Arctic Research

Why in news?

India will have around-the-year manning of the Arctic with the launch of the first-ever winter expedition in this region.

Why is the Arctic region being studied?

> *Arctic region is the region, which is above the Arctic Circle and includes the Arctic Ocean with the North Pole at its centre.*

- **Polar studies**- The polar regions, Arctic and Antarctica, offer pristine environments for scientists to study a range of natural phenomena for atmospheric, oceanic, biological, geological, glaciological and earth sciences research.
- **Climate conditions**- It is unique in many ways and offers opportunity for many discoveries about how the physical and biologic environments function under extreme conditions
- **Unique fauna**-Several species of animals are unique to the Arctic (e.g., polar bear, walrus, musk ox) and many species of birds have their summer home.
- **Native communities**-The Arctic, unlike the Antarctic is inhabited by humans, including diverse Native communities with a longer history than many of the southerly societies.

- **Anthropological studies**- The study of the Native culture is important for its preservation, and it can give insights about long-term human survival in the Arctic.
- **Economic value-**The Arctic has many natural resources that could be exploited for economic benefit.
- Crude oil, gold and industrial metals, and diamonds are presently being extracted now, yet much of the Arctic's potential for natural resources is unknown
- **Human impact**- Arctic is not as isolated from heavily populated areas and modern civilization is having impact on the Arctic.
- **Global warming-** Arctic is witnessing a series of unusual changes over past two decades due to release of greenhouse gases into the atmosphere by industrialized nations
- **Warming trend**- It has warmed by 4°C in 100 years and is losing sea ice at 13% per decade, which could make the Arctic Ocean ice-free by 2040.
- **Climate change**- The Arctic sea-ice loss could increase tropical temperature, precipitation and extreme rainfall events, and shift the Inter Tropical Convergence Zone
- **Scientific evidence**- It has shown that the Arctic ice and the sea ice have the potential to affect humans outside the Arctic region, as sea levels rise, and to influence atmospheric circulations.

Scientific research in Arctic region

• **UN Convention on the Law of the Sea (UNCLOS)-** It allows for the freedom of marine scientific research in the high seas of the central Arctic Ocean.
• **Arctic Council-** It is an intergovernmental forum for cooperation and coordination on Arctic issues, including scientific research.
• **Svalbard Treaty, 1920-** It recognizes the sovereignty of Norway over the archipelago of Svalbard, but also grants equal rights to all parties to engage in economic activities, such as mining and fishing in the region and its territorial waters.
• **Individual jurisdictions in the Arctic countries**- The Arctic region is divided into different zones of sovereignty and jurisdiction, depending on the location and the nature of the activities.

How India is engaged in the Arctic region?

- **Impact on India-**The vulnerability of the Arctic region may have an impact on India in terms of economic security, water security and sustainability.
- **Svalbard treaty**- India's engagement with the Arctic can be traced to the signing of the Svalbard Treaty in 1920.
- **Conduct studies**: Indian conducts studies regarding atmospheric, biological, marine, hydrological, glaciological events.
- **Arctic Council-** India is an observer state in Arctic Council including China.
- **Himadri research station-** India's first permanent Arctic research station located at Spitsbergen, Svalbard, Norway.
- It is located at the *International Arctic Research base, Ny-Alesund*.
- **Arctic Policy of 2022**- It mentions that the country's approach to economic development of the region is guided by UN Sustainable Development Goals.
- **Potential for minerals**- The region constitutes the largest unexplored prospective area for hydrocarbons remaining on the earth, it may have significant reserves of coal, zinc and silver.
- **Institutional support**- In 2018 India renamed National Centre for Antarctic and Ocean Research to National Centre for Polar and Ocean Research.
- **Infrastructural base-**
    - Multi-sensor moored observatory was inaugurated in 2014
    - Northernmost atmospheric lab was launched in 2016.

Himadri Research Station

• **1st winter expedition**- It will give a major boost to the country's research around global climate, sea levels and biodiversity.
• **Aim**- To maintain a year long presence at the Himadri research station in Svalbard, Norway.
• **Data collection**- It will collect data on atmospheric processes, aurora borealis, atmospheric electricity, and space physics studies.
• **Study cosmic dawn**- For the first time researchers will undertake the characterization of the *radio frequency environment* in the Svalbard region of the Arctic, it will help astronomers assess the suitability of this uniquely located region.
• **Unique study**- It will allow researchers to conduct unique *scientific observations during polar nights*, where there is no sunlight for nearly 24 hours and sub-zero temperatures (as low as -15°C).
• **Significance-** It will be only the 4th research station in the Arctic to be manned around the year.

What lies ahead?

- The 1st winter expedition realises the India's vision of making it a developed nation by 2047, as it is committed to expanding scientific activities and international cooperation and collaboration.
- Arctic is an area of scientific, climatic, and strategic importance hence Indian scientists will play a vital role in addressing areas that affect life and survival on this planet.

References

1. Indian Express- India set to man its Arctic base
2. PIB- India's maiden winter expedition