

GOVERNMENT OF INDIA
MINISTRY OF EARTH SCIENCES
RAJYASABHA
UNSTARRED QUESTION No-32
ANSWERED ON – 20/07/2023

STEPS TO PRESERVE THE HIMALAYAN GLACIERS

32. # SHRI DEEPAK PRAKASH:

Will the Minister of EARTH SCIENCES be pleased to state:

- (a) the research being conducted for cryosphere studies in the Himalayas during the last three years;
- (b) the observations and conclusions made in the research work conducted and whether any suggestions have been given regarding steps to be taken to preserve the Himalayan glaciers; and
- (c) the number of persons engaged for the purpose of conducting research work during the last three years?

ANSWER

**THE MINISTER OF EARTH SCIENCES
(SHRI KIREN RIJJU)**

- (a) & (b) Several Indian institutes/universities/organizations funded by the Government of India through Ministry of Earth Sciences (MoES), Department of Science & Technology (DST), Ministry of Environment Forest and Climate Change (MoEFCC), Department of Space (DoS), Ministry of Mines (MoM) and Ministry of Jal Shakti (MoJS) monitor Himalayan glaciers for various scientific studies including glacier melting and have reported accelerated heterogeneous mass loss in Himalayan glaciers. The mean retreat rate of Hindu Kush Himalayan glaciers is 14.9 ± 15.1 meter/annum (m/a); which varies from 12.7 ± 13.2 m/a in Indus, 15.5 ± 14.4 m/a in Ganga and 20.2 ± 19.7 m/a in Brahmaputra River basins. However, glaciers in the Karakoram region have shown comparatively minor length change (-1.37 ± 22.8 m/a), indicating the stable conditions.

Ministry of Earth Sciences (MoES) through its autonomous institute, the National Centre for Polar and Ocean Research (NCPOR) has been monitoring six glaciers in the Chandra basin (2437 km² area) in western Himalaya since 2013. A state-of-the-art field research station 'Himansh' established in Chandra basin and operational since 2016 for conducting field experiment and expeditions to glaciers. The glacier inventory prepared by NCPOR for the Chandra basin shows that it has lost about 6% of its glacial area during last 20 years and 2.4 meter water equivalent (m w.e.) to 9 m w.e. ice mass during 2013-2021. The glaciers in Bhaga basin lost huge ice mass in the range 6 m w.e. to 9 m.w.e. during 2008-2021. Annual rate of retreat of Chandra basin glaciers vary from 13 to 33 meter/year during last decade.

DST's Wadia Institute of Himalayan Geology (WIHG) has been pursuing cryospheric research on different aspects that include glacier dynamics, hydrology and hazards using both satellite data and ground-based observations. WIHG have observed that glaciers in the Garhwal Himalaya shows significant heterogeneities in glacier thinning and surface flow velocity patterns. The observations show an overall retreat of glaciers with variable rate of melting and retreat based on different facets like topography (elevation, aspect and slope), climate (temperature and precipitation) and debris cover. The observed retreats are 15-20 m/year for the Dokriani Glacier in Bhagirathi basin, 9-11 m/year Chorabari Glacier in Mandakini basin, ~12 m/year at Durung-Drung and ~ 5.6 m/year at Pensilungpa glaciers in Suru basin.

National Institute of Hydrology (NIH) has been monitoring the hydrological and hydro – meteorological data at Bhojwasa downstream of Gaumukh since 2000. The volume of flow recorded during these years does not show much variation. NIH is also monitoring two glaciers namely Phuche and Khadung in Ladakh Himalayas since 2010.

Indian Space Research Organization's (ISRO's) Space application Centre (SAC) has mapped 5234 glaciers of Himalayan-Karakoram (H-K) region using primarily IRS LISS III data which indicated varied loss in glacier area in the region. Geological Survey of India (GSI) and various Institutes/Universities under the projects funded by DST have conducted mass balance studies on number of glaciers and found that majority of Himalayan glaciers are melting/ retreating at varying rates in different regions.

The melting of glaciers is a natural process and cannot be controlled. The recession or melting of glaciers is mainly caused by global warming and climate change. Therefore, the rate of melting of glacier can't be prevented or slowed down, unless all the factors responsible for the global warming and climate change can be controlled. In view of the above, though various Indian institutes, organizations and universities are monitoring the Himalayan glaciers using both field and remotely sensed data to comprehensively understand the nature of their response, none have reported any suggestions related to preserving the Himalayan glaciers.

- (c) Around 90 research personals including scientists, faculties as well as research scholars in different academic and research institutions across country were engaged for the purpose of conducting research work on Himalayan glaciers during the last three years.
