Causes Of Climate Change

What is climate?

Climate

- Climate is the average weather in a place over many years.
- The weather can change in just a few hours whereas climate takes millions of years to change.
- Planet earth has witnessed many variations in climate since the beginning.

What are the pieces of evidence of Climate Change?

Evidence of Climate Change

- Sea level rise
- Global temperature rise
- Warming oceans
- Shrinking ice sheets
- Declining Arctic sea ice
- Glacial retreat
- Extreme natural events
- Ocean acidification
- Decreased snow cover

What are the causes of Climate Change?

Causes of Climate Change

- There are several causes of climate change. The most significant anthropogenic effect on the climate is the increasing trend in the concentration of greenhouse gases in the atmosphere.

- The causes can be grouped into two:
    - Astronomical causes
        - Sunspot activities
        - Millankovitch oscillations
    - Terrestrial causes
        - Volcanism
        - Concentration of greenhouse

- The astronomical causes are the variations in solar output related to sunspot activities.
- Sunspots are dark and cooler patches on the sun which rise and fall in a recurring manner.
- When the number of sunspots increases, cooler and wetter weather and greater storminess occur.
- These modify the amount of insolation received from the sun, which in turn, might have a bearing on the climate.
- Milankovitch oscillations, which infer cycles in the variations in the earth's orbital characteristics around the sun, the wobbling of the earth and the changes in the earth's axial tilt. All these alter the amount of insolation received from the sun, which in turn, might have a bearing on the climate.

Volcanism

- Volcanism is regarded as another cause for climate change.
- Volcanic eruptions throw up loads of aerosols into the atmosphere.
- These aerosols persist in the atmosphere for a substantial period of time decreasing the radiation of sun reaching the surface of Earth.

Concentration of greenhouse gases

- The primary Greenhouse gases of concern are Chlorofluorocarbons (CFCs), Methane (CH_4), Nitrous oxide (N_2O), Carbon dioxide (CO_2), and Ozone (O_3).
- Some other gases such as nitric oxide (NO) and carbon monoxide (CO) easily react with Greenhouse gases and affect their concentration in the atmosphere.
- The largest concentration of Greenhouse gas in the atmosphere is carbon dioxide.

Greenhouse effect

- The greenhouse effect is a normal process that warms the surface of the Earth.
- Solar radiation reaches the atmosphere of Earth and some of this is reflected back into space.
- The rest of the energy of the sun is absorbed by the terrestrial and the oceans, heating the Earth.
- Heat radiates from Earth towards space.
- Some of this heat is trapped by greenhouse gases in the atmosphere, keeping the Earth warm enough to sustain life.
- Human activities such as burning fossil fuels, agriculture, and land clearing are increasing the amount of greenhouse gases released into the atmosphere.
- This is trapping extra heat, and causing the temperature of the earth to rise and ultimately result in Global Warming.

Global Warming

- Global warming is the gradual heating of the surface of the Earth, ocean, and atmosphere.
- Global warming begins with the greenhouse effect, which is caused by the interaction between incoming radiation from the sun and the atmosphere of Earth.

- The atmosphere is acting as a greenhouse due to the presence of greenhouse gases.