

BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL**PRINCIPAL BENCH, NEW DELHI****Original Application No. 1156 of 2024****IN THE MATTER OF:**

News Item titled "Glacial lakes multiply in Himachal Pradesh and Tibet posing a threat to lives and infrastructure downstream" appearing in The Hindu dated 11.08.2024

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Respondent No. 7**Filed by****Through**

Place: New Delhi
Dated: 02.07.2026

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BEFORE THE NATIONAL GREEN TRIBUNAL PRINCIPAL BENCH

AT

NEW DELHI

IN

ORIGINAL APPLICATION 1156 OF 2024

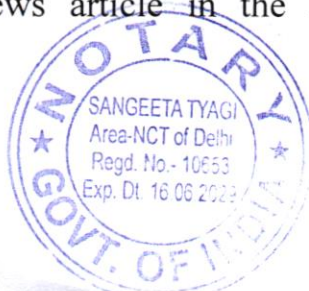
IN THE MATTER OF :

News item titled “ Glacial lakes multiply in Himachal Pradesh and Tibet posing a threat to lives and infrastructure downstream” appearing in The Hindu dated 11.08.2024

Reply Counter Affidavit on Behalf of Respondent No 7 i.e. National Disaster Management Authority (NDMA), New Delhi.

Most Respectfully Showeth: -

1. That the present reply is being filed through Shri Abhishek Sharma presently posted as Senior Research Officer in the National Disaster Management Authority.
2. That the present affidavit is being filed in my official capacity at the NDMA and I am well conversant with the facts of the case and circumstances of the case, on the basis of the official records available in the office and as such authorised and competent to file the present reply.
3. That this Hon'ble Tribunal has taken Suo moto cognizance on the basis of news article in the Hindu on 11.08.2024 and The Times of India



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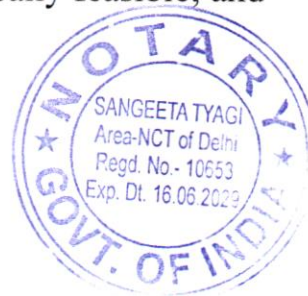
ABHISHEK SHARMA
Senior Research Officer

4. It is submitted that, National NDMA acknowledges the concerns raised in the news item and associated reports regarding the rapid multiplication and expansion of glacial lakes in the Satluj River catchment, covering Himachal Pradesh and the Trans-Himalayan region, including Tibet.
5. It is submitted that, as highlighted by a study conducted by HIMCOSTE, the number of glacial lakes in the region has increased from 562 in 2019 to 1,048 in 2023, with a predominance of small lakes measuring less than 5 hectares. This trend reflects accelerated, climate driven glacier retreat at higher elevations. The proliferation of glacial lakes particularly moraine dammed lakes in the Upper Satluj basin significantly elevates the risk of Glacial Lake Outburst Floods (GLOFs), which may result in sudden and high-volume water releases, causing downstream flooding, damage to habitations, hydropower projects, roads, and other critical infrastructure, and posing threats to human life in vulnerable regions of Himachal Pradesh and beyond.
6. It is respectfully submitted that the National Disaster Management Authority (NDMA), in close coordination with the concerned State Governments and various Central Ministries, Departments and technical agencies, has undertaken and is actively implementing a comprehensive institutional framework for the identification, monitoring, assessment and mitigation of risks arising from Glacial Lake Outburst Floods (GLOFs) across the Indian Himalayan Region, including the Satluj River Basin.
7. It is further submitted that the catastrophic GLOF incident originating from South Lhonak Lake, Sikkim, in October 2023, underscored the urgency of strengthening disaster risk reduction mechanisms and consequently served as a catalyst for intensifying NDMA's initiatives aimed at the integration of advanced monitoring technologies, enhancement of inter-agency coordination, and promotion of community participation to improve preparedness, resilience and timely dissemination of early warnings, particularly in remote and high-altitude regions.
8. It is submitted that, in the aftermath of the South Lhonak Lake GLOF event, NDMA, under the aegis of the Ministry of Home Affairs (MHA), constituted the Committee on Disaster Risk Reduction (CoDRR) with the objective of adopting a multidisciplinary, multi-sectoral and whole-of-

government approach towards disaster risk reduction and resilience building.

