FOURTH GLOBAL BLEACHING: ENVIRONMENT

NEWS: It's official, nearly 84% of coral reefs are affected in the most widespread mass global bleaching event

WHAT'S IN THE NEWS?

The world is witnessing its fourth and largest global coral bleaching event, with over 83% of coral reefs affected mainly due to rising ocean temperatures caused by climate change. If warming continues, annual coral bleaching is projected worldwide by 2040-2050, threatening marine biodiversity, coastal protection, and economies.

Context

- The US National Oceanic and Atmospheric Administration (NOAA), in partnership with the International Coral Reef Initiative, has officially confirmed that the world is undergoing its fourth global coral bleaching event.
- This global event highlights the increasing vulnerability of marine ecosystems to climate change and anthropogenic pressures.

About the Current Event

- Bleaching-level heat stress has impacted approximately 83.7% of the planet's coral reef areas, according to latest global monitoring reports.
- Mass coral bleaching has now been recorded in at least 83 countries and territories worldwide, affecting diverse reef ecosystems.
- The ongoing event has surpassed previous bleaching episodes in terms of extent and severity, making it the largest recorded bleaching event.

Historical Context of Global Coral Bleaching Events

- The first recorded global coral bleaching event occurred in 1998, triggered largely by a strong El Niño-induced rise in ocean temperatures.
- The second global bleaching event took place in 2010, once again driven by extreme ocean heat anomalies.
- The third global bleaching event spanned from 2014 to 2017, where about 68.2% of the world's reef areas experienced bleaching-level heat stress, devastating many iconic reefs.

Future Projections

- Climate models predict that by 2040–2050, coral reefs worldwide are likely to experience annual bleaching events without sufficient recovery periods.
- Such persistent and recurring bleaching will drastically reduce coral resilience, pushing many species toward extinction if no mitigation occurs.

Great Barrier Reef Status

- The Great Barrier Reef, one of the world's largest and most biodiverse reef systems, is currently undergoing its sixth mass bleaching event.
- This marks the second consecutive large-scale bleaching event following the major 2016–2017 bleaching crisis, indicating a worrying pattern.
- The primary cause of the current bleaching is prolonged marine heatwaves, especially affecting the Far Northern and Northern sectors.
- Australia has now officially recorded mass coral bleaching in the Great Barrier Reef in the years 1998, 2002, 2016, 2017, 2020, 2022, and 2024.

What are Corals?

- Corals are tiny, soft-bodied marine invertebrates belonging to the phylum Cnidaria, a group that also includes jellyfish and sea anemones.
- Each coral polyp secretes a calcium carbonate exoskeleton, which over time builds up to form the massive structures we recognize as coral reefs.
- Coral reefs are composed of millions of such tiny polyps living together in colonies, creating vibrant underwater ecosystems.
- Corals get their colors from symbiotic microscopic algae called zooxanthellae, which live within their tissues and contribute to their energy needs through photosynthesis.
- There are three main types of coral reefs: fringing reefs (near shorelines), barrier reefs (separated from shore by a lagoon), and atolls (circular reefs around submerged volcanic islands).

Coral Bleaching Explained

- Coral bleaching occurs when environmental stress, mainly elevated sea temperatures, causes corals to expel the zooxanthellae algae living in their tissues.
- Without these algae, corals lose their color and appear white or pale, a condition that greatly weakens their health and energy production.
- While bleached corals are not immediately dead, they are more susceptible to disease, predation, and eventual mortality if stressful conditions persist.
- Previous bleaching events have caused the death of an estimated 14% of the world's remaining coral populations.

