

**BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL
(SOUTHERN ZONE BENCH, CHENNAI)**

ORIGINAL APPLICATION NO. 227 OF 2024(SZ)

In the matter of:

Tribunal on its own motion SUO MOTU based on the news item published in The Hindu, Chennai edition paper dated 30.07.2024, titled **“Wayanad landslides Live updates : 54 killed, over 100 feared missing in Kerala hill station; relief operations delayed”**.

-VS-

Ministry of Environment Forest and Climate change and
State of kerala

.....Respondent(s)

**REPORT FILED BY THE DISTRICT COLLECTOR,
IDUKKI/8TH RESPONDENT**

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Dated at Chennai on this the 07th day of August, 2025.

For. E.K.K. Kumaresan
7/8/25

M/s. E.K.KUMARESAN

Standing Counsel for State Government of Kerala - NGT(SZ) Chennai Bench

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REPORT ON NGT OA-227/2024 SUO MOTO

As per the order dated September 27, 2024, in OA 227/2024, the National Green Tribunal directed the submission of details regarding encroachments identified in the hill districts of Kerala and the measures undertaken to prevent landslides in these areas. The following details are submitted:

Encroachments

A total of 432 encroachments have been identified in Idukki District, out of which 111 encroachments have been evicted since 2010.

Measures initiated to Prevent Landslides

The District Disaster Management Authority issued Order No. DCIDK/4747/2023-DM3, dated 11-06-2024, regarding the construction of buildings in 13 Panchayats in the hilly areas of the district. As per the order, Construction of buildings in the red zone areas of 13 Panchayats in the hilly region is restricted. Only residential houses up to a maximum area of 150 m² are permitted in these zones. Quarrying activities are strictly banned in the red zone areas of these Panchayats. Buildings in the orange zone are limited to a maximum of three stories. Restricting construction activities in red-zone regions identified as landslide-prone is a proactive step being taken to mitigate the risk of landslides in the district

The District Administration is closely monitoring rainfall data from various locations in and around the district to analyze the daily rainfall situation in a localized pattern. Micro-level rainfall analysis is crucial for issuing early warnings.

As part of disaster preparedness, the district administration is preparing a taluk-wise landslide susceptibility map. This involves interpolating KSEB consumer IDs to identify individuals residing in different landslide-prone zones, enabling the implementation of necessary precautionary measures. Local Self-Government (LSG) level mock drills on landslides are being conducted under the Rebuild Kerala Initiative to enhance community training in disaster risk resilience.

A **Mock Exercise** on a cyclone scenario was conducted on 11-04-2025 by the National Disaster Management Authority (NDMA) in coordination with State and District authorities. The exercise was carried out at critical institutions in the district, namely Pallivasal Power House and Moolamattam Power House.

All key stakeholders participated in the mock drill, including the Police Department, Fire & Rescue Services, National Disaster Response Force (NDRF), Local Self Government Department (LSGD), Revenue Department, Civil Defence, and Apthamithra Volunteers.



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Emergency Response Teams (ERTs)

Emergency Response Teams (ERTs) have been constituted at the Local Self Government (LSG) level. In each Grama Panchayat and Municipality within the district, four teams comprising ten members each have been formed. The responsibilities of these teams are categorized as follows: Early Warning, Camp Management, First Aid, and Rescue.

Each team has received specialized training in their respective areas from the District Disaster Management Plan Coordinator, the Health Department, and the Fire & Rescue Department. These trained teams are intended to be deployed at the LSG level in the event of a disaster or emergency situation.

IDUKKI DISASTER RESILIENCE AND INFORMATION SYSTEM

District Disaster Management Authority, Idukki has submitted a proposal for the implementation of a comprehensive Hazard Monitoring System focused on regions with known active landslide zones. The project costs around 3 crore rupees and is under approval by the government. These locations have witnessed multiple past landslides and, as identified through BHUKOSH (A portal of Geological Survey of India) and other geological datasets, remain highly vulnerable to future landslides. Unmonitored, these sites pose significant risks to life, infrastructure, and the environment.

The objective of the proposal is to establish a real-time monitoring, alert, and response mechanism using a network of advanced geotechnical instruments, GIS integration, and AI-driven early warning technologies for proactive landslide risk mitigation. The system is aimed to deploy a set of geotechnical and hydrometeorological sensors including:

- **Piezometer** (Measures pore water pressure in the soil, crucial for identifying subsurface saturation that can trigger slides),
- **Inclinometer** (Detects subsurface movement and slope deformation, allowing early detection of mass movements),
- **Earth Pressure Cell** (Detects subsurface movement and slope deformation, allowing early detection of mass movements),




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- **Crack Meter** (Measures surface cracks' widening, indicating ongoing displacement or structural stress),
- **Rain Gauge** (Captures rainfall intensity and patterns, a critical factor influencing landslide initiation),
- **River Gauge** (Measures the rise in water level in rivers; real-time measurements can help to notify people downstream about the rise in water level).

It is planned to deploy 46 units of landslide monitoring systems, 48 river gauges, and 40 rain gauges in various parts of the district. We are already taking rainfall data from 195 river gauges installed in various parts of the district by both government and private sector.

