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1. Fourth global mass coral bleaching triggered: What are corals and why are they important?

Why in News?

The fourth global mass coral bleaching event has been triggered by extraordinary ocean temperatures, the US National Oceanic and Atmospheric Administration (NOAA) said recently. This could have serious consequences for ocean life and millions of people who rely on reefs for food, jobs, and coastal defence.

Since mid-March 2023, the average sea surface temperature (SST) has been abnormally high. In March this year, it reached a record monthly high of 21.07 degree Celsius, according to the EU Copernicus Climate Change Service (C3S). The primary reason behind the soaring temperatures is the rising emissions of heat-trapping greenhouse gases (GHGs) such as carbon dioxide and methane in the atmosphere. Nearly 90% of the extra heat trapped by GHGs has been absorbed by the oceans — that is why they have become so warm.

But first, what are corals and coral reefs?

Corals are essentially animals, which are sessile, meaning they permanently attach themselves to the ocean floor. They use their tiny tentacle-like hands to catch food from the water and sweep into their mouth. Each individual coral animal is known as a polyp and it lives in groups of hundreds to thousands of genetically identical polyps that form a 'colony'.



A variety of corals form an outcrop on Flynn Reef, part of the Great Barrier Reef near Cairns, Queensland, Australia, in 2010.

Corals are largely classified as either hard coral or soft coral. It is the hard corals that are the architects of coral reefs — complex three-dimensional structures built up over thousands of years. “Unlike soft corals, hard corals have stony skeletons made out of limestone that are produced by coral polyps. When polyps die, their skeletons are left behind and used as foundations for new polyps.

Coral reefs, also referred to as “rainforests of the sea”, have existed on the Earth for nearly 450 million years. Australia’s Great Barrier Reef is the largest in the world, stretching across 2,028 kilometres.

What is the significance of corals?

Coral reefs have a crucial role in marine ecosystems. Thousands of marine species can be found living on one reef. For instance, “the Great Barrier Reef contains over 400 coral species, 1,500 fish species, 4,000 mollusc species and six of the world’s seven sea turtle species”. Research has shown that there could be millions of undiscovered species of organisms living in and around reefs.

These massive structures also provide economic goods and services worth about \$375 billion each year. More than 500 million people across the world depend on coral reefs for food, income and coastal protection from storms and floods. Coral reefs can absorb up to 97% of the energy from waves, storms, and floods, which prevents loss of life, property damage, and soil erosion. Therefore, the absence of coral reefs would not only result in severe ramifications for marine life but also for humans.

