

PARLIAMENT QUESTION: EARLY WARNING SYSTEMS FOR FLOODS AND CYCLONES

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Currently, India Meteorological Department (IMD) prepares and updates district-wise early warnings for heavy rainfall and cyclone-related events four times a day, with forecasts valid for up to seven days. IMD generates real-time weather-related warnings and graphical products to support timely weather monitoring and dissemination of information. These warnings cover all vulnerable districts to ensure the timely dissemination of information for preparedness and mitigation. Further, these warnings are shared using multiple channels, e.g., Common Alerting Protocol (CAP), mobile Apps, websites, WhatsApp, Social media, etc. However, the warning communications with automated siren and alert infrastructure are the responsibilities of State Disaster Management Authorities (SDMA) and State Emergency Operation Centres (SEOCs). IMD supports the Central Water Commission by providing observed and forecasted rainfall data.

Central Water Commission (CWC) is the nodal Organisation entrusted with the task of flood forecasting & early flood warnings in the country. Presently, CWC issues flood forecasts at 350 forecasting stations (150 Inflow Forecast Stations on major dams/barrages & 200 Level Forecast Stations on major rivers). The network has been established in consultation with the State Governments and UTs. In order to provide more lead time to the local authorities to plan evacuation of people & take other remedial measures, CWC has developed a basin-wise flood forecasting model based on rainfall-runoff mathematical modelling for 7 days advance advisory at its forecasting stations in addition to short-range forecast having a response time up to 24 hours. CWC flood forecasting services are also integrated with an integrated alert dissemination platform, Common Alert Protocol (CAP), issued to the State Disaster Management Authority (SDMA) of the respective States/UTs.

In view of the severity of the flood situation in flood-prone regions, Government has launched/inaugurated a web-based C-Flood platform. It provides two days advance inundation forecasts up to village level in the form of inundation maps and water level predictions. The salient features of C-flood web-based platform are:

- C-Flood integrates flood inundation output information derived from advanced 2D hydrodynamic modelling with extent and depth information.
- It has been designed to serve as a unified inundation information system integrating flood modelling outputs from national and regional agencies for all river basins as per their respective action plans. It covers inundation forecasts for the Godavari, Tapi, and Mahanadi River Basins in the initial phase.
- The web-portal supports three languages, namely, Hindi, English & Odia in the initial phase.

- It includes an inundation forecast for the next two days. It shows inundation information up to the village level.
- It indicates three categories of Flood Alerts based on the inundation depth: Yellow Alert indicates inundation below 0.5m, an Orange Alert corresponds to depths below 1.5m, and a RedAlert signifies inundation exceeding 1.5m.
- To improve and access the forecast accuracy, satellite-based datasets and ground-based hydrological observations are utilized.

A “Flood Watch India” Mobile App has been developed by the CWC, which was launched on 17th August 2023. It presently provides information about flood forecasting at 200 stations, flood monitoring for the present flood situation at an additional 500 stations, and the reservoir storage position of 150 major reservoirs in the country. The App is helpful to both the disaster management authorities at Central, State, District, and local levels as well as the general public by giving flood-related alerts in time for taking preventive measures.

For the States of Punjab, West Bengal, and Bihar, there is no major deficiency as such with respect to generating and updating color-coded district-wise heavy rainfall warnings, and also for providing time-to-time rainfall data and Quantitative Precipitation Forecast (QPF) to CWC for updating flood warnings relevant to catchment areas.

There is no lack of end-to-end connectivity at the local levels to warn residents. For cyclone warnings dissemination, IMD utilises all available means of communication to reach out to disaster managers, media, and the general public. The warnings are issued through IMD National & State-level websites and a dedicated website for tropical cyclones, shared via CAP, SMS alerts to registered users, social media, including Facebook, X, WhatsApp groups, and mobile apps. It is also complemented by regular Press releases and media briefings, both at the National and State levels. Warnings for fishermen are regularly broadcast through All India Radio. In addition, warnings for fishermen are also sent by SMS through the Indian National Centre for Ocean Information Services (INCOIS) network, and for fishermen in the deep Sea, warnings are sent through NAViC. IMD also conducts pre-cyclone meetings with disaster managers at the Central and State levels to ensure preparedness ahead of cyclone season. During adverse weather conditions, the disaster managers at the Central & State levels are briefed personally by the Director General, IMD.

The State Disaster Management Authority (SDMA) and the State Emergency Operations Center (SEOC) share the warnings to the vulnerable population through their State-level disaster warning communication network. However, to make a robust and foolproof warning dissemination to the last mile to the vulnerable population, there is need for further improvement of mobile and digital connectivity at the local levels, strengthening of the local level dissemination system through the installation of sirens, creating awareness among the common man, strengthening satellite communication for fishermen etc.

To support activities necessary for the efficient and effective working of the early warning system at the state level such as strengthening of the local capacity for dissemination, awareness related to impact of various disasters, public response to early warnings system etc., resources are available to the State disaster management authorities through the State Disaster Response Fund (SDRF) and State Disaster

Mitigation Fund (SDMF). If there is a request from the States for financial assistance, the Central Government considers it in accordance with the relevant guidelines for the National Disaster Response Fund (NDRF) and National Disaster Mitigation Fund (NDMF).

This information was submitted by Minister of State (Independent Charge) For Earth Sciences Dr. Jitendra Singh in Lok Sabha today.

NKR/JKP

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