



*Rapid changes in the Arctic and its impact on India's climatic conditions are the principal motivation behind India's engagement in the region; Research stations at Spitsbergen, Svalbard, Norway.*

# 8. Strengthening India's Arctic Foray

**India's Arctic foray is supported by its Arctic programme and the recently released Arctic Policy (2022). The goals and objectives of India in the Arctic are represented by not only scientific exploration, but also international co-operation, economic and human development as well as capacity-building. Leading institutions in India including MoES, MEA, DST, MoEFCC, MoPS, MoPNG and MoD are the key stakeholders in Indian efforts to engage with Arctic affairs. Meanwhile, emphasis has been given on involving India's think tanks as well as academia for capacity-building through research, consultation and awareness-building. The cumulative efforts of various government bodies including joint expeditions, research and writing, organizing events, surveys and other activities are all targeted towards promoting India's foray in the Arctic.**

## 8.1 Introduction

India's Arctic foray combines the history of the nation's scientific involvement with the future national and global needs in its Arctic Policy titled 'India and the Arctic: Building a Partnership for Sustainable Development' released by the MoES in March 2022. The Policy lays down six pillars representing its objectives and goals. It includes strengthening India's scientific research and cooperation, climate and environmental protection, economic and human development, transportation and connectivity, governance and international cooperation, and national capacity building.

Implementing India's Arctic Policy requires multiple stakeholders, including various governmental departments, academia, the research community, think tanks working on Polar issues, business, and industry. Therefore, India's Arctic journey

comprises scientific studies and exploration, economic planning and international cooperation, and socio-cultural engagement and its objectives find expression through multidimensional actions.

## 8.2 Rationale

India's engagement in the Arctic is primarily drawn from the science of the Arctic and its significance for India. Thus, science is the instrument for Indian policy-makers, and one of the most important driving forces is climate change. Since the mid-20th century, the shrinking cryosphere in the Arctic and the high mountain areas has led to a predominantly negative influence on livelihood, including food security, health, infrastructure, transportation, tourism, as well as the culture of human societies—most importantly for the indigenous peoples (Verma, 2023). Studies show that the Arctic is warming upto four times faster than the global average, and the Polar regions are the first to respond to climate change (Ravichandran, 2023a). A result of this heating may be seen in the increased influx of freshwater in the Arctic seas and oceans (Ibid.). As what happens in the Arctic is not local but global (Ravichandran, 2023a), melting in the Arctic could adversely affect India, notwithstanding the vast distances that separate the two—profoundly impacting the Indian Monsoon (Frydenlund, 2023). Since the monsoon accounts for 70 per cent of India's rains (Verma, 2023), understanding the Arctic's changes is an imperative bedrock of its future needs. Indian scientists indicate that a decreasing sea-ice cover and an increase in the dark ocean areas in the Arctic lower

shrinking cryosphere  
tourism

Fig. 8.1: Indian Arctic programme: Svalbard (2013);Canadian Arctic (2023)



Source: Jain, 2023

albedo effect

the Sun's albedo effect. Such profound changes seem to aid extreme rainfall in India, adversely impacting the Himalayan region (Ravichandran, 2023). Understanding this connection, especially when the Indian Ocean is warming fast too, is critical for India, for it affects one-fifth of humanity (Verma, 2023).

global warming

The scientific community has been quietly working to study the Poles over the years, which helped India hone a white paper on the Arctic into a Policy document in 2022 (Saran, 2023). Earlier, the study of the Poles was narrowly limited to a small set of people. The connection between India and the Poles needed to be understood with clarity. Despite humble beginnings, a small budget, and a limited workforce, Indian researchers have engaged with the Poles for decades. Climate and global warming are the most critical aspects of the study that has facilitated an understanding in India about an Arctic connection. As the Indian government began rearranging institutional arrangements, starting with the Department of Ocean Development a few decades ago into a full-fledged Ministry of Earth Sciences with dedicated institutes working on Arctic and Antarctic, it began to realize the importance of the Arctic. Over the years, other institutions have emerged to study the Arctic and the Antarctic, especially in the Indian universities (Ibid.). Therefore, the changes in the Arctic and its impact on India's climatic conditions are the principal motivation and rationale behind India's engagement in the region.

