GOVERNMENT OF INDIA
MINISTRY OF EARTH SCIENCES
RAJYA SABHA
UNSTARRED QUESTION NO. 362
ANSWERED ON 25/07/2024

IMPACTS OF CLIMATE CHANGE

362. SHRI G.C. CHANDRASHEKHAR:

Will the Minister of **EARTH SCIENCES** be pleased to state:

(a) the latest research findings on climate change impacts, including global temperature trends, sea-level changes, and regional climate variability; and
(b) the details on measures proposed to mitigate these effects and adapt to environmental changes in the near future?

ANSWER
THE MINISTER OF STATE (INDEPENDENT CHARGE) FOR
MINISTRY OF SCIENCE AND TECHNOLOGY
AND EARTH SCIENCES
(DR. JITENDRA SINGH)

(a) The ministry has done a detailed climate change assessment and prepared a report, namely,"Assessment of Climate Change over the Indian Region" (https://link.springer.com/book/10.1007/978-981-15-4327-2). Some of the research findings from the Intergovernmental Panel on Climate Change (IPCC) and the ministry reports are below:

- Global Temperature trend: The global average temperature has risen by around 1°C since pre-industrial times. This magnitude and rate of warming cannot be explained by natural variations alone and must necessarily take into account changes due to human activities. Emissions of greenhouse gases (GHGs), aerosols, and changes in Land Use and Land Cover (LULC) during the industrial period have substantially altered the atmospheric composition and, consequently, the planetary energy balance and are thus primarily responsible for the present-day climate change.

- Warming since the 1950s has already contributed to a significant increase in weather and climate extremes globally (e.g., heatwaves, droughts, heavy precipitation, and severe cyclones), changes in precipitation and wind patterns (including shifts in the global monsoon systems), warming and acidification of the global oceans, melting of sea ice and glaciers, rising sea levels, and changes in marine and terrestrial ecosystems.

- Sea Level Rise: Sea levels have risen globally because of the continental ice melt and thermal expansion of ocean water in response to global warming. Sea-level rise in the North Indian Ocean (NIO) occurred at a rate of 1.06–1.75 mm per year during 1874–2004 and has accelerated to 3.3 mm per year in the last two and a half decades (1993–2017).

- Temperature trends over India with regional changes: India's average temperature has risen by around 0.7°C during 1901–2018. This temperature rise is largely due to GHG-induced warming, partially offset by forcing due to anthropogenic aerosols and changes in LULC. In the recent 30-year period (1986–2015), temperatures of the warmest day and the coldest night of the year have risen by about 0.63°C and 0.4°C, respectively.

- Tropical Cyclones: There has been a significant reduction in the annual frequency of tropical cyclones over the NIO basin since the middle of the twentieth century (1951–2018). In contrast, the frequency of very severe cyclonic storms (VSCSs) during the post-monsoon season has increased significantly (+1 event per decade) during the last two decades (2000–2018). However, a clear signal of anthropogenic warming on these trends has not yet emerged. Climate models project a rise in the intensity of tropical cyclones in the NIO basin during the twenty-first century.

- Changes in the Himalayas: The Hindu Kush Himalayas (HKH) experienced a temperature rise of about 1.3°C during 1951–2014. Several areas of HKH have experienced a declining trend in snowfall and the retreat of glaciers in recent decades. In contrast, the high-elevation Karakoram Himalayas have experienced higher winter snowfall, shielding the region from glacier shrinkage.

(b) According to the IPCC, to hold the planet's long-term average temperature rise below the 1.5-degree threshold, the world will have to reach net zero emissions by the year 2050. Despite not being a significant contributor to the problem of climate change, India has demonstrated a proactive stance by surpassing its fair share of efforts to address this global issue.

The Indian government remains steadfast in its commitment to combat climate change through various programs and initiatives, such as the National Action Plan on Climate Change (NAPCC) and the State Action Plan on Climate Change (SAPCC).These plans encompass specific missions in areas like solar energy, energy efficiency, water conservation, sustainable agriculture, health, the Himalayan ecosystem preservation, sustainable habitat development, Green India, and strategic knowledge for climate change.The NAPCC serves as a comprehensive framework for all climate-related actions. Additionally, India has taken a proactive role in fostering international collaborations through initiatives such as the International Solar Alliance and the Coalition for Disaster-Resilient Infrastructure. India is committed to pursuing low-carbon strategies for development and is actively pursuing them, as per national circumstances. India updated its Nationally Determined Contribution (NDC) in August 2022 as follows:

- Meet 50% of India's cumulative electric power installed capacity from non-fossil sources by 2030.
- Reduce the emission intensity of GDP by 45% below 2005 levels by 2030.
- Put forward and further propagate a healthy and sustainable way of living based on the traditions and values of conservation and moderation, including through a mass movement for LiFE-Lifestyle for Environment as a key to combating climate change. In keeping with its sustainable development goals (SDGs) and commitments, the government has been promoting sustainability across all fronts of development and urbanization.

****