LOHAFEX: Notes for UPSC

LOHAFEX was an ocean iron fertilization experiment jointly planned by the Council of Scientific and Industrial Research (CSIR) in India and the Helmholtz Foundation in Germany. The purpose of the experiment was to see if the iron would cause an algal bloom and trap carbon dioxide from the atmosphere.

Important points regarding LOHAFEX

- LOHAFEX (Loha means iron in Hindi while Fex is an acronym for fertilisation) experiment in the Southern Ocean, Antarctica, was aimed at increasing CO sequestration through ocean iron fertilisation as part of studies on global warming mitigation.
- The Council of Scientific Industrial Research (CSIR), India, and Helmholtz Foundation, Germany jointly planned LOHAFEX.
- Among the three new LOHAFEX clusters that were discovered, the first was related to a class of Bacteroidetes while the second and third belonged to Firmicutes.

The project was scrapped by the German government following protests from several NGOs. Environmentalists feared damage to the marine ecosystem from an artificial algal bloom. They argued that long-term effects of ocean fertilization would not be detectable during short-term observation. Other critics feared the entry into large-scale manipulation of ecosystems with these large geo-engineering experiments. The German government sent the proposal for scientific and legal reviews that were supportive of the project and the experiment was allowed to continue.

Details about the experiment

- The experiment was carried out in waters low in silicic acid which was likely to affect sequestration efficacy.
- A 900 square kilometres (350 sq mi) portion of the southwest Atlantic was fertilized with iron sulfate. A large phytoplankton bloom was triggered.
- This bloom did not contain diatoms because the site was depleted in silicic acid, an essential nutrient for diatom growth
- Diatoms are a major group of microalgae and are among the most common types of phytoplankton.
- LOHAFEX confirmed that the potential of levels of sequestration depends strongly upon appropriate siting.
- Areas apparently rich in nutrients, but lacking in plankton activity or other sea life) might be iron-deficient

- These "desolate" regions came to be called "High Nutrient, Low Chlorophyll" (HNLC) zones.

Iron Fertilization

- Stimulation of phytoplankton production through the intentional introduction of iron fines to iron-poor areas of the ocean surface is called Iron Fertilization. This is intended at accelerating the carbon dioxide (CO_2) sequestration from the atmosphere and enhancing the biological productivity.
- Iron is a trace element necessary for photosynthesis in plants. It is highly insoluble in sea water and in a variety of locations is the limiting nutrient for phytoplankton growth. Large algal blooms can be created by supplying iron to iron-deficient ocean waters. The algal blooms facilitate the nourishment of other organisms.
- The first scientist to publicly suggest that climate change could be reduced by adding large amounts of soluble iron to the ocean was John Gribbin.

Relevant Questions for LOHAFEX

Why was LOHAFEX controversial?

Environmentalists feared that the experiments might destroy the marine ecosystem, especially with respect to the fertilization of algae which a lot of sea creatures depended on for sustenance.

Where was the LOHAFEX experiment conducted?

The LOHAFEX experiment was conducted in Punta Arenas, off the coast of Chile.

Was LOHFEX the first experiment of its kind?

LOHAFEX was not the first experiment of its kind. In 2000 and 2004, comparable amounts of iron sulfate were discharged from the same ship (EisenEx experiment). 10 to 20 percent of the algal bloom died off and sank to the sea floor.