather patterns, which over the years contributes to climate change.

##### Plate tectonics

The constant change in temperature of the core of the Earth's surface causes plate repositioning. This affects the local temperature of the environment and other codependent environmental factors, which in turn lead to climate change.

##### Eruption of volcano

An eruption of a volcano lasts for a very short period of time, but its after-effects are persistent for years. When lava erupts out of a volcano, a large amount of carbon dioxide, dust particles, aerosol droplets, and other greenhouse gases enter the earth's atmosphere. When excreted in large concentrations, these gases can warm up the earth's atmospheric layers and contribute to global warming. Hence, causing climate change.

##### Ocean currents

The movement of winds in the horizontal direction contradicts the natural flow of ocean currents. Hence, causes temperature variation, which in turn leads to a

change in the climate of the particular geographical area. This contributes to climate change as well.

## **Anthropogenic Factors**

Anthropogenic factors are influenced by human actions and deeds. The anthropogenic factors include the following:

### **Greenhouse gases**

The gases that absorb heat radiation from the sun and result in an increase in the temperature of the Earth's surface are called greenhouse gases. These include carbon dioxide, chlorofluorocarbons, water vapors, methane, and nitrous oxide. Due to industrialization, deforestation, and urbanization, the levels of concentrations of these gases are increasing in the atmosphere day by day, hence contributing to global warming.

### **Aerosoles**

Aerosols are extremely tiny liquid particles suspended in the earth's atmosphere. Their presence can be caused by a variety of activities such as coal burning, burning of plants grown with ammonia-containing fertilizers, biomass burning, and other industrial processes. They scatter and absorb solar radiation as well as infrared radiation, causing a change in the temperature of atmospheric layers. They also affect the physical and chemical composition of clouds, including cloud formation. Hence, it has an indirect impact on the climate.

### **Land use pattern**

Extensive usage of land for industrial purposes leads to deforestation, and changes in agricultural patterns lead to increased levels of greenhouse gases. Losing trees means losing the capability of cooling the environment, which is equivalent to increased carbon dioxide levels.

## **Climate Change Impact**

Let's discuss the impacts of climate change below

### **Landscape Change**

Landscape change has contributed to the continuous change in the positioning of land mass and also the movement of the flora and fauna towards the polar regions as they seek a cooler environment to tackle rising temperatures. On the contrary, the habitat of polar species is in danger due to the melting of ice as a result of global warming.

### **The rise in the Levels of the Sea**

The melting of glaciers is the result of global warming due to the increased temperature of the earth's atmosphere. All this water merges with the ocean and results in a significant rise in the sea level leading to a high risk of natural disasters like floods in the

coastal regions. These disasters erode the coastlines and destroy the ecosystems and wetlands around it.

## Ocean Acidification

Increased levels of carbon dioxide in the atmosphere lead to increased absorption of carbon dioxide by the ocean leading to ocean acidification. This, as a result, destroys the habitat for aquatic species like planktons, molluscs, and corals.

## Ecosystem Imbalances

Changes in weather patterns disrupt the local environment Hence destroying the suitable ecological conditions and The survival of indigenous species. This causes an imbalance in the ecosystem and destroys the natural environment.

## Natural Disasters

Draughts are occurring in various parts of the world as a result of a lack of adequate rainfall and high intensity of solar radiation in that geographical area, depleting the local species. The rise in sea level is another phenomenon caused by climate change that leads to floods, hurricanes, and storms.

## Adverse Human Health

Human health is compromised due to the high concentration of toxic gases in the atmosphere, which leads to various respiratory diseases. High temperatures also lead to an increase in various potential diseases in humans.

## National Action Plan on Climate Change

The NAPCC is a committee set up by the Indian government with the aim of tackling climate change. It includes the following 8 missions:

- National Solar Mission
- National Mission for Enhanced Energy Efficiency
- National Water Mission
- National Mission for Sustaining the Himalayan Ecosystem
- National Mission on Sustainable Habitat
- National Mission on Strategic Knowledge for Climate Change
- National Mission for a Green India
- National Mission for Sustainable Agriculture