

GOVERNMENT OF INDIA
MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE

LOK SABHA
UNSTARRED QUESTION NO. 1886
TO BE ANSWERED ON 14.03.2022

Effects of Climate Change

1886. SHRIMATI POONAM MAHAJAN:
SHRI INDRA HANG SUBBA:
MS. DEBASREE CHAUDHURI:

Will the Minister of ENVIRONMENT, FOREST AND CLIMATE CHANGE be pleased to state:

- (a) whether the Government has taken note of the Climate Change across the country and if so, the details thereof;
- (b) the details of geographical areas that have witnessed the most significant Climatic Change, with special reference to the Himalayas, indicating the impact of such a change on the environment in the country;
- (c) whether the Government has separate fund allocation to carry out research studies on climate change in the Himalayas, if so, the details thereof, if not, the reasons therefor;
- (d) whether the Government has any plans to setup institutions for environment and climate change in the Northeast region, if so, the details thereof; and
- (e) whether the Government has conducted any study to examine the trend of declining rainfall in certain areas of the country and if so, the details thereof and if not, the reasons therefor?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE
(SHRI ASHWINI KUMAR CHOUBEY)

(a) The Government is seized of the matter and has been assessing climate change over the years through various Ministries and Agencies. India Meteorological Department (IMD) brings out the publication 'Annual Climate Summary' at the end of every year that features highlights of climate patterns including temperature and rainfall over the country, long term changes since the year 1901 in all India temperature and rainfall in annual and seasonal scales. As per the World Meteorological Organisation, the global mean temperature for 2021 was about $1.11(\pm 0.13)^{\circ}\text{C}$ above the pre-industrial (1850-1900) levels.

According to the Ministry of Earth Sciences, the surface air temperature over India has risen by about 0.7°C during 1901–2018. The sea surface temperatures in the tropical Indian Ocean have also increased by about 1°C during 1951–2015. On an average, at present, the sea level along the Indian coast is estimated to be rising at about 1.7 mm/year.

(b) and (c) While many studies monitor current changes in the environment, the science of attribution of these changes particularly to global warming is far more complex and is currently an evolving subject. Such changes as are observed may arise from a number of causes, including the inherent variability in climatic systems that are common in the biosphere and geosphere. Most studies so far have relied on mathematical modelling of climate change impacts.

According to the information provided by the Gobind Ballabh Pant National Institute of Himalayan Environment, some of the impacts of climate change observed in the Indian Himalayan Region are as follows: (i) upward movement of treeline of woody species at a slow rate having likely impact on alpine pastures over the time span of several decades, (ii) upward movement of herbaceous plants over the time scale of a century which has already been observed and documented in states such as Sikkim, (iii) gradual shifting of production zone of horticultural crops like apple orchards in Himachal Pradesh, over decades, and (iv) melting or retreat of certain glaciers, though there are also stable or even advancing glaciers in the Himalaya, thereby emphasizing the complex geographical and cyclical nature of the glacial dynamics.

The monitoring of glaciers is pursued by the Indian Space Research Organization (ISRO), Geological Survey of India (GSI), Ministry of Earth Sciences (MoES), Defence Geoinformatics Research Establishment (DGRE), and also through various research projects sponsored by the Department of Science and Technology (DST). The latter also has an autonomous institution on Himalayan Geology, namely, the Wadia Institute of Himalayan Geology, Dehradun. The Central Water Commission (CWC) monitors 477 glacial lakes and water bodies in the Himalayan Region of the Indian river basin system, having an area of more than 50 hectares on a monthly basis in the monsoon season since 2011. Further, the National Disaster Management Authority has issued guidelines titled "Management of Glacial Lake Outburst Floods (GLOFs)" in October 2020, which inter-alia includes a discussion on Early Warning Systems.

(d) Along with the Ministry of Environment, Forest and Climate Change and its various bodies and institutions, all other departments and institutions of the government that are associated with climate change relevant matters, pay due attention to climatic trends, impacts and other relevant phenomena in the North-East region. It may also be noted that there is a separate Ministry of Development of North East Region that is occupied with, inter alia, issues related to climate change and environment in the North-East especially in the context of development.

(e) India Meteorological Department (IMD) has carried out an analysis of observed monsoon rainfall variability and changes of 29 States and Union Territories at State and District levels based on the IMD's observational data of 30 years (1989-2018) during the Southwest monsoon season from June to September. The reports on observed rainfall variability and its trend for each State and Union Territory are available on the IMD website. Although there is inter-annual variability, the total precipitation during the Indian summer monsoon has remained largely stable over the period 1901-2019 and has shown a weak decreasing trend during the last three decades. Further, the following are findings of the IMD on the changes of rainfall and its intensities during the last three decades:

- Five states viz., Uttar Pradesh, Bihar, West Bengal, Meghalaya, and Nagaland have shown significant decreasing trends in southwest monsoon rainfall during the recent 30 years period (1989-2018).
- The annual rainfall over these five states along with the states of Arunachal Pradesh and Himachal Pradesh also show significant decreasing trends.
- Other states do not show any significant changes in southwest monsoon rainfall during the same period.
- Considering district-wise rainfall, there are many districts in the country, which show significant changes in southwest monsoon and annual rainfall during the recent 30 years period (1989-2018).
- With regard to the frequency of heavy rainfall days, a significant increasing trend is observed over Saurashtra & Kachchh, Southeastern parts of Rajasthan, Northern parts of Tamil Nadu, Northern parts of Andhra Pradesh and adjoining areas of Southwest Odisha, many parts of Chhattisgarh, Southwest Madhya Pradesh, West Bengal, Manipur & Mizoram, Konkan & Goa, and Uttarakhand.
