

GOVERNMENT OF INDIA
MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE

RAJYA SABHA
UNSTARRED QUESTION NO.175
TO BE ANSWERED ON 08.12.2022

Rising carbon emissions in the North Eastern Region

175. SHRI DEREK O'BRIEN:

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

- (a) whether Government is aware that rising black carbon emissions is leading to a decrease in low-intensity rainfall while increasing severe rain in the pre monsoon season in the North Eastern Region;
- (b) if so, the details of steps being taken by Government to mitigate this crisis, if not, the reasons therefor;
- (c) whether Government has conducted any studies to understand the impact of this change on the local economy as well as the national climate; and
- (d) if so, the details thereof, if not, the reasons therefor?

ANSWER

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

(a) to (d) Black Carbon is mainly produced by anthropogenic activities as a result of the incomplete combustion of fossil fuels, biofuels and biomass. As per information received from India Meteorological Department (IMD), aerosols including black carbon influence the cloud formation and the rainfall pattern. A recent paper on "Aerosol influence on the pre-monsoon rainfall mechanisms over North-East India: A WRF-Chem study" published by Indian Institute of Technology, Guwahati in the Journal of Atmospheric Research (April, 2022) mentions that rising black carbon emissions is leading to suppression of lower intensity rainfall and increasing heavy rain in the pre-monsoon season in the North Eastern Region. But the conclusions of this study are based on only 10 days model simulations. Analysis of rainfall data records of IMD points out increase in extreme rainfall events over parts of North East India.

The Indian Space Research Organization (ISRO) is operating a network of aerosol observatories under ISRO Geosphere Biosphere Programme. One of the important parameters being measured from this network is the black carbon mass concentration. The long-term measurements of black carbon over the Indian region from the aforesaid regional network of aerosol observatories clearly showed a decreasing trend ($0.24 \mu\text{g m}^{-3}\text{year}^{-1}$) in the past decade. The studies at North Eastern Space Application Centre (NESAC/ ISRO) using available

data from foreign sources (MERRA-2 - Modern-Era Retrospective analysis for Research and Applications) suggest a mild rising trend ($0.000531 \mu\text{g m}^{-3} \text{ month}^{-1}$) of black carbon concentration over North Eastern Region. However, no specific study has been carried out on the relation between black carbon and rainfall.