9. It is submitted that the CoDRR serves as a collaborative platform comprising leading national institutions and technical agencies, including the Defence Research and Development Organisation/Defence Geoinformatics Research Establishment (DRDO/DGRE), Ministry of Jal Shakti through the Department of Water Resources (DoWR), Central Water Commission (CWC), Centre for Development of Advanced Computing (CDAC), Geological Survey of India (GSI), India Meteorological Department (IMD), National Remote Sensing Centre (NRSC), Indian Institute of Remote Sensing (IIRS), North Eastern Space Applications Centre (NESAC), National Institute of Hydrology (NIH), National Centre for Polar and Ocean Research (NCPOR), National Geophysical Research Institute (NGRI), and other relevant stakeholders.
10. It is submitted that the CoDRR framework addresses a broad spectrum of disaster risks, including those arising from Glacial Lake Outburst Floods, earthquakes, landslides, coastal erosion, urban flooding induced by monsoon variability, and drought conditions. The framework further emphasizes disaster risk financing, psycho-social support mechanisms and other resilience-building measures for long-term risk reduction and sustainable development.
11. It is submitted that NDMA is implementing the National GLOF Risk Mitigation Programme (NGRMP), with a financial outlay of ₹150 crore approved by the Ministry of Home Affairs, across four Himalayan States, namely Arunachal Pradesh, Himachal Pradesh, Uttarakhand and Sikkim. The principal objectives of the Programme, inter alia, include:
 - a. Preparation of comprehensive inventories and classification of glacial lakes for hazard identification and risk assessment;
 - b. Deployment of advanced monitoring systems and Early Warning Systems (EWS) for breach detection and dissemination of real-time alerts;
 - c. Implementation of site-specific structural and non-structural mitigation measures, including controlled lowering of lake water levels and strengthening of moraine dams, wherever technically feasible; and

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d. Capacity building, awareness generation and community outreach programmes aimed at enhancing local preparedness, response capabilities and resilience.

12. It is submitted that the key initiatives undertaken by NDMA in furtherance of GLOF risk mitigation include the following:

- i. Issuance of the National Guidelines on Management of Glacial Lake Outburst Floods (GLOFs) in October 2020, providing a comprehensive framework for identification, monitoring, hazard assessment, mitigation planning, early warning mechanisms and emergency response.
- ii. Identification, assessment and prioritisation of 195 potentially high-risk glacial lakes in Category A,B,C and UC across six Himalayan administrative regions, namely Himachal Pradesh, Uttarakhand, Sikkim, Arunachal Pradesh, and the Union Territories of Jammu & Kashmir and Ladakh.
- iii. Facilitation of scientific expeditions by State Governments under the NGRMP for detailed investigations of high-risk glacial lakes within their respective jurisdictions. Considering the challenging terrain, high-altitude conditions and limited operational windows, studies including bathymetric surveys, geophysical investigations such as Electrical Resistivity Tomography (ERT) and Ground Penetrating Radar (GPR), and drone-based mapping are being undertaken as essential prerequisites for designing appropriate structural and non-structural mitigation interventions. Since the inception of the programme 30 plus scientific assessments/expeditions has been carried out by states/UTs.
- iv. Installation of two Automatic Weather Stations/Automatic Weather and Water Stations (AWS/AWWS) at the South Lhonak and Shako Chu glacial lakes by the Sikkim State Disaster Management Authority (SSDMA), in collaboration with NDMA and the Swiss Agency for Development and Cooperation (SDC), has enabled continuous monitoring through the collection of visual records and hydrometeorological data, including weather conditions, precipitation, atmospheric pressure, and other related parameters.
- v. In addition, NDMA, in collaboration with C-DAC, has developed a Glacial Lake Outburst Flood (GLOF) Early Warning System (EWS). The system has recently been installed on a pilot basis at Sissu Lake (a man-made lake) in Lahaul & Spiti district, Himachal Pradesh, for field testing and

validation. Upon the opening of the operational window for high-altitude expeditions, the sensor network is proposed to be relocated and deployed at the Ghephang Gath Glacial Lake, which has been identified as a high-risk glacial lake requiring continuous monitoring.