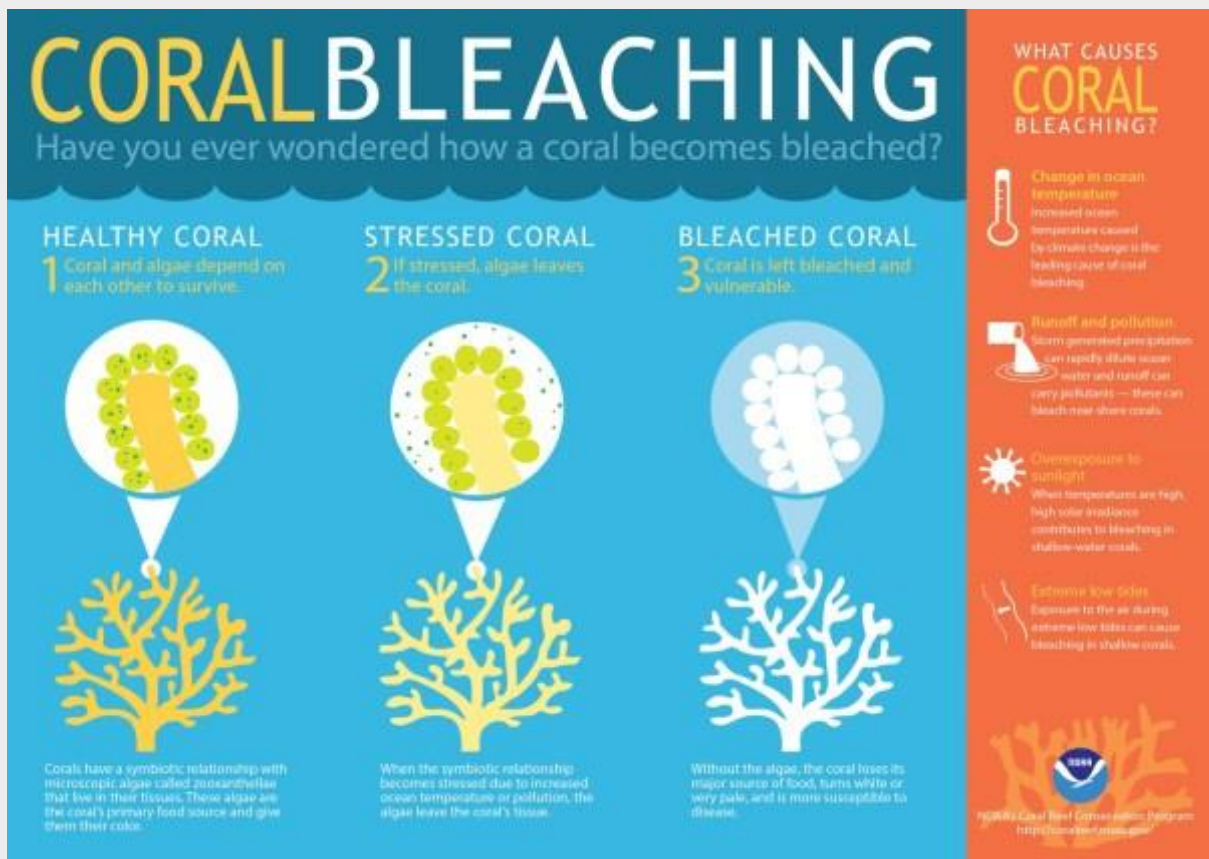
What is coral bleaching?

Most corals contain algae called zooxanthellae — they are plant-like organisms — in their tissues. Corals and zooxanthellae have a symbiotic relationship. While corals provide zooxanthellae a safe place to live, zooxanthellae provide oxygen and organic products of photosynthesis that help corals to grow and thrive. Zooxanthellae also give bright and unique colours to corals.

Corals are very sensitive to light and temperature and even a small change in their living conditions can stress them. When stressed, they expel zooxanthellae and turn entirely white. This is called coral bleaching.

Coral bleaching doesn’t immediately lead to the death of corals. They rather go under more stress and are subject to mortality. Coral bleaching reduces the reproductivity of corals and makes them more vulnerable to fatal diseases. If the bleaching is not too severe, corals have been known to recover.

Global mass bleaching of coral reefs is when significant coral bleaching is confirmed in the Atlantic, Indian and Pacific oceans, according to a report published by The Conversation. Such events are a relatively new phenomenon. The first one took place in 1998 in which 20% of the world’s reef areas suffered bleaching-level heat stress. The next two global bleaching events occurred in 2010 (35% of reefs affected) and between 2014 and 2017 (56% of reefs affected).

