

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 <u>zenith in March</u>.

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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 '<u>sea-ice free summer</u>' 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 <u>ice-free Augusts and</u> 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 <u>Polar Regions cool</u> and maintaining the <u>earth's energy balance</u>.
- **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 '<u>feedback loop</u>'.
- 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 <u>Yup'ik</u>, <u>Iñupiat</u>, <u>and Inuit</u>.
- **New pathways** Reduced ice can open commercial and economic opportunities provoking global competition.
- Reduced ice opens up <u>shipping lanes</u> and increases <u>access to natural resources</u> in the Arctic region.

Reference

1. The Hindu - What is happening to Arctic sea ice?