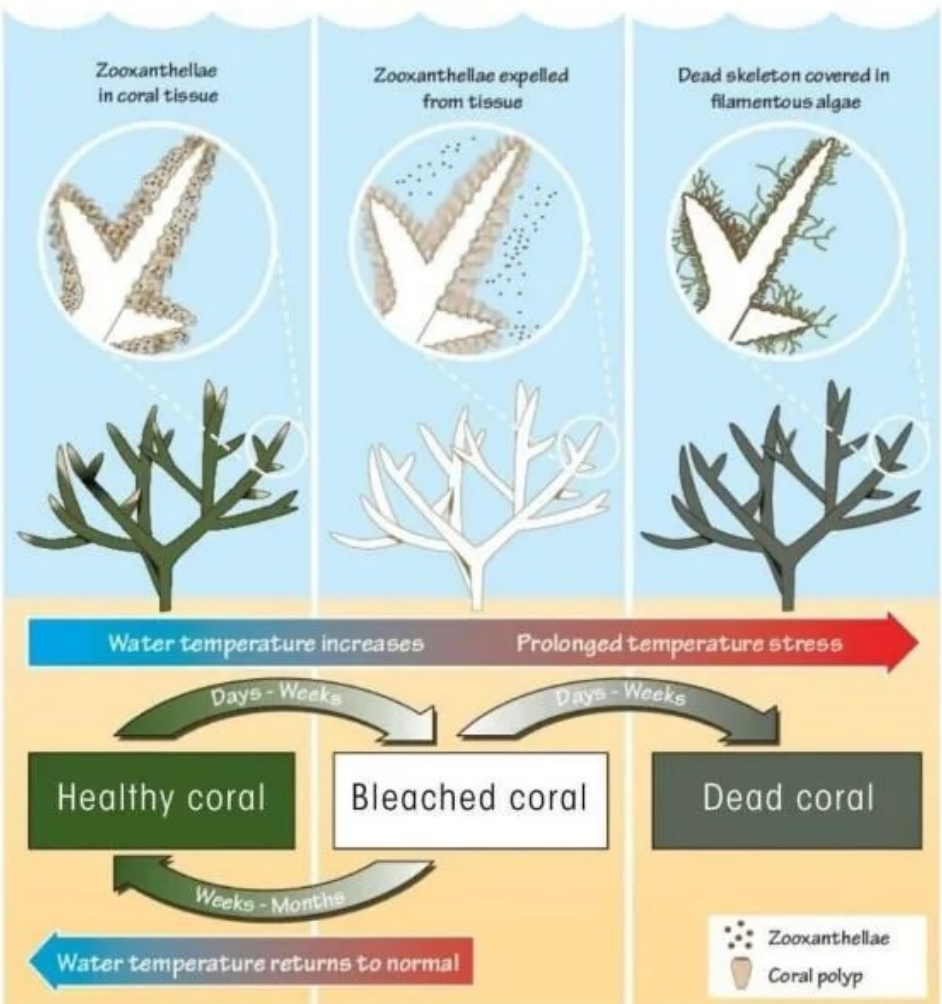
Triggers of Coral Bleaching

- The primary driver of coral bleaching is climate change, particularly ocean warming caused by greenhouse gas emissions.

- A rise of just 2°F (about 1°C) in ocean water temperature can initiate bleaching by disrupting the delicate symbiotic balance between coral and algae.
- Additional stress factors include unusually low tides that expose corals to air, excessive sunlight causing thermal stress, and pollution degrading reef water quality.

Concerns Around Coral Bleaching

- Coral reefs rarely recover to their former health once large-scale mortality occurs, leading to permanent ecosystem degradation.
- The loss of corals leads to collapse in biodiversity, affecting fish, crustaceans, and thousands of marine organisms dependent on reefs for habitat and food.
- The destruction of coral ecosystems has ripple effects across the broader oceanic environment, reducing fish stocks and altering food webs critical to human nutrition.
- Coral degradation severely impacts subsistence fisheries, coastal protection, tourism revenue, and global marine biodiversity.



Impact of Coral Bleaching

- Coral reefs serve as critical nurseries and protection zones for thousands of marine species, supporting diverse ecosystems.
- Collapse of reefs endangers already threatened marine species, many of which rely on reefs for breeding, spawning, and shelter.
- Coral reefs function as natural breakwaters, reducing coastal erosion and protecting communities from storm surges and rising sea levels.
- Economically, reefs provide ecosystem services estimated at $2.7 trillion annually, supporting fisheries, tourism, and coastal economies.
- The collapse of reef ecosystems worsens the global overfishing crisis by removing critical habitats essential for fishery sustainability.

Can Corals Recover from Bleaching?

- Recovery is possible if ocean temperatures normalize quickly and if the environmental stress is temporary.
- Bleached corals can regain their zooxanthellae algae over time and gradually restore their color and energy production.
- Recovery periods can range from a few years to decades, depending on the severity of bleaching, local stressors, and coral species resilience.
- Successful recovery depends on minimal additional stresses and active reef management practices to support regeneration.

Way Ahead for Coral Conservation

- Strengthening Marine Protected Areas (MPAs) to safeguard key reef areas from overfishing, pollution, and tourism pressures is critical.
- Implementing coral restoration strategies, such as coral gardening, where healthy coral fragments are grown and transplanted onto degraded reef areas.
- Promoting selective breeding and propagation of coral species with higher resilience to temperature stress and acidification.
- Driving global policy initiatives to reduce greenhouse gas emissions in line with the Paris Climate Agreement to limit ocean warming.
- Increasing investments in research focused on coral biology, bleaching mechanisms, and restoration science to inform better conservation practices.

- Developing and deploying advanced coral monitoring tools like satellite remote sensing, underwater drones, and artificial intelligence models to detect early signs of reef distress.

Source : https://www.downtoearth.org.in/climate-change/its-official-nearly-84-of-coral-reefs-are-affected-in-the-most-widespread-mass-global-bleaching-event