Each landslide-prone location will be equipped with a calibrated combination of the above sensors based on site-specific risk and geological profile.

These sensor outputs are continuously fed into a centralized system. The system will analyze data for unusual patterns (e.g. rapid pore pressure rise, intense rainfall, subsurface movement) to predict landslide probability using AI & Machine Learning algorithms. It visualizes real-time spatial data, hazard zones, and monitoring stations, and enables trajectory mapping during disaster events.

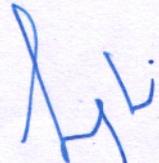
Early Warning and Public Alert Mechanism

The system is intended to issue automated warnings to the public through various public alert mechanisms. Upon detecting anomalies, the system activates an automated alert protocol. It sends SMS alerts in local languages to vulnerable communities. Real-time alerts are dispatched to emergency response units and local authorities for immediate action.

KaWaCHaM (Kerala Warnings, Crisis and Hazard Management System)

KaWaCHaM (Kerala Warnings, Crisis and Hazard Management System) is an advanced disaster risk warning system developed by the Kerala State Disaster Management Authority (KSDMA) under the National Cyclone Risk Mitigation Project (NCRMP). It plays a crucial role in strengthening Kerala's disaster preparedness and response mechanisms, particularly by addressing last-mile communication challenges during emergencies.




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The primary objective of KaWaCHaM is to provide unified, real-time alerts and ensure effective coordination between various emergency response units. It aims to improve the overall efficiency of Kerala's disaster risk management by integrating advanced technology and streamlined communication systems.

Key Features

- **Unified Alert System:**

KaWaCHaM integrates Kerala's entire early warning mechanism into a single, cohesive framework.

- **Multiple Communication Channels:**

Alerts are disseminated through a range of channels including sirens, mobile text messages, and social media platforms.

- **Real-time Alerts:**

The system provides timely warnings for extreme weather events such as heavy rain, strong winds, and sea surges.

- **Emergency Operation Centers (EOCs):**

A total of 93 EOCs across the state are connected through VPN to facilitate real-time coordination and response.

- **Decision Support Software:**

Offers tools for data-driven decision-making during emergency situations.

- **Centralized Data Center:**

Houses a large database for storage, analysis, and retrieval of critical information.

- **Siren-Strobe Light Units:**

126 siren units have been strategically installed across the state to deliver on-ground alerts.

Benefits

- **Improved Public Safety:**

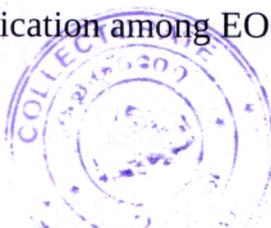
Ensures timely dissemination of warnings, allowing citizens to take preventive measures.

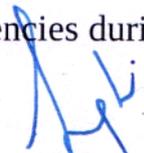
- **Enhanced Disaster Preparedness:**

Integrates multiple elements of disaster management, including hazard assessment and action planning.

- **Streamlined Coordination:**

Enables seamless communication among EOCs and relevant agencies during disaster situations.




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- **Technology-Driven Response:**

Utilizes modern technology for real-time information sharing and efficient disaster response.

KaWaCHaM in Idukki District

As part of the statewide implementation, KaWaCHaM has been actively established in key locations within Idukki district. The system operates through both control rooms and siren locations for localized alerts and efficient coordination.

KaWaCHaM Control Rooms in Idukki

1. District Emergency Operation Centre (DEOC), Idukki
2. Taluk Emergency Operation Centre (TEOC), Thodupuzha
3. TEOC, Idukki
4. Idukki Fire Station
5. TEOC, Peerumedu
6. TEOC, Devikulam
7. TEOC, Udumbanchola

KaWaCHaM Siren Locations in Idukki

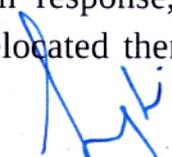
1. Community Study Center (CSC), Manakudy
2. Government High School, Mannamkandam
3. Dr.APJ Abdul Kalam Government Higher Secondary School, Thodupuzha
4. College of Engineering, Munnar

KaWaCHaM represents a significant leap forward in Kerala's efforts to build a resilient and responsive disaster management system. In districts like Idukki, where terrain and weather pose unique challenges, the implementation of KaWaCHaM ensures that timely alerts and coordinated responses can significantly reduce disaster impact and safeguard lives and property.

Monsoon 2025

This year, the monsoon began with heavy rainfall and strong winds across the district. The District Administration continuously monitored the rainfall situation, and several areas received over 800 mm of rain within five days. In response, the administration evacuated residents from vulnerable locations and relocated them to relief camps.




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No casualties due to landslides were reported during this period. As a precautionary measure, the District Disaster Management Authority (DDMA) banned all adventure and water-related tourism activities on days with heavy rainfall. Additionally, restrictions were imposed on night travel in hilly areas to ensure the safety of both residents and tourists.

Orders were issued to all departments to identify and remove dangerously standing trees along roadsides and in public areas. Directions were also given to Local Self Government (LSG) Secretaries to prune or remove hazardous trees located on both public and private properties.




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