Protection of Antarctic Ecosystems

Why in news?

- *Recently, a new study assessed how Antarctica's species will respond to future threats.*
- *It also talks about the conservation efforts and costs that are needed to protect Antarctic ecosystems.*

What is the significance of Antarctica?

- Antarctica provides priceless services to the planet and humankind.
- It helps regulate the global climate by driving atmospheric circulation and ocean currents, and absorbing heat and carbon dioxide.
- Antarctica even drives weather patterns in Australia.
- Antarctica's land-based species have adapted to survive the coldest, windiest, highest, driest continent on Earth.
- The species includes two flowering plants, hardy moss and lichens, numerous microbes, tough invertebrates, and breeding seabirds including the emperor penguins and Adélie penguins.

What are the threats to Antarctic biodiversity?

- Antarctica's plants and animals face numerous threats. Chief among them is climate change.
- As global warming worsens, Antarctica's ice-free areas are predicted to expand, rapidly changing the habitat available for wildlife.
- As extreme weather events such as heatwaves become more frequent, Antarctica's plants and animals are expected to suffer.
- Also, scientists and tourists visiting the icy continent each year can harm the environment through pollution and disturbing the ground or plants.
- The combination of more human visitors and milder temperatures in Antarctica also creates the conditions for invasive species to thrive.

What are the findings of the study?

Response to threats

- Under a worst-case scenario, the populations of 97% of Antarctic terrestrial species and breeding seabirds could decline between now and 2100, if current conservation efforts stay on the same trajectory.
- At best, the populations of 37% of species would decline.
- The most likely scenario is a decline in 65% of the continent's plants and wildlife by the year 2100.

Threats to some species

- **Emperor penguins -** The emperor penguin relies on ice for breeding, and is the most vulnerable of Antarctica's species.
- In the worst-case scenario, the emperor penguin is at risk of extinction by 2100 – the only species in our study facing this fate.
- **Scottnema lindsayae** - The nematode worm Scottnema lindsayae is another Antarctic specialist species.
- The species lives in extremely dry soils, and is at risk as warming and ice-melt increases soil moisture.

Beneficial to some species

- Climate change won't lead to a decline in all Antarctic species - in fact, some may benefit initially.
- These include the two Antarctic plants, some **mosses** and the **gentoo penguin**.
- These species may increase their populations and become more widely distributed in the event of more liquid water (as opposed to ice), more ice-free land and warmer temperatures.

What could be done?

- Current conservation efforts are insufficient to conserve Antarctic species in a changing world.
- As Antarctica faces increasing pressure from climate change and human activities, a combination of regional and global conservation efforts is needed.
- The experts of the study identified **ten management strategies** to mitigate threats to the continent's land-based species.
- These strategies include measures such as
    - Mitigating climate change (listed as the "influence external policy" strategy),
    - Minimise impacts of human activity,
    - Managing non-native species and disease,
    - Managing and protecting species,
    - Managing existing and new infrastructure,
    - Protecting areas and vegetation,
    - Granting special protections to species, and
    - Increasing bio-security to prevent introductions of non-native species.

> *Reducing climate change to no more than 2 degrees Celsius of warming would benefit up to 68% of terrestrial species and breeding seabirds.*

How much would it all cost?

- Since climate change is the biggest threat to Antarctica's biodiversity, limiting global warming is the most effective way to secure their future.
- Just **USD 23 million per year** would be enough to implement 10 key strategies to reduce threats to the biodiversity of Antarctica.

- This relatively small sum would benefit up to 84% of terrestrial bird, mammal, and plant groups.
- By comparison, the cost to recover Australia's threatened species is estimated at more than USD 1.2 billion per year.

Reference

Indian Express | Why Antarctica's emperor penguins could be extinct by 2100

Quick Facts

Emperor Penguins

- Emperor Penguin (*Aptenodytes forsteri*) is a carnivorous flightless bird species.
- Emperors are the largest of all penguins. It is also the tallest and heaviest of all penguins.
- They live in colonies on the Antarctic ice and in the frigid surrounding waters.
- Its diet consists of fish, crustaceans, such as krill, and cephalopods, such as squid.
- **IUCN status -** Near threatened