

Parliament Question: Fourth Global Coral Bleaching Event

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In India, the Fourth Global Coral Bleaching Event (GCBE4) has impacted regions such as the Andaman and Nicobar Islands, Gulf of Mannar, Lakshadweep, and the Gulf of Kachchh.

<i>Sl. No.</i>	<i>Coral Reef Areas of India faced Fourth Global Coral Bleaching</i>	<i>Bleaching impact</i>	<i>Cause of Bleaching</i>
1.	Andaman and Nicobar Islands	Observed small scale bleaching in the Andaman region only especially South Andaman region	Increase in sea surface temperature: El Niño effect
2.	Gulf of Mannar	Small scale bleaching in some patchy areas	Increase in sea surface temperature: El Niño effect
3.	Lakshadweep	Widespread bleaching	Increase in sea surface temperature: El Niño effect

The Government of India has launched several programs using advanced technologies like satellite imagery to manage and protect coral reef ecosystems:

- National Centre for Sustainable Coastal Management (NCSCM), under Ministry of Environment Forest and Climate Change (MoEF&CC) is working on *Coral Reef in situ Observation Network (CReON)* program which focuses on long-term coral reef health monitoring, calcification rates and ocean acidification, based on deployment of Data Buoy and Automated Weather Stations at various Coral Reef sites along the Indian Coast including Andaman & Nicobar and Lakshadweep Islands. NCSCM has mapped 1439 sq km of the coral reefs of India, as per the Coastal Regulation Zone Notification (CRZ), 2011 and 2019. Recently, NCSCM has submitted a proposal to the MoEF&CC to map the coral biodiversity of the Lakshadweep Islands, to determine the current extent and status (health) of the coral reefs of Lakshadweep under the National Coastal Mission.
- Space Applications Centre (SAC), ISRO, Ahmedabad has undertaken a project on *Inventory of Indian Coral Reefs: Mapping, monitoring and their Health Assessment* at the behest of Department of Biotechnology & Department of Space (DBT & DOS). As part of this study, SAC is mapping the coral reef regions of India at 1:25,000 scale and has mapped the reefs of Malvan, Maharashtra using Resourcesat-2 Linear Imaging Self Scanner (LISS) – IV sensor's data pertaining to 2020 timeframe using digital image processing, image classification and Geographic Information System (GIS) based post-classification analysis. The new geospatial database is also compared with SAC, ISRO's earlier coral reef database pertaining to 2004-08 timeframe based on Resourcesat-1 LISS-IV and LISS-III sensors' data for decadal monitoring.
- Indian National Centre for Ocean Information Services (INCOIS), Hyderabad under the Ministry of

Earth Sciences (MoES) provides coral bleaching alert services based on satellite-derived sea surface temperature data for Indian coral ecosystems. These alerts highlight coral regions impacted by bleaching due to thermal stress.

- National Centre for Coastal Research (NCCR), Chennai under MoES is also carrying out coral bleaching monitoring studies in Palk Bay, Andaman Island and Lakshadweep Island. Regular monitoring of the health of the reef, bleaching event & recovery status, mapping the coral reefs using remote Sensing and insitu efforts and restoration activities are also being done.

The Zoological Survey of India is dedicated to monitor the India's coral reefs through various efforts such as LTPMPs, Coral Restoration, Coral Transplantation, research on the reproductive biology of scleractinian corals, studies on bleaching-resistant corals and zooxanthellae, and more.

<i>S l . No.</i>	<i>Coral Reef Areas</i>	<i>Coral Bleaching Status 2023-24</i>	<i>Post Bleaching Status</i>
1.	Andaman and Nicobar Islands	15-18% in South Andaman Islands only	Most of the reefs recovered. Studies are going on to record the status
2.	Gulf of Mannar	27%	Most of the reefs recovered. Studies are going on to record the status
3.	Lakshadweep	84.6%	Some of the reefs recovered. Studies are under progress to record the status

Preliminary results from the project on Inventory of Indian Coral Reefs by SAC, Ahemedabad indicates apparent loss of reef area for Malvan reef in Maharashtra over a period of thirteen years (2007 to 2020). The same condition is observed for four reefs (Koswari, Nalla Tanni Tivu, Pichaimoopan Valasai and Shingle reef) over a period of twelve to fourteen years (2004/05 to 2018) out of the eleven reefs mapped for Gulf of Mannar.

The Government of India has taken the following initiatives in order to reduce the stress faced by coral reefs of the Indian subcontinent:

- Zoological Survey of India (ZSI) has been collecting coral reef data through in-situ observations, focusing on restoration strategies and ecological threats from 2002 onwards.
- Corals and coral reefs are classified as CRZ-IA area under the Coastal Regulation Zone Notification 2011 and 2019.
- Marine Protected Areas (MPAs) have been established and expanded to limit human activities, promoting ecosystem (coral reef) recovery.
- The ZSI has mapped 143.46 square kilometers of coral reefs outside Protected Areas in the Andaman Islands and is conducting research on coral growth and reproductive strategies.
- India's largest coral translocation project in the Gulf of Kachchh has successfully moved over 16,000 corals to new locations to aid reef restoration.
- India collaborates with international organizations like NOAA and ICRI to enhance coral conservation efforts and align with global standards.
- The government has implemented legal protections for corals under the Wildlife Protection Act, 1972, and the Coastal Regulation Zone (CRZ) notifications to regulate human activities impacting coral reefs.

- Successful restoration of corals in the Gulf of Mannar and Palk Bay was carried out by NCCR jointly with the Department of Environment & Forest (Wild Life Division-Gulf of Mannar Marine Park Authority). Species such as *Acropora* sp., *Porites* sp., *Favites* sp., *Favia* sp., *Goniastrea* sp., and *Montipora* sp. corals were used for the restoration programs.

This information was given by Union Minister of State (Independent Charge) for Science & Technology and Earth Sciences, Dr. Jitendra Singh in a written reply in the Lok Sabha today.

NKR/KS

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