

14

**COMMITTEE
ON EXTERNAL AFFAIRS
(2025-26)**

EIGHTEENTH LOK SABHA

MINISTRY OF EXTERNAL AFFAIRS

INDIA'S ROLE AND PRESENCE IN THE ARCTIC AND ANTARCTIC REGIONS

FOURTEENTH REPORT



**LOK SABHA SECRETARIAT
NEW DELHI**

JULY 2026 /Shravana, 1948 (Saka)



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COMMITTEE ON EXTERNAL AFFAIRS
(2025-26)

(EIGHTEENTH LOK SABHA)

MINISTRY OF EXTERNAL AFFAIRS

India's Role and Presence in the Arctic and Antarctic Regions

Presented to Lok Sabha on 30 July, 2026
Laid on the Table of Rajya Sabha on 30 July, 2026



LOK SABHA SECRETARIAT
NEW DELHI

JULY 2026 /Shravana, 1948 (Saka)

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COMPOSITION OF THE COMMITTEE ON EXTERNAL AFFAIRS (2024-25)

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18. Ms. Praniti Sushilkumar Shinde
19. Ms. Bansuri Swaraj
20. Shri Akshay Yadav
21. Vacant

Rajya Sabha

22. Dr. John Brittas
23. Shri Raghav Chadha
24. Smt. Sagarika Ghose
25. Dr. K. Laxman
26. Shri Satnam Singh Sandhu
27. Shri Rajeev Shukla
28. Shri Ratanjit Pratap Narain Singh
29. Dr. Sudhanshu Trivedi
30. Dr. Abhishek Manu Singhvi*

* Dr. Abhishek Manu Singhvi, Member of Parliament, Rajya Sabha nominated to the Committee *w.e.f.* 03.06.2026.

Shri A.D Singh, Member of Parliament, Rajya Sabha, retired on 09.04.2026

@ Shri Ayodhya Rami Reddy Alla, Member of Parliament, Rajya Sabha, retired on 21.06.2026.

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| 1. Shri Anjani Kumar | – | Joint Secretary |
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| 3. Ms. Shanta Banerjee Datta | – | Deputy Secretary |

INTRODUCTION

I, the Chairperson of the Committee on External Affairs (2025-26), having been authorized by the Committee to submit the Report on their behalf, present this Fourteenth Report (18th Lok Sabha) on the subject 'India's Role and Presence in the Arctic and Antarctic regions'.

2. The Committee selected the subject 'India's Role and Presence in the Arctic and Antarctic regions' for detailed examination during the year 2024-25 and 2025-26. Briefing by the representatives of the Ministry of External Affairs and the Ministry of Earth Sciences, on this subject, was held on 23 July, 2025. Thereafter, the Committee heard the views of four experts on the subject namely, Dr. Rasik Ravindra Secretary General, Society for the Geopolitics of Arctic, Antarctic & Himalayan Areas (SaGAA), Dr. Thamban Meloth, Director, National Centre for Polar and Ocean Research (NCPOR), Capt. (IN) Anurag Bisen (Retd.) Senior Fellow, Vivekananda International Foundation (VIF) and Ms. Zerín Osho Director, Institute for Governance and Sustainable Development (IGSD) on 30 October, 2025 in accordance with Rule 331 (L) of the Rules of Procedure and Conduct of Business in Lok Sabha.

3. The Report was considered and adopted by the Committee at their Sitting held on 21 July, 2026. The Minutes of the Sitzings of the Committee are appended to the Report.

4. The Committee wish to express their gratitude to the Ministry of External Affairs, Ministry of Earth Sciences for placing material information as well as tendering evidence and views before the Committee. The Committee also express their thanks to Shri Milind Deora, MP(RS), and Sea Shepherd Global, an international non-profit marine wildlife conservation organisation, for furnishing valuable inputs in writing which was of great help in the examination of the subject.

5. The Committee place on record their appreciation for the assistance rendered to them by the officials of the Lok Sabha Secretariat attached to the Committee.

6. For facility of reference, the Observations/Recommendations of the Committee have been printed in bold letters in Part-II of the Report.

NEW DELHI

21 July, 2026

30 Asadha, 1948 (Saka)

Dr. Shashi Tharoor,

Chairperson,

Committee on External Affairs

Report

Narration Analysis

I India's role and presence in Arctic and Antarctic: A Brief Overview

Polar region are areas of significant importance for the entire world. Geographically, North and South Poles have huge differences which implies that our approach to both these areas have to be calibrated differently. With advancing technology, as well as the adverse impact of global climate change, access to these regions have become much easier. As a result opportunities and challenges have emerged from scientific, economic and strategic perspectives. India, despite being a tropical country, has been influenced by changes in the polar region and has also developed stakes because of our own scientific advancement and economic interests. India's overall approach has been a triad of science, economy and strategy. India's Antarctic approach was evolved when India joined the Antarctic Treaty and set up research bases there. Similarly the Arctic policy was postulated in 2022 to give a broad strategic approach to the polar region, especially the Arctic region. In addition to the above, one of the key focuses now is to develop knowledge about various dimensions of the polar region and develop our competence from all perspectives.

(a) Arctic and Antarctic regions – Contrasting geographical features

1.1 Generally, the Arctic region is considered to be above 66 degrees North latitude. There are eight States who have territory in that region. The Antarctic region usually refers to areas 60 degrees South latitude. Arctic and Antarctic regions represent nearly 90% of the ice sheet of the planet which store 70% of fresh water resource. However, these two regions of earth have contrasting geographical significance. Arctic is a sea surrounded by landmass while Antarctic is a landmass surrounded by Ocean. There are indigenous people living in Arctic Region along with non-indigenous people while there is no permanent habitation in Antarctica. Since the Arctic coastal States have sovereign rights on their areas including the Exclusive Economic Zone (EEZ) and the rights over extended continental shelves under the United Nations Convention on the Law of the Sea (UNCLOS), Arctic is therefore distinct from Antarctica with no sovereign control of any nation.



1.2 While deposing before the Committee on 23 July 2025, the then Secretary West, MEA made following submission regarding India's interest in Arctic and Antarctica:

"India's interests in engaging with these two regions emanates mainly from interconnection with climate. The climate interdependence also affects monsoon patterns, in which we have a deep interest. Besides, as the polar ice melts, it presents both new challenges and opportunities for all major players. It also impacts water availability, agriculture and consequently our economic security. If the Arctic trade routes open, we must consider what that would mean for India's opportunities, as well as those of other global players. The scientific and research collaboration opportunities that both these regions offer to all countries are significant. Furthermore, we need to assess how the geostrategic balance might shift, or remain the same. From a geostrategic perspective, in the Arctic, among the eight member States, seven are NATO members, Russia is not the member of it. This creates an interesting strategic dynamic."

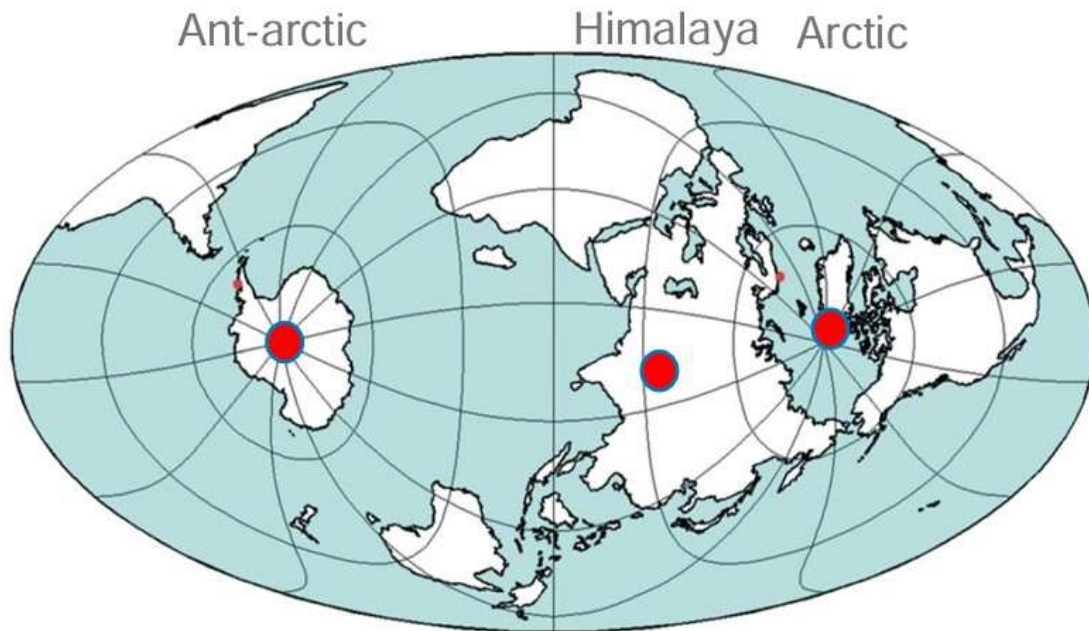
(b) Changing dynamics of Polar regions due to climate change

1.3 Polar areas provide a deep insight into the present global climate and predictions for future as the polar climate is warming up dramatically faster than elsewhere which affect the climate of the entire planet and having the largest accumulation of ice in the world, melting of ice here will increase the global sea level. There are three polar areas in the cryosphere of the earth:

- North pole
- South pole
- Himalayas

1.4 The Committee have been informed that Greenland and Antarctic ice sheets have been losing mass over past 20 years and global sea levels rose 20 cm in past 100 years. Arctic sea ice extent is declining at a rate of 13 % per decade.

1.5 Polar areas have been called the 'Global barometer'. Rising temperatures are causing rapid environmental changes in the Arctic and Antarctic, including sea-ice loss, ice-shelf breakup, glacier retreat, permafrost thaw and ice sheet instability, with serious implications for global sea-level rise and climate changes.



1.6 The Committee have been informed that 2040s will be a critical decade for polar regions since many studies have estimated that, by 2040s, the Arctic will lose its summer sea ice due to climate change. This would open up the polar sea route for commercial shipping traffic as well as increased opportunity for economic exploitation, including mining, fishing, and tourism as well as challenge of biosecurity and associated geopolitical confrontations. For Antarctica, 2048 marks an important year in the Antarctic Treaty, where any Consultative Party can request a review conference to discuss potential changes to the Protocol on Environmental Protection to the Antarctic Treaty. However, the Antarctic Treaty or the Protocol does not have an expiry date.

1.7 During the sitting of the Committee held on 30 October, 2025, a non official witness explained the problem of polar warming and its effects as under:

"I would say that the Arctic and Antarctic regions are experiencing unprecedented environmental transformation due to accelerated climate change...The melting Arctic Sea ice is also affecting Indian monsoons. Several studies at the National

Centre for Polar and Ocean Research have clearly shown a link between changes in Arctic Sea ice and extreme rainfall in India. Similarly, recent studies show that changes in Antarctic are also connected to the Indian monsoon and rainfall patterns. Most importantly, the difference between Antarctic and the Arctic is that Antarctic ice is freshwater ice, which sits over land, similar to the Indian subcontinent. In fact, India and Antarctica were once connected. The land structure is similar, but the ice thickness can reach up to four kilometres in some areas, averaging about 2.5 to 3 kilometres. This makes Antarctica the most elevated continent on Earth. If the ice melts completely, it could raise global sea levels by 60 meters. In contrast, Arctic ice is primarily sea ice, which is already sitting in the ocean and does not contribute to sea level rise. However, the Greenland ice, which is land ice, can lead to a sea level increase of about seven meters. Most modelling studies predict that the Arctic will be ice-free at least during the summer months before 2050 if current emission trends continue, and some studies suggest it may happen even faster.”

1.8 Antarctica and Arctic have been a significant part of India's foreign policy. The major aspect of this relation was India's pursuit for scientific researches to understand the interconnectivity of polar climate and monsoon pattern. So far, policy focus has been on understanding the science behind monsoon system and conservation of pristine polar areas which are the backbone of earth which has been appreciated globally. India has played a constructive role in science and governance of Antarctica and sustainable development of Arctic regions. India aims to be a strategically important partner in Antarctic and Arctic affairs. However, rapid climate change, huge deposits of natural resources and geopolitical changes have led massive interest in these regions. Developments in these areas have great impact on India's strategic, commercial, environmental and scientific interests and therefore calls for active Indian engagement in these regions. Under the current climate change and geopolitical scenario, India needs to increase its visibility and take up proactive leadership role to establish it as a voice of global south. Keeping in view the growing importance of these regions, the Committee have examined the various aspects of India's engagement in Arctic and Antarctic and are discussed in the subsequent paragraphs.

(c) India's influence in shaping global outlook in polar regions

1.9 India understood the strategic importance of polar regions much before it set its foot there. In 1956, the Indian Delegation to the United Nations proposed that the 'Antarctic Question' should be discussed at the eleventh UN General Assembly (UNGA), hinting that they favoured some form of trusteeship for the southern continent (United Nations 1956). India stated that claims to national sovereignty in Antarctica represented 'outdated vestiges of European colonialism' and expressed concern at the political consequences of the continuing sovereignty dispute. In particular, India raised fears that nuclear weapon testing in Antarctica could adversely disrupt global atmospheric systems and stop the monsoon.

(d) Timelines of India's presence and involvement in the polar regions (1920 – 2025)

- 1920 : Svalbard Treaty: India (*under British administration*) became a party to the treaty, giving equal rights of access for scientific research and commercial activity on the Svalbard archipelago. After independence, India retained this legal status, giving it early legitimacy in the Arctic framework.
- 1977 : Department of Ocean Development formed, providing an institutional base for future expeditions.
- 1981 : First Antarctic Expedition: India launched its first voyage.
- 1983 : Consultative Party to the Antarctic Treaty: Gained full decision-making rights in Antarctic governance by demonstrating active research.
- 1983 : Dakshin Gangotri Station established (later buried in ice, now serves as a supply base).
- 1989 : Maitri Station established in Queen Maud Land, Antarctica; became India's permanent operational hub.
- 1997 : India joined CCAMLR.
- 2007 : First Indian Arctic Expedition to Svalbard, Norway.
- 2008 : Himadri Research Station established at Ny-Ålesund, Svalbard—India became one of the 12 nations with a permanent Arctic station.
- 2010 : Bharati Station established in Antarctica, a modern year-round facility.
- 2011 : India joined NySMAC (Ny-Ålesund Science Managers Committee).
- 2013 : Arctic Council Observer Status granted (Kiruna Ministerial).

- 2014 : IndARC moored observatory deployed in Kongsfjorden (first by an Asian nation).
- 2016 : Atmospheric Laboratory established at Gruvebadet, Ny-Ålesund.
- 2022 : India's Antarctic Act passed - establishes permits, environmental safeguards, and compliance mechanisms domestically.
- 2022 : India's Arctic Policy released: Six-pillar framework (Science, Climate, Economic Development, Connectivity, Governance, Capacity-building).
- 2023 : India at Arctic Circle Assembly: Presented Arctic Policy
- 2024 : The 46th Antarctic Treaty Consultative Meeting and the 26th Committee for Environmental Protection was hosted in Kochi, India.
- 2024 : Maitri-II redevelopment project launched.
- 2025 : Arctic Circle India Forum: the first dedicated India-centered event under the Arctic Circle platform.

(e) India's association with International Polar Platforms

1.10 India has been showing its sustained presence in Arctic and Antarctic by carrying out research and operational activities in and around their year-long stations, with a focus on critical scientific issues related to climate change and life in extremes, with dedicated projects having strong national and international cooperation. Some of the major milestones in our presence in the international forums include:

- 1983- India joined the Antarctic Treaty and became a Consultative Party. As a Consultative Party, India participates in the decision-making process regarding Antarctica's administration, scientific research, environmental protection, and logistical cooperation through the Antarctic Treaty Consultative Meetings (ATCM).
- 1984- India became a member of the Scientific Committee on Antarctic Research (SCAR) and held its vice-chairmanship from 2008-2012 and 2018-2022. Further, many Indian scientists are active members of its various scientific working groups.
- 1986- India became party to the Convention for the Conservation of Antarctic Marine Living Resources (CCAMLR) as a full member of the Commission and was entrusted the chairmanship during 1998-2000.

- 1988- As one of the founding members of the Council of Managers of National Antarctic Programs (COMNAP), India has been playing a crucial role since its establishment in 1988. Indian scientists served as vice chair of COMNAP during 2008-2011, 2017-2020, 2024-2027, with its continuing commitment.
- 1997- India ratified the Protocol on Environmental Protection to the Antarctic Treaty in 1997, thus reaffirming its contribution to the conservation of the Antarctic environment.
- 2006- India became part of the Asian Forum for Polar Sciences (AFoPS), the other member nations are China, Japan, South Korea, Malaysia and Thailand. AFoPS was established in 2004 to advance the polar research among countries in the Asian region through mutual cooperation. Also, India was entrusted with the chair of AFoPS during 2010-2012 and 2025-2026.
- 2008- India became a member of the Ny-Ålesund Science Managers Committee (NySMAC), an international body coordinating scientific activities at the International Arctic Research Base in Ny-Ålesund, Svalbard.
- 2012- India became a member of the International Arctic Science Committee (IASC), with membership to its apex body, IASC Council, and part of its various Working Groups and Action Groups.
- 2013- India was granted Observer status to the Arctic Council, a high-level intergovernmental forum focusing on sustainable development, environmental protection, and other Arctic-related matters. India has also contributed to its various working groups.
- 2019- India joined the Svalbard Integrated Arctic Earth Observing System (SIOS), which is a regional observational system addressing Earth System Science (ESS) questions related to global change.
- 2019- NCPOR joined the University of the Arctic (UArctic) network. Currently, there are also a few other Indian Universities part of this network.

1.11 Further, India is an active contributor to the Arctic Circle initiative led by Iceland and Arctic Frontiers initiative led by Norway as well as the initiatives led by Russia.

(f) India's contribution in polar research and climate change

1.12 With regard to the major contribution made by India in polar research and climate change, the Ministry of External Affairs, in their written submission, stated as under:

“India has made significant contributions to the global scientific community, including polar research and scientific research on climate change. The major contributions are listed below:

Antarctica:

Set up three world-class research stations- *Dakshin Gangotri*, *Maitri*, and *Bharati* thereby extending the scientific footprint across the geographic regimes in the continent, including the South Pole.

Completion of 44 annual scientific expeditions, including several international collaborative projects.

In the Southern Ocean- 12 scientific expeditions have been undertaken that provided vital data on the role of the Southern Ocean in global circulation and carbon cycle.

