

**GOVERNMENT OF INDIA  
MINISTRY OF EARTH SCIENCES  
LOKSABHA  
UNSTARRED QUESTION NO. 1864  
TO BE ANSWERED ON FRIDAY, 30<sup>TH</sup> JULY, 2021**

**MEASURES TO MAKE WESTERN COAST CYCLONE PROOF**

**1864. SHRI SHYAM SINGH YADAV:**

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

- (a) the details of steps taken by Government to make areas along western coast cyclone proof in light of the current increase in frequency of cyclones in Arabian Sea;
- (b) the funds earmarked and utilized for the purpose along with the outcome thereof;
- (c) the steps being taken to improve the system of cyclone forecasting;
- (d) whether the Government proposes to distribute emergency kits to people living in most vulnerable areas prone to cyclones; and
- (e) if so, the details thereof and if not, the reasons therefor?

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

- (a) The tropical Indian Ocean has experienced a rapid increase in ocean warming, with the strongest warming seen in the Arabian Sea which causes the recent increase in frequency of cyclones. There is an advanced cyclone early warning system for Five states (viz., Gujarat, Maharashtra, Goa, Karnataka & Kerala), the Union Territories (viz., Daman, Diu, Dadara & Nagar Haveli) along the **western coast** and the Island UT, Lakshadweep. This is achieved via seven Cyclone Warning Centers covering the east & west coasts. Three Area Cyclone Warning Centres (ACWCs) are located at Chennai, Mumbai and Kolkata and four Cyclone Warning Centres (CWCs) are at Thiruvananthapuram, Visakhapatnam, Ahmedabad and Bhubaneswar. The responsibility for operational storm warning work for the respective area rests with the ACWCs and CWCs.

Area of responsibility of ACWCs and CWCs along the **western coast** is shown in the Table below:

<b>Centre</b>	<b>Coastal area*</b>	<b>Maritime State/UT</b>
ACWC Mumbai	State: Maharashtra & Goa	State: Maharashtra & Goa
CWC Thiruvananthapuram	State: Kerala & Karnataka UT: Lakshadweep	State: Kerala & Karnataka UT: Lakshadweep
CWC Ahmedabad	State: Gujarat UT: Dadra-Nagar Haveli- Daman-Diu	State: Gujarat UT: Dadra-Nagar Haveli-Daman- Diu

*\*Coastal strip of responsibility extends upto 75 km from the coast line.*

Apart from the above as a part of the National Cyclone Risk Mitigation Project (NCRMP), being implemented by National Disaster Management Authority (NDMA) in 8 cyclone prone states of the country, following cyclone risk mitigation infrastructure/assets are being created in 5 western coastal states (Goa, Gujarat, Karnataka, Kerala & Maharashtra) :

- Early Warning Dissemination System (EWDS) works are under progress in Goa, Karnataka and Kerala
- 53 no. of Multi purpose Cyclone Shelters (MPCS) have been completed
- About 443 Km of Underground Electric Cabling (UGC) completed
- About 13.2 Km of saline embankment has been completed
- About 205 Km of road has also been completed.

- (b) Forewarning and up-gradation of the forecasting capabilities of cyclones are being implemented in IMD through various sub-schemes under the umbrella scheme “**Atmosphere & Climate Research-Modelling Observing Systems & Services (ACROSS)**” of the Ministry. Cumulative expenditures during last five Financial-Years for all 4 sub-schemes of IMD, viz. Atmospheric Observation Network (AON), Upgradation of Forecast System (UFS), Weather & Climate Services (WCS) and Commissioning of Polarimetric Doppler Weather Radars (PDWR), under ACROSS are as follows:

Name of Sub-scheme	Total expenditure during the Financial-Year (Rs. in Crores)				
	2016-17	2017-18	2018-19	2019-20	2020-21
<b>ACROSS-IMD (AON, UFS, WCS &amp; PDWR)</b>	<b>144.08</b>	<b>134.09</b>	<b>175.94</b>	<b>206.04</b>	<b>150.33</b>

Also, under NCRMP cyclone risk mitigation infrastructure/assets are being implemented in Western coast States with an outlay of Rs. 1156.57 Cr (GoI share : 925.95 Cr; State share : 231.62 Cr; and 614.57 Cr has been utilized so far.

- (c) In the present scenario, India is second to none in early warning services as well as in managing the disasters associated with Cyclones. IMD has demonstrated its capability to provide early warning for Cyclones with high precision. With the help of such early warnings, the Government is able to mobilise evacuation operations in a timely manner, thereby saving lives & livelihood. The cyclone forecast accuracy has significantly improved in recent years as has been demonstrated during cyclones Phailin (2013), Hudhud (2014), Vardah (2016), Titli (2018), Fani & Bulbul (2019), Amphan, Nisarga & Nivar (2020) and Tauktae & Yaas (2021). During recent years, the loss of life has been drastically reduced in the recent years. Though the IMD under the Ministry of Earth Sciences has demonstrated the capability of predicting Cyclones with an actionable precision, efforts are still continued to further improve the forecasting capabilities by augmenting the observational network and numerical modelling capability.

Also, a web based Dynamic Composite Risk Atlas (Web-DCRA) and Decision Support System (DSS) tool for real-time Cyclone and associate impacts forecasting, including storm surge and inland flooding for the area falling within 10 m elevation above mean sea level, in 13 coastal states (covering both eastern and western coasts) of the country is being developed under NCRMP Phase-II. The Web-DCRA and DSS tool has been installed/hosted at IMD.

- (d) All MPCS created under NCRMP will be equipped with Shelter level equipment to be used to deal with the emergency situation during the cyclones.
- (e) Ministry of Earth Sciences through IMD issues forecast and warning services as per the protocol to the relevant central and state government agencies to effectively manage the disaster preparedness.

\*\*\*\*\*