Biorock/mineral accretion technology

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Context: Zoological Survey of India (ZSI), with help from Gujarat's forest department, is attempting for the first time a process to restore coral reefs using biorock or mineral accretion technology.

- Biorock is the name given to the substance formed by electro accumulation of minerals dissolved in seawater on steel structures that are lowered onto the sea bed and are connected to a power source, in this case solar panels that float on the surface.
- A biorock structure was installed one nautical mile off the Mithapur coast in the Gulf of Kachchh. The location for installing the biorock had been chosen keeping in mind the high tidal amplitude in the Gulf of Kachchh
- The technology works by passing a small amount of electrical current through electrodes in the water. When a positively charged anode and negatively charged cathode are placed on the sea floor, with an electric current flowing between them, calcium ions combine with carbonate ions and adhere to the structure (cathode). This results in calcium carbonate formation. Coral larvae adhere to the $CaCO_3$ and grow quickly
- Fragments of broken corals are tied to the biorock structure, where they are able to grow at least four to six times faster than their actual growth as they need not spend their energy in building their own calcium carbonate skeletons.

Coral Reefs

- Coral reefs are large underwater structures composed of the skeletons of colonial marine invertebrates called

corals. The colors of the corals are due to the presence of algae zooxanthellae.

- They contain the most diverse ecosystems on the planet. They: protect coastlines from the damaging effects of wave action and tropical storms.
- India has four major coral reefs areas in Andaman and Nicobar Islands, Lakshadweep, Gulf of Mannar and Gulf of Kutch. While the reefs in Andaman are considered the richest and most diverse, the ones in the Kutch area are the poorest.
- Threats to corals were posed both by climate change induced acidification as well as by anthropogenic factors.