Established India's first Ice Core Laboratory and undertook ice core drilling projects in Antarctica.

Established an ocean - sea ice - ice shelf coupled numerical Regional Ocean Modelling System model, to understand the general ocean circulation, water mass exchanges, and heat transport for the continental margins of coastal Antarctica.

Established the Prydz Bay Air-Sea-Ice Exchange Antarctic coastal observatory near the Indian Antarctic Station 'Bharati' to study air - ice - sea interaction in coastal Antarctica.

Undertook drilling into the Antarctic ice sheet and developed extensive expertise in ice core research, to understand climate change and life in extreme conditions.

Studied the variability and dynamics of Antarctic sea ice extremes and polynyas.

Arctic:

Established Indian research station Himadri at Ny-Ålesund, Svalbard, Norway, where long-term atmospheric, oceanographic, biological and cryospheric monitoring are undertaken;

Undertook multiple expeditions to the North Pole and the deep Arctic Ocean, including the Canadian Arctic;

Launched regular winter expeditions to the Arctic from December 2023 as well as undertook an expedition to study the hydro - biogeochemistry of the East Greenland Shelf/ Denmark Strait; Formulated India's Arctic Policy 2022 and the Indian Antarctic Act 2022;

Established an Atmospheric Observatory in Ny-Ålesund, Svalbard, Norway to continuously record atmospheric characteristics, viz. temperature, clouds, and precipitation at very high resolution;

Installed an Oceanographic Mooring System in Ny-Ålesund, Svalbard - IndARC Multisensor Mooring - to ensure year-round continuous physical and biogeochemical data at the climate - sensitive study region (Kongsfjorden);

Enhanced the understanding of linkages between climate change in polar regions and the Indian summer monsoon.

Himalayas:

Established Himansh station, India's highest research base at 4000 m in the Himalayas,
Set up a network of observational systems for monitoring the Himalayan glaciers.

Associated initiatives:

Improved understanding of the microbial loop activity in the Indian Sector of the Southern Ocean by linking bacterial diversity with phytoplankton and Dissolved Organic Matter/Particulate Organic Matter characteristics.

Delineated the forcing factors and mechanisms driving variability in phytoplankton carbon uptake rates in the Indian Sector of the Southern Ocean.

Established a dedicated National Polar Data Centre, a dedicated portal for various polar data and metadata collected by the Indian expeditions.

Actively participating in international scientific conferences to share our research and established partnership with several international research centres and academic institutions.”

1.13 Further, the Ministry of Earth Sciences, in their written submission, stated as under:

“India has made a significant contribution to the global scientific community, including polar research and scientific research on climate change. The major contributions are as follows:

Constructed three world-class research stations in Antarctica – Dakshin Gangotri, Maitri, and Bharati and extended the scientific footprint across the geographic regimes in the continent, including the South Pole. Completed 44 annual scientific expeditions, including several international collaborative projects.

Established the Indian research station Himadri in Arctic at Ny-Ålesund, Svalbard, where the long-term atmospheric, oceanographic, biological and cryospheric monitoring is being carried out; participated in expeditions to the North Pole and the deep Arctic Ocean, including expanding to the Canadian Arctic. India has launched regular winter expeditions to the Arctic since 2023.

Constructed the state-of-art Himansh station in Himalayas– India's highest research base at ~4000 m – and established a network of observational systems for monitoring the Himalayan glaciers and emanating rivers.

Undertook 12 scientific expeditions in southern ocean that provided vital data on the role of the Southern Ocean in global circulation and carbon cycle.

Established India's first Ice Core Laboratory and undertook many ice core drilling projects in Antarctica.

Formulated India's Arctic Policy 2022 and the Indian Antarctic Act 2022.

An Atmospheric Observatory established in Ny-Ålesund, Svalbard, to continuously record atmospheric characteristics, viz. temperature, clouds, and precipitation at very high resolution.

An Oceanographic Mooring System established in Ny-Ålesund, Svalbard - IndARC Multisensor Mooring - to ensure year-round continuous physical and biogeochemical data at the climate-sensitive study region (Kongsfjorden).

Enhanced the understanding of linkages between climate change in polar regions and the Indian summer monsoon.

Established an ocean-sea ice-ice shelf coupled numerical Regional Ocean Modelling System (ROMS) model, to understand the general ocean circulation, water mass exchanges, and heat transport for the continental margins of coastal Antarctica.

Established the Prydz Bay Air-Sea-Ice Exchange (PRAISE) Antarctic coastal observatory near the Indian Antarctic Station 'Bharati' to study air-ice-sea interaction in coastal Antarctica

Undertook drilling into Antarctic ice sheet and developed extensive expertise in ice core research, to under the climate change and life in extreme conditions.

Delineated the forcing factors and mechanisms driving variability in phytoplankton carbon uptake rates in the Indian Sector of the Southern Ocean.

Established a dedicated National Polar Data Centre (NPDC), a portal for various polar data and metadata collected by the Indian expeditions.

Research finds are disseminated through scientific publications and other outreach activities.”

(g) Impact of Polar warming on Indian climate

1.14 For India, polar warming has direct relevance as it can alter our monsoon behaviour, increase extreme weather events and contribute to sea-level rise that threatens coastal regions, ecosystems and livelihoods. Arctic warming can weaken and destabilize the Indian monsoon by altering jet streams and atmospheric circulation, leading to erratic rainfall, droughts, or floods. In this context, sustained polar research is crucial for understanding climate linkages, improving climate prediction, and strengthening India's long-term resilience to climate change.

1.15 While discussing India's contribution in the climate change studies of polar regions, one of the experts submitted the following in his deposition before the Committee on 30.10.2025:

"If you look at India's engagement within the Arctic and Antarctic, it has an integrated approach because we are one country which works both in Antarctic, Arctic and Himalayas, which therefore have a significant impact on our societal relevance. The comparative studies between these regions also provide actually knowledge on the polar tropical climate linkages, especially with the Indian monsoons, the sea level rise and its coastal vulnerability. Polar amplification means the poles are warming enormously higher than the rest of the world. It is nearly three to four times higher than that. That has a feedback mechanism to the rest of the world, including the Indian monsoons. We are also working on the conservation of these fragile polar ecosystems and those life adaptations in those extreme environments... A large number of Himalayan hazards are actually related to thawing of land itself because it is becoming very unstable land...The changing climate also contributes to storm surges, with an increase in extreme weather events, such as cyclones in the Arabian Sea, which was never the case. We always used to see cyclones happening in the Bay of Bengal but now, we can see the situation happening in the Arabian Sea. Thus, small changes in sea level can have cascading effects." "

1.16 During the sitting of the Committee held on 30.10.2025, a non official witness apprised the Committee that a study has been conducted on the relationship between Arctic Sea ice loss and the Indian southwest monsoon in which a distinct and measurable link has been found between Arctic Sea ice and the Himalayan system, particularly concerning summer monsoons. Elaborating further on this issue, the non official witness stated following:

"There is a distinct and measurable link between Arctic Sea ice and the Himalayan system, particularly concerning summer monsoons... In the Kara Sea ice, when that decreases, which is in the Arctic, you see a sudden weakening of the tropical temperature gradient between the Arctic waters and the tropical waters that go up using the ocean currents... That is the exact bit we are studying because it is such a specific study to relate and also show causation and correlation between loss of Arctic Sea ice. Of course, in the larger scheme of things, climate change matters. But we are trying to get into evidences because that is going to be really helpful in building up what India's narrative should be, which I am going to speak about briefly... We are essentially looking at anywhere between three to four per cent GDP loss year on year, starting 2035, if averaged out for the two scenarios. And this is only and only for rain-fed agriculture. Climate change, as you said, Sir, the broader context of it."

1.17 When asked about any study being undertaken by the Government to assess the economic impact of teleconnection between rise in Arctic temperature and weakening of monsoons, the Ministry of Earth Sciences, in their post evidence written submission, stated as under:

“As on date, Government has not conducted any study on the economic impacts of teleconnection between rise in Arctic temperature and weakening of monsoons. Although the Institute for Governance & Sustainable Development (IGSD), a US based NGO, whose office in India has initiated a report on the economic impact of Arctic warming on India, the data needs a careful evaluation. Though there is credible evidence that Arctic sea-ice melt will intensify by the mid-21st century, the translation of this signal into regional rainfall changes over India and their subsequent economic impacts needs further examination.”

1.18 However, the MEA, in their post evidence replies, informed the Committee as under:

“Currently research is being done to establish direct linkages between rising temperature in the Arctic region with monsoon rain patterns. Economic impact of changing monsoon patterns are also being separately studied by relevant agencies. With the availability of greater granular data on teleconnection, more detailed assessment can be made on the monsoon patterns and its consequential impact on economic life of India.”

(h) Upcoming role of India in Arctic and Antarctic regions

1.19 Elucidating the role India looks forward to play in the governance of the Arctic and Antarctic, the Ministry of External Affairs in their written submission, informed the Committee that India envisions itself as a science-driven and environmentally responsible actor in both the Arctic and Antarctic. In the Arctic, it focuses on contributing research on climate, oceans and ecosystems, promoting sustainable development policies as an Observer in the Arctic Council and serving as a bridge between Arctic States and the Global South. In the Antarctica, India participates as a Consultative Party to the Antarctic Treaty System, operating permanent research stations and engaging in regulated, science-based resource management through the Convention for the Conservation of Antarctic Marine Living Resources (CCAMLR).

1.20 India’s tools of engagement have been through science diplomacy, rule-based engagement, diversified partnerships and inclusive multilateralism, energy cooperation and research opportunities. India’s interlocutors include State actors (*Arctic coastal countries and other Observers*), non-State actors (*academia, NGOs, private sector*) and multilateral fora (*Arctic Council, Antarctic Treaty System, CCAMLR*).”

1.21 When asked by the Committee to furnish the roadmap or short term strategy for India’s presence and role in the two regions, the Ministry of External Affairs, in their written submission, stated as under:

“A multi prong approach has been rolled out in the short term to build our capabilities and to better understand impact on India due to various changes in the polar region. On the scientific side, more and more Indian universities are being encouraged to develop course content, and to undertake serious research by deploying scientists in our research stations in both the Poles. We have also increased our outreach to various foreign universities and research institutes that are active in polar research. We have also started increasing our participation in international events, which focus on scientific and strategic aspects related to the polar region. We have also started including discussions on polar issues in various International Strategic conferences hosted in India to develop our competence and articulate our point of view. One of the short term goals is to develop our own infrastructure, including platforms, such as icebreakers and ice class vessels to our own polar research vessel. Indian experts are also looking at opportunities and challenges, which might evolve when the polar sea routes become a reality in the coming decade. We have also started evaluating all the international agreements of importance, to which India can join, to develop our stakes.”

1.22 In this regard the Ministry of Earth Sciences also informed in their written submission that the immediate strategy of the Ministry is to expand the scientific exploration and footprints across the Antarctic and Arctic region. In Antarctica, India is expanding its expeditions to different parts of Antarctica, beyond its limited logistic periphery around the Maitri and Bharati stations. In coming years, it is planned to join international initiatives like the Antarctic RINGS and Antarctic InSync programs, which will have a circum-Antarctic footprint. In the Arctic, we will undertake more oceanographic expeditions beyond the limits of Svalbard by collaborating with Arctic States or hiring ice-class vessels. Most importantly, the Ministry will initiate the acquisition of a Polar Research Vessel and construction of new Maitri station, after due approvals.

II Existing MEA set up dealing with Arctic and Antarctic regions

2.0 During their sitting held on 30 October 2025, the Committee were apprised that all countries which have a major presence within the Arctic region also have a Polar Desk or a Polar Ambassador, who ensures that their policies remain consistent with what happens in the world. India should also have such dedicated division and the Ministry of External Affairs should establish at least a Polar Desk to take up the matter relating to these areas more proactively.

2.1 Emphasising the need for having a dedicated representative of the Government, a non official witness further stated following:

“...we are basically all scientists, you know. So, we look into that aspect more, actually, in climate change, those aspects more. But it would always be important to have somebody, you know, adding value in terms of this policy and strategic inputs.”

2.2 The Committee raised a specific query on existing set up in the Ministry of External Affairs dealing with the polar areas. On this the MEA, in their post evidence written submission, informed that a focused and sustained approach is adopted, in consultation with the relevant Indian Embassies abroad and Government of India agencies/Ministries, to engage with the polar region. India's engagement has seen a considerable surge in recent times, driven by *India's Arctic Policy: Building a Partnership for Sustainable Development* released in 2022. The Polar Cell in the UNES (*United Nations Economic and Social*) Division of the Ministry handles all matters related to our engagement with the Polar region. The Division is headed by the Joint Secretary (UNES). The Division coordinates with all concerned with India's outreach and engagement as well as India's participation in leading global policy platforms.

2.3 When asked to furnish the details of the countries which have a dedicated polar desk/ambassador, the Ministry of External Affairs, in their post evidence replies, informed as under:

“Over the years, countries are exploring institutionalised or dedicated mechanisms to handle polar related issues, including appointing a Polar/ Arctic Affairs Ambassador or a dedicated representative/ Committee/ desk to deal with the matter. All Arctic Council Member States have a Polar/ Arctic Ambassador along with a dedicated Polar/Arctic Affairs Desk or Department. Most Non-Arctic Observer States to the Arctic Council, including Japan, China, Singapore and South Korea, have Special Representative/Ambassador for Polar/ Arctic Affairs.”

2.4 Further, when the Committee asked about any proposal to appoint a Polar Ambassador to represent India's interests in the Arctic, the MEA, in their written submission, replied that currently, no such proposal is under consideration.

2.5 In response to another query on the need for a dedicated desk in our country, the MEA informed that the Polar Cell in the UNES Division of the Ministry handles polar related issues in an exclusive manner.

III Himalaya: The 'Third Pole'

3.0 The Himalayas are termed as the “Third Pole” of the earth which holds largest freshwater reserve outside poles and is equated with Arctic significance. Research programs being carried out in the Third pole stress climate similarities between Himalayas and the Arctic and the Antarctic regions.

3.1 Elaborating on the importance of ‘Himalayas’ as the third pole and its global significance, the Ministry of External Affairs, in their written submission, stated as under:

“There is a narrative that the Himalayas is considered as the “Third Pole,” in view of the large concentration of glaciers outside the polar regions. As per the estimates, it stores 12,000 km³ of ice. This is also the origin of some of the major river systems, including the Indus, Ganges, Brahmaputra and Yangtze, supporting water security for over 1.5 billion people across South, Central, and East Asia. Seasonal glacier melt regulates river flows, which are crucial for agriculture, hydropower and drinking water.

Studies indicate that the Himalayas play a vital role in global climate regulation, by acting as a heat sink and influencing the Asian monsoon system. Its glaciers, snow cover, and ecosystems affect regional and global climate patterns and biodiversity. With rising temperature, occurrence of natural hazards such as glacial lake outburst floods, landslides, and avalanches have increased.

In addition, the Himalayan region also functions as a carbon sink and plays a critical role in soil conservation, water purification and sustains a unique Alpine flora and fauna.

India has been undertaking scientific research as well as satellite imaging of the glaciers of the Himalayas in order to understand the climatic impact of melting glaciers in the Himalayas. Institutions like NCPOR, the Wadia Institute of Himalayan Geology, and the Indian Space Research Organisation (ISRO) have been in the forefront in this regard by focusing research on glacial retreat, snow cover changes, and climate modelling. India has also been working on water resource management and disaster mitigation strategies in the Himalayas to ensure sustainable development, regional cooperation, and global climate insights.”

3.2 Highlighting the adverse effect of rising temperature in Himalaya, the Ministry of Earth Sciences *inter alia* stated following in their written submission:

- a. “The Himalaya has the largest concentration of snow and ice outside the Antarctic and Arctic regions. These mountains have profound influence on social, economic, cultural and demography of the Himalayan nations. Being a young mountain, it is fragile and hazard-prone, especially earthquakes. The Hindukush-Karakoram-Himalayan (HKH) region is known as the “Water Tower of Asia” and “Third Pole” for its significant snow and ice reserves which play an essential role in sustaining water availability.
- b. The mountain range's presence is crucial for the Asian monsoon and its glaciers are a vital water source for billions of people, making it a climate-

sensitive region vulnerable to melting and shifts in weather patterns due to global warming. The Himalaya is warming much faster than rest of the globe, and thus affecting wind circulation, monsoon, and even storm tracks. Due to its unique geographic position and high altitude, it faces rapid changes in the weather patterns and ecosystem. Most of the Himalayan glaciers are retreating, and the retreat rates have accelerated in the past few decades, but the observed retreat are not regionally uniform. To understand the future sustainability of snow and ice field water resources in Himalaya, studies to quantify the snow-cover, ice pack and hydrological modelling. Retreat of Himalayan glaciers in many cases are also creating proglacial lakes, which expand as the glaciers are retreating, potentially increasing potential hazards such as glacial lake outburst floods (GLOF).

Research station in Himalaya

3.3 Himansh is a dedicated high-altitude field station established in 2013, situated at 4080 m above mean sea level near Batal (about 100 km from Manali) in Lahaul-Spiti valley of Himachal Pradesh. The NCPOR established this facility to support its various glaciological surveys, advanced warning system and water-level observation network in Chandra Basin. The station has three units which includes two units to accommodate eight persons at a time, one laboratory unit, and associated support systems. The station has necessary satellite communication facilities and the station and observational systems are powered by a 20 kw solar power system.

3.4 Drawing similarity between Arctic and Himalayan studies, a non official witness further informed the following:

“Our Arctic study also has relevance to what we study in Himalayas. A large number of Himalayan hazards are actually related to thawing of land itself because it is becoming very unstable land. Additionally, the changing climate exacerbates extreme rainfall, cloudbursts and other issues. This also has life implications, such as species distributions and the loss of sea ice habitats.”