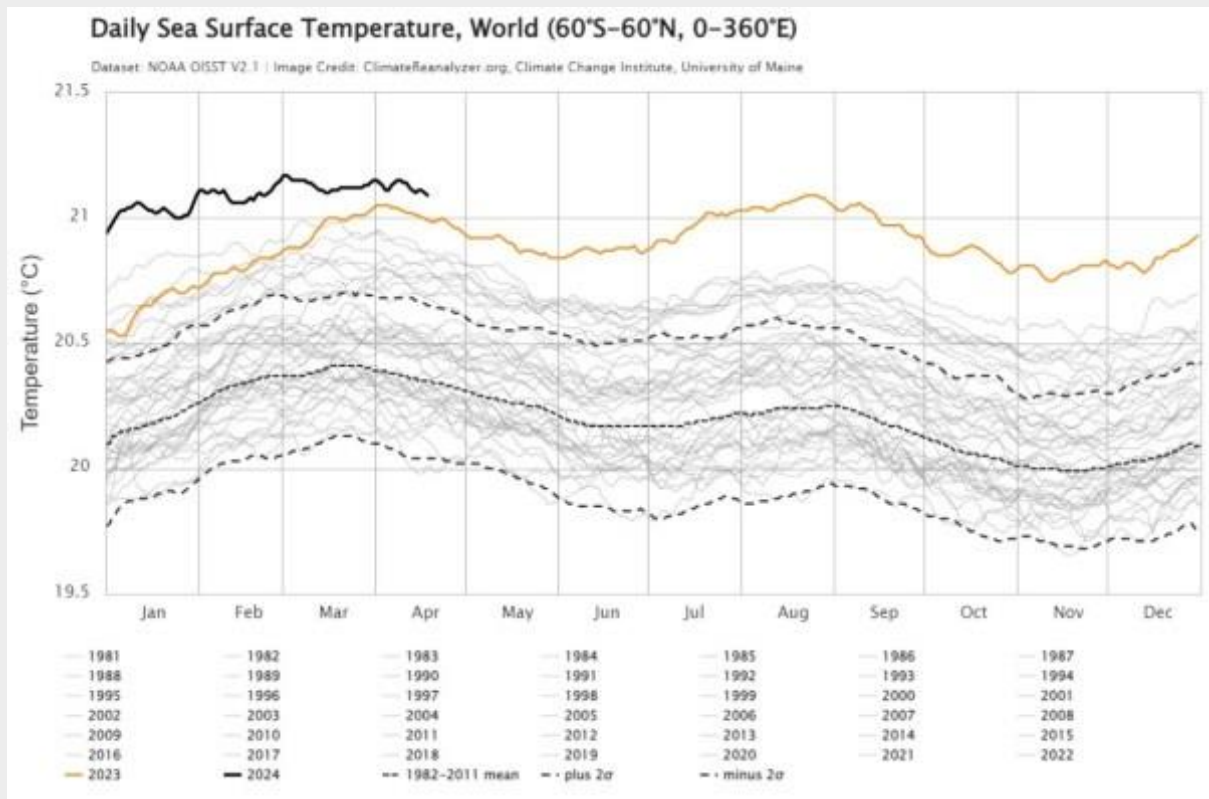


What is happening right now?

NOAA has confirmed that the fourth global bleaching event is currently underway. Nearly 54 countries, territories and local economies — from Florida, the US, Saudi Arabia to Fiji — have confirmed bleaching. The Great Barrier Reef is witnessing its most severe bleaching event. About a third of the reefs surveyed by air showed prevalence of very high or extreme bleaching.

In total, more than 54% of the world's coral area has experienced bleaching-level heat stress in the past year, and that number is increasing by about 1% per week.

The key driver behind the current event is higher ocean temperatures. However, the situation has been exacerbated by El Niño, a weather pattern which is associated with warmer oceans. Given that El Niño is weakening and a cooler La Niña may set in by the end of the year, the event may not last for very long.



Credit: Climate Analyser

What can be the impact of the event?

With global temperatures soaring, such events are expected to become more frequent and longer. As a result, the world may lose the vast majority of its coral reefs at 1.5 degree Celsius of warming, and virtually all at 2 degree, according to a 2018 report by the Intergovernmental Panel on Climate Change (IPCC) — a United Nations body which assesses the science related to climate change. Currently, the average global temperature of the Earth has increased by at least 1.1 degree Celsius since 1850.

To curb global warming to no more than 1.5 degree Celsius, countries need to bring GHG emissions to a net zero by 2050, according to the Paris Agreement. The goal, however, is unlikely to be achieved as record levels of GHG emissions have continued to be emitted into the atmosphere.

Relevance: GS Prelims & Mains Paper III; Environment

Source: Indian express

2. Maldives ex-President Yameen acquitted: Case against him, context of domestic politics

Why in News?

The High Court of Maldives, the country's second highest judicial body, overturned the conviction and 11-year prison sentence of former president Abdulla Yameen Abdul Gayoom recently, and ordered a retrial.

Yameen had been fined \$5 million, and sentenced to seven years in jail on money laundering charges, with another four year sentence added after he was found guilty of bribery in connection to the same case.



