

**GOVERNMENT OF INDIA
MINISTRY OF EARTH SCIENCES
LOK SABHA
UNSTARRED QUESTION NO. 4165
TO BE ANSWERED ON WEDNESDAY, 26TH MARCH, 2025**

SEISMOLOGICAL OBSERVATIONS

**4165. SMT. SHAMBHAVI:
SHRI NARESH GANPAT MHASKE.
SHRI RAJESH VERMA:
SHRI RAVINDRA DATTARAM WAIKAR:**

Will the Minister of EARTH SCIENCES be pleased to state:

- (a) the details of the seismological observation which have been set up across the country to monitor earthquake activity since 2020, State-wise and year-wise;
- (b) the details of the earthquake occurrences in the country during the last five years, State-wise and year-wise;
- (c) the details of the initiatives implemented by the Government to develop an earthquake early warning system in the country;
- (d) the details of the collaborations with the international agencies to share seismic data and improve forecasting;
- (e) the steps taken by the Government to enhance seismic monitoring and improve data collection on the frequency of earthquakes in the country; and
- (f) whether the Government is considering to expand India's earthquake forecasting capabilities with the help of artificial intelligence and machine learning and if so, the details thereof?

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

- (a) National Centre for Seismology (NCS), Ministry of Earth Sciences (MoES) is monitoring earthquake activity in and around the country through its National Seismological Network consisting of 166 permanent Seismic Observatories. A total of 49 observatories throughout different states have been set up in the past five years, from 2020 to 2024. Details of seismic observatories (state-wise and year-wise) are given in Annexure-I.
- (b) A total no. of 2768 earthquakes occurred in Indian states/UT from Jan 2020 to 22nd March 2025. State-wise and year-wise details of the earthquake are enclosed in Annexure-II. The details of these earthquakes are also available on NCS's website (seismo.gov.in).
- (c) India has undertaken significant initiatives to establish Earthquake Early Warning (EEW) systems, aiming to mitigate the impact of earthquakes. NCS and Indian Institute of Technology Roorkee (IITR) have been at the forefront of these efforts. IIT Roorkee under the project of MoES has been involved in creating an EEW system for Uttarakhand India. A network of 169 MEMS instruments is installed in Uttarakhand Himalaya. They have also developed BhuDev computer app for the same.

Also, NCS, MoES, is piloting an EEW system in the NW Himalayas. This system is supposed to consider various factors, including earthquake magnitude, depth, location, and potential ground effects. These efforts are in the initial stage, and the fidelity, robustness and success rate of such warning systems are still to be assessed thoroughly before the system can be considered for real-time operations.

- (d) NCS is sharing the seismic data of three stations, namely Shillong, Sri Vijya Puram (Port-Blair) and Minicoy, with USGS in exchange for their data for improved seismic monitoring of earthquakes occurring within and surrounding region of India. NCS also shares phase data of each earthquake with the International Seismological Centre (ISC) UK for collaboration in Seismological research throughout the world for the improvements in the earthquake monitoring. However, as of now, no mechanism or technology exists to accurately forecast earthquakes in terms of time, location, and magnitude.
- (e) The NCS-MoES is continuously working to strengthen earthquake monitoring by establishing, installing, and upgrading seismic stations as part of its routine operations. Committed to adopting the latest technology, NCS aims to enhance seismic monitoring which gradually improves the earthquake detection capabilities. To further this effort, NCS has proposed adding 100 more stations to its network for enhancing seismic monitoring and data collection.
- (f) As on date there is no such mechanism/technology to forecast the earthquake in terms of time, space and magnitude. So, the question doesn't arise.

Annexure -I

Total Seismic Observatories installed state-wise and after 2020 to 2024 state-wise/year-wise

States/Year	Total Seismological observatory	2020	2021	2022	2023	2024
A&N Island	5					2
Andhra Pradesh	6		4			
Arunachal Pradesh	8		2		1	1
Assam	7					
Bihar	6			1	1	
Chandigarh	1					
Chhattisgarh	4		2			
DNH and Daman Diu						
Delhi	7					
Goa	1					
Gujarat	4		2			
Haryana	10		1			
Himachal Pradesh	7					
Jammu & Kashmir	3		1			
Jharkhand	3					
Karnataka	7		6			
Kerala	3		2			
Ladakh	2					
Lakshadweep	1					
Madhya Pradesh	7		4			
Maharashtra	15		5	1		
Manipur	1					
Meghalaya	2					
Mizoram	3		1			
Nagaland	2					
Odisha	3					
Puducherry						
Punjab	2		1			
Rajasthan	9		4			
Sikkim	1					
Tamil Nadu	7					4
Telangana	1					
Tripura	2					
Uttar Pradesh	15					
Uttarakhand	8		3			
West Bengal	3					
Total	166	0	38	2	2	7

Annexure -II

State-wise and Year-wise earthquakes during 2020 to 22nd March, 2025

States/Year	2020	2021	2022	2023	2024	22nd March, 2025
A & N Islands	3	4	2	1		
Andhra Pradesh		3	2	5	4	
Arunachal Pradesh	33	33	19	32	34	5
Assam	52	113	24	61	77	10
Bihar			3	2		
Chandigarh		1				1
Chhattisgarh	2	3	5	4	8	
DNH & Daman Diu	2					
Delhi	5	8	3	4	6	2
Goa						
Gujarat	10	8	14	10	15	1
Haryana	35	16	10	25	22	3
Himachal Pradesh	80	65	54	44	37	5
Jammu & Kashmir	50	17	35	52	44	2
Jharkhand	1			1	3	
Karnataka	2	25	33	24	12	1
Kerala	1	2	2		2	
Ladakh	34	34	34	29	41	13
Lakshadweep						
Madhya Pradesh	10	12	8	18	15	1
Maharashtra	91	39	37	43	38	1
Manipur	43	40	26	52	44	15
Meghalaya	24	16	15	41	43	7
Mizoram	22	7	7	8	3	1
Nagaland	18	3		7	10	
Odisha	3		4	1	5	
Puducherry		2				
Punjab	3	3	2	3	3	
Rajasthan	11	7	11	11	12	3
Sikkim	7	10	3	3	9	1
Tamil Nadu		3	5	1	2	
Telangana	1	4		12	8	
Tripura				2	3	
Uttar Pradesh	6	28	4	8	11	12
Uttarakhand	23	11	40	92	55	1
West Bengal	4	4	3	9	9	1
Total	576	521	405	605	575	86