IV Arctic warming – Challenges and Opportunities

4.0 The Arctic influences the weather and climate of the entire Northern Hemisphere, and the cool northern region helps to moderate the climate of the rest of the planet. Rise in global temperature and warming of Arctic has resulted in shrinkage of Arctic sea ice extent, declining at a rate of 13% per decade. Globally, the cost of Arctic warming are seen in following changes:

- Heat Waves
- Extreme winters

- Rising sea level
- Food Security
- Loss of wildlife
- Thawing permafrost

4.1 Change in Arctic climate and melting of ice will have following economic and socio-political impact:

- Environmental pressures –
- Loss of habitat/species
- Increase in ocean acidification
- Strengthening of waves resulting in coastal erosion
- Change in ocean properties

Economic impact –

- Offshore exploration and extraction will benefit 13% Oil, 30% natural gas, & 20% natural gas liquids. However this will be accompanied by drilling, liquidation infra, transfer pipelines, fuel storage, etc.
- Mineral deposits in Arctic such as Nickel, Copper, Platinum, diamonds, gold, lead, Zinc, etc. will be accessible but thawing permafrost and erosion is likely to increase challenges and increase costs for the industry.
- Opening of new navigable routes will improve connections between the Atlantic and the Pacific Oceans, reducing shipping cost and thus benefitting fishing and mining industry. However increased number of vessels will endanger marine ecosystems.
- Fishing will increase in these areas due to warmer climates, however harvesting sites will move upwards as mid latitude species will move further north.
- Tourism will also increase due to longer summers and improved accessibility to ports, however simultaneously endangering the Arctic landscape, wildlife and ecosystems.

Social impact –

Change in way of life of polar natives, viz. traditional diet, means of transport, local economies, etc.

Political impact –

Arctic governance will have to readjust with cooperation of global powers and involvement of non Arctic States as well. International effort will be needed for cooperation, especially oil spill pollution prevention, shipping regulation and fisheries management.

(a) Indian Arctic Programme

4.2 Indian Arctic Programme commenced in 2007. The Indian Arctic Programme studies climate change, its impacts, and adaptation strategies through interdisciplinary research in atmospheric and space sciences, marine and biological sciences, earth sciences and glaciology. NCPOR under MoES coordinates and implements India's Arctic research Program. NCPOR has been undertaking scientific studies on Arctic sea ice, ocean-atmosphere interactions and their tele-connections with the Indian monsoon, extreme weather events and coastal variability. Indian scientists are involved in continuous, long-term monitoring of Atmospheric and Oceanographic parameters in the Arctic.

Arctic Research Station –‘Himadri’

4.3 Himadri, opened in 2008, is India's sole Arctic research station located at the International Arctic Research base, NyÅlesund, Svalbard, Norway. Ny-Ålesund, one of the world's northernmost year-round research communities, hosts institutions from over 11 countries, with India maintaining a year-round presence since 2023. It is located at a distance of 1,200 kilometres from the North Pole. Unlike the Antarctic stations, Himadri station is a leased property belonging to Kings Bay AS, a company owned by the Norwegian Ministry of Climate and Environment. The station has laboratory facilities and accommodation for eight people at a time.

Long term Observation mooring for Arctic Observation

4.4 IndARC, India's first multi-sensor moored ocean observatory, was deployed in the Kongsfjorden in 2014 to continuously monitor the ongoing rapid changes on a high resolution in the Arctic ocean waters even during the cold, inaccessible seasons. It measures different oceanic parameters such as temperature, salinity, chlorophyll, noise, CO₂, water circulation, etc. which are used to understand the causes and changes in atmospheric and oceanic properties due to melting Arctic ice.

Atmospheric laboratory

4.5 India's first atmospheric laboratory in Arctic was established at Gruvabadet, Ny-Ålesund, in 2016. This facility has sophisticated facilities to monitor atmospheric

conditions like clouds, precipitation, long-range pollutants, leading to excellent scientific findings.

(b) India in Arctic

4.6 India's presence and growing role in Arctic is reflected in active participation of its scientists in several working Groups (WG) of Arctic Council such as Arctic Contaminants Action program (ACAP), Arctic Monitoring and assessment Prog (AMAP) and Sustainable development working Group (SDW) as also those of International Arctic Science Committee (IASC) e.g. Atmosphere WG, Cryosphere WG, Marine WG, Terrestrial WG and WG on Social and Human Science, contributing to international efforts to enrich data bank on these vital issues.

4.7 Further, India has marked its presence in most of the international forum such as Arctic Circle, International Arctic Science Committee (IASC), Arctic Security Conferences organized by Fridtjof Nansen Institute (FNI), Arctic Science Summit Week (ASSW), U-Arctic, Svalbard Science Forum (SSF), Ny-Alesund Science Management Committee (NySMAC), Asian Forum on Polar Science (AFOPS) and Svalbard Integrated Arctic Earth Observing System (SIOS) etc.

(c) Contribution of Indian Technology in development of Arctic

4.8 Some of the most recent developments in India's technological contributions to the Arctic's development are:

- The joint NASA/ISRO (Indian Space Research Organization) Synthetic Aperture Radar (NISAR) satellite mission, launched in 2025, will provide new opportunities for the study of the Antarctic and Arctic. The NISAR satellite will provide crucial, high resolution radar data for monitoring Antarctic and Arctic ice dynamics, sea ice changes, glacier melt and permafrost, complementing optical data with its all-weather capability to track the health of the cryosphere, sea level rise, and global climate impacts with frequent global coverage (every 12 days).
- The IITM Earth System Model under the MoES has incorporated sea ice into its model, which is helping to predict Arctic sea-ice related changes to improve the weather/ climate predictions.

4.9 When asked in what ways India can leverage its technological competence in development of Arctic, the Ministry of Earth Sciences, in their post evidence written submission, stated as under:

“India can leverage its technological competence to contribute meaningfully to Arctic development through a science-driven approach. Space-based capabilities from ISRO can support sea-ice monitoring, environmental change detection, climate observation, and safer Arctic navigation. India’s strengths in climate and Earth system modelling, supported by high performance computing, can improve understanding of Arctic processes and their linkages with global climate systems, including the Indian monsoon. Indigenous sensor technologies, autonomous platforms, drones, and ocean buoys can enable reliable observations in extreme Arctic conditions with minimal environmental impact. India can also adapt its expertise in renewable energy, energy storage, and micro-grid systems to support low-carbon power solutions for remote Arctic stations and communities. Additionally, data science and artificial intelligence can be applied to integrate satellite and in-situ data, enhance early-warning systems, and provide decision-support tools. Together, these technologies position India as a trusted, innovation-driven, and environmentally responsible partner in Arctic development.”

(d) India’s presence in Arctic Governance

4.10 Arctic Council is the leading inter governmental forum promoting cooperation in the Arctic. It does not create legally binding obligation for members. The Arctic council has 8 Member, 6 permanent participants & 13 Observer States. India has an Observer Status in the Arctic Council since 2013.

4.11 When India joined Arctic Council in 2013 as an Observer, it had already gained an impressive expertise of conducting meaningful science and participating in governance of a cold and harsh Antarctic continent for over three decades. With investigations already spread over two cryosphere regions of the world i.e. Antarctica and Himalaya, it was a natural step forward to include Arctic in the studies to have a comprehensive view of the changes taking place in the ice- covered regions of the earth as a whole. The inclusion of India among the select group of non-Arctic nations as Observer was a recognition of its scientific achievements in the Arctic domain within a short spell of period beginning 2007, when it launched its first Arctic Expedition and participated in International Polar Year. Regular scientific expeditions have been undertaken to Svalbard from 2008 onwards.

4.12 During the sitting of the Committee held on 23 July 2025, representative of the MEA stated following:

“In terms of the Arctic region, the governance structure or the cooperative structure that has evolved is in the form of Arctic Council which is not strictly an

inter-Governmental body but more of an international forum. This forum is unique in the sense that they also have something called 'permanent observers', which means that the indigenous population living in those areas are also included in the policy discussions that go on in the Arctic Council. The Arctic Council float from the competing claims, again which are partly taken care of by the UNCLOS, which is the UN Convention on Law of the Sea. So, that defines the territorial or sovereignty claims in that region. There are two interesting territories over there. One is the Svalbard archipelago and the other one is the Greenland, which has been in the news recently. The focus of the Arctic Council is more on the science and research. But as the ice melts, due to global warming, there is an increasing speculation about the extraction of the minerals/rare earth minerals, hydrocarbons, the opening of shipping routes, fishing, and other resources that may become available. So, there is a certain sense of contestation and interest in the region."

4.13 The Committee were given to understand that Arctic Council is the main mechanism of cooperation in the Arctic region. The current geopolitical tensions are creating a huge roadblock. India is an Observer to the Arctic Council and contributes to its various working groups. Since the Arctic Council consists of only eight Arctic States as its members, Observers can't meaningfully contribute to Council's decision-making as they are not given certain privileges stated as under:

- Exclude the Observers from the decision-making processes of Arctic Council
- Limit their engagement to the level of Working Groups
- Restrict their financial contribution
- Research proposals only through an Arctic State or a Permanent Participant
- Adherence to the Ottawa Declaration and the Rules of Procedure. Observers cannot undertake research directly amongst themselves.

4.14 When asked about the exact role and responsibility of the Observer in the Arctic Council, the Ministry of External Affairs, in their written submission, stated that the primary role of an Observers in the Arctic Council is to participate in the work of the Arctic Council, where feasible and make relevant contributions, especially at the level of Working Groups. Observers can also propose projects through an Arctic State or a Permanent Participant but financial contributions from an Observers to any given project may not exceed the financing from Arctic States, unless otherwise decided by the Senior Arctic Officials. In meetings of the Council's subsidiary bodies to which Observers are invited, Observers may, at the discretion of the Chair, make statements after the Arctic States and Permanent Participants, present written statements, submit

relevant documents and provide views on the issues under discussion. Observers may also submit written statements at Ministerial meetings.

4.15 With regard to the contribution made by India since joining the Arctic Circle as Observer, the Ministry of External Affairs, in their written submission, stated as under:

“Since joining the Arctic Council as an Observer in 2013, India has been actively contributing to various Working Groups of the Arctic Council namely, *Arctic Contaminants Action Program*, *Arctic Monitoring and Assessment Programme*, and *the Conservation of Arctic Flora and Fauna*. Some of the projects include Geochemistry of mercury and emerging contaminants in the benthic realm of Arctic fjords and coastal waters of Svalbard; investigation of atmospheric aerosols and their characterization over the Arctic; long term monitoring of Arctic fjords for climate change studies; monitoring of Arctic Precipitation; integrated monitoring of Glaciers in the Svalbard, Arctic, etc. In addition, India has also been participating in various meetings organised by the Arctic Council Secretariat, physically as well as virtually. In addition, India also hosted the Arctic Circle India Forum 2025 in New Delhi.”

4.16 When the Committee desired to know that to what extent India's objectives in Arctic region has been affected due to its status as 'Observer' State, MoES, in their post evidence written submission stated as under:

“India's objectives in the Arctic are significantly constrained due to the fact that we are an Observer State in the Arctic Council. As per the Arctic Council rules, an Observer has no voting rights or direct role in decision-making, limiting its influence on Arctic governance and regulations. Further, any access to the resources will require collaboration with an Arctic State. However, scientific research and collaboration are largely unaffected, as opportunities for research are still open. Most importantly, the Observer status provide certain respect among non-Arctic States as it provides opportunities for closer ties with the Arctic Council States.”

4.17 Further asked, if upgrading its status as Member would enable India to play a more active involvement in Arctic affairs, the Ministry of Earth Sciences, in their post evidence written submission, furnished following reply:

“If we need to make a greater impact in the Arctic, a full membership would be crucial. However, the Arctic Council's rules of procedure do not have provisions to incorporate countries outside the Arctic Circle as members. All formal decisions of the Arctic Council and its subsidiary bodies require the consensus of the eight Arctic States, which is highly unlikely in the current geopolitical scenarios or in the near future. The current rules of the Arctic Council membership does not permit a Non-Arctic State to apply for membership to the Council. However, admission of India to Observer Status in 2013 has been crucial in orienting and directing our interests in the region. The Ministry of External Affairs, in coordination with

relevant GoI agencies/line Ministries, has been engaging on Arctic issues, through active participation and representation in relevant forums/platforms, both within and outside the region, as well as through the Indian Missions by offering facilitation in promoting India's interests in the region."

4.18 The MEA, in their written submission further stated following on this issue:

"The 'Member State' status in the Arctic Council is legally restricted to the eight nations with territory above the Arctic Circle. However, India continues to deepen its engagements with all the Member States and Observers of the Arctic Council, guided by the Arctic Policy (2022)."

4.19 During the deliberations held on 30 October 2025, a non official witness presented the following viewpoint regarding the quest for membership of the Arctic Council:

"Once we sign a document for getting the observer-ship, there is a certain mandate, there is a certain charter, which gives you certain rules. Among those rules, the first criterion is that you have to honour the sovereignty of the Arctic States and you will work within those mandates which are given to you. For example, he said that you cannot exceed 50 per cent of the partnership, you do not get the seat on the same table, you are not even a permanent participant member. All these things we have signed and we have signed knowing what are the conditions. Now, if you start saying that we do not want this, but we want this, it will be slightly going overboard. We have to move very cautiously, take support of all the Global South, Singapore, China and others. Then, possibly move a mandate within the observers like this charter is very old, it is more than 20 years old and requires some modification. Then, we can make a ground for India's elevated structure within the Arctic Council."

(e) Arctic Policy 2022

4.20 India's Arctic Policy 2022 aims to strengthen scientific exploration, understand climate change impacts, enhance economic cooperation with the Arctic region, prepare for changes in global shipping routes due to melting ice, strengthen international cooperation and build national capacities. It is built on six pillars: Science and Research, Climate and Environmental Protection, Economic and Human Development, Transportation and Connectivity, Governance and International Cooperation, and National Capacity Building.

4.21 Regarding the tangible and intangible gains in short, medium and long term envisaged in the Policy, the Ministry of External Affairs, in their written submission, stated as under:

“India's Arctic Policy envisions gains from scientific, academic and economic points of views. In the short to medium term, more Indian researchers and academic institutions will start actively involving themselves in polar science. This will enhance institutional capabilities in terms of access to technologies, equipment and resources. This in turn will result in more high quality research projects and improve our understanding of monsoon patterns and mitigating along with taking adaptive domestic measures to ensure food and livelihood security. In the medium and long term, it is expected that Indian business enterprises will get more actively involved in the north sea route as well as sustainable management of resources and energy, which might emerge due to thawing of sea ice in the Arctic region.”

4.22 Asked to state the most important pillar of Arctic policy and how far it has succeeded in achieving the objectives in Arctic region, the Ministry of External Affairs in their post evidence written replies stated as under:

“India's approach to Arctic engagement has been primarily in the scientific domain, therefore the Pillar 1 '*Science and Research*' as well as Pillar 2 '*Climate and Environmental Protection*' are significant. Further, the climate change and its impact on Arctic sea ice melt as well as the teleconnection with the Indian monsoon and the threat to India's outlying islands has been clearly brought out in the policy. The melting of the ice also provides opportunities for harnessing the resource potential as well as the new shipping routes which need to be leveraged sustainably as elaborated in the Pillar 3 '*Economic and Human Development*' as well as Pillar 4 '*Transportation and Connectivity*'. All these activities need to be undertaken through international cooperation with various nations as well as in adherence to the international regulations as brought out in the Pillar 5 '*Governance and International Cooperation*'. While enhancing our Arctic engagement, it is equally essential to build our capacities as brought out in Pillar 6 '*National Capacity Building*' which is also interlinked to the first five pillars. Therefore, all six (06) pillars of the policy are equally important and are interlinked with each other. Various activities are being undertaken by several stakeholders such as government, academia, scientists, researchers, business community towards fulfilling the objectives as laid out in the Arctic policy and thereby enhancing India's overall engagement with the Arctic region. Thus, the Arctic policy has been the guiding document to progressively enhance India's engagement with the Arctic region.”

4.23 When asked whether any substantial gains, including broadening or change in India's scientific research or operational activities and enhanced research infrastructure has been effected since adoption of the policy, the Ministry of External Affairs in their written submission, stated as under:

“The Arctic Policy has provided a right direction and focus on this important issue, especially among the scientific, academic and business communities. Some notable activities / impact has been:

- Indian officials have started speaking in major Arctic related conferences in Arctic countries;
- Arctic Circle India Forum meeting was organised in May 2025;
- More Indian researchers and universities are showing interest to visit Himadri to undertake field research;
- The number of research papers related to polar science is increasing;
- India's Arctic research station 'Himadri' at Svalbard is now hosting scientists even during Winters since December 2023;
- In 2023, India undertook a maiden expedition at Canadian High Arctic Research Station;
- A delegation from NCPOR conducted an expedition to Greenland in July 2025;
- During the India-Russia Summit in 2024, an MoU was signed between National Centre for Polar and Ocean Research, Goa as well as Arctic and Antarctic Research Institute, Russia;
- Some of the Indian institutions have shown interest to join the UArctic network;
- As part of national capacity building, University Grants Commission has launched four Massive Open Online Courses on Arctic studies which have witnessed more than 3000 registrations;
- Process has also started to have India's ice class vessels; and
- Training institutes of sea farers have started developing programme to provide additional training to Indian seafarers to operate in polar waters.”

4.24 Responding to the same query, the Ministry of Earth Sciences, in their written submission, informed the Committee as under:

“Since the adoption of India's Arctic Policy in 2022, several measures have been taken with a Pan-Arctic perspective to broaden scientific research, enhance operational activities, and strengthen infrastructure related to India's Arctic engagement as follows:

(i) Expansion of Scientific Research Activities in Ny-Ålesund, Svalbard

India initiated Arctic Winter Expeditions since 2023 - 2024, which provides support to start new scientific themes on Space Science, Astronomy, and Astrophysics, and supports year-round monitoring. Now Indian researchers are present in the Arctic throughout the year including polar nights during winters. Since 2023, scientific studies have expanded beyond traditional disciplines such as glaciology and atmospheric sciences to include Climate change and monsoon linkages, Arctic biodiversity and microbial ecosystems, Permafrost and carbon cycle dynamics, Arctic marine pollution and plastics. Also, enhanced monitoring is achieved through increased use of climate models to study Arctic-tropical teleconnections and their impact on Indian weather patterns and utilising satellite remote sensing data for Arctic sea ice monitoring.

(ii) Strengthening of Research Infrastructure

India's Arctic research station Himadri, located in Ny-Ålesund, Svalbard, has seen upgrades in scientific equipment and communication systems. Efforts are

underway to enable remote access and data sharing from Himadri with Indian institutions.

(iii) Arctic Ocean Expeditions

Indian scientists have participated in collaborative scientific cruises in the Central Arctic Ocean in 2022 and 2023 in collaboration with the Norwegian Polar Institute. One of the important dedicated projects NCPOR has taken up is “East Greenland Shelf Expedition”, which explored the East Greenland Sea and Denmark Strait during July–August 2025.

