



ARCTIC ICE MELTING - GS I AND III MAINS

Q. The rapid disappearance of sea ice is a source of concern for all living things on the planet. Discuss the impacts of Arctic Ice Melting in this line. (15 marks, 250 words)

News: *Melting Arctic Sea Ice Threatens Polar Bears*

What's in the news?

- In the Arctic, the impact of climate change is happening at an accelerated pace, with temperatures rising two to four times faster than the global average.

Key takeaways:

- “It’s called the polar amplification,” explains Vladimir Romanovsky, a geophysicist at the University of Alaska in Fairbanks. “Snow and ice reflect lots of energy back to space when ice and snow are melting and the surface turns much darker. So, this amount of energy will be absorbed by the surface and it will make the surface warmer – at the same time making the atmosphere warmer as well.”

Factors responsible for Increasing Melting:

- **Human-induced factors contribute to approximately 90% of ice melting**, while natural variability accounts for the rest. If significant emission reductions are not undertaken, an ice-free summer could occur as early as the 2030s.
- **The Recent study in the Nature journal suggests that the melting of Arctic Sea ice in summer is inevitable in the coming decades.**
- The loss of Arctic Sea ice due to global warming (**arctic amplification**) has raised concerns about its impact on global climate and the environment.

Multifaceted detrimental impacts of the declining Arctic Sea Ice:

1. Albedo feedback effect

- Sea ice is white, so it reflects most sunlight back to space. This reflectivity, known as "albedo," helps keep the poles cold by limiting their heat absorption.
- As shrinking sea ice exposes more seawater to sunlight, the ocean absorbs more heat, which in turn melts more ice and curbs albedo even further. This creates a positive feedback loop, one of several ways warming begets more warming.

2. Rising sea level:

- The Greenland ice sheet's melting contributes to rising sea levels, with a complete melt potentially causing a seven-meter rise.



3. Impact on climate tipping point:

- Arctic sea ice is one of the climate tipping points. Declining sea ice will cause irreversible damages to the environment.

4. Impact on thermohaline circulation:

- Declining Arctic Sea ice collapses the thermohaline circulation of the ocean. This is because of the density difference of ocean water due to high warming effects.

5. Food Security:

- Polar vortexes, heat waves and unpredictable weather patterns due to ice loss can damage global crop production; Shifting fish species distributions and impacting the Arctic food web

6. Impact on indigenous people:

- Many Arctic people rely on seals and other native animals for food, yet the deterioration of sea ice can make it increasingly difficult and dangerous to pursue certain prey.
- Increased risk of coastal flooding, coastal erosion and storm surge for coastal communities

7. Biodiversity Threat:

- Melting Arctic ice threatens the biodiversity of the region, impacting species such as polar bears and altering the food web.

8. Security threat:

- Emerging Race Course - Competition among countries like the US, China, and Russia for resource extraction and influence in the Arctic region.

9. Methane emission:

- Melting of Arctic Sea ice will expose the methane which is otherwise trapped under sea ice. This poses a greater risk of greenhouse gas effect.

WAY FORWARD:

1. Global cooperation in **arresting rising global temperature well below 1.5 degree Celsius** as per the Paris deal.
2. Paradigm shift from carbon neutral technology to **Carbon negative technology**.
3. **Fund transfer and technology transfer** from developed to developing countries according to climate justice.
4. New age **geoengineering measures** to reduce the insolation.
5. International institutions to oversee the resources of Arctic region as per the rule based order for the common good of mankind.

The rapid disappearance of sea ice is a source of concern for all living things on the planet. Maintaining a balance between anthropological activities and the environment's carrying capacity is thus one of the most important tasks that can be performed at this time.