The corruption case against Yameen

Yameen was indicted in the Maldives Marketing and Public Relations Corporation (MMPRC) scandal, where over \$90 million was embezzled from the MMPRC, a government body, to cover election costs and broker deals for votes in the country's Parliament.

This scandal was uncovered in 2016 during an Al Jazeera investigation, which also found that leases for at least 50 Maldivian islands were obtained by private companies without due process. The investigation implicated Yameen, the Maldives president at the time, several lawmakers, and Maldivian officials linked to Yameen.

In the 2018 presidential election, Yameen was defeated by the joint opposition candidate Ibrahim Mohamed Solih of the Maldivian Democratic Party (MDP). The new government immediately began graft proceedings against Yameen, and in December 2018, three months after the elections, the Maldives High Court ordered the seizure of assets worth \$6.5 million belonging to Yameen.

In December 2022, the Maldives Criminal Court sentenced Yameen to 11 years in prison, and fined him \$5 million after finding him guilty of corruption and money laundering for charges related to receiving kickbacks. He began serving his sentence in Maafushi Prison, but moved to home confinement in October 2023.

Now, the High Court has ruled that Yameen's trial was unfair, and thus acquitted him, while ordering a lower court to restart proceedings against him.

Context of Maldives' domestic politics

Due to his convictions, Yameen was unable to contest in the 2023 presidential elections in Maldives, among the most contentious in the nation's recent democratic history. His party Progressive Party of the Maldives (PPM), however, fielded the eventual winner Mohamed Muizzu as its candidate.

PPM, which was in the principle Opposition during Solih's reign, won the elections on the back of Muizzu's massive 'India Out' campaign calling for the exit of Indian military personnel stationed in the Maldives, as well as a general distancing from New Delhi. While Yameen was not contesting, this campaign was very much a continuation of his policies from 2013-18, when he openly courted Saudi Arabia and China, and was hostile to New Delhi. 'India Out' campaigners even used Yameen's photos on the ground and on social media, eventually, Yameen himself came out in support of the campaign.

And after taking office, Muizzu immediately acted on the 'India Out' campaign, committing to a 'Maldives First' policy that prioritises national interests and sovereignty. A number of developments since have greatly strained Maldives' relations with New Delhi.

Relevance: GS Prelims & Mains Paper II; Bilateral Relations

Source: Indian Express

3. Llama 3, Meta's most sophisticated and capable large language model

Why in News?

Meta recently introduced its most capable Large Language Model (LLM), the Meta Llama 3. The company also introduced an image generator, which updates pictures in real-time even as the user types out the prompt. Meta will be integrating its latest model into its proprietary virtual assistant — Meta AI.

Meta is pitching its latest models as the most sophisticated AI models, steering way ahead of its peers such as Google, Mistral, etc., in terms of performance and capabilities. The updated Meta AI assistant will be integrated into Facebook, Instagram, WhatsApp, Messenger, and a standalone website much like OpenAI's ChatGPT.

What is Llama 3?

Llama or Large Language Model Meta AI is a family of LLMs introduced by Meta AI in February 2023. Meta released Llama 2 in July last year.

What Does Large Language Model (LLM) Mean?

A large language model (LLM) is a type of machine learning model that can perform a variety of natural language processing (NLP) tasks such as generating and classifying text, answering questions in a conversational manner, and translating text from one language to another. The label "large" refers to the number of values (parameters) the language model can change autonomously as it learns. Some of the most successful LLMs have hundreds of billions of parameters.

LLMs are trained with immense amounts of data and use self-supervised learning to predict the next token in a sentence, given the surrounding context. The process is repeated over and over until the model reaches an acceptable level of accuracy.

Once an LLM has been trained, it can be fine-tuned for a wide range of NLP tasks, including:

- Building conversational chatbots like ChatGPT.
- Generating text for product descriptions, blog posts and articles.
- Answering frequently asked questions (FAQs) and routing customer inquiries to the most appropriate human.
- Analyzing customer feedback from email, social media posts and product reviews.
- Translating business content into different languages.
- Classifying and categorizing large amounts of text data for more efficient processing and analysis.

Relevance: GS Prelims & Mains Paper III; Science & Technology
Source: Indian Express

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