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GOVERNMENT OF INDIA
MINISTRY OF HOME AFFAIRS

LOK SABHA
STARRED QUESTION NO. *440

TO BE ANSWERED ON THE 01ST APRIL, 2025/ CHAITRA 11, 1947 (SAKA)

GLACIAL LAKE OUTBURST FLOOD MITIGATION

***440. SHRI BALABHADRA MAJHI:**
SHRI TRIVENDRA SINGH RAWAT:

Will the Minister of HOME AFFAIRS be pleased to state:

(a) the steps being taken to strengthen early warning systems, particularly in remote and inaccessible areas;

(b) the details of plans of the Government to involve local communities in monitoring and alerting mechanisms to ensure last-mile connectivity;

(c) the manner in which the Government plans to assess and minimize the economic impact of potential Glacial Lake Outburst Flood (GLOF) events on local communities including tourism-dependent regions;

(d) whether there are plans to extend similar mitigation measures to other Himalayan States or regions facing GLOF risks in the future; and

(e) if so, the details thereof?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF HOME AFFAIRS
(SHRI NITYANAND RAI)

(a) to (e): A statement is laid on the table of the House.

STATEMENT IN REPLY TO PARTS (a) TO (e) OF THE STARRED QUESTION NO. 440* FOR ANSWER IN LOK SABHA ON 01.04.2025

Strengthening of Early Warning Systems is prerequisite for preparedness measures and is the most important element of entire cycle of disaster management.

The Prime Minister has enunciated ten-point agenda on Disaster Risk Reduction (DRR) during the Asian Ministerial Conference on Disaster Risk Reduction (AMCDRR) held in New Delhi in November 2016. The all-inclusive agenda includes the following: -

"Leverage technology to enhance the efficiency of disaster risk management efforts." and "Build on local capacity and initiative to enhance disaster risk reduction".

The Government effectively deploys technologies for improved early warning and forecasting of disaster in the vulnerable areas. Central Government has designated nodal agencies for early warning of different natural disasters.

To promote the use of modern technologies and to strengthen the early warning system for natural disasters, Ministry of Earth Sciences has

launched a Multi-faceted transformative approach namely "Mission Mausam" for the period 2024-2026 with the goal of making India a "weather-ready and climate smart" nation.

Under the National Cyclone Risk Mitigation Project (NCRMP) Early Warning Systems have been installed in the Coastal States, which have proved to be of great help in alert dissemination to the coastal community during recent cyclones.

'Common Alerting Protocol (CAP) based Integrated Alert System' has been initiated with an outlay of Rs. 354.83 Crore, for dissemination of geo targeted early warnings/alerts related to disasters to the citizens of India for all 36 States/UTs using various disseminating medium like SMS, TV, Radio, Indian Railways, Costal Sirens, Cell broadcast, Internet (RSS feed & Browser Notification), Satellite Receiver of GAGAN & NavIC etc., through integration of all alerting agencies, [India Meteorological Department (IMD), Central Water Commission (CWC), Indian National Centre for Ocean Information Services (INCOIS), Defence Geo-informatics Research Establishment (DGRE), Geological Survey of India (GSI) and Forest Survey of India (FSI)].

In CAP system, the alerts related to various disasters are generated by Alert Generating Agencies like IMD, CWC, INCOIS, DGRE & FSI and moderated by SDMAs of concern States/UTs. The alerts are sent to geo targeted areas in regional languages. There is a web-based dashboard to disaster managers for approving/editing alerts and choosing media for dissemination. The system has been used successfully in recent disasters. More than 4500 crore SMS alerts have been disseminated so far using CAP.

National Disaster Management Authority (NDMA) has also initiated a project for Pan India, end-to-end secure and foolproof Disaster Grade Cell Broadcasting System (CBS) to improve faster dissemination of alert / early warning messages to the citizen.

Defence Geoinformatics Research Establishment (DGRE), Chandigarh under Defence Research and Development Organisation (DRDO) is also the nodal agency for studying and developing avalanche mitigation technologies. DGRE has installed 72 Snow Meteorological Observatories and 45 Automated Weather Stations (AWS).

India Metrological Department (IMD) issues regular and precise weather forecasts & warning bulletins including for cyclones to all the affected/ likely affected States/ UTs.

IMD uses a suite of quality observations from Satellites, Radars and Conventional & Automatic Weather Stations for monitoring of cyclones developing over the Bay of Bengal and Arabian Sea. It includes INSAT 3D, 3DR and SCATSAT satellites, Doppler Weather Radars (DWRs) along the coast and coastal Automated Weather Stations (AWS), High wind speed recorders, Automatic Rain Gauges (ARGs), Meteorological buoys and ships.

NDMA also conducts capacity building programmes, organizes awareness workshops and fosters community-based risk reduction strategies and also trainings for monitoring and alert mechanism to ensure last mile connectivity.

Wadia Institute of Himalayan Geology (WIHG) monitors the glaciers and provides comprehensive analysis of factors that trigger hazards and its associated downstream risks to significantly enhance early warning capabilities and disaster preparedness. WIHG has prepared glacial lake

inventories for Uttarakhand (2015) and Himachal Pradesh (2018), identifying 1,266 lakes (7.6 km²) in Uttarakhand and 958 lakes (9.6 km²) in Himachal Pradesh.

Central Water Commission (CWC) monitors 902 Glacial lakes and water bodies, to enable the detection of relative change in water spread areas of Glacial lakes and water bodies as well as identifying those ones which have expanded substantially during its monitoring months.

Central Government has approved National Glacial Lake Outburst Flood (GLOF) Risk Mitigation Project (NGRMP) for its implementation in four states namely, Arunachal Pradesh, Himachal Pradesh, Sikkim and Uttarakhand at a financial outlay of Rs. 150.00 crore.

NGRMP is aimed at reducing the risks associated with glacial lake outburst floods, particularly in regions that are highly susceptible to such natural disasters. The objectives of NGRMP project are:

(i) Prevent loss of life and reduce economic loss and damage to critical infrastructure due to GLOF and similar events.

(ii) Strengthen the early warning and monitoring capacities based on last mile connectivity.

(iii) Strengthen scientific and technical capabilities in GLOF risk reduction and mitigation at local levels through strengthening of local level institutions and communities.

(iv) Use of indigenous knowledge and scientific cutting-edge mitigation measures to reduce and mitigate GLOF risk.

NGRMP, approved by the Government, has one of its components as GLOF monitoring and Early Warning Systems (EWS) including remote sensing data, community involvement for monitoring, alerting / dissemination.

Two Automatic Weather Stations (AWS) have been installed in Sikkim with further deployments of EWS planned in collaboration with C-DAC, ISRO and Space Applications Centre, Ahmedabad to provide early warning to local communities in case of any GLOF event.

CWC has finalized the criteria for Risk Indexing of Glacial Lakes offering a structured approach for identifying and ranking such lakes based on their likelihood of failure and potential damage they could cause in the event of GLOF.

A Committee on Disaster Risk Reduction (CoDRR) under NDMA involving representatives from six Himalayan States / Union Territories and other Stakeholders, has identified a set of high risk glacial lakes for sending expeditions to directly assess these lakes and prepare comprehensive mitigation strategies in terms of setting up EWS / other structural and non-structural measures.

Subsequent to Teesta-III Hydroelectric dam collapse in October, 2023, CWC has decided to review the design flood of all the existing and under construction dams vulnerable to GLOFs to ensure their adequate spillway capacity for a combination of Probable Maximum Flood / Standard Probable Flood and GLOF. Further, GLOF Studies has been made mandatory for all new dams planned having Glacial Lakes in their catchments.

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