GOVERNMENT OF INDIA
MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE

RAJYA SABHA
STARRED QUESTION NO. 196
TO BE ANSWERED ON 15.03.2021

Impact of Climate Change

*196. DR. AMEE YAJNIK:

Will the Minister of ENVIRONMENT, FOREST AND CLIMATE CHANGE be pleased to state:
(a) whether Government has taken note of the Climate Change across the country;
(b) if so, the details thereof;
(c) the 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; and
(d) whether Government has conducted any study to examine the trend of declining rainfall in certain areas of the country and if so, the details thereof?

ANSWER

MINISTER FOR ENVIRONMENT, FOREST AND CLIMATE CHANGE
(SHRI PRAKASH JAVADEKAR)

(a) to (d): A Statement is laid on the Table of the House.

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Statement referred to in reply to part (a) to (d) of Rajya Sabha Starred Question No. 196 due for the reply on 15.03.2021 by DR. AMEE YAJNIK regarding Impact of Climate Change.

(a) & (b): 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 report by the World Meteorological Organization (WMO), the average global temperature for 2015-2019 is currently estimated to be 1.1 degree Celsius above pre-industrial (1850-1900). According to the MoES, the surface air temperature over India has risen by about 0.7 °C during 1901–2018 which is accompanied with an increase in atmospheric moisture content. 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.

India is a Party to the United Nations Framework Convention on Climate Change (UNFCCC), its Kyoto Protocol (KP), and the Paris Agreement (PA). Independent studies rate India's efforts highly and compliant with the requirements under PA.The Government of India stands committed to combating climate change through its several programmes and schemes including the National Action Plan on Climate Change (NAPCC)which comprises missions in specific areas of solar energy, energy efficiency, water, agriculture, Himalayan ecosystem, sustainable habitat, green India, and strategic knowledge on climate change. The NAPCC provides an overarching framework for all climate actions.Thirty-three States /Union Territories have prepared their State Action Plan on Climate Change (SAPCC) in line with NAPCC taking into account the State's specific issues relating to climate change. These SAPCCs outline sector-specific and cross-sectoral priority actions, including adaptation.

(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 but these are yet to be empirically verified.

According to the information provided by 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): India Meteorological Department (IMD) has carried out an analysis of observed monsoon rainfall variability and changes of 29 States & Union Territory at State and District levels based on the IMD's observational data of recent 30 years (1989- 2018) during the Southwest monsoon season from June-July-August-September (JJAS). The reports on observed rainfall variability and its trend for each State and Union Territory are available in 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 recent few decades. Further, the followingare 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.

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