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## Climate Change 2021 Report: IPCC

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### Why in News

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Recently, the **Intergovernmental Panel on Climate Change (IPCC)** released the first part of its **Sixth Assessment Report (AR6)** titled **Climate Change 2021: The Physical Science Basis**.

- It is prepared by the scientists of **Working Group-I**. The **two remaining parts would be released in 2022**.
- It noted that global **net-zero by 2050** was the **minimum required to keep the temperature rise to 1.5 degree Celsius**.
- It sets the stage for the **Conference of Parties (CoP) 26** conference in **November 2021**.

# Alarm bells

A look at some of the observations and forecasts made by the panel on climate change

■ Heatwaves and humid heat stress will become more intense and frequent over Southeast Asia during the 21st century

■ Both annual and summer monsoon precipitation will increase, with enhanced interannual variability over Southeast Asia

■ Heat extremes have increased while cold extremes have decreased, and these trends will continue over the coming decades

■ Glacier run-off in the Asian high mountains will increase up to mid-21st century, and subsequently run-off may decrease due to the loss of glacier storage

■ Relative sea level around Asia increased faster than global average, with coastal area loss and shoreline retreat. Regional mean sea level will continue to rise



## Key Points

- **Average Surface Temperature:**
  - The average surface temperature of the Earth will **cross 1.5 °C over pre-industrial levels in the next 20 years** (By 2040) and **2°C by the middle of the century** without sharp reduction of emissions.
    - In 2018, the IPCC's **Special Report Global Warming of 1.5°C** had estimated that two-fifths of the global population lived in regions with warming above 1.5°C.
  - The **last decade was hotter than any period of time in the past 1,25,000 years**. Global surface temperature was 1.09°C higher in the decade between 2011-2020 than between 1850-1900.
  - This is the **first time** that the IPCC has said that the **1.5°C warming was inevitable even in the best case scenario**.

- **Carbon dioxide (CO<sub>2</sub>) Concentrations:**

- They are the **highest in at least two million years**. Humans have emitted 2,400 billion tonnes of CO<sub>2</sub> since the late 1800s.
- Most of this can be **attributed to human activities, particularly the burning of fossil fuels**.

The effect of human activities has **warmed the climate at a rate unprecedented in 2,000 years**.

- The world has already **depleted 86% of its available carbon budget**.

- **Impact of Global Warming:**

- **Sea- Level Rise:**

- **Sea-level rise has tripled compared with 1901-1971**. The Arctic Sea ice is the lowest it has been in 1,000 years.
- Coastal areas will see continued sea-level rise throughout the 21<sup>st</sup> century, resulting in **coastal erosion and more frequent and severe flooding in low-lying areas**.
- About 50% of the sea level rise is **due to thermal expansion** (when water heats up, it expands, thus warmer oceans simply occupy more space).

- **Precipitation & Drought:**

Every additional 0.5 °C of warming will **increase hot extremes, extreme precipitation and drought**. Additional warming will also weaken the Earth's carbon sinks present in plants, soils, and the ocean.

- **Heat Extremes:**

Heat extremes have increased while cold extremes have decreased, and these trends will continue over the coming decades over Asia.

- **Receding Snowline & Melting Glaciers:**

- Global Warming will have a **serious impact on mountain ranges across the world, including the Himalayas**.
- The freezing level of mountains are likely to change and snowlines will retreat over the coming decades.
- Retreating snowlines and melting glaciers is a cause for alarm as **this can cause a change in the water cycle, the precipitation patterns, increased floods as well as an increased scarcity of water** in the future in the states across the Himalayas.
- The level of temperature rise in the mountains and glacial melt is unprecedented in 2,000 years. The retreat of glaciers is now attributed to anthropogenic factors and human influence.

- **Indian Sub-continent Specific Findings:**
  - **Heatwaves:** Heatwaves and humid heat stress **will be more intense and frequent during the 21<sup>st</sup> century** over South Asia.
  - **Monsoon:** Changes in monsoon precipitation are also expected, with both annual and summer monsoon precipitation projected to increase.
    - The South West Monsoon **has declined** over the past few decades **because of the increase of aerosols**, but **once this reduces, we will experience heavy monsoon rainfall.**
  - **Sea Temperature:** The Indian Ocean, which includes the Arabian Sea and Bay of Bengal, has **warmed faster than the global average.**
    - The **sea surface temperature over Indian ocean is likely to increase by 1 to 2 °C** when there is 1.5°C to 2°C global warming.
    - In the Indian Ocean, the sea temperature is heating at a higher rate than other areas, and therefore may influence other regions.
- **Net- Zero Emissions:**
  - **About:**
    - It means that **all man-made greenhouse gas emissions must be removed from the atmosphere through reduction measures**, thus reducing the Earth's net climate balance, after removal via natural and artificial sink, to zero.
    - This way humankind would be **carbon neutral and global temperature would stabilise.**
  - **Current Situation:**
    - Several countries, **more than 100, have already announced their intentions to achieve net-zero emissions by 2050.** These include major emitters like the United States, China and the European Union.
    - **India, the third largest emitter in the world**, has been holding out, arguing that it was already doing much more than it was required to do, performing better, in relative terms, than other countries.
      - Any further burden would **jeopardise its continuing efforts to pull its millions out of poverty.**
    - IPCC has informed that a global net-zero by 2050 was the minimum required to keep the temperature rise to 1.5°C. **Without India, this would not be possible.**
      - Even **China, the world's biggest emitter, has a net-zero goal for 2060.**

## Intergovernmental Panel on Climate Change

- It is the **international body for assessing the science related to climate change.**

- It was **set up in 1988** by the **World Meteorological Organization (WMO)** and **United Nations Environment Programme (UNEP)** to provide policymakers with regular assessments of the scientific basis of climate change, its impacts and future risks, and options for adaptation and mitigation.
- IPCC assessments **provide a scientific basis for governments at all levels to develop climate related policies**, and they underlie negotiations at the UN Climate Conference – the **United Nations Framework Convention on Climate Change (UNFCCC)**.

### IPCC Assessment Reports

- Every few years (about 7 years), the IPCC produces assessment reports that are the most **comprehensive scientific evaluations of the state of earth's climate**.
- So far, five assessment reports have been produced, the **first one being released in 1990**. The **fifth assessment report had come out in 2014** in the run up to the **climate change conference in Paris**.
- The Assessment Reports - by **three working groups of scientists**.
  - **Working Group-I** - Deals with the scientific basis for climate change.
  - **Working Group-II** - Looks at the likely impacts, vulnerabilities and adaptation issues.
  - **Working Group-III** - Deals with actions that can be taken to combat climate change.

### Way Forward

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- Climate change is described by many as a far **greater threat to humanity than Covid-19, because of its irreversible impacts**. Many of the impacts such as sea level rise and melting of glaciers will continue for many years.
- There is a **need for a drastic and immediate cut in carbon emissions**, given that the changes to the climate already made are not reversible.
- All nations, especially the **G20** and other major emitters, **need to join the net-zero emissions coalition** and reinforce their commitments with credible, concrete and enhanced **Nationally Determined Contributions** and policies before **COP26 in Glasgow, Scotland**.

**Source: IE**