(iv) Canadian Arctic Expedition

NCPOR organised the Indian expedition to the Canadian High Arctic in Cambridge Bay of Nunavut region in 2023 and 2024, facilitated through an agreement with the Polar Knowledge Canada

(v) Increased International Collaboration

India has scaled up scientific collaboration with Arctic nations through both bilateral and multilateral programs. India continues to actively engage with the Arctic Council (as Observer) and other polar science forums such as the International Arctic Science Committee (IASC), Asian Forum for Polar Sciences, Arctic Climate Forum, Svalbard Integrated Observing Systems, and Ny-Ålesund Science Managers Committee.

(vi) Capacity Building and Outreach

NCPOR has helped academicians to develop credit courses in universities, including MOOC courses on the Arctic under the aegis of UGC. NCPOR also organises the biennial National Conference on Polar Sciences (NCPs) to bring together polar researchers working across the Arctic, Antarctic, Southern Ocean, and the Himalayas from all over the country. The conference serves as a common platform to foster interdisciplinary discussions on various scientific and operational challenges. Awareness and outreach activities on the importance of Arctic research have increased through academic and public forums.”

4.25 Further, dwelling on the positive outcome in enhancing India’s capacity after the adoption of Arctic policy, the Ministry of External affairs, in their post evidence submission, stated as under:

“India’s Arctic Policy 2022 has laid a solid foundation to strengthen scientific capabilities, expand research networks, initiate academic courses, and build institutional capacity to study the Arctic region. It has significantly enhanced India’s role in international Arctic science and policy dialogues. The Arctic Policy has enabled increased scientific observatories and sustained research presence in Svalbard. There has been a substantial increase in scientific proposals to undertake studies in Arctic, from institutions across the country, revealing increased awareness and interests in Arctic. India has undertaken winter expeditions to Svalbard since 2023 for year-round presence in the Arctic region. The existing challenges emanate from restrictions on research activities as most part of the Arctic lies under the jurisdiction of sovereign states, limited access to the central Arctic Ocean for field observations, remoteness and logistic challenges in accessing the various Arctic Research Stations, while ensuring minimal adverse

environmental impact. Many of these issues necessitate long-term approaches and are under consideration of relevant Ministries/ Government of India agencies.”

4.26 In this regard the Ministry of Earth Sciences also, in their written submission, stated as under:

“India's Arctic Policy has laid a strategic foundation that has translated into measurable gains in scientific research, diplomatic outreach, institutional capacity, and climate preparedness. These developments mark a mature and forward-looking Arctic engagement, well-aligned with India's global climate commitments and national interests. The Arctic Policy has provided a formal framework for India's engagement in the Arctic, enabling focused and long-term planning of Arctic research programs.”

4.27 In response to a query on strategic road map to establish India as a major player in the development of the Arctic, the Ministry of External Affairs, in their post evidence replies, stated as under:

“The objectives laid out in the Arctic policy summarises the plan/ roadmap for India's Arctic engagement. Considering the limitations as an Observer to the Arctic Council, our focus has been to adopt a scientific studies-led, sustainability-focused, and partnership-driven approach to contribute meaningfully to the development of the Arctic. Deepening international collaborations through Arctic Council working groups, institutionalising bilateral cooperation and engaging with leading policy and political platforms on Arctic along with building skilled human capacity and leveraging space-based assets have been instrumental in this regard. We have also prioritized strengthening long-term Arctic observations, climate modelling, and research on Arctic–monsoon linkages, supported by advanced polar infrastructure and indigenous technologies.”

4.28 Replying to a further query on coordination among various ministries involved such as External Affairs, Earth Sciences, Defence, Science & Technology, Environment & Forests to align for a unified Arctic strategy and mechanism established to ensure regular communication and information sharing on Arctic-related developments, the Ministry of External Affairs, in their written submission, stated that the Arctic Policy is implemented by an inter-ministerial group ‘Empowered Arctic Policy Group’ chaired by Secretary, MoES. The group meets periodically to review the progress of various activities undertaken by relevant stakeholders.

4.29 Asked about the need to include private sector also in the national policy for Arctic to promote collaborations for developing infrastructure and access the resources in the Arctic region, the Ministry of External Affairs, in their written submission stated that India's Arctic Policy has a multidimensional approach. Our engagements in the region have followed a multistakeholder framework. The necessity

of inclusion of the private sector is elaborately included in the Pillar 4 '*Economic and Human Development*' in the Arctic Policy.

4.30 When asked to what extent the Arctic policy has helped in forming collaborations between Indian and international institutes, the Ministry of External Affairs stated that India's Arctic Policy has significantly strengthened collaborations between Indian and international institutes, particularly in scientific research, climate studies and capacity building. The policy has reinforced long-standing institutional partnerships led by the NCPOR with major Arctic research organizations in countries such as Norway, Russia, Germany, and Italy. Indian scientists actively collaborate at international research hubs like Ny-Ålesund, Svalbard, benefiting from shared infrastructure and joint field campaigns. Most importantly, the Policy enabled the Indian efforts to expand beyond Svalbard, by exploring regions like Canadian Arctic, Central Arctic, East Greenland Sea, NE Greenland. It has also encouraged joint scientific projects, shared observatories, open data exchange, and co-authored publications in key areas including atmospheric aerosols, cryosphere–climate interactions, oceanography, biogeochemistry, and Arctic ecology. Additionally, strengthened academic linkages have enabled researcher training, joint PhD programs, and access to advanced polar instrumentation. Indian scientists are also contributing to shaping Arctic research priorities for the next decade through teams constituted by the International Arctic Science Committee.

4.31 When asked whether India has taken steps to promote green energy initiatives in the region, given India's expertise in solar and wind energy, the Ministry of External Affairs, in their written submission, stated as under:

“India's Arctic Policy recognises the role of renewables and microgrids for Arctic/sub-Arctic communities. India has a bilateral renewable energy Joint Working Group mechanism with Denmark, Finland, Norway and Sweden. However, no specific projects in the Arctic region have been deliberated upon in these meetings. In addition, Denmark, Norway and Sweden are part of the International Solar Alliance, which provides a potential opportunity to collaborate on solar energy, if the stakeholders show interest. There is an ongoing conversation with Norway and Denmark on green shipping and a few such vessels have been constructed in India for European clients.”

V India's Relations with the Arctic States

5.0 India became an Observer to the Arctic Council in 2013. India maintains bilateral relations with all the eight States viz. Canada, Denmark (Greenland/Faroe Islands), Finland, Iceland, Norway, Russia, Sweden, and the US who have territorial jurisdiction in the Arctic region.

Russia

5.1 India and Russia are cooperating in the Arctic region. In the context of the Northern Sea Route, there is a Working Group established with Russia to explore shipping cooperation.

5.2 A query was raised on the steps taken to enhance bilateral cooperation with Russia in the Arctic under the India Russia Inter-Governmental Commission on Trade, Economic, Scientific, Technological and Cultural Cooperation (IRIGC-TEC) on the lines of similar mechanism set up between Russia and China in 2017. Responding to this, the Ministry of External Affairs, in their post evidence replies, stated as under:

“India and Russia have established a Joint Working Group (JWG) on Northern Sea Route focusing on Arctic issues under the India-Russia Inter-Governmental Commission on Trade, Economic, Scientific, Technological and Cultural Cooperation (IRIGC-TEC). Two Meetings of the JWG have been held so far in October 2024 and July 2025. Both sides have agreed to conduct a feasibility study to collaborate further on increasing cargo volume to 5 million tonnes through NSR by 2030. Joint investment in infrastructure projects in Arctic zone, constructing ice-class vessels in India and training Indian crews in Polar waters were also discussed.”

5.3 Stressing on the need for research in Russian Arctic to better understand the polar science, a non official witness stated as under:

“After having access to Svalbard, Greenland, Canada; India needs to work in Russian Arctic to have a wholesome idea of Arctic. The Arctic research station located in Chersky, Sakha in northeast Siberia is one of the world's three largest Arctic stations which conducts research in Arctic biology, geophysics, and atmospheric physics and being located on frozen Pleistocene sediments that offer an excellent site for permafrost research. Far Eastern Federal University is planning to open an Arctic campus at the research station.

The Arctic is inextricably linked to global affairs. The expansion of NATO, Russia-Ukraine conflict and isolation of former has resulted in ending the Arctic Exceptionalism (High North-Low tension) and caused disruption of activities of Arctic Council. Under such conditions, India can play a constructive role in bridging the gap in the field of cooperation and assimilation of scientific data from different groups as no meaningful conclusion on Arctic issues can be drawn in absence of data from Russian Arctic that extends over more than 40

% of the Arctic. India needs to extend its research, especially in the field of Permafrost research by working in Russian Arctic Station.”

5.4 When asked about plans to collaborate with Russians to extend research in Russian Arctic region, the Ministry of External Affairs, in their post evidence reply, stated as under:

“Collaboration with Russia in the Arctic is desired for enhancing India’s engagement across the region in accordance with the Arctic Policy 2022. Since more than half of the Arctic coastlines lies within Russia, exploring the Russian Arctic is essential. A MoU between the National Centre for Polar and Ocean Research (NCPOR, Goa) and the Arctic and Antarctic Research Institute (AARI, St Petersburg) was signed in 2024, and several meetings have been held since to advance the MoU. During the 23rd India-Russia Annual Summit held in New Delhi on 05 December 2025, both sides confirmed their readiness to intensify trade and investment cooperation in the Far East and the Arctic zone of the Russian Federation. During the Summit, a Memorandum of Understanding was signed between the Ministry of Ports, Shipping and Waterways, India and the Ministry of Transport of the Russian Federation on the Training of Specialists for Ships Operating in Polar Waters. The Program of India-Russia Cooperation in Trade, Economic and Investment Spheres in the Russian Far East for the period from 2024-2029 provides the necessary framework for further cooperation between India and the Russian Far East region, especially in the sectors of agriculture, energy, mining, manpower, diamonds, pharmaceuticals, maritime transport, etc. Both sides underscored the importance of holding regular bilateral consultations on Arctic related issues and welcomed the progress made in multi-faceted bilateral cooperation on the Northern Sea Route. NCPOR, Goa and the Shirshov Institute of Oceanology, Russian Academy of Sciences (IORAS), Russia have signed a Memorandum of Understanding to promote international academic cooperation and enhance effectiveness of joint research investigations in areas of mutual interest across the polar regions and ocean realms.”

5.5 During the deliberations held on 30 October, 2025, the Committee were apprised that in Arctic, India's role has become slightly more critical after the conflict between the Russia and other Arctic States. Now, it has become Arctic 7 (A7) versus Russia. Since Russia occupies more than 50 per cent of the area of the Arctic, so, whatever data Russia collects is of huge importance. But it is not getting into the main data bank of the entire Arctic Council. So, that is a big problem now. The current scenario in the Arctic region is a stage for India because we have good relations with all the Arctic States and also with Russia, so we can have a bridging role where we can get access to the data, we can bring that data to the Council's working group data, and we can give a holistic view of the entire thing. We are one of the only countries which is working in Antarctic, Arctic and also Himalayas. All the cryosphere domain of the world, we have our stations there and we have our data over there.

5.6 When a query was raised as to how India can act as a bridge between Russia and West to ensure cooperation in development of Arctic and prevent China in expanding its role in the region, the MEA, in their written submission stated as under:

“India's role and collaborations in the Arctic region include long standing strategic partnership with Russia and time-tested relations and scientific cooperation with other countries in the region. India has always maintained an independent foreign policy approach with all the countries and ensures that its engagements are not influenced by its relations with others. India continues to have close cooperation and collaboration with Nordic countries bilaterally as well as in a plurilateral format, including under the rubric of the India Nordic Summit.”

5.7 Further, a non official witness stated the following regarding the opposition faced in attempts to collaborating with Russia:

“We are very keen also to have this engagement with the Russians in Arctic. The only problem which we face is that when we do that, beyond a certain point, we have a very forceful pushback from the rest of the collaborators which are serious Antarctic, as well as Arctic players. For example, the NCPOR lost one of the important Antarctic project with British Antarctic Survey, UK because we still have strong logistic collaboration with Russia in Antarctica, because we still use their aircraft and airfields and so on. So, we do have issues, when you go very thick with Russia. Therefore it is important to balance.”

5.8 In a written note furnished by a non official witness, following viewpoint has been expressed:

“India also can play a role in drawing a balance between the Arctic-7 and Russia to foster stability as also to provide an alternative to China, which claims itself as a “near Arctic State” citing its proximity and interests in new shipping routes.”

5.9 When asked how India can project itself as an alternative to China, the Ministry of External Affairs, in their post evidence written replies, informed the Committee as under:

“India, being an active Observer State to the Arctic Council, has been engaging with relevant stakeholders and has recently expanded its focus to include economic and human development, in line with our Arctic Policy 2022. India has been collaborating with all Arctic Council Member States and Non-Arctic Observer States to deepen and synergise our engagement in the region. These efforts are driven by the robust and long-standing diplomatic relations as well as India’s credibility as a scientific research-led player in the region.”

5.10 Another query was raised with regard to Government strategy for engaging with Russia in view of the intense pressure on India to stop purchasing Russian oil and have any collaboration with it. The MEA in their post evidence written submission stated the following in this regard:

“India’s engagement with Russia is guided by its longstanding Strategic Partnership and its national interests, including energy security and economic stability. Ensuring stable energy prices and secured supplies have been the twin goals of our energy policy. This includes broad-basing our energy sourcing and diversifying as appropriate to meet market conditions.”

5.11 When asked about the strategy of the Government to manage the evolving geopolitical landscape and review the impact and role of India in the uncertain governance structure, the Ministry of External Affairs, in their written submission, stated as under:

“India’s strategy is to remain focused on safeguarding its interests through multi-vector engagement. India is strengthening its scientific legitimacy through Himadri, IndARC, and polar expeditions. India will continue to engage with all the stakeholders and play a positive role to bring the attention of the international community on the need to work collaboratively on climate change and scientific advancement.”

5.12 One of the non official witness also expressed following viewpoint during the deliberations:

“We have to get involved and see that the balance is maintained between Russia and these Arctic States. We have to move very cautiously because this is a very tender stage where if you go only with Russia, you are antagonising all the seven Arctic States. In my perspective, we have to keep that in mind.”

5.13 Expressing similar views, another non official witness stated following while making presentation before the Committee:

“India needs to be working on a tightrope here to balance multipolarity. I think, being seen as siding with Russia may be in our greatest interest, but we also do have to manage our relations with the United States and the Europeans. All of this needs to be done in the presence of Chinese capital injections. So, over the last 12 years, the Chinese have invested about 10 billion dollars in Russian Arctic infrastructure whereas Indian investments do not even compare. You also have about 20 per cent of Chinese ownership in the stakes of Yamal LNG and LNG 2 projects which are the largest two gas projects in the Arctic.”

Norway

5.14 India's *Himadri* Station (2008) is hosted in Ny-Ålesund, Svalbard (*it is a sovereign territory under Norway*). Norwegian Polar Institute has a cooperation agreement with NCPOR in joint research and provide logistic support. Norway has supported India's scientific activities in the Arctic region as well as India's participation in the Arctic Council. Several joint scientific research has also been undertaken as well as ongoing with Research / Academic Institutions of Norway.

Nordic States (Finland, Sweden, Iceland, Denmark/Greenland)

5.15 India engages with Nordic countries mainly through India–Nordic Summits (2018, 2022). Iceland engages through the Arctic Circle Assembly (Reykjavik), where India regularly participates. Scientific expeditions have also been undertaken in Greenland with the support of the Danish Government.

5.16 Enlightening the Committee further about engagement with Nordic countries, a non official witness stated the following

“We have good and balanced relation with both the Nordics and the United States, as well as with Russia. Presently, our relations with these countries have not conflicted, unlike the situation between Ukraine and Russia. We have already held two iterations of the Nordic summit. Therefore, we can pursue our own bilateral cooperation with these countries independently. It is not a zero-sum situation. We must have manpower pacts with both Russia and the Nordic nations to supply our skilled workforce.”

5.17 Regarding steps taken for cooperation between the Nordic countries and India, the Ministry of External Affairs, in their post evidence replies stated as under:

“India and Finland are exploring cooperation for smooth flow of experts and specialists and discussions are also underway on cooperation in the area of Polar Science and Operations. Indian companies, including L&T, are cooperating with companies like METSO for mining cooperation. There is also

an agreement between Finnish Meteorological Institute (FMI) and Indian Institute of Technology Madras (IITM) in 2022 focusing on cryosphere and aerosol research, urban climate resilience and skill transfer programs.”

United States & Canada

5.18 Cooperation with the US and Canada is mainly in scientific forums (*Arctic Council working groups, Arctic Monitoring and Assessment Programme, climate modelling*). Recently, scientific expeditions have also been conducted in the Arctic region of Canada with the support of the Canadian Government. More activities are being planned for the future.

VI Engagement with Arctic nations

6.0 India needs to increase its engagement with Arctic States to have a more meaningful role in its affairs. In a written note submitted by a non official witness, following points have been emphasised for India’s role in the Arctic:

“India has considerable opportunities to deepen its role in the Arctic:

Economic and Strategic Opportunities

We can expand our involvement by encouraging Indian industry to explore responsible avenues in rare earths, minerals, mining, shipping, maritime infrastructure and ports, in partnership with Arctic nations.

Research and Multilateral Cooperation

We should intensify multilateral scientific research on climate change and glacial dynamics, linking findings from the Arctic to our own Himalayan glaciers which are melting rapidly and serve as the source of major Indian rivers.

We should also expand bilateral and multilateral engagement not only with the five Nordic nations, but also with the Canadian, Russian and American Arctic regions and strengthen ties with other friendly countries engaged in Arctic investment and research, such as Japan, South Korea, the UAE and Singapore.”

6.1 Providing the details of scientific cooperation and agreements with the Arctic and other States, the Ministry of Earth Sciences stated as under:

“On the scientific front, NCPOR has several MoUs with various international institutions like the Norwegian Polar Institute (NPI, Norway), the Arctic and Antarctic Research Institute (AARI, Russia), Alfred-Wegener Institute fuer Polar and Meeresforschung (AWI, Germany) and the Polar Knowledge Canada (PKC, Canada) for cooperation in the Arctic region.

Participation in joint cruises, field campaigns and projects: Indian researchers participated in Central Arctic Cruise expeditions with Norway. Indian researchers undertook a dedicated East Greenland Sea expedition in 2025 for better understanding the changes in the Arctic Ocean, using a vessel from University of Gothenburg, Sweden.

