GOVERNMENT OF INDIA
MINISTRY OF EARTH SCIENCES
RAJYA SABHA
UNSTARRED QUESTION NO. 1312
ANSWERED ON 11/12/2025

WARNING SYSTEMS IN ODISHA

1312. SHRI DEBASHISH SAMANTARAY:

Will the Minister of **EARTH SCIENCES** be pleased to state:

(a) the steps taken to improve early warning systems for cyclones and floods in Odisha;
(b) the number of meteorological and flood monitoring stations in the State;
(c) the funds allocated for disaster preparedness and mitigation measures during the last three years;
(d) the details of training programmes being conducted for local authorities and communities; and
(e) the measures planned to strengthen climate resilience in flood-prone districts of the State?

ANSWER
THE MINISTER OF STATE (INDEPENDENT CHARGE) FOR
MINISTRY OF SCIENCE AND TECHNOLOGY
AND EARTH SCIENCES
(DR. JITENDRA SINGH)

(a)-(b) The Ministry is making continuous efforts to make advancements in cyclone prediction systems to minimize the impact of cyclones in the country, including Odisha. The India Meteorological Department (IMD) has demonstrated its capability to provide high-precision early warning for cyclones in recent years. The IMD has adopted new techniques and technologies over time to detect, monitor, and provide timely early warnings for disruptive weather events, including cyclones. The IMD has expanded its infrastructure for observations, data exchange, monitoring & analysis, forecasting, and warning services in the country, including Odisha, utilizing the latest technology. IMD uses a suite of (surface, upper-air, ocean, space-based) quality observations from satellites, radars, and conventional & automatic weather stations (AWS) to monitor cyclones developing over the Bay of Bengal and the Arabian Sea. The Doppler Weather Radars (DWRs) have been installed in Odisha and are operational at Paradip and Gopalpur, enabling the accurate real-time monitoring of cyclones. These DWRs provide around-the-clock observation, characteristic of clouds that develop, intensify, and dissipate, including their movement from time to time.

Under the Mission Mausam, the Bharat Forecast System (BharatFS), an advanced computer simulation model, has already been developed, and it has been operational at a very high spatial resolution of 6 km. It also has the capability to provide predictions of rainfall events up to 10 days, covering the short and medium-range forecasts. Due to its higher resolution and improved dynamics, it generates weather forecasts at the

panchayat or cluster of panchayats level. To further support the operations of high-resolution model simulations in real-time, the computing facilities (Arunika and Arka) have been substantially increased to integrate voluminous data and run meso-scale, regional, and global models.

IMD has a well-defined Standard Operating Procedure (SOP) for monitoring & forecasting cyclones and issuing warnings and advisory alerts to the respective States well in advance. IMD utilizes the latest dissemination tools, including the Common Alert Protocol (CAP), mobile apps, websites, APIs, and other social media platforms, to deliver efficient, effective, and timely early warning services. The current observational network in the State of Odisha is given below:

- Surface Monitoring System Network: It comprises 39 manned observatories, 29 Automated Weather Stations (AWS), and 136 Automated Rain Gauge (ARG) stations.

- DWR Network: Odisha has two radar stations, i.e., at Paradip and Gopalpur, which are functional round the clock.

- High Wind Speed Recorder Network: Odisha currently has six high wind speed recorders covering the entire coast.

- Aviation Weather Observatory: It currently has four aerodrome meteorological stations and one Aerodrome Meteorological Office (AMO), with four aviation weather automatic stations and two manned observatories.

As a non-structural measure for flood management, the Central Water Commission (CWC) under the Ministry of Jal Shakti is mandated to issue short-range flood forecasts, with a lead time of up to 24 hours, to the concerned State Governments at designated locations. CWC also issues inflow forecasts to identified reservoirs for proper reservoir regulation. The network has been established in consultation with the State Government/Project authorities. The CWC maintains 19 flood forecasting stations in Odisha. Out of 19 forecasting sites, 12 are level forecasting stations, and 7 are inflow forecasting stations in Subarnarekha, Mahanadi, Barhmani & Baitaranai, and East Flowing Rivers, Mahanadi to Pennar and Godavari basins.