white paper

The objectives of India's Arctic Policy 2022 align seamlessly with the Arctic science programme as it augments the needs of India's scientific community working on the Poles. The Arctic science programme, initiated considerably before the official white paper, aims at strengthening India's scientific research and cooperation. The policy document institutionalized the goals, visions, and efforts of India's scientific communities in the Arctic. Since formulating the Arctic Policy, India's Arctic engagement not only focuses on enhanced cooperation in science but also on policy-making and economic and social cooperation (Ravichandran; Khanna, 2023).

scientific cooperation

Therefore, from scientific cooperation to climate protection, and human and economic development, the focus of India's Arctic policy is manifold. One important stipulated objective of India's Arctic engagement is that the Arctic or Polar research should harmonize with the Himalaya since the fate of 1.9 billion people hinges on the mountains (Ravichandran, 2023).

Himalayan cryosphere

teleconnections

From a scientific standpoint, India's Arctic science programme encompasses the activities of the NCPOR in the Arctic and the initiatives taken by its parent body, the MoES (Jain, 2023). The NCPOR is responsible for coordinating and implementing India's Polar programmes, which include the Indian Antarctic and the Arctic programmes along with studies on Himalayan cryosphere and the Southern Ocean (Ibid.) (Fig. 8.3). There are diverse scientific themes on which Indian scientists work in the Arctic, apart from studying the teleconnections between the Indian monsoon and Arctic climatic variabilities (Ibid.). Most of India's scientific themes related to the Arctic are in line

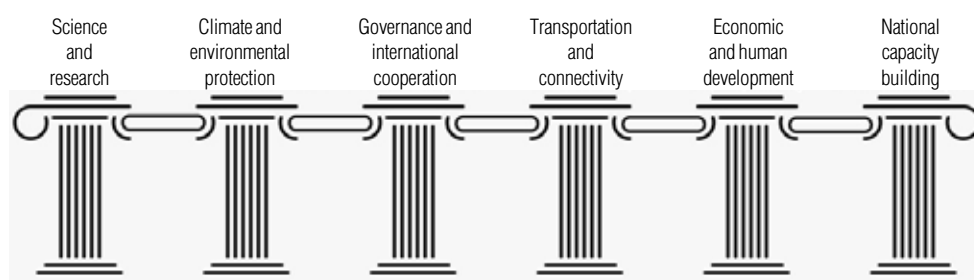
with the Arctic Council's working groups, such as biodiversity assessment, long-term monitoring, atmospheric prediction, atmospheric sciences, and aerosol studies (Ibid.). India has steadfastly built the capacity to achieve scientific objectives in the Arctic region. In 2014, NCPOR collaborated with NIOT Chennai to deploy the IndArc, the first of its kind outside Indian offshore waters (Ibid.).

The six pillars of India's Arctic policy further intensify India's Arctic involvement by facilitating enhanced international cooperation in areas beyond science—a collaboration with international partners at all levels, including responsible exploration and harnessing of renewable energy and clean technology; traditional systems of medicine such as ayurveda, unani, and yoga; promoting peace, stability, and security within the framework of international laws (Khanna, 2023) (Fig. 8.2). It further includes maintaining a strong focus on the preservation of the environment and sustainable socio-economic development; enhanced understanding of legislations and regulatory framework at the regional, national, and sub-national levels; strengthening multi-disciplinary research and collaboration with international partners at all levels; building capacity through cooperation such as the NASA-ISRO SAR mission, sharing resource and data; facilitating services such as telecommunication, search and rescue, environment and climate modelling in the Arctic (Ibid.).

### 8.4 Actions

India's actions for its Arctic involvement may be explored across scientific, political, economic and socio-cultural engagement.

