



## GLOBAL WARMING - GS I AND III MAINS

**Q.** Global warming makes a significant impact on climate, agriculture and food production, as well as human health and well-being. Elucidate (10 marks, 150 words)

**News:** *2023 is hottest year ever, says WMO report*

### What's in the news?

- The year 2023 is all set to be the warmest year ever, the World Meteorological Organisation (WMO) has said, as climate negotiators and world leaders began their discussions at the annual climate change conference, COP28, in Dubai.

### Key takeaways:

- Global average temperatures till October this year were about 1.4 degree Celsius higher than pre-industrial average, considerably more than the previous hottest year 2016 which was about 1.29 degree Celsius warmer.
- The gap is so large that data from November and December is unlikely to prevent 2023 from becoming the warmest ever, the WMO said.

### Global Warming:

- Global warming refers to the long-term increase in Earth's average surface temperature due to the buildup of greenhouse gases in the atmosphere.

### Causes of Global Warming:

- The primary cause of global warming is human activities, particularly the burning of fossil fuels such as coal, oil, and natural gas, which release carbon dioxide (CO<sub>2</sub>) and other greenhouse gases into the atmosphere.

### Impacts of Global Warming:

#### 1. Sea level rise:

- As the Earth's temperature increases, ice and snow in the polar regions begin to melt, causing sea levels to rise.
- This can have a significant impact on coastal areas, as it can lead to flooding and erosion.

#### 2. Extreme weather:

- Global warming can lead to an increase in the frequency and severity of extreme weather events such as heat waves, droughts, and heavy precipitation.
- This can have a significant impact on agriculture and food production, as well as human health and well-being.



### 3. Ocean acidification:

- As carbon dioxide (CO<sub>2</sub>) is absorbed by the ocean, it can lead to a decrease in the pH level of seawater, a process known as ocean acidification.
- This can have a significant impact on marine life, as it can make it more difficult for shellfish and other organisms to form and maintain their shells.

### 4. Wildfires:

- Global warming can lead to an increase in the frequency and severity of wildfires.
- This can have a significant impact on human communities, as well as wildlife and their habitats.

### 5. Climate-induced migration:

- Climate change can lead to the displacement of people due to extreme weather events, sea-level rise and other impacts.
- This can lead to increased pressure on infrastructure and resources in receiving areas and can lead to conflicts.

### 6. Glacier retreat:

- As the Earth's temperature increases, glaciers and ice sheets begin to melt, causing them to retreat.
- This can have a significant impact on freshwater availability and flooding in downstream areas that rely on glacier meltwater.

### 7. Changes in precipitation patterns:

- Global warming can lead to changes in precipitation patterns, such as increased droughts in some regions, also heavy cloud bursts with flash floods.

### 8. Climate variability:

- Global warming can cause changes in precipitation patterns, leading to more extreme weather events such as floods and droughts.

### 9. Loss of biodiversity:

- Global warming can cause changes in temperature and precipitation patterns, which can lead to the loss of habitats for many plant and animal species.

### 10. Natural disasters:

- Global warming can increase the frequency and severity of natural disasters such as wildfires, hurricanes and typhoons, which can cause significant damage to infrastructure and communities.

## WAY FORWARD:

### 1. Binding emission reduction targets:

- The Kyoto Protocol sets binding emission reduction targets for developed countries (known as Annex I countries) during the commitment period (2008-2012).
- These targets aimed to collectively reduce greenhouse gas emissions by an average of 5.2% below 1990 levels.

### 2. Cap-and-trade system:

- The Kyoto Protocol introduced a cap-and-trade system called the Clean Development Mechanism (CDM).



- This mechanism allows developed countries to invest in emission reduction projects in developing countries and earn emission reduction credits, which can be used to meet their own reduction targets.

### **3. Promotion of renewable energy and energy efficiency:**

- The Kyoto Protocol encourages the adoption of renewable energy sources and energy-efficient technologies to reduce greenhouse gas emissions.
- It promotes sustainable development practices and the transfer of clean technologies to developing countries.

### **4. Carbon sinks and sequestration:**

- The Kyoto Protocol recognizes the role of carbon sinks, such as forests and land-use practices, in absorbing carbon dioxide from the atmosphere.
- It provides provisions for countries to account for emissions and removals associated with these sinks.

### **5. Compliance mechanisms:**

- The Kyoto Protocol establishes compliance mechanisms to ensure that countries meet their emission reduction targets.
- This includes regular reporting, review processes, and financial penalties for non-compliance.

Hence, these control measures aim to limit global warming, reduce greenhouse gas emissions, and mitigate the adverse effects of climate change on the global climate system. Continued international cooperation, policy implementation, and technological advancements are crucial for achieving the goals outlined in these agreements and ensuring a sustainable and resilient future.