CWC is providing a Seven-day advisory flood forecast on its web portal https://aff.india-water.gov.in/ through pan-India rainfall-based mathematical modelling for all the flood forecasting stations in major river basins of the country. CWC takes immense steps and adopts various dissemination mechanisms to get maximum reach to the flood warnings produced, so that mitigation measures can be adopted by State Governments, SDMA, NDMA, and the public. The flood forecasts formulated by CWC are disseminated to all stakeholders through the Flood Forecasting Website (https://ffs.india-water.gov.in/)/FloodWatch India 2.0 App/E-mail/WhatsApp/ Facebook (CWCOfficial.FF)/X(CWCOfficial_FF), 'CWC Flood updates' (Youtube Channel), and CAP Alert through the NDMA Sachet portal. There are 81 hydrological observation (HO) stations in the State of Odisha from where CWC is collecting hydro-metrological data.

Hydrological Observation (HO) stations in Odisha						
State	**G**	**GD**	**GDQ**	**GDSQ**	**GQ**	**Grand Total**
Odisha	40	5	5	22	9	81

G-Gauge, D-Discharge, S-Silt, Q-Quality

(c) The Ministry of Earth Sciences (MoES) implements central sector schemes uniformly across the country; therefore, funds are not allocated on a State-wise basis. As these schemes are implemented centrally, no funds are released directly to State Governments for disaster preparedness and mitigation measures.

(d) Community awareness programs are carried out at different locations, like the Krishi Fair at OUAT Bhubaneswar and Puri, Exhibition. The scientific officials (scientists and meteorologists) of IMD interact with various communities, including farmers, entrepreneurs, and college and school students. Lectures are delivered at various platforms on different occasions, such as National Science Day, World Environment Day, and World Meteorological Day. The Media (print and electronic) workshops are organized to explain the technical terms of meteorology, which help them to frame the news in a correct manner. Various stakeholder-specific programs and initiatives are also initiated, such as practical solutions for Cyclone Resilient Robust Electricity Transmission and Distribution (T&D) infrastructure in the Coastal areas of the country, between 'Early-warning decision support and coastal Infrastructure systems for India, etc.

National Water Academy (NWA), Central Water Commission (CWC), Pune regularly conducts training and capacity-building programmes on subjects related to Flood Forecasting, Flood Management, Flood Modelling, and Flood Disaster Management aimed at enhancing the technical and operational capacities of stakeholders across the country. These programmes are open to stakeholders on a pan-India basis, including officers from State Governments, State and Central PSUs, academic institutions, private organizations, and NGOs.

(e) The Ministry of Jal Shakti (MoJS) had circulated the Model Flood Plain Zoning Bill to all the States for enactment during 1975. But, only a few states, i.e., Manipur, Rajasthan, Uttarakhand, erstwhile Jammu and Kashmir, Arunachal Pradesh, and Bodoland Territorial Council (BTC) have enacted the bill. Further, the Ministry of Jal Shakti released the 'Technical Guidelines on Flood Plain Zoning' during August 2025 to the states for enactment. This document marks the first dedicated technical framework to standardize floodplain management nationwide, building on the 1975 model bill with modern tools like satellite-based mapping and hydrological modelling. The guidelines' primary objectives are to curb flood vulnerabilities through regulated land use, promote eco-friendly activities, and integrate non-structural interventions with existing flood control strategies for enhanced resilience. The guideline recommends the categorization of a river's floodplain into the following three risk-based zones:

- High-risk Protected Zone- (1-in-5-year floods), prohibiting permanent constructions, waste dumping, and hazardous storage while allowing green uses like parks and fisheries.

- Medium-risk Regulatory Zone (1-in-5 to 1-in-25-year floods), restricting residential and high-density developments but permitting public facilities

- Low-risk Warning Zone (1-in-25 to 1-in-100-year floods), which bans only high-hazard industries while supporting essential infrastructure.

Further upon, to sensitize the States about FPZ, two national-level workshops were organized by MoJS at New Delhi during 2024. Two Regional workshops at specific locations across the country have already been organized.

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