**Fig. 8.2: Six pillars of India's Arctic policy**



- Enhance cooperation
- Harmonize with the Himalayan region
- Contribute to increasing understanding of Arctic region

Source: Khanna, 2023

aerosol studies

IndArc

yoga

regulatory framework  
multi-disciplinary

### 8.4.1 Scientific Engagement

#### Arctic Circle

#### Korean Polar Research Institute

One of the most essential objectives of India's Arctic engagement is science. It is also the first of the six pillars of India's Arctic Policy. The Arctic Council's operations were partially stalled for some time; hence engagement with international Track 2 organizations such as the Arctic Circle was enhanced. Participation of Indian scientific, policy and academic institutions in the Arctic Circle forums and events in Reykjavik and Japan was enabled (Jain, 2023). In 2019, India collaborated with the Korean Polar Research Institute to embark on an Arctic Ocean cruise (Ibid.). The focus was on microphysical and microbiological processes, specifically the teleconnection. The Korean Polar Research Institute facilitated the Indian team aboard their ship to travel to Western Arctic and engage in relevant areas of study. Himadri, India's Arctic station in Svalbard, Norway, currently functions for about 180 days roughly in a year. Efforts are being made to drive it up to 365 days, thus, making it a round-the-year station (Khanna, 2023) (Fig. 8.1).

#### Gruebadet Observatory

Indian biologists from NCPOR are expanding their understanding of permafrost microbiology in the Arctic regions beyond Svalbard (Jain, 2023). Two Indian scientists are engaged in the installation of atmospheric instruments in the Gruebadet Observatory, Svalbard, Norway, set up under the long-running Indian Arctic programme (Ibid.). India's Arctic Science programmes also links the Indian monsoon and the Arctic climatic variability using paleo-oceanographic proxies (Ibid.).

#### migratory birds

Another study focuses on the role of migratory birds in the dissemination of antibiotic-resistant bacteria to the Arctic. Certain migratory birds in the Arctic travel every year to Antarctica and carry back some of the microorganisms to the Arctic and other places (Jain, 2023). This project is studying the role of this transfer on the Arctic ecosystem.

#### microplastics

NCPOR scientists are also working on microplastics in the Arctic region and their various types and sources (Ibid.). The goal is to decipher and help policy-makers decide which products to ban in the Arctic and the Poles.

#### POLARNET

POLARNET is an atmosphere-based system initiated to monitor various greenhouse and aerosol measurements to assist modelling (Jain, 2023). It attempts to cover all Polar regions, viz. Antarctica, the Southern Ocean, and the Arctic. Charts and instruments have been designed to get a more holistic picture of the aerosol and the atmospheric variability in the Arctic region. Other flagship scientific projects of India in the Arctic include monitoring of Kongsforden for climate change studies, Arctic precipitation, bacteria and plankton and more (Ibid.). The Indian Arctic programme has contributed around 180 papers so far, with increasing intensity in the later years, marking heightened interest in Arctic research (Ibid.). These contributions are made across biology, physics, geology, mathematics and statistics.

#### Kongsforden

#### 180 papers

### 8.4.2 International Cooperation

India's efforts for international cooperation in the Arctic, which is the fifth pillar of the Arctic policy, can be explained through various institutional collaborations. The bilateral relations between India and Norway are well positioned on Polar research and extends to other areas of collaboration such as the blue economy, research in Antarctica, deep ocean technologies, and integrated ocean management, amongst others (Frydenlund, 2023). India is working towards strengthening the Empowered Arctic Policy Group (EAPG), prioritizing activities through the preparation of a roadmap, establishment of points of contact in key ministries such as MoES, MOEF&CC, MEA, MOPSW, MOPNG, MoD and DST through quarterly meetings for coordination and reviewing its activities. In addition, compilation and dissemination of a newsletter, interaction with think tanks, consultative mechanisms with Asian observers to the Arctic Council, establishment of points of contact for enhancing collaboration and multilateral construct amongst Asian observers for engaging in the Arctic is also being undertaken (Khanna, 2023). Towards enhancement of international cooperation, India is interacting with Greenland as India intends to assist resource sharing pathways from the region. Especially in the case of rare earth and other minerals which are unique to the region, India is therefore, closely engaging with Greenland and its leadership. India is also looking to develop ties with Asian Observers and explore collaborative work. Recently a meeting took place between India and Singapore's Special Envoy for Arctic Affairs to discuss matters of Arctic cooperation (Ibid.).

