Arctic Thaw – Climate Crisis, Geopolitical Competition, and India's Strategic Interests

Mains: *GS I – Geography*

Why in News?

The Arctic region is undergoing unprecedented environmental transformation due to rapid climate change.

What is the issue?

- **Highest surface air temperature** – According to the *Arctic Report Card 2025 published by the National Oceanic and Atmospheric Administration (NOAA)*, the Arctic recorded the highest surface air temperatures in the last 125 years.
- The past ten years have been the warmest decade ever recorded in the Arctic region.
- **Arctic ampification** – Arctic warming is occurring at more than twice the global average rate, a phenomenon known as Arctic amplification.
- **Arctic Climate Crisis –** Shrinking glaciers, rising ocean temperatures, and declining sea ice are key indicators of Arctic warming.
- The oldest and thickest Arctic sea ice has declined by more than *95% since the 1980s.*
- March 2025 recorded the lowest maximum sea ice extent in the 47-year satellite observation record.
- June snow cover in the Arctic is now nearly 50% of what it was in the 1960s.
- *Reduced snow and ice cover lowers the region's albedo*, leading to greater absorption of solar radiation.
- This process creates a positive feedback loop that accelerates further warming.
- Permafrost thaw releases iron, mercury, and toxic metals into rivers, a phenomenon described as *"rusting rivers."*
- These changes degrade freshwater quality and disrupt Arctic ecosystems and indigenous livelihoods.

What are the impacts and consequences of Arctic Thaw?

- **Ecological Consequences of Arctic Warming –** Arctic warming is reshaping terrestrial and marine ecosystems at an unprecedented pace.
- Thawing permafrost destabilizes land surfaces and releases large quantities of greenhouse gases like methane.
- The process of Atlantification is introducing warmer Atlantic waters into the Arctic Ocean.
- Atlantification leads to increased ocean mixing, reduced sea ice formation, and altered

circulation patterns.
- Rising ocean temperatures have increased phytoplankton productivity and chlorophyll concentration.
- While this may boost fisheries temporarily, it also disrupts established food chains.
- Wildlife species such as polar bears, seals, and Arctic birds face habitat loss and food scarcity.
- Indigenous communities experience threats to food security, traditional livelihoods, and cultural survival.
- **Impact on Indian Monsoon –** Arctic changes are not regionally confined and have far-reaching global climatic consequences.
- A 2024 study by India's National Centre for Polar and Ocean Research (NCPOR) highlights Arctic influence on atmospheric circulation.
- Arctic warming affects Rossby waves and jet stream patterns in the Northern Hemisphere.
- These altered atmospheric patterns increase the unpredictability of the Indian Summer Monsoon Rainfall (ISMR).
- Variability in monsoon rainfall directly affects Indian agriculture, food security, and rural livelihoods.
- Therefore, Arctic climate stability is closely linked to India's domestic climate resilience.

What are the importance of Arctic region?

- **The Arctic as a Geopolitical Hotspot –** The Arctic covers nearly 4 % of the Earth's surface and connects North America, Europe, and Asia.
- The region is governed primarily through the Arctic Council, which includes eight Arctic states.
- These states are the United States, Canada, Russia, Norway, Denmark (Greenland), Iceland, Sweden, and Finland.
- The Arctic is estimated to hold significant reserves of oil, natural gas, and critical minerals.
- Melting ice is making these resources increasingly accessible for exploration and exploitation.
- New maritime routes are emerging due to reduced ice cover.
- These developments have transformed the Arctic into a centre of strategic competition.
- **Economic and Strategic Significance –** The Northern Sea Route (NSR), also known as the Northeast Passage, connects the Pacific Ocean with the Atlantic Ocean.
- Climate-induced ice retreat has made the NSR increasingly navigable for longer durations.
- The NSR can reduce travel distance between Eastern Asia and Europe by nearly 40% compared to the Suez Canal route.
- Reduced travel time lowers fuel costs, shipping duration, and carbon emissions.
- Russia views the NSR as a strategic asset for economic development and geopolitical leverage.
- Western sanctions on Russia have increased its reliance on Asian partners for NSR development.

- Infrastructure development along the NSR requires massive investment in ports, ice-breakers, and satellite navigation systems.
- **China and Non-Arctic Actors in the Arctic –** China declared itself a "*near-Arctic state*" in 2018.
- It launched the Polar Silk Road as part of its Belt and Road Initiative.
- China seeks access to Arctic shipping lanes, energy resources, and scientific influence.
- Other non-Arctic states, including India, Japan, and South Korea, are increasing their Arctic engagement.
- These countries advocate for the Arctic as a global commons accessible to all.
- However, increasing militarisation and geopolitical fragmentation threaten Arctic cooperation.
- Finland and Sweden joining NATO has further polarized Arctic geopolitics.

What is the India's Arctic engagement?

- **Historical and Institutional Foundations –** India is a signatory to the Svalbard Treaty of 1920.
- India launched its first Arctic scientific expedition in 2007.
- The Himadri research station was established in Svalbard in 2008.
- India obtained Observer status in the Arctic Council in 2013.
- Scientific research has remained the cornerstone of India's Arctic presence.
- India released its Arctic Policy in 2022 to institutionalize its engagement.
- **India's Arctic Policy 2022 – Six Pillars**
    - Strengthening scientific research and international cooperation.
    - Climate and environmental protection.
    - Economic and human development.
    - Transportation and connectivity.
    - Governance and multilateral engagement.
    - National capacity building in polar sciences.
- The policy reflects India's balanced approach combining sustainability and strategic interests.
- **India's Strategic Interests in the Arctic –** India seeks energy diversification and access to critical minerals through Arctic cooperation.
- Since 2021, India has supported infrastructure development along Russia's Northern Sea Route.
- The Chennai-Vladivostok maritime corridor became operational in 2024.
- This corridor reduces shipping time between India and Europe by nearly two weeks.
- India can leverage its experience in the Himalayas and Antarctica for Arctic research.
- Strengthening climate modelling and monsoon research is essential.
- Diplomatic engagement with all Arctic states is necessary to safeguard India's interests.
- Cooperation between the "Third Pole" and the "North Pole" will shape the Arctic's future.

What lies ahead?

- The Arctic thaw represents both a global climate emergency and a geopolitical inflection point.

- Environmental degradation in the Arctic has direct implications for global climate systems.
- Economic opportunities are expanding alongside strategic rivalries.
- India’s Arctic policy provides a comprehensive framework but requires sustained implementation.
- Scientific leadership, climate diplomacy, and strategic partnerships will define India’s Arctic role.
- A cooperative and rules-based Arctic order is essential for global climate stability.

Reference

The Indian Express| Arctic Thaw

