The Great Barrier Reef (GBR)

Why in news?

The highest levels of coral cover, within the past 36 years, have been recorded in the northern and central parts of Australia's Great Barrier Reef (GBR).

What are coral reefs?

- Corals are marine invertebrates or animals which do not possess a spine.
- They are the largest living structures on the planet.
- Each coral is called a polyp and thousands of such polyps live together to form a colony.
- Corals are of two types, hard corals and soft corals.
- **Hard corals** – They extract calcium carbonate from seawater to build hard, white coral exoskeletons.
- Hard corals are in a way the engineers of reef ecosystems.
- Measuring the extent of hard corals is a widely-accepted metric for measuring the condition of coral reefs.
- **Soft corals** – They attach themselves to such skeletons and older skeletons built by their ancestors.
- Soft corals also add their own skeletons to the hard structure over the years.
- These growing multiplying structures gradually form coral reefs.

What is Australia's Great Barrier Reef (GBR)?

- Australia's Great Barrier Reef is the world's largest reef system.
- It stretches across 2,300 km and has nearly 3,000 individual reefs.
- It hosts 400 different types of coral and gives shelter to 1,500 species of fish and 4,000 types of mollusc.
- Coral reefs support over 25% of marine biodiversity even as they take up only 1% of the seafloor.
- The marine life supported by reefs further fuels global fishing industries.

> *"Coral reef systems generate $2.7 trillion in annual economic value through goods and service trade and tourism."*

What does the report say?

- The annual long-term monitoring report by the Australian Institute of Marine Science (AIMS) found that Australia's great barrier reefs are improving.
- AIMS began its first research 36 years ago, and reefs are surveyed through in-water

and aerial techniques.
- The current report surveyed 87 reefs in the GBR between August 2021 and May 2022.
- The new survey shows record levels of region-wide coral cover in the northern and central GBR since the first ever AIMS survey was done.
- Coral cover is measured by determining the increase in the cover of hard corals.
- The hard coral cover in northern GBR had reached 36% while that in the central region had reached 33%.
- Meanwhile, coral cover levels declined in the southern region from 38% in 2021 to 34% in 2022.
- However, the record levels of recovery were fuelled largely by increases in the fast-growing Acropora corals, which are a dominant type in the GBR.

"Acropora is a genus of small polyp stony coral in the phylum Cnidaria and some of its species are known as table coral, elkhorn coral, and staghorn coral."

- These fast-growing corals are also the most susceptible to environmental pressures such as rising temperatures, cyclones, pollution, and crown-of-thorn starfish (COTs) attacks, which prey on corals.

"In Australia, the Barrier Reef, in pre-COVID times, generated $4.6 billion annually through tourism and employed over 60,000 people including divers and guides."

Does this mean the reef is out of the woods?

- The biggest threat to the health of the reef is climate change-induced heat stress, resulting in coral bleaching.
- Corals share a symbiotic relationship with single-celled algae called zooxanthellae.
- The algae prepare food for corals through photosynthesis and also give them their vibrant coloration.
- When exposed to conditions like heat stress, pollution, or high levels of ocean acidity, the zooxanthellae start producing reactive oxygen species not beneficial to the corals.
- The corals kick out the color-giving algae from their polyps.
- This exposes their pale white exoskeleton and leads to coral starvation as corals cannot produce their own food.
- Bleached corals can survive depending on the levels of bleaching and the recovery of sea temperatures to normal levels.
- Severe bleaching and prolonged stress in the external environment can lead to coral death.
- Over the last couple of decades, climate change-induced rise in temperature has made seas warmer than usual.
- According to the UN assessment in 2021, the world is going to experience heating at 1.5°C in the next decade.
- This is the temperature at which bleaching becomes more frequent and recovery less impactful.

- The concern is that in the past decade, mass bleaching events have become more closely spaced in time.
- The first mass bleaching event occurred in 1998 when the El Niño weather pattern caused sea surfaces to heat, causing 8% of the world's coral to die.
- The second event took place in 2002.
- However, the longest and most damaging bleaching event took place from 2014 to 2017.
- Mass bleaching then occurred again in 2020, followed by earlier this year.
- According to the Australian government's scientists, 91% of the reefs it had surveyed in March were affected by bleaching.

What are the future challenges?

- The AIMS report says that the prognosis for the future disturbance suggests an increase in marine heatwaves.
- Such marine heatwaves will last longer and the ongoing risk of COTs outbreaks and cyclones may further affect the corals.
- Therefore, the observed recovery offers good news for the overall state of the GBR.
- However, there is an increasing concern about its ability to maintain this state.

Reference:

1. https://www.thehindu.com/sci-tech/energy-and-environment/explained-the-great-barrier-reefs-recovery-and-vulnerability-to-climate-threats/article65741674.ece?homepage=true

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