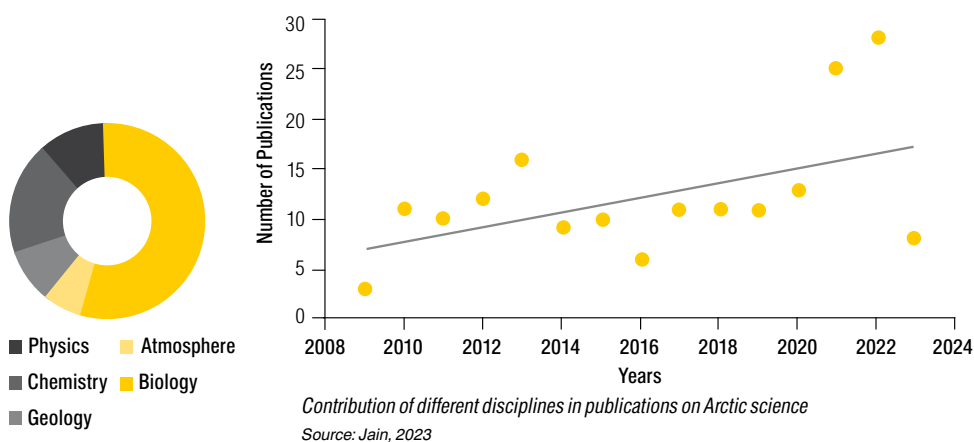
blue economy

Empowered Arctic Policy Group

### 8.4.3 Socio-economic and Cultural Engagement

India is engaging in the Arctic to enhance socio-economic development and cooperation, i.e., the third pillar in its Arctic policy. Interaction between policy-makers and industry

Fig. 8.3: Indian Arctic programme: Scientific contribution



## soft power diplomacy

is being enhanced. India has organized meetings between the AEC and all of India's industrial chambers – FICCI, ASSOCHAM and ICC among others in order to explore synergies (Khanna, 2023). The synergies can help further economic cooperation in the Arctic between India and prominent international actors in the region.

## Indian embassies

Cultural instruments or soft power diplomacy have been enabled to further India's human development goals in the Arctic. One such example of this is when India celebrated International Yoga Day on June 21, 2022. Yoga being a globally widespread form of Indian meditation, holds the power to promote human development in the Arctic, boosting physical and mental health awareness. Not only did the Indian station in the Arctic (Himadri) celebrate and observe Yoga Day, but the Indian embassies in Finland, Russia and Denmark (Greenland) also organized Yoga Day celebrations, all being prominent part of the Arctic (Ibid.).

## newsletter

Another goal of India's Arctic involvement is to increase awareness and understanding of the Arctic region within the nation. Prominent figures were involved in television programmes to discuss Arctic-related issues. Additionally, an EAPG has been established, and points of contact have been appointed in key ministries such as MoES, MoEFCC, MEA, MoPS, MoPNG, MoD, and DST (Khanna, 2023). A quarterly newsletter is sent to all parts of the government and missions overseas, capturing all the activities related to the Arctic.

## AYUSH AEC

Interaction with think tanks is undertaken every six months, and a think tank section is introduced in the newsletter to capture their activities. The focus is on sharing best practices, engaging in international collaboration with Asian observers, promoting AYUSH and Yoga, building capacity in shipbuilding and seafaring, offering Arctic courses, and think tanks becoming members of the AEC (Khanna, 2023). The aim is to ensure year-round engagement in the Arctic and facilitate collaboration among various stakeholders.

### 8.5 Achievements

India has hit several milestones in exploring the Arctic and engaging as a stakeholder. Some of its recent achievements are listed below:

- i. India's key institutions, such as the NCPOR which is regarded as India's gateway to the Polar regions, have taken initiatives towards scientific capacity-building and have earned accomplishments in this area. For example, the NCPOR has invested in a laboratory for DNA sequencing with both types of sequencing facilities, first-generation sequencing and second-generation sequencing, to understand the impact of climate change on the microbial community and their response to climate change (Jain, 2023).
- ii. Indian scientists, collaborating with the Norwegian Polar Institute, visited the geographical North Pole via the Norwegian research vessel Kron PrinsHaakon on



October, 2022. A team of two scientists collected samples from the North Pole (Jain, 2023).