- vi. Strengthening of institutional preparedness and capacity building through regular workshops, training programmes and stakeholder consultations. In this regard, an international conference titled “Strategies for GLOF Risk Reduction” was organized in November 2024 at India Habitat Centre, New Delhi.
- vii. Conducting regular monthly meetings under the CoDRR framework with States and Union Territories to facilitate coordination, planning, review and information sharing among key stakeholders, including NRSC, CWC, DGRE, NIH, CDAC and SDC.
- viii. Maintaining close coordination with the Central Water Commission (CWC) for first-order assessments, risk indexing of priority glacial lakes and continuous monitoring through periodic technical reports and advisories.
- ix. Promotion of multi-hazard Early Warning Systems, strengthening of State Disaster Management Authorities (SDMAs), and implementation of community-based disaster preparedness initiatives in GLOF-prone river basins, including the Satluj Basin.
- x. Advocating enhanced transboundary cooperation, particularly in view of the origin of the Satluj River in the Tibetan region, for facilitating data sharing, coordinated monitoring and joint risk assessments, wherever feasible and practicable.

13. It is submitted that the initiatives undertaken with specific reference to the Satluj River Basin are as follows:

- i. The State of Himachal Pradesh has been included under Phase-I of the National GLOF Risk Mitigation Programme (NGRMP), encompassing activities such as preparation of glacial lake inventories, hazard and vulnerability mapping, community awareness programmes and formulation of mitigation strategies.
- ii. NDMA extends technical and institutional support to initiatives undertaken by the Himachal Pradesh State Disaster Management Authority (HPSDMA) and the Himachal Pradesh Council for Science, Technology and Environment (HIMCOSTE) for satellite-based monitoring and

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identification of potentially hazardous glacial lakes in the Upper Satluj region. Further, GLOF risk considerations are being mainstreamed into developmental planning processes, including environmental appraisal of hydropower projects and enhancement of infrastructure resilience in downstream districts such as Kinnaur, Shimla and Kullu.

14. Without prejudice to the aforesaid measures already undertaken, NDMA respectfully submits that the following measures may merit consideration by this Hon'ble Tribunal for further strengthening GLOF risk management and mitigation efforts:

- i. Expeditionous expansion and implementation of the National GLOF Risk Mitigation Programme in additional vulnerable river basins, with particular emphasis on transboundary river systems such as the Satluj Basin.
- ii. Mandatory incorporation of comprehensive GLOF hazard and risk assessments within the planning, appraisal and approval processes of infrastructure and developmental projects in Himalayan States.
- iii. Establishment, augmentation and integration of real-time automated monitoring networks and sensor-based Early Warning Systems for all identified priority glacial lakes.
- iv. Promotion of collaborative research involving national institutions and international partners for advanced hydrodynamic modelling, climate-change scenario projections and evidence-based risk assessment; and
- v. Intensification of community-based awareness programmes, capacity-building initiatives, mock drills and preparedness exercises in downstream vulnerable areas to enhance local resilience and emergency response capabilities.

15. . It is respectfully submitted that the National Disaster Management Authority (NDMA), being the statutory authority constituted under the Disaster Management Act, 2005 and entrusted with the responsibility of laying down policies, plans and guidelines for disaster management in the country, has been discharging its mandate with due diligence, foresight and a proactive approach in relation to the risks posed by Glacial Lake Outburst Floods (GLOFs). recognising the increasing vulnerability of the Himalayan region to GLOF events arising from climatic and geomorphological factors, NDMA has continuously undertaken policy, planning, coordination and implementation measures aimed at identification, monitoring, assessment and mitigation of GLOF risks. The

Authority has further facilitated the deployment of advanced monitoring technologies, Early Warning Systems, scientific studies, capacity-building initiatives and inter-agency coordination mechanisms to strengthen preparedness, enhance resilience and minimise the potential adverse impacts of GLOF events on vulnerable communities and critical infrastructure.

16. In view of the facts and circumstances set out hereinabove, it is most respectfully prayed that this Hon'ble Tribunal may be pleased to take the aforesaid submissions on record and consider the same while passing such orders, directions or further reliefs as may be deemed fit and proper in the facts and circumstances of the present matter, in the interest of justice.

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VERIFICATION

Verified at New Delhi on this day of July, 2026 that the contents of the above affidavit are true and correct to the best of my knowledge based on the records; and no part of it is false and nothing material has been concealed there from.



ATTESTED
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NOTARY PUBLIC
(GOVT. OF INDIA)

2 JUL 2026

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