

Arctic Sea Ice

Why in news?

A recent study says that the loss of Arctic sea ice is inevitable in the decades ahead, even if the world sharply reduces carbon emissions.

What is Arctic sea ice?

- They are the massive sheets of ice that pad the Arctic region.
- During winter, the sea ice envelops most of the Arctic Ocean and in summer, due to longer periods of exposure to sunlight, a portion of it melts.
- Sea ice normally melts and is at its thinnest and most sparse in mid-September.
- With the onset of winter and dipping temperatures, the ice reaches its zenith in March.



What is happening to Arctic sea ice?

- The Arctic sea ice is decreasing as acknowledged in several reports of the Intergovernmental Panel on Climate Change (IPCC).
- **Ice-free arctic** - If the global emissions drive temperature beyond 4.5°C, then the Arctic is ice-free by 2081-2100.
- Under this assumption, the world will see its first 'sea-ice free summer' before 2050.
- **Polar jet streams** - They are currents of air that form when warm and cold air meet.
- The diminished sea ice while warming the Arctic also leads to a weakening of the polar jet streams.
- **Western disturbances** - This weakening has been linked to rising temperatures and heatwaves in Europe as well as unseasonal showers in northwest India.

The rate of arctic ice loss has been nearly 13% every year, ever since satellites began to monitor arctic.

What does the new study say?

- As much as 90% of the ice-melting was due to human-instigated, or anthropogenic factors and the rest of it (10%) is caused by natural variability.
- The new study corrected for the existing climate models and the ice-free summer is inevitable.
- But reducing carbon emissions might better able to adapt to climate 'tipping points.'
- **Above 4.5°C** - It turned out that there were also likely to be ice-free Augusts and Octobers by 2080 in the emission scenarios where temperatures rose above 4.5°C.

- **Below 2°C** - Even if the temperature-rise was restricted to say 1.5°C or 2°C, as envisaged in the Paris Agreement, there is no scenario under which the Arctic sea ice can be saved in summer.

Why is the Arctic sea ice important?

- Arctic sea ice play a major role in influencing global climate and the rise and fall in Arctic sea temperatures.
- **Albedo effect** - Sea ice is light-coloured and therefore has more albedo.
- Thus sea ice plays a vital role in keeping Polar Regions cool and maintaining the earth's energy balance.
- **Natural barrier** - Sea ice also keeps the air cool by forming a barrier between the cold air above and the relatively warmer water below.
- **Feedback Loop** - As the amount of sea ice decreases, the Arctic region's cooling effect is reduced leading to 'feedback loop'.
- More absorption of solar energy causes ocean warming, which leads to more loss of sea ice and further warming.
- **Biodiversity** - Changes in sea ice can affect biodiversity and impact mammals such as polar bears and walruses.
- These mammals rely on the presence of sea ice for hunting, breeding, and migrating.
- **Arctic lifestyle** - The reduction in ice cover also affects the traditional hunting lifestyle of indigenous Arctic populations such as the Yup'ik, Iñupiat, and Inuit.
- **New pathways** - Reduced ice can open commercial and economic opportunities provoking global competition.
- Reduced ice opens up shipping lanes and increases access to natural resources in the Arctic region.

Reference

1. [The Hindu - What is happening to Arctic sea ice?](#)