- iii. Monitoring Kongsfjorden and Krossfjorden for climate change and ecosystem modelling studies have been conducted (Jain, 2023).
- iv. Monitoring of Arctic precipitation and atmospheric variabilities and characterization of aerosol and black carbon measurements are being done (Jain, 2023).
- v. Indian scientists are expanding scientific activities beyond Svalbard. Two scientists from NCPOR have planned to visit the CHARS in the Arctic region to pursue research in atmospheric and marine science, environmental chemistry, cryospheric studies and more (Jain, 2023).
- vi. India has planned an Arctic Ocean Paleoceanography expedition from 15th August – 10th September 2023 (Jain, 2023).
- vii. Presently, India produces the third largest number of seafarers, in terms of officers and has fulfilled 10 per cent of the global demand (Khanna, 2023). Efforts have been made to build capacity in education. The UGC has conducted online courses on the SWAYAM portal and received many proposals (92). India is currently selecting four proposals and exploring ways to finance them so that Indians can access the information and learn online (Khanna, 2023).
- ix. Indian universities are looking to gain membership to the UArctic, as outlined during an online interaction with the UArctic (Khanna, 2023). UGC and UArctic organized a national webinar on capacity-building in education on December 9, 2022.
- x. Arctic-related questions were included in Kaun Banega Karodpati and Think You, a quiz involving 7,500 schools organized by the Navy (Khanna, 2023).

## 8.6 Recommendations

Despite the accomplishments, there is a need to expand India's Arctic involvement, and various actions and strategies are required to promote a deeper engagement.

- i. The six pillars of Arctic policy need a focused, multi-stakeholder approach involving not just the government entities but also research institutions, think tanks, universities and the private sector (Verma, 2023).
- ii. The current period is an extraordinarily difficult time in global geopolitics (Frydenlund, 2023). The Arctic should never be a region for geopolitical or geostrategic contestation between major powers. It should remain an area for cooperation for the

benefit of all humanity (Saran, 2023). The stability of the Arctic Council is, therefore, crucial for the geopolitical stability of the Arctic (Hoglund, 2023).

- iii. India is worried about the Himalaya and the consequences of climate change. Therefore, it needs to bolster institutional support, enhance investments, and put in place state-of-the-art monitoring networks and satellite-based observations to better cryospheric science in all three Polar regions and the oceans. India's modelling effort also needs strengthening to better future predictions (Ravichandran, 2023). India needs to enhance its scientific presence at Himadri all year round through multiple scientific projects (Khanna, 2023).
- iv. The nation needs to heighten international engagement, focusing on Asian Observers to the Arctic Council. India's proactive role in Arctic Council Working Groups needs to be strengthened through increased participation (Khanna, 2023). International outreach through membership in the Arctic Economic Council may also be sought (Khanna, 2023).
- v. Arctic is congruent with the ideas of Mission LiFE, an India-led global mass movement encouraging individual and community action to protect and preserve the environment. Therefore, best practices from the Arctic must be shared globally for sustainable development (Khanna, 2023).
- vi. India can strengthen its Arctic involvement by providing satellite medical services in the Arctic (Khanna, 2023).
- vii. India can help make the Northern Sea Route and associated waterways commercially important, contributing a workforce towards hydrography or satellite-based communications for ships on the Arctic routes (Khanna, 2023). Collaboration on shipbuilding is another area that India needs to work on to improve its engagement in the region. India is poised to procure its icebreaker and strategise on building yards to enable the building of ice-class vessels (Khanna, 2023).
- viii. The UGC can introduce Arctic courses by including them in NCERT textbooks, gaining memberships for various universities in the UArctic (Khanna, 2023). Increased research on the Arctic in Indian universities will enable high-quality capacity building in the nation (Ravichandran, 2023a).
- ix. There is also a need to conduct regular conferences, seminars and workshops to increase awareness among the Indian milieu (Khanna, 2023). Round-table discussions at the national and international level on Polar issues need to be enabled (Goel, 2023).