Participation in Arctic Council Activities and other relevant fora: As an Observer State to the Arctic Council, India participates in Council meetings and various working groups. India is also a Council member of the International Arctic Science Committee (IASC). India contributes regularly to the Arctic Circle meetings, a leading non governmental forum for Arctic cooperation and hosted the Arctic Circle India Forum in 2025 in New Delhi. India also participates in the Norway-led Arctic Frontiers meetings. Such forums focus on governance, climate science, and strategic cooperation. Such engagement underlines India's commitment to multilateral dialogue and inclusive governance."

6.2 Asked about the Government's strategy for protecting India's geopolitical and economic interests in the region by actively engaging with various actors, the Ministry of External Affairs, in their written submission, stated as under:

"India's Arctic strategy, articulated in the India Arctic Policy (2022), is science-driven, diplomacy-oriented, and sustainability-focused. Some of the areas of cooperation include to secure long-term interests in climate resilience, energy security, trade, and sea-route governance, while enhancing India's role as a responsible global stakeholder. India continues to engage with all concerned stakeholders, including at political / official levels as well as in the scientific / academic and business communities to promote our interest as well as our point of view."

6.3 Dwelling upon major challenges faced by India in Arctic region, the Ministry of Earth Sciences, in their post evidence submission, stated as under:

"Since most part of the Arctic lies under the jurisdiction of sovereign States, access to Arctic land and coastal ocean needs support and collaborations from the Arctic Council nations.

Many new restrictions have been brought by the Norwegian Government for undertaking research activities in Svalbard Arctic. Permission from Governor of Svalbard is required for any field activities, sometime which takes long time. Further, all research and monitoring activities on Svalbard needs to be carried out in accordance with the Norwegian Strategy for research and higher education in Svalbard, and any operational and development of infrastructure needs to be in accordance with the Research Strategy for Ny-Ålesund Research Station. These regulations strongly nudge us to use the common facilities and discourage individual station facilities like those of Himadri. Such regulations are regularly evolving, making it difficult to enhance our R&D activities in Svalbard. MEA may take up such increased restrictions we face for work in Svalbard with the Norwegian MFA.

The Canadian Arctic field studies depend largely on the multiple approvals required from indigenous communities and associations, which are complicated. Another issue with accessing the Canadian High Arctic Station (CHARS) is the remoteness and logistic challenges, which delays establishment of research systems. Most importantly, there exists poor support system at the CHARS."

Most important challenge is the sub-critical permanent manpower to undertake Arctic research and operations. Although there was a proposal to enhance the permanent scientific manpower when the India's Arctic Policy was approved, the same was never approved. As a result, it is extremely difficult to expand our Arctic footprints when compared to other nations.

The lack of a dedicated Polar Research Vessel (PRV) was identified as a critical challenge, limiting the expansion of research beyond Svalbard and restricting access to the wider Arctic Ocean. Although process of acquisition of a polar research vessel is now approved in-principle, the whole process will take about 5 years' time. Given this, the access to the central Arctic Ocean for field observations remains limited and dependent on collaborations with international partners who own ice-class research vessels."

6.4 Asked about initiative/leadership role India has taken to engage with countries such as Japan, South Korea, Singapore and UAE, etc. which are investing in development of infrastructure in Arctic region, the Ministry of External Affairs, in their post evidence submission, stated as under:

"During participation in various Arctic events, the Indian delegations regularly interact with the key stakeholders, including from Japan, South Korea, Singapore and UAE.

India hosted a session (which had participation from UAE) on '*Role and Importance of Global South in the Arctic*' during the *Arctic Circle Assembly-2025*.

Singapore's Special Envoy for Arctic Affairs Ambassador Sam Tan participated in the Arctic Circle India Forum, held in India in May 2025.

There are ongoing collaborations with Japan in the area of science and technology, particularly marine and earth science & technology, polar research, glacial hydrology and atmospheric sciences by virtue of the Memorandum of Understanding (MoU) between the Ministry of Earth Sciences (MoES), Government of India, and the Japan Agency for Marine-Earth Science and Technology (JAMSTEC), signed in 2016 to promote cooperation in the field of marine and earth science and technology. The MoU was renewed in 2023, adding three new areas of collaboration:- Modelling of climate variability, Marine plastics and Glacial hydrology. A Memorandum of Cooperation (MoC) between the National Centre for Polar and Ocean Research (NCPOR), India and the National Institute of Polar Research (NIPR), Japan was signed in 2019 to promote collaboration in polar research.

The Embassy of India in Seoul has been regularly engaging with the think-tanks and research institutions in the South Korea (ROK) which deals with the Arctic region including Korea Maritime Institute (KMI). Mission also plans to organise a conference on "Arctic Affairs" in collaboration with the KMI. Separately, MoES also engages with the key stakeholders in the ROK which deals with the Arctic affairs. Delegates from MoES and NCPOR have participated in the "Arctic Partnership Week" organised by the KMI."

6.5 When asked why India's engagement/collaboration with Arctic countries has been relatively lower as compared to other Asian nations viz. China, Japan and South Korea, the Ministry of Earth Sciences, in their post evidence submission, stated as under:

“While India's Arctic engagement has improved significantly since the last decade, it is still not at par, especially with China, Korea and Japan. The most important reasons are:

All these Asian nations have substantially increased the investment in funding and scientific manpower over the last decade; among these China and Korea invested 5-10 times higher than India in annual budget and scientific manpower. All these nations have dedicated polar ice-class research vessels that enable them to undertake multiple oceanic expeditions in Arctic Ocean. Countries collaborate with those who have significant assets and access to big funding as the single most important requirement in polar regions are logistic and scientific infrastructure. Currently, India don't have a polar vessel and therefore, have to depend on other countries to support our oceanographic program.

Some of these countries have dedicated Polar Ambassador or desks for polar engagement and facilitating collaboration.”

6.6 In this regard, the Ministry of External Affairs, however, informed the Committee as under:

“India's engagement with the Arctic region has been consistent and multidimensional. Our interests in the region are guided by India's *Arctic Policy: Building a Partnership for Sustainable Development* released in 2022 and have seen a consistent upward trajectory. While the initial focus of India's engagements was scientific research, the contemporary focus areas have evolved to include economic and geopolitical aspects. There is greater engagement of Indian think-tanks. Hence, country-wise comparisons may not be reflective of India's strategy and long-term interests in the region.”

6.7 Asked to furnish the details of efforts made to have more engagements/dialogues with other countries on activities in Arctic/political dialogues related to Arctic region, the Ministry of External Affairs, in their post evidence submission, stated as under:

“India's approach to the Arctic region encompasses policy, multilateral and bilateral cooperation, as well as a scientific presence through increased engagement with multiple Arctic states. As an Observer State to the Arctic Council, India participates in meetings of the Council and various working groups. India is also a Council member of the International Arctic Science Committee (IASC). Apart from official meetings, India has been participating other multidisciplinary and multistakeholder meetings related to polar issues.

Such meetings are attended by officials from the Government [Indian Missions, MEA, NSCS (Polar Cell), Indian Navy etc.], as well as scientists, academia, think-tank, researchers and business representatives. Furthermore, the Government has been actively engaging with leading policy forums/ platforms through Indian Embassies in relevant countries as well as through scientific cooperation facilitated through NCPOR/ MoES. India is also exploring instituting dialogue/ cooperation mechanisms at bilateral or plurilateral level on polar issues.”

6.8 A non official witness, during the testimony before the Committee, presented the following viewpoint with regard to India’s engagement with Arctic nations:

“We must have greater collaboration between Asian observers on the Arctic. So, there are five of them and China, Japan and South Korea, they have trilateral on the Arctic. My recommendation is that India, Japan and South Korea also to have a trilateral on the Arctic because our positions are a little different from the Arctic Council countries since we are Observers because we have got different powers and different rights.”

6.9 While giving a holistic view of India’s engagement in Arctic, the representative of the MEA informed the Committee during their sitting held on 23 July, 2025 as under:

“If we try to summarise the engagement of India, it is expanding with stakeholders, not only in terms of individual countries but also other stakeholders. We are a consultative party at the Antarctic Treaty and an observer at the Arctic Council; plus, we have a bilateral collaboration on Polar Research with a number of Arctic Member States including especially the Nordics now. There are many other think-tanks and fora which are active in these Polar deliberations. For instance, the Arctic Circle, which is based in Iceland; Arctic Frontiers, which is hosted in Norway; and UArctic, a network of universities that operates out of Finland. In Russia, we have the International Arctic Forum, and there is also the Arctic Economic Council. In addition, there is the International Arctic Science Committee. India is expanding its engagement both with the member states, the countries themselves and with individual think tanks and NGOs. We are also seeing a growing interest within India among various think tanks and other stakeholders in understanding our role and becoming more active in this region.”

VII India’s role in Arctic Council as a voice of Global south

7.0 During the discussion with experts, a view was expressed before the Committee that India should lead the interests of ‘Global South’ in Arctic Council. While furnishing their views in this regard, the MEA, in their post evidence written replies stated as under:

“India has always been committed towards addressing the needs and aspirations of fellow developing countries and has been constructively championing the

cause of holistic human-centric development of countries of the Global South. India's approach of protection of global commons, including addressing maritime shipping concerns and enhancing connectivity and economic inter-linkages *ipso facto* is an articulation of perspectives of Global South. As an Observer in the Arctic Council, India represents the voice of the Global South in the Arctic region."

7.1 Further, asked to state in what ways India can be a leading voice of Global South in Arctic Council, the MEA in their post evidence replies stated as under:

"India has undertaken several research projects which demonstrates linkages between climate change in the Arctic region to that with the tropical regions. These studies are valuable for the Global South in general. In addition, India will continue to articulate its interests in the Arctic Council, which are similar to that of other Global South countries."

7.2 In response to a query on changes needed to enable India to be actively engaged in Arctic affairs as a leading country of Global South, the MEA stated following in their written submission:

"As an Observer nation in the Arctic Council, India has been engaging with relevant countries through both science-led cooperation as well as through consultations and dialogues at bilateral levels. These endeavours have enabled India to evolve its approach toward Arctic governance as a significant stakeholder. As the leading voice of the Global South, our engagements in the region can be instrumental in formulating a rules-based, inclusive and sustainable approach to Arctic governance that is rooted in scientific cooperation. India will continue to monitor changes, if any, are conceptualised or proposed in the governance of the Arctic Council and will get actively involved, keeping in view of its interests in the region."

VIII Recent Developments in Arctic Geopolitics

8.0 During the deliberations with experts, the Committee have been informed that presently the maritime border of Bering strait is patrolled by both the US Coast Guard and Russian Border guard and together they ensure maritime safety in Bering strait. However, recent developments in Arctic has made the region vulnerable. Finland and Sweden are the new NATO Members. NATO held military exercise in 2024 wherein 20,000 military personnel from 13 countries participated including 4,000 military personnel from Finland.

8.1 Further, China is building a Polar silk route with the backing of Russia. When asked about India's take on China building a Polar-Silk route with the backing of Russia and their Belt and Road Initiative, the Ministry of External Affairs, in their written submission, stated as under:

“India has been closely monitoring evolving global geopolitics as well as activities in the Arctic region. It will work with partners to ensure that all activities in geographically fragile ecosystems are done in a science based manner with primary focus on environmental sustainability, with minimal negative impact on the environment. India will also strongly support rules based international order, specially in the maritime space, which is governed by established international conventions and agreements.”

8.2 Asked to state the implications of increasing military activity in the north pole for India and its role as a balancing factor in the region, the MEA, in their post evidence written replies, stated as under:

“India has been closely monitoring the geopolitical developments in the region to calibrate appropriate course of action. India’s Arctic Policy emphasises peace, stability and sustainable governance.”

8.3 Speaking about renewed interest of USA in Arctic, a non official witness submitted before the Committee following:

“The US for the longest time had not really considered the Arctic. There has been a sudden awakening to Arctic particularly in its relationships with Greenland... President Trump has also forced a deal with Greenland and is in the process of speaking to the Europeans about critical mineral deals from Greenland. In addition to that, the former Arctic Ambassador of the US is expected to take office again and it seems that there is going to be a very big announcement coming up between the Europeans and the Americans perhaps under the larger domain of the NATO on what the US Europe partnership on the Arctic looks like. There is also an increasing amount of interest from the UK on having a track II with India as another fellow observer country on the Arctic Council because the UK faces the UK-US gap which is a naval gap for them. It is a security concern. So, it seems that starting early next year, there will be some interest from the UK as well”.

8.4 A non official witness during his presentation before the Committee informed that an Agreement was signed in 2017 on enhancing International Arctic Scientific Cooperation. However, much of the research and data sharing has been put on hold due to funding restrictions by Europe and US. Further, several field experiments shifted to the North American or European Arctic. No data is now available on permafrost research from Russia. Funding for international scientists at Russia's Science Station in Siberia and studying climate change in the Arctic has been stopped. Russia has also ceased funding of Arctic Council till resumption of normalcy and is promoting alternate mechanisms through BRICS.

8.5 When asked about any impact on the international collaborations pertaining to climate change in the backdrop of Russia Ukraine conflict, and if so, the response of India in this regard, the Ministry of External Affairs, in their written submission, stated as under:

“India has taken a pragmatic approach in navigating these challenges. India continues to advocate for science as a bridge, promoting apolitical collaboration in areas like climate change, which affects all nations regardless of geopolitical divides.”

8.6 Responding to the same query, the Ministry of Earth Sciences informed the Committee following in their written submission:

“Due to the conflict, the seven Arctic Council member States paused formal cooperation with Russia in 2022. Several multinational Arctic research projects involving Russian institutions were suspended or scaled down, affecting fieldwork, data exchange, and logistical cooperation in the Arctic.

India is expanding its Arctic research collaborations with countries such as Norway, Germany, Canada, Sweden, South Korea, and Japan to ensure continuity of research and reduce over-reliance on any single partner affected by geopolitical tensions.”

8.7 Further asked to state the steps being taken, in coordination with other stakeholder Ministries and the Ministry of Earth Sciences to ensure that the scientific research and projects continue in a collaborative manner despite the conflict in the region, the Ministry of External Affairs, in their written submission, stated as under:

“India recognises the importance of maintaining continuity in international scientific collaboration, especially in critical areas such as climate change and polar research, even in the face of global geopolitical challenges. It must also be recognised that there is no active armed conflict in the Arctic region. India continues active engagement in multilateral forums such as the Arctic Council (as an Observer), the International Arctic Science Committee and others. It has also continued its ongoing scientific projects with different Arctic countries, including the operation of its Arctic research station, Himadri, at Svalbard. As mentioned above, Indian scientists and researchers continue to undertake new projects with partner institutes and researchers.”

8.8 The Ministry of Earth Sciences, in their written submission stressed the importance of international cooperation in sectors of oil spill pollution prevention, shipping regulation and fisheries management in the wake of Arctic Sea ice decline.

8.9 In response to a query on India’s role in facilitating exchange of information between Russia and rest seven Arctic nations on climate change to enable adoption of

measures mitigating its effects, the MEA, in their post evidence written submission, stated as under:

“Following the Russia-Ukraine Conflict, the Arctic Council entered a pause as a collective response from the seven other Arctic Member States, though some programmes that did not have Russian participation resumed in the summer of 2022. Given India’s long-standing and multidimensional diplomatic relations with the Arctic Council Member States, including Russia, India has been leveraging its scientific expertise, interests in the Northern Sea Route and best practices in the domain of climate change to deepen our exchange with the States and coordinate regarding scientific/ research collaboration.”

Nuclear Safety

8.10 Unlike Antarctica where the Antarctic Treaty ensures ban on any nuclear activity, the Arctic does not have any such Treaty and is guided by CTBT of 1996. In this regard, when asked to state India’s stated position regarding nuclear safety and test explosions in the Arctic, the Ministry of External Affairs, in their written submission, stated as under:

“India’s Arctic Policy (2022) emphasizes peace, stability, and sustainable governance. India maintains a voluntary, unilateral moratorium on nuclear explosive testing and meeting the basic obligation of the Comprehensive Test Ban Treaty. Also, India is a party to the *Environmental Modification Convention, formally the Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques*. India has been advocating countries to act in a responsible manner, in accordance with their international obligations on nuclear issues.”

8.11 Further asked to state India’s response on Russia’s withdrawal from the CTBT against the backdrop of the Russia-Ukraine conflict and any latest efforts made by India to sensitise the global community regarding the threat of nuclear weapons testing in the region, the Ministry of External Affairs, in their written submission, stated that India continues to express, at multilateral forums like the United Nations, its support for strengthening global non-proliferation architecture.

8.12 Responding to a specific query on engagement with Russia diplomatically on the likely resumption of activities by Russia at the nuclear test sites in Novaya Zemlya in the Arctic Ocean, the Ministry of External Affairs, in their written submission, stated as that India has been an advocate of nuclear non proliferation and expects all countries to act in accordance with their international obligation under international law and relevant international conventions and agreements.

IX Geoeconomic importance of Arctic

9.0 As per many studies, it is estimated that, by the 2040s, the Arctic will lose its summer sea ice due to the impact of global warming. This could lead to increased shipping along the polar shipping routes as well as possible increase in exploration of mineral and hydrocarbon resources. Opening of new trade routes like Northern Sea Route would result in shortening the distance between Asia and Europe. However, exploitation of resources in this region has to be evaluated from environmental, commercial and technological perspectives before any study can be undertaken about its potential impact on global supply chain.

9.1 In this regard, a non official witness stated that on strategic minerals, we must have arrangements with countries like United States has recently signed a pact with Japan on strategic minerals and they have signed with other countries including Pakistan. This is a long-term measure that we must have some pact signed with countries in the Arctic because they are extremely rich in strategic minerals.

9.2 Asked to state the specific steps taken by the Government to advance India's energy interests and exploration of rare earth minerals in the Arctic region with greater bilateral and multilateral engagements with all stakeholders, the Ministry of External Affairs, in their written submission, stated *inter alia* as under:

“India's Arctic Policy (2022) with an explicit pillar on “Economic & Human Development,” calls for responsible cooperation in resource/mineral exploration and related infrastructure. However, there is no international regulation on exploitation of mineral resources in the High Seas. The International Seabed Authority, which has been set up by the UN Convention on the Law of the Seas, is actively considering a regulation on mining in the High Seas. However, there are few intergovernmental discussions to secure critical minerals. These include,

Minerals Security Partnership: India has become 14th member of the Mineral Security Partnership in June 2023. The other member countries include Arctic countries (U.S., Canada, Norway, Finland and Sweden).

India-US Critical Minerals MoU (2024): In October, 2024, India and the US signed a new MOU to expand and diversify Critical Minerals Supply Chains, with the aim of leveraging the two countries' complementary strengths to ensure greater resilience in the critical minerals sector.”

9.3 During the course of their interaction with the experts, the Committee were given to understand that Active Pharmaceutical Ingredients (APIs) and air-conditioning are the

two sectors that can grow fairly quickly in India with accessibility to critical minerals in the Arctic Region. The Committee were informed that Russia is severely restricted to access capital and technology and it is soliciting funding and technology, and that where India should actually step in to be an active partner. India may utilise its partnership with Russia to enhance its Arctic engagement through skilled workforce mobility, technology partnerships and institutional cooperation. Asked to respond on the above suggestion, the MEA, in their written replies, stated as under:

“Russia’s Arctic Policy is comprehensive, which focuses on economic and social development of the region, security and strategic aspects as well as climate and environmental dimensions. The challenge of vastness of land, difficult climatic conditions, emerging technologies and sparse population has resulted in Russia engaging with other partners in the Arctic region. During the 23rd Annual Summit held in December 2025, India and Russia have signed an agreement on manpower mobility and orderly migration to promote safe and mutually beneficial migration between two countries. The MoU will have mutual benefits including in the Arctic region. India is also pursuing cooperation on various issues related to Arctic region with individual Nordic countries bilaterally and also under the broader India-Nordic regional partnership.”

9.4 Arctic Warming has also given rise to strong possibility of future navigation through Arctic. For Arctic navigation, there are four routes:

- Northern Sea Route (NSR)
- North West Passage (NWP)
- Transpolar Sea Route (TSR)
- Arctic Bridge Route (ABR)

9.5 The fastest and direct European route would be the Transpolar Sea Route (TSR) straight over the North Pole. However, at present, two main routes viz. Northern Sea Route (NSR)—along Russia’s northern coast, predominantly for journeys between Europe and Asia, and the North West Passage (NWP) through the Canadian Archipelago, as a route from the US East Coast to Asia are being focused.

9.6 The melting ice in the Arctic is opening up NSR, offering India a shorter and more cost effective route between Asia and Europe which is crucial for India’s trade interests.

9.7 When asked how India has devised strategy and used the opportunity to reduce shipping costs and time and foster economic ties with Arctic States, the Ministry of External Affairs, in their written submission, *inter alia* stated as under:

“... a proper study needs to be undertaken to understand whether this sea route will have any direct impact on cargo movement to and from India and Europe / Asia.”

9.8 During the sitting of the Committee held on 30.10.2025, a non official witness stated following in his written submission:

“On the geoeconomic front, India needs to join efforts in developing the new N-S sea route as an alternative to the navigation route of Suez Canal. The new route will not only cut cruising time to one third but also avoid the problems faced due to Somali sea pirates and hence may become viable in spite of navigational hazards of icy waters. Though there may still be patches of sea ice during winter months but the Arctic Sea will become free of *multiple year fast ice* with the result that the ice class vessels may be able to meet the requirement of shipping and strong ice breakers may not be required. The Chinese container vessels have recently made several trips successfully through the Arctic Ocean, though in summer months. The disappearing sea ice and opening of this new ocean also creates a number of security challenges. Increasing human activity in the region will require creating a corresponding emergency response infrastructure, which is easier said than done. The eight members of the Arctic Council (Canada, Denmark, Finland, Iceland, Norway, Russia, Sweden, and the United States) had begun to address some of these problems through binding agreements, which cover the whole region and are specifically tailored to its geographic characteristics but recent conflict has put a stop to cooperation. India is keen to explore economic potential, such as the Chennai-Vladivostok corridor, which could offer faster access to Europe and integrate with the N-S Route.”

9.9 When asked about Eastern Maritime Corridor (Chennai Vladivostok route) and advantage for Indian trade through this route, the MEA, in their post evidence replies, submitted as under:

“The Chennai-Vladivostok Eastern Maritime Corridor is a sea route connecting port of Chennai with Vladivostok, a key port city in Russian Far East. It is a maritime link designed to enhance trade investment and connectivity between India and Russia, aligning with India’s Act East Policy. The Corridor is operational and was announced by the Hon’ble Minister of Ports, Shipping and Waterways in November 2024. The Corridor benefits trade by reducing shipping time (from 40 plus to ~ 24 days), lowering costs, providing direct access to Russian Far East resources like coal, oil and boosting India’s energy security and enabling faster movement of goods like textiles machinery and fertilizers, strengthening India-Russia economic ties and diversifying trade routes.”

9.10 Asked about any assessment made by the Government for shipping through northern sea route for Indian trade, the MEA in their post evidence written submission stated as under:

“A MoU in the Field of Development of Cooperation in Maritime Cargo Transportation in the Waters of NSR was proposed by the Russian side. Ministry of Ports, Shipping and Waterways conveyed that the MoU may be considered after feasibility study. Both sides agreed to prepare the joint feasibility study and joint action plan for fixing and achieving the target indicator. India has also proposed to conduct a joint feasibility study for operationalising the Northern Sea Route (NSR) with Russian and Indian agencies. India expressed its keenness to work with Norway in Arctic navigation by collaborating on R&D in Arctic shipping, design and construction of ice-class vessels, and advancement of navigational technologies.”

9.11 When asked about Chinese efforts to play an influential role in northern sea route, the MEA, in their post evidence submission, submitted following replies:

“Russia and China have established a Sub-Committee for Cooperation on Northern Sea Route (NSR) in 2024. During the second meeting in October 2025, both sides approved the action plan for the further development of shipment along the NSR between them. The volume of container transport is growing and the cargo traffic along NSR is expected to grow. Russia is keen to diversify its partnership with other countries, including India in the development of NSR.”

X Outreach to indigenous people

10.0 Singapore is offering education, scholarships, and opportunities to indigenous people in the Arctic as part of their appeal for permanent participation in the Arctic Council. During the course of the sitting held on 30.10.2025, when the Committee asked about any such initiative taken by India, a non official witness apprised the Committee as under:

“The indigenous people’s point, I will take your question first. This has been a very important strategy that has been increasingly adopted across the Arctic Council negotiations particularly the indigenous people creating almost as their own block, if you will, almost like a membership and a seat at the table and they are a very powerful grouping inside the Arctic Council. India has not yet done anything similar to what the Singaporeans have chosen to do. So, this is certainly going to be an important point of engagement which needs certain considerations from the Government. I think Indian foreign policy on the Arctic is like the lamp of foreign policy here. Arctic is the lamp of Indian foreign policy. There is a lot of thought that needs to be put into devising these particular strategies where we are not there yet.”

10.1 When asked about any initiative taken by the Government on the lines of Singapore which is offering education, scholarships, and opportunities to indigenous

people in the Arctic as part of their appeal for permanent participation in the Arctic Council, the MEA, in their post evidence written submission stated as under:

“The Indian Embassies have significantly expanded their public and cultural diplomacy. These measures aim to build long-term confidence with the local population and position India as a responsible stakeholder in the region. The Embassy of Norway organizes dedicated events, with particular focus on Tromsø (the Headquarters of the Arctic Council is located in Tromsø) including formal interactions with researchers and students to align India’s Arctic policies with local academic needs. India and Norway launched SAHAV, an open-source digital tool for marine spatial planning. This has enabled India to demonstrate to the local Norwegian public that its Arctic involvement is focused on science-based, sustainable governance. The Embassy of India in Finland has proposed hosting a workshop that will highlight India’s role in the region. Similarly, suggestions to promote Yoga and benefits of the Indian system of medicine among indigenous populations living within the Arctic Circle is also being explored. Indian Missions in the region have been exploring possibilities for enhancing our cooperation with a multidimensional focus, including through organising specific events that cater to the local population.”

10.2 Responding to the same query, the Ministry of Earth Sciences have submitted following in their post evidence written submission:

“Not yet. However, providing opportunities and scholarships to indigenous people in the Arctic will not enable any change in the status from Observer to Member. As per the rules of procedure, all formal decisions of the Arctic Council and its subsidiary bodies require the consensus of the eight Arctic States.”

XI Indian narrative on Arctic

11.0 During the course of meeting with experts on the subject, the Committee were apprised that the Chinese narrative of ‘Third pole’ links Himalayas with Arctic, thereby validating its quest for Arctic Council Membership. There is a need to build an Indian narrative in the Arctic region as India has actively pursued scientific research in polar climate and contributed in understanding the complexities involved in climate linkage between Arctic and Himalayan region. In this regard, when the Committee desired to know that whether India is in a better position to contribute to Arctic affairs due to its work in Himalayas, the Ministry of External Affairs, stated as under:

“As outlined in India’s Arctic policy, it mentions synergies in the studies in polar regions and the studies in the Himalayas. It also highlights that India’s experience in the Himalayas can help in understanding the Arctic region. This has been acknowledged by many of the Arctic nations and other nations such as Japan and Korea. This has also been empirically proven by various studies.

Therefore, India has adopted a gradual stepwise approach towards our engagement, depending on the demands and requirements. India has been closely monitoring the geopolitical and geo-economic developments in the regions and is calibrating our approach based on our commitment to rules-based international order.”

11.1 Further, the Ministry of Earth Sciences, in their post evidence replies put forward the India’s role in the third pole as under:

“India’s decades of Himalayan cryosphere research (glaciological and permafrost related) provide unique insights into the global climate system, directly linking the Third Pole with Arctic processes. Unlike narrowly strategic interpretations, India’s engagement is rooted in science, sustainability, and multilateral cooperation. This continuum—from Himalaya to Arctic to Antarctic—validates India’s role as a responsible stakeholder in polar governance and strengthens its contributions within the Arctic Council framework.”

11.2 Asked to elaborate on the nature of the narrative India needs to build and the hindrances encountered in building that narrative, the MEA, in their written submission stated as under:

“India is not an Arctic State. India’s Arctic narrative is distinct, credible, and future-oriented, rooted in its global responsibilities and national interests. The key elements include: Science & Climate Leadership, Sustainability & Responsible Stake holding, Global Commons Approach, Strategic Autonomy & Diversified Partnerships and Economic & Connectivity Interests. Since India’s first Antarctic (1981) and Arctic expeditions (2007), India’s knowledge and understanding of these issues are steadily improving. More and more stakeholders in India have started engaging on these issues in a more concerted manner. With the Arctic Policy of 2022, direction and focus has also been given to India’s approach. This will strengthen in the years to come. High costs, geographic distance, access to technology, low interest in Indian private sectors, etc are some of the challenges.”

11.3 When asked whether the Government has formulated/proposed to formulate an Indian narrative of Arctic based on the scientific evidence of interrelation of Indian monsoon with Arctic climate change and its economic impact, the Ministry of Earth Sciences, in their written submission, stated as under:

“Yes, India’s narrative of Arctic has shaped up through its consistent scientific and strategic engagement in the region. India emphasizes that although the dramatic changes are happening in Arctic and Antarctica, the impact is much bigger in tropical island nations and coastal States, especially due to the non-linear impact of sea-level rise and impact on extreme weather systems. Several observational, climatic, and modelling studies have shown a strong teleconnection between Arctic climate and Indian monsoon. Through an effective Arctic Policy, India positions itself as a bridge between developing nations and Arctic stakeholders, advocating for sustainability, cooperation, and equitable access. India’s Arctic narrative is about balancing scientific responsibility, climate awareness, and strategic opportunity.”

11.4 The MEA also further made following submission in their post evidence written replies:

“India’s Arctic Policy of 2022 brings forth the Indian perspective and narrative to the changes happening in the Arctic region. The body of scientific research undertaken so far has evoked greater interest in the academic and research community to study different aspects of Arctic climate change. With the availability of more research information, more precise economic impact studies can be undertaken in the future. These will be useful inputs for future policy formulation.”

XII Need for recognising Arctic area as a Quasi Global Common

12.0 Most of the resources in Arctic are within sovereign territories and declaring Arctic as being Global Commons is resisted by the Arctic countries. In this regard when asked to state the Government’s view on this, the MEA furnished the following written submission:

“India is committed to a rules-based approach and envisions itself as a science-driven and environmentally responsible actor in both Arctic and Antarctic. Our engagements, both at political and scientific levels, are guided by this approach as well as by sustainability- focused cooperation in the areas including energy security and sea-route governance. There are also established international regimes related to deep sea mining and fishing. India will engage constructively as per its obligations under such regimes.”

12.1 When the Committee desired to know whether treating Arctic as a Global Commons has serious disadvantages, the MEA, in their written submission, stated as under:

“Most of the Arctic region encompasses territories which are sovereign to the Arctic nations and is also inhabited by about 4 million people, out of which roughly 10 percent of the inhabitants are indigenous. There are sovereign rights for all States and UNCLOS provides the legal framework for all ocean

and sea activities of nations, defining maritime zones (like territorial seas, EEZs, high seas) and allocating rights for resource use, navigation, and environmental protection.”

12.2 However, during the deliberations held on 30.10.2025, a non official witness stressed on the need for rather treating it as ‘Quasi Global Commons’. In this regard, the Committee were informed as under:

“Legally speaking, even Arctic is not a global commons, it does fall under the legal definition of a quasi global commons and a quasi-global commons is essentially part of the world, very good example of this would be the amazon forest. So, the amazon forest has been recognised as the lungs of the planet and despite the fact that it falls under the territorial claims of three different countries, there is an understanding both in common law and territorial domestic laws across those three countries that the preservation of these forests is so critical for the global good that it becomes a quasi-global commons which is essentially what the Indian foreign policy should also aim at, creating and opening up the Arctic to perhaps the legal understanding in legal interpretation of the region as a quasi-global common starting from the high seas, of course, without getting into territorial jurisdictions of the countries because there are conflicting claims on those territories as well.”

XIII Strategic importance of Antarctica

13.0 The Committee have been informed that Antarctica is the only continent that is beyond the purview of the UN and is governed by the Antarctic Treaty System. Antarctica having an area nearly five times of India and holding ice sheet as thick as 4.5 km at places, can lead to a potential sea level rise of 60 meters, if it melted entirely. Being a country of more than 11,000 km long coastline and multiple islands, any sea level rise will have significant economic and strategic impact on India. Melting of sea ice surrounding Antarctica and Arctic will also have significant impact on Indian Monsoon climate system. Strategically, a continuous Indian presence in Antarctica strengthens our role in international decision-making, enhances its credibility in polar governance, and ensures preparedness for future global discussions within the framework of the Antarctic Treaty. Indian Antarctic operations have also enabled technological advancement, logistics capability, and human resource development in extreme environments.

13.1 Overall, Antarctica is strategically important for India as a platform for scientific leadership, diplomatic engagement, and responsible stewardship, reinforcing India’s commitment to global commons and its long term environmental and geopolitical interests. The Government of India has been consistently strengthening the expansion

of India's polar program through a combination of infrastructure upgradation, new platforms, legal and data frameworks, and capacity building under the Polar Science and Cryosphere Research (PACER) sub-scheme of PRITHVI scheme of the Ministry of Earth Sciences, implemented through the National Centre for Polar and Ocean Research (NCPOR), Goa.

Achievements of Indian Antarctic Programme

13.2 Major achievements of Indian Antarctic programme are:

- 45 annual Indian Scientific Expeditions to Antarctica have been launched, involving more than 120 national / international institutions in these expeditions.
- India has established three year-round research stations in Antarctica – Dakshin Gangotri, Maitri and Bharati – so far. These stations enabled Indian scientists to undertake scientific research, helping India to secure many important roles in the Antarctic governance and scientific leadership.
- During the last four decades, India expanded its scientific and operational footprint across different geographic regimes in Antarctica, from 12°E to 76°E and from 69°S to 90°S (South Pole).
- The Indian Antarctic Act was enacted in 2022 to provide a legal framework for India's activities in Antarctica, supported by the Indian Antarctic Environmental Protection Rules 2023 to ensure the proper implementation of the Act.
- Under the initiative of Integrated Atmospheric Observation Facility for Antarctica (IAOFA), infrastructure for clear-air atmospheric observatories have been established at Maitri and Bharati.
- Ice core drilling in Central Dronning Maud Land revealed major climate shifts in Antarctica during the last 500 years that are tied to tropical and extra-tropical climate changes.
- Completed the entire geological mapping of 20,000 km² in Central Dronning Maud Land, Antarctica.
- Discovered more than 75 new extremophile microbes, new to science. This has great significance for the life under extreme conditions and their applications in bioprospecting and drug discoveries.

- Population genetics study conducted on snow petrels in east Antarctica showed strong gene flow between disjunct populations spaced about more than 2500 km apart.
- India's research in the Schirmacher Oasis (Maitri) has yielded significant insights into its over 100 glacial lakes and 150 lakes in the Larsemann Hills (Bharati) of East Antarctica.
- Provided leadership to Global South in Antarctica by supporting participation of Indian Ocean Rim countries in Indian Antarctic Expeditions – Malaysia, Mauritius, Bangladesh in the past and UAE during the current season (2025-26).
- Major International and National Collaborative Projects were undertaken in Antarctica under Indian Scientific Expedition to Antarctica (ISEA).

13.3 Asked about any noticeable change in India's role in Antarctica vis - a-vis other countries and measures taken to strengthen India's position, the MEA in their post evidence written submission, informed the Committee that India has been consistent in its policy and role in Antarctic governance. During the last four decades, India's role in Antarctica has evolved from basic participation to recognized leadership in Antarctic science, governance and operations, driven by the credibility built through sustained research at its stations. This long-term engagement has enabled India to assume leadership roles in key Antarctic research and operational committees, including SCAR, COMNAP, ATCM and its Committee for Environmental Protection. Indian experts have chaired/ contributed to the working groups and contributed to policy development, environmental stewardship, logistics coordination, and international cooperation. India also hosted the 46th Antarctic Treaty Consultative Meeting (ATCM) in 2024 at Kochi and also hosted and chaired the Annual General Meeting of Asian Forum on Polar Sciences (AFoPS) in Goa.

XIV Antarctic Treaty

14.0 The International Geophysical Year (IGY) during 1957-1958 and the participation of more than 67 countries led to large-scale international experiments focused on many unexplored regions, including Antarctica. This brought strong global attention to Antarctica to understand the mysteries of remote areas of earth. In addition, the inherent pressure built by India's statement at the UNGA, made the claimant nations and other major players in Antarctica move quickly towards signing of the Antarctic Treaty on 1st

December 1959. India raised 'Antarctic Question' in the UN in 1956 for advocating its identification as an area of peace, free of any discord. The Indian stand probably infused the discussion of Article I (Peaceful uses) and Article V (Nuclear Activity) of the Antarctic Treaty, prohibiting nuclear explosion and disposal of radioactive waste. Originally there were 12 signatories to the Antarctic Treaty viz. Argentina, Australia, Belgium, Chile, France, Japan, New Zealand, Norway, South Africa, UK, USA, USSR. Now there are 57 States Party to the Treaty, of which 29 are Consultative Parties.

14.1 India signed the Antarctic Treaty in 1983 and attained the status of Consultative Party in the Antarctic Treaty System (ATS), which regulates all international relations concerning Antarctica. The Antarctic Treaty Consultative Meeting (ATCM) is the highest governing body of the Antarctic Treaty where decisions are consensus-based and thus India has a critical role to play. ATS is a set of three related agreements that regulate international relations with respect to Antarctica. India is a party to two of the agreements viz. the Protocol on Environmental Protection to the Antarctic Treaty (Madrid, 1991) and the Convention for the Conservation of Antarctic Marine Living Resources (CCAMLR, Canberra, 1980). India has not signed the Convention for the Conservation of Antarctic Seals (CCAS, London 1972) as no work has been done in this area.

14.2 When the Committee desired to be apprised about the rights and obligations of the Consultative Party in the Antarctic Treaty and the contribution made by India as a Consultative party since joining the Antarctic Treaty, the Ministry of External Affairs, in their written submission, stated as under:

"The Rights and Obligations of Consultative Party in Antarctic Treaty are the following:

Consultative Parties take part in decision-making at the annual Antarctic Treaty Consultative Meetings, where all decisions are by consensus.

Consultative Parties must demonstrate substantial scientific research (e.g., stations/expeditions), exchange scientific plans/results, allow inspections, use Antarctica only for peaceful purposes, and implement the 1991 Madrid Protocol (Environmental Impact Assessments, protection of flora/fauna, waste and marine-pollution controls; mining is prohibited).

India's contribution:

India became a Consultative Party in 1983 and has sustained year-round science via Dakshin Gangotri (1983), Maitri (since 1989), and Bharati (since 2012).

India joined the Scientific Committee on Antarctic Research in 1984 and has been a member of CCAMLR since 1986.

India also hosted the 46th Antarctic Treaty Consultative Meeting and the 26th Committee for Environmental Protection at Kochi in May 2024."

14.3 When asked about India's participation in the decision making process under the Antarctic Treaty, the Ministry of External Affairs, in their written submission, stated as under:

"India participates as a Consultative Party in the Antarctic Treaty Consultative Meetings and in the Committee for Environmental Protection, submitting papers, negotiating measures/resolutions by consensus, and working through CCAMLR on Southern Ocean conservation. In 2024, India hosted the 46th Antarctic Treaty Consultative Meeting and the 26th Committee for Environmental Protection and helped steer focused discussions on regulating tourism, biosecurity (including Highly Pathogenic Avian Influenza), and greater use of renewables at Antarctic Research stations."

14.4 When asked about the strains, if any, in the Antarctic Treaty System and strategy proposed/adopted to address them, the Ministry of External Affairs, in their written submission, stated as under:

"The Antarctic Treaty System faces strains from resource pressures, geopolitical rivalries, environmental vulnerabilities and governance challenges. Growing interest in mineral and hydrocarbon resources, the climate change impact, expanding human activity, and occasional disputes over fisheries and protection of biodiversity; all test the consensus-driven framework of the Antarctic Treaty System. These factors could potentially undermine environmental protection, the non-militarized status of Antarctica, and effective governance of the region. India addresses these challenges through a science-led and collaborative multilateral approach, with emphasis on research-based decision-making and strict compliance with the Madrid Protocol, and environmentally sustainable practices at its stations. India has been actively participating in the Antarctic Treaty Consultative Meetings, CCAMLR, and the Scientific Committee on Antarctic Research, and has strongly advocated for Antarctica to remain a peaceful, cooperative, and ecologically protected global commons, while focusing on scientific and environmental issues."

14.5 A query was raised about the major areas of convergence and divergence amongst all parties in ATCM. While responding to the same, both the MEA and MoES, in their written submission, stated as under:

"While the Antarctic Treaty is still considered to be a gold standard for many agreements, over the last few years, the geopolitical tensions between the parties are also casting shadows in ATCMs.

Areas of Convergence:

- All parties agree on the foundational principles outlined in the Antarctic Treaty and the Protocol on Environmental Protection.
- Peaceful Purposes: Universal agreement that Antarctica shall be used exclusively for peaceful purposes, prohibiting military bases, weapons testing, and nuclear explosions or the disposal of radioactive waste.

- Freedom of Scientific Investigation: Strong consensus on the importance of scientific research and international cooperation, with a commitment to freely exchange scientific plans, data, and personnel.
- Environmental Protection: General agreement on the need to protect the unique Antarctic environment and its ecosystems. This led to the adoption of the Madrid Protocol, which designates Antarctica as a natural reserve and bans all activities relating to mineral resources other than scientific research.
- Sovereignty Neutrality (Article IV): Agreement to "freeze" existing territorial claims for the duration of the Treaty, allowing claimant and non-claimant states to cooperate without prejudice to their legal positions.
- Compliance and Inspection: Acceptance of the robust inspection system, which allows any member State to inspect the research station/s of another member State.

Areas of Divergence

- One of the divergences amongst parties in the recent Antarctic Treaty Consultative Meetings (ATCM) was regarding granting the Emperor Penguin "Specially Protected Species" status, largely due to objections from China.
- Mineral Resources: While mining is currently banned, some states are suspected of engaging in activities that could be interpreted as undeclared resource exploration under the guise of research.
- Marine Protected Areas (MPAs): Establishing large-scale MPAs in the Southern Ocean has been a point of significant contention.
- Tourism Regulation: The rapid growth of Antarctic tourism has raised concerns about environmental impacts and safety. While there is consensus on the need for regulation, parties diverge on the stringency and specifics of a legally binding framework versus non-binding guidelines.
- Decision-Making Process: Since only Consultative Parties have voting rights, extensive debates over the criteria for achieving consultative status without any conclusion are delaying the decision making. This issue has exacerbated following the Russia Ukraine conflict.
- Liability Regime: The Annex VI on Liability Arising from Environmental Emergencies, adopted in 2005, has yet to enter into force because not all Consultative Parties have approved it, highlighting ongoing disagreement on specific liability rules."

14.6 Dwelling on the need for expansion of ATS in the changing geopolitics, a non official witness stated the following:

"Since 2014 no State Party has got elevated to Consultative status. Perhaps now is the time when more representation from countries that meet the Treaty requirements covered under Decisions 2 of 2017 can be encouraged even at the risk of losing dominance of select few."

14.7 When asked about the role played by India in decision making process in the areas of divergence/disagreement, the Ministry of External Affairs furnished following written reply:

“During the last four decades, India’s role in Antarctica has evolved from active participation to increased leadership in Antarctic governance and operations. India has played a crucial role in developing a comprehensive framework to regulate Antarctic tourism, aiming for an ambitious, flexible system that protects the environment while managing growing visitor numbers, focusing on environmental impact assessments, cumulative impacts, biosecurity, and compliance. It was initiated at the 46th ATCM held in 2024 at Kochi meeting, which brought all parties for committing to a robust, unified regulatory system to manage tourism's complex challenges in Antarctica, building on existing measures and international cooperation.”

Antarctica – ‘Global Common’

14.8 During their interaction with subject experts, the Committee were apprised that while Arctic area has territorial sovereignty, therefore contest its treatment as ‘global common’, Antarctica has been treated as ‘Global Common’ as it is not under the jurisdiction of any country. In this regard, during the course of evidence held on 23 July 2025, the representative of the MEA stated following:

“In the Antarctic situation, earlier there were territorial claims. The Antarctic Treaty, sought to treat the continent as a global common, as a common heritage. It aims at non-militarisation of the continent, not having any mining etc. There is, of course, no indigenous population on that continent. Today, we have an estimated number of around 70 research stations from a very large number of countries who are operating there. In the ocean surrounding the continent, there is an interest in fishing, and, of course, there is also some little tourism that is starting on the Antarctic Continent. Between the two, it is relatively a settled status because it is a Treaty.”

14.9 The Committee desired to know the policy measures adopted by the Indian Government to treat Antarctica as a Global common. Responding to the same, the MEA in their post evidence written replies, stated as under:

“The Antarctic region is uninhabited and not sovereign to any nation. The Antarctica is governed by the Antarctic Treaty System (ATS) signed in 1959, an international framework ensuring Antarctica remains a peaceful, scientific reserve, banning military activity, mineral resource activities, nuclear tests, and radioactive waste disposal, while promoting cooperation and freezing territorial claims. India’s policy towards Antarctica is firmly anchored in the global commons approach of ATS and is also reflected in India’s initiation of the question of Antarctica in the UN General Assembly way back in 1956. Since then, India has become a Consultative Party to the Antarctic Treaty in 1983, currently one of 29 parties with rights to govern Antarctica. India is an active member and has been taking forward this narrative independently as well as through bilateral and multilateral platforms. India has consistently supported the freedom of scientific investigation, environmental protection, and international cooperation. Through its research programme and the establishment of permanent research stations, India adopts a science-led engagement.”

14.10 Further, the MoES also stated following in their post evidence replies:

“Since the Antarctic Treaty is the only governing mechanism for Antarctica, it is in India’s interest to treat Antarctica as Global Commons. Further, as resolved in Resolution D (2023) of 45 ATCM, the Antarctic Treaty or the Protocol does not have an expiry date. For any changes to be made to the Madrid Protocol, including potential modifications after end of its 50-year term in 2048, a unanimous agreement of all Consultative Parties will be required. Such a unanimity to support the territorial claims or stop treating Antarctica as Global Commons is highly unlikely in the foreseeable future. Therefore, India has consistently supported the freedom of scientific investigation, environmental protection, and international cooperation. Through its research programme and the establishment of permanent research stations, India exercises presence without claim, using science as the basis of engagement.”

India’s Scientific Journey in Antarctica

14.11 With a strong policy decision at the highest level, the first Indian Scientific Expedition to Antarctica was launched from Goa in 1981 with a 21-member team under the leadership of Dr. S. Z. Qasim, then Director of the National Institute of Oceanography, using a chartered Norwegian vessel ‘Polar Circle’. The first expedition was executed under the codename ‘Operation Gangotri’ which was intended to establish India’s presence in Antarctica and was initially largely kept under the wraps of the public eye. Since then, India has been an active proponent of Antarctic research and has established itself as one of the strong polar research nations in the international Antarctic scientific community.

XV Research station in Antarctica

15.0 There are currently 70 permanent research stations scattered across the

continent of Antarctica, which represent 30 countries from every continent on Earth. India established its first year-round Antarctic research station, 'Dakshin Gangotri' at coastal Dronning Maud Land in 1983 to undertake research activities. This was also the year when India joined the Antarctic Treaty System and was granted Consultative Party status. As Dakshin Gangotri was created for a quick abode of India in Antarctica and was built on the ice shelf, it got buried quickly by ice and was replaced by Maitri at Schirmacher Oasis, a stable ice-free land about 100 km inland from the coast that became operational in 1989. Since then, Maitri has been central hub of Indian scientific activities in Antarctica. To expand India's footprint across Antarctica, India established a very modern research station, Bharati at Princess Elisabeth Land situated at about 2500 km east of the Maitri station, in 2012. This station provided a unique opportunity to establish coastal marine observatories and also provided access to land areas that were connected with India during the geological past.

15.1 Another important landmark in India's scientific journey to Antarctica was the first Indian Scientific Expedition to the South Pole in 2010 when an 8-member team led by NCPOR undertook a 2300 km long traverse from India's Maitri station to the geographic South Pole. Indian researchers also joined a Norway-led Central Arctic Expedition that undertook experiments in the North Pole in 2022.

15.2 Currently, India is restricting the oceanographic mooring in the landfast ice regions of Prydz Bay near Bharati station. Due to the limited availability of ship time on MoES research vessels, NCPOR has been chartering different research vessels to implement Southern Ocean expeditions.

15.3 During the deliberations held on 30.10.2025, an expert highlighted the following with regard to existing research station in Antarctica and need for its upgradation as under:

"We have two stations in Antarctica. One of the stations is quite old and was not meant for modern times; it was just intended to provide shelter when we wanted to establish a presence in Antarctica and play a role in the Antarctic Treaty System. That need was addressed by having the Maitri station. Furthermore, Maitri happens to be one of the very strategically important areas within Antarctica. It is located in the region where most countries have research bases and is connected to air support from other continents. Therefore, it is an extremely important area that we need to continue to focus on. That is why we have a proposal with the Government, which has been approved in principle, to build a new station there."

XVI Inspection of Research Stations in Antarctica

16.0 Inspections of research station of other countries under the ATS are crucial for upholding the Treaty's core principles: peaceful use, scientific cooperation, and environmental protection, ensuring compliance while building trust and transparency in a region vital for global climate science. These inspections, though sometimes symbolic, build confidence, prevent misuse (like dual-use tech), and serve as a key mechanism for monitoring activities and promoting adherence to environmental protocols, even as new geopolitical interests emerge. Initially focused on demilitarization, inspections now heavily emphasize environmental stewardship, especially after the Madrid Protocol. Inspection reports commonly document training, medical capability, and emergency planning—helping identify gaps and spread good practices. These reports are tabled as ATCM papers and archived, contributing to institutional memory and continuous improvement. Modern inspections increasingly involve multiple countries, reducing costs and enhancing collaboration.

16.1 A non official witness, in his presentation made before the Committee suggested following with regard to inspection of Indian research station in Antarctica:

“Indian Station Maitri has been inspected by several Consultative Parties so far under the provisions of Antarctica Treaty. The Treaty and the Indian Antarctic Act too authorize India for the same. India has not made use of this provision to assert its rightful position. It is high time we conduct such an inspection of a few Antarctic facilities of other Parties”.

16.2 Asked about inspection of research station of other countries done by India, the Ministry of External Affairs, in their written submission, stated as under:

“India hasn’t conducted such inspection so far. The major reason for the same could be traced to cost involved as Antarctic stations are situated hundreds and thousands of kilometres apart and dedicated chartering of flights are required within the continent. Also, these inspections are conducted jointly by multiple countries and therefore, we need to identify the right partners. However, it is critically important to initiate the process in near future that will provide full access to stations, equipment, and vessels for designated observers.”

16.3 Discussing the importance of the inspections, an expert informed the Committee as under:

“We have also been proposing to the Government that India should carry out inspections of the Antarctic stations of other countries within Antarctica. It is because that actually shows your strength and we have a lot of countries visiting our stations and making reports. These reports can be sometimes bad or good, whatever it is, but that shows the strength of each of those nations.”

16.4 Indian Antarctic Act 2022 & Indian Antarctic Environmental Protection Rules 2023

The Indian Antarctic Act 2022 provide for the national measures for protecting the Antarctic environment and dependent and associated ecosystems and gives effect to the Antarctic Treaty, the Convention on the Conservation of Antarctic Marine Living Resources and the Protocol on Environmental Protection to the Antarctic Treaty and for matters connected therewith or incidental thereto. The Indian Antarctic Environmental Protection Rules 2023 ensure the proper implementation of the Indian Antarctic Act 2022 to ensure compliance with the Antarctic Treaty System.

16.5 The main objectives of the Indian Antarctic Act 2022 is to provide for national measures for protecting the Antarctic environment and dependent and associated ecosystems and to give effect to the Antarctic Treaty, the Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR), the Protocol on Environmental Protection (CEP) to the Antarctic Treaty and for matters connected therewith or incidental thereto. Major objectives of the Indian Antarctic Environmental Protection Rules, 2023 are:

- To implement India's international obligations under the ATS
- To regulate Indian activities in Antarctica through a permit-based system
- To protect the Antarctic environment and dependent ecosystems
- To ensure peaceful and scientific use of Antarctica
- To provide enforcement, liability, and penalties

XVII Tourism in Antarctica

17.0 The Committee observe that Antarctic tourism has been growing. Even though there is consensus on the need for regulation, there are divergent views on legally binding framework versus non-binding guidelines. In this regard, the Committee desired to know the stand taken by the Government regarding some form of regulation on tourism in Antarctica so that the pristine environment is preserved in the region. Replying to this, the Ministry of External Affairs, in their written submission, stated as under:

“India supports rules-based regulation of tourism under the Antarctic Treaty System and has already put national permitting and enforcement in place through the Indian Antarctic Act 2022 and the Indian Antarctic Environmental Protection Rules, 2023. India's stance aligns with the Madrid Protocol and the Antarctic Treaty Consultative Meetings guidance that Parties must control non-governmental activities via domestic law.”

17.1 On being asked about the active role played by India in working with other nations for regulation of Antarctic tourism and outcome achieved so far, the Ministry of External Affairs, in their written submission, stated as under:

“India has taken an active multilateral role, by hosting the 46th Antarctic Treaty Consultative Meeting and the 26th Committee for Environmental Protection in Kochi (May 20–30, 2024), where Parties agreed to develop a comprehensive and consistent framework for the regulation of Antarctic tourism. India facilitated the first-ever focused discussions on regulating tourism during this meeting.”

17.2 When asked whether there is a need to engage with the tourism industry to improve India’s tourism to Antarctica, the Ministry of External Affairs, in their written submission, informed the Committee as under:

“While no treaty specifically regulates tourism in Antarctica, tourism is governed under binding provisions of the Antarctic Treaty System measures, national laws (Indian tourists need to obtain authorisation from NCPOR) and practices adopted by International Association of Antarctic Tour Operators (a self regulated industry body). While tourism to the Antarctic, including Indian tourists, have increased over the years, there is also increasing concern on the environmental impact of such activities. In the 46th Antarctic Treaty Consultative Meeting in Kochi in 2024, this issue was considered and Parties agreed to develop a new comprehensive framework to regulate tourism and non governmental activities, including stricter control on large cruise vessels, cap on number of tourists, and designated tourism zone to protect fragile ecosystems. Hence, the focus of Indian tourism should be responsible and sustainable tourism, while recognising the fragile nature of the Antarctic ecosystem. Indian tourists and tour operators should be sensitised about these issues before they undertake any tourism activity in the Antarctic.”

17.3 During the deliberations of the Committee, a non official witness informed that India took lead in advocating for ‘responsible tourism’ during the 30th ATCM held under its chairmanship in New Delhi. When the Committee asked about the challenges being faced in enforcing ‘responsible tourism’ in Antarctica and success achieved in this endeavour, the MEA stated following in their post evidence submission:

“Enforcing responsible tourism in Antarctica faces major challenges from booming visitor numbers (about 1.1 lakhs during 2024-2025 season), diverse visitor motivations (from serious explorers to casual tourists), need for strong international cooperation, with issues including managing pollution (black carbon, grey water), preventing invasive species, protecting fragile ecosystems from foot traffic, and ensuring consistent regulation across self regulating operators. Antarctica’s immense size and remoteness make comprehensive monitoring and enforcement extremely difficult and costly. The delicate balance between economic growth, public access, and environmental preservation remains a significant hurdle for the Antarctic Treaty System. One of the key

outcomes of the 46th ATCM hosted by India was Decision 5 (2024) on the Development of a Framework for the Regulation of Tourism and Other Non-Governmental Activities in Antarctica. As per the decision, there is a plan to develop a robust, compliant, and adaptive framework to manage the increasing tourism and non-governmental activities while ensuring environmentally responsible practices. The 47th ATCM, Milan has taken this forward further and currently, the ATCM parties are working towards drafting the framework during the intersessional period.”

XVIII Capacity Building for Polar Research

18.0 India’s polar exploration has evolved steadily since the first launch of Antarctic expedition 1981 and has achieved an important milestone with the completion of 45 Antarctic expeditions by 2025. Over the decades, the programme has significantly strengthened India’s scientific presence across the diverse geography of Antarctic and Arctic continents, developing significant expertise in scientific research and polar logistics.

1. In response to a specific query on the major challenges involved in undertaking the scientific research, the MEA, in their written submission, stated as under:
2. “Major challenges involved in undertaking the scientific research in polar regions include:
 - **Logistical Difficulties and High Costs:** The sheer remoteness of polar regions means that transportation of personnel, equipment, food, and fuel is a massive logistical undertaking and extremely expensive. Access is often limited by thick sea ice and specific seasonal "windows" for operations, which can be further disrupted by severe weather or changing climate conditions.
 - **Harsh Environmental Conditions:** Researchers face extreme cold, strong winds, and low humidity, which can lead to frostbite and hypothermia. The dynamic and unpredictable nature of the ice, including cracks and pressure ridges, poses physical safety risks and can cause significant delays to expeditions.
 - **Technological Limitations:** Equipment must be specifically adapted to withstand negative temperatures and harsh conditions; standard technology can fail or perform poorly. Power systems and data storage/transmission capabilities are also a constant concern, requiring specialized engineering solutions.
 - **Human Health and Psychological Stress:** The physical isolation and confinement for extended periods (especially during the long, dark winter months) can lead to psychological challenges such as sleep disturbances, mood decrements, interpersonal conflicts, and fatigue, a condition sometimes referred to as the "winter-over syndrome".

- Limited Observational Data and Funding: Historically, observational records in polar regions are relatively short due to the difficulty of year-round data collection. Furthermore, research programs often face pressure from short-term funding cycles and competition for resources, which can strain finances and impact long-term data collection and career stability for early-career researchers.
- Regulatory and International Coordination: Scientific activities must adhere to national and international regulations and treaties (such as the Antarctic Treaty's environmental protocols), which requires careful planning and significant international collaboration and agreement on safety standards and data sharing."

18.1 Further, the Ministry of Earth Sciences informed the Committee that Antarctic research is heavily constrained by complex and expensive logistics. In this regard, when asked about specific measures being taken to overcome the constraints, the Ministry of Earth Sciences, in their written submission, stated as under:

"Antarctica is a continent of extremes — geographically isolated, climatically hostile and far removed from any human habitation. India has maintained its presence there since 1981 through annual expeditions and year-round occupation of its stations. Even maintaining a minimum presence requires a full spectrum of logistical capabilities such as multipurpose icebreakers, helicopters, safe living structures, inland transport vehicles, specialised equipment and trained manpower. This makes Antarctic logistics inherently complex, interdependent and extremely expensive.

Indian Antarctic Expeditions follow the international protocols and standard operating procedures. We deploy a chartered ice class vessel annually to supply fuel, provisions and logistic and life support systems. India have joined the DROMLAN (Dronning Maud Land Air Network) Consortium, allowing us to transport Indian expeditioners by air from Cape Town to the nearest Russian airfields closer to the Maitri and Bharati stations. This has enabled scientists to plan and fully utilise their time at disposal for experiments and sampling. Most importantly, this air facility has enabled medical and emergency evacuation a reality.

All supplies, including millions of litres of fuel, food, machinery, building materials and scientific equipment are transported by a multipurpose icebreaker vessel capable of carrying helicopters, heavy cargo and personnel.

Helicopters, snow vehicles and field camp setups are used for reaching remote scientific sites.

Both the stations are equipped with heating, renewable energy support, robust shelters and medical facilities to withstand severe weather and isolation for up to nine months at a time.

Project Maitri-II for building a new, environmentally compliant and technologically advanced station has already been initiated. This facility will

incorporate state-of-the-art laboratories, energy-efficient systems, renewable energy integration, advanced waste management and modern living quarters designed for long-term, safe habitation.

Additional ongoing and planned augmentation measures include:

Renewable Energy Integration: Progressive installation of wind/solar hybrid systems to reduce dependence on fossil fuels and lower environmental impact.

Advanced Communication Systems: High-speed satellite communication facilities for real-time data transfer and improved coordination.

Enhanced Waste Management: Systems aligned with the Protocol on Environmental Protection to the Antarctic Treaty.”

(a) Financial allocation for Polar research

18.2 Budget for India’s polar scientific and operational activities is allocated as a Grant-in-Aid. The funding is channelled through the Polar Science & Cryosphere Research (PACER) sub-scheme, which falls under the umbrella scheme called PRITHVI Vigyan. The scheme is implemented by the National Centre for Polar and Ocean Research (NCPOR), which is the nodal agency responsible for conducting India’s annual scientific expeditions to the Antarctic and Arctic. Currently India maintains two research stations in Antarctica (Maitri and Bharti) and one in the Arctic (Himadri). All expenditures are exclusively dedicated to logistics, station maintenance, scientific research and capital investments in equipment and infrastructure.

18.3 The allocation and utilization of funds for the previous three financial years are as follows:

Year	Budget Estimate (in Cr.)	Revised Estimate (in Cr.)	Actual Expenditure (in Cr.)
2022-23	140.24	157	156.96
2023-24	146	160	159.87
2024-25	146	226.25	226.20
2025-26	200	200	199.96
2026-27	210		

18.4 The Committee have been informed that the major components of expenditure planned for the year 2026-27 include the Antarctic, Arctic, Southern Ocean, Cryosphere and Climate programme.

18.5 As per the information provided by the Ministry of Earth Sciences, NCPOR does not engage in tourism-related activities. The expenditure incurred is purely for logistics,

station maintenance at Antarctica and research activity, along with capital investment for the purchase of scientific equipment and station infrastructure.

18.6 Asked to furnish the total amount of funds utilised in polar research in Arctic and Antarctic regions, the MEA, submitted as under:

“Most of the funds allocated for the polar expeditions are utilised for Antarctic expeditions, operations and hiring ice class vessel/aircrafts for supply of life-saving essentials to two year-round stations in Antarctica. The entire Antarctic operations, station manning and management are exclusively handled by NCPOR and therefore, forms operationally the most challenging and financially expensive program among Indian initiatives in the poles. Compared to this, our Arctic activities so far are mostly restricted to Ny-Ålesund in Svalbard, with our research station, observatories and activities facilitated by Kings Bay AS, a company owned by the Norwegian Government. As an example, details of expenditure/actual utilization of funds for polar research in Arctic and Antarctic regions for the FY 2024-25 are given below:

Financial Year	Antarctica Expenditure	Arctic Expenditure
2024-25	190.41 Crores	17.53rores

Considering the increased expenditure related Antarctic operations like chartering polar vessels/aircrafts/helicopters and managing and maintaining the two year-round stations (Maitri and Bharati), we need to increase the outlay for Indian Antarctic Program. Further, our planned Pan-Arctic expansion across the Arctic Ocean necessitates a significant increase in the budget outlay for Indian Arctic Program. Since the bulk of budget outlay for polar program is utilised for the operational needs, unless there is a 30% increase in annual budget outlay under PACER sub-scheme of PRITHVI Scheme, we cannot increase our scientific and operational footprint across the polar regions. Most importantly, it is equally important to increase the core scientific/technical manpower to form nucleus of the multiple activities envisaged.”

18.7 As per the submission of the Ministry of External Affairs, the current level of investment has secured India's place among the selected club of countries having round-the-year Antarctic stations for more than a year. Critical limitations for our presence in Antarctic includes, continued dependence on chartered ice-class vessel, which usually struggles with unpredictable sea ice. Our permanent station Maitri, which has operated since 1989, far exceeded its intended lifespan 10 years. Additional funds will facilitate enhancement of India's role and presence in the Antarctic region.

18.8 Three of the most critical and high-priority areas that need focus are:

New Antarctic station: Maitri Station, commissioned in 1989, has outlived its life and is beyond meaningful repair. It no longer supports modern laboratories and fails to meet the environmental standards of the Antarctic Treaty as well as of our own Antarctic Act, 2022. The station needs a full replacement.

Dedicated Polar Research Vessel: Continued dependency on chartered ice-class vessels puts India at a huge disadvantage. These vessels are not easily available in the market, lacks scientific capabilities, and hinder our ability to conduct meaningful Arctic/Antarctic research. A dedicated ice-breaking research vessel is essential for our independent, pan-Arctic/pan-Antarctic missions.

Scientific and technical manpower: A substantial increase in skilled personnel is fundamental to execute the expanded scientific and operational activities in the polar regions.

18.9 In this regard, a non official witness also stated following in the testimony:

“as per my calculations, for 2021, 2022 and 2023, the Arctic and Antarctic was under PACER. Their total allocation was Rs. 365 crore and out of which NCPOR was some figure which is extremely frugal. I mean Rs. 365 crore, after three years now is probably about Rs. 200 crore but it is extremely limited for undertaking our operations.”

18.10 When asked about additional requirement of fund to enable India to enhance its role in the polar regions, the Ministry of External Affairs, in their written submission, stated as under:

“India is actively enhancing its polar presence by expanding its scientific footprint beyond the current logistic periphery of its stations. This includes plans to join international initiatives like Antarctic RINGS and Antarctic Insync Programme, which would give us a circum-Antarctic reach, and undertaking Arctic expeditions beyond Svalbard through collaborations. Government has also initiated the acquisition of a Polar Research Vessel and construction of a new Maitri station. While annual budgetary allocations, cover existing expeditions. However, new strategic initiatives will require dedicated, additional funding to be accomplished.”

18.11 Further asked about any engagement with various industries and private sectors in the country to bring about investment for various activities undertaken in the region especially related to tourism, connectivity, digital infrastructure, energy, etc. the Ministry of External Affairs, in their written submission, stated as under:

“So far, India’s engagement in the Antarctic has been largely State-driven, coordinated mainly through the Ministry of Earth Sciences (MoES) and NCPOR. The focus has been on scientific research, logistics, and compliance with the Antarctic Treaty System rather than commercial or private-sector activities. However, the Government will be supportive of the private sector, especially industries as well as academic institutions which are interested in extending their footprint in the Polar region, which is in accordance with India’s international obligation.”

18.12 In this regard, the Ministry of Earth Sciences further stated as under:

“Considering the strategic and geopolitical nature of the polar research expeditions, interest from Indian private sector is non-existent. However, the recent Indian Antarctic Act 2022 has provisions that will enable tourist and Antarctic fishing activity permits from India for such activities, if they come forward.”

18.13 Asked to furnish the details of the steps taken to augment research facilities in Antarctica, the Ministry of External Affairs, in their written submission, stated as under:

“Necessary approvals are underway for three key initiatives: (i) Replacement of Maitri Station in Antarctica, (ii) Construction of a Polar Research Vessel and (iii) Increase in scientific and technical manpower. However, a dedicated fund allocation will be needed to accomplish them.”

18.14 When asked about the major benefits obtained so far from the research studies carried out in Indian stations in polar areas along with the challenges encountered, the MEA furnished following reply in their post evidence submission:

“Indian scientific expeditions to Antarctica, the Arctic and the Southern Ocean have enabled India to maintain a strong scientific standing in these remote regions of the planet and act as a currency of global influence. India’s sustained presence and research efforts in Antarctica have secured its position as a Consultative Party under the Antarctic Treaty System and an Observer in the Arctic Council, thereby enhancing its global diplomatic standing and influence in polar governance. Operating research stations in extreme polar environments enabled the development of specialized infrastructure, technology and human expertise in cold-region engineering and logistics, which has spinoff benefits for other sectors. India’s research in the polar regions has yielded significant benefits, primarily in enhancing the understanding of climate change and its impact on the Indian monsoon system and Himalayan glaciers, as well as providing geopolitical and strategic advantages. Indian studies have helped to establish a crucial link between climatic conditions in the Arctic/Antarctic and the Indian monsoon, which is vital for India’s agriculture and economy. India’s permanent research stations (Maitri, Bharati and Himadri) continuously monitor essential climate parameters, ozone concentration, aerosols, and greenhouse gases. This provides valuable data to global climate models, helping to understand the effects of global warming and rising sea levels. Indian scientists

have conducted extensive research on life in extremes of Antarctica and Arctic, discovering new species of cold-adaptive microbes with potential biotechnological applications. Systematic geological mapping of large areas in East Antarctica has also been completed, contributing to the understanding of the ancient history of the Indian subcontinent's continental break-up. The polar studies help scientists better understand glacial melt in the Himalayas (often called the "Third Pole"), which is the source of many perennial Indian rivers and are sites of increased hazards related to the defrosting due to the global warming. Long term atmospheric, cryospheric, and environmental observations have improved understanding of Antarctic and Arctic climate processes, thus offering insights relevant to the Indian monsoon. All such studies have led to about 35 PhDs at NCPOR on polar and ocean sciences.

Enhancing the operational capabilities of India's Antarctic research stations requires continuous maintenance and upgradation of infrastructure, strengthened logistical support for increasingly demanding programmes, and the sustained conduct of scientific observations in one of the world's most remote and extreme environments. However, these efforts are constrained by several challenges, notably fixed budgets, cost overruns due to uncertainties of operations, and the inherently high costs associated with polar operations. Increasing the operational capabilities of the Himadri research station in Arctic also faces several financial and logistics challenges. High logistics and transportation costs for personnel, cargo, and emergency support significantly increase operational expenses. Dependence on international infrastructure, vessels, and services adds to recurring costs. Polar-grade scientific instruments, power systems, and safety equipment are expensive to procure and maintain, while extreme weather accelerates wear and replacement needs. Additional costs related to energy supply, communications, personnel training, medical emergencies further constrain the expansion of year-round operations and technological enhancement at polar stations. Most importantly, limited core scientific/technical manpower at NCPOR is creating huge hurdles to increase the operational and scientific activities in Arctic and Antarctica."

18.15 Another non official witness informed that increased investment in polar science and research will also open up the possibilities of generating revenue. In this regard, he submitted the following before the Committee:

"One is the Monsoon Mission of the Ministry of Earth Sciences. Second is the Deep Ocean Mission. In the Deep Ocean Mission, there are two segments where we can prove immediate gains. One is the Convention of the Marine Living Resources, which gives us a power to go and search for the krills. Now, I think the Ministry is planning that this year onwards they will start expeditions for krill, taking away krill from the Indian Southern Ocean. Once that thing starts, possibly we will get quick returns because krill has a lot of demand. There is a lot of demand for krill as a protein. India does not have that market as such. This is one aspect.

The Second is our involvement with the International Seabed Authority. If all of you know, India has already got some area for prospecting lease in the deep Indian Ocean, like China has some area. We have also asked for some lease and we have been proving that there are resources in the deep Indian Ocean

where we can get certain minerals, polymetallic minerals, cobalt minerals, and we are already exploring in those areas. I think within a couple of years, we will be able to prove to our own country that these resources are there, but the mining and the metallurgy is a different process. We can definitely prove that since you have given us this amount, we have given you these resources.”

18.16 The Committee have been informed that growth and diversification of Antarctic resources and other commercial activities such as fishery and tourism bioprospecting weigh heavily on the minds of stakeholders. However, India has enacted Antarctic Act 2022 and formulated Indian Antarctic Environmental Protection Rules, 2023 to protect the pristine environment of Antarctic while contributing to enrichment of scientific knowledge and sustainable development of the regions for the benefit of society. When the Committee asked about the stand taken by India in respect of commercial utilization of resources of Antarctica, the Ministry of Earth Sciences, in their written submission, stated as under:

“Through Indian Antarctic Act 2022 and Indian Antarctic Environmental Protection Rules, 2023, India is committed to protect the Antarctica and enhance understanding about its response to the climate change at regional as well as global level. This is consistent with India’s commitment to the Antarctic Treaty System and associated environmental protocols. In fact the Act has provisions to give permits for commercial activities like tourism, being a peaceful activity. Further, under the Antarctic Treaty System, mineral resource (non-living resources) activities are prohibited indefinitely, except for scientific research, due to the Madrid Protocol (Environmental Protocol) of 1991. Although the current ban of mineral activities is for 50 years (until 2048), any changes to this clause also require unanimous consent to modify, making future mining also unlikely in the foreseeable future. Compared to this, fishery (living resources) exploration and exploitation is governed by the CCAMLR Convention (Convention on the Conservation of Antarctic Marine Living Resources) under the Antarctic Treaty System. The prime objectives of CCAMLR are the conservation of living resources of Antarctica while permitting sustainable levels of exploitation of resources, focusing on an ecosystem-based approach to protect predators and the environment. India is a Member of CCAMLR and therefore, has the rights for sustainable exploitation of marine living resources in the Antarctic Treaty region (south of 60°S Latitude). Given the recent interest of some Indian companies in the Southern Ocean fisheries, framing of detailed regulations for the same under the Indian Antarctic Act 2022 and in accordance with the CCAMLR norms is underway.”

18.17 The Ministry of External Affairs also made following submission on this issue:

“Through Indian Antarctic Act 2022 and Indian Antarctic Environmental Protection Rules, 2023 a harmonious policy and regulatory framework for India’s Antarctic activities through well-established legal mechanisms has been

laid out. These facilitate India's interest and pro-active involvement in the management of growing Antarctic tourism and sustainable development of fisheries resources in Antarctic waters. This is consistent with India's commitment to the Antarctic Treaty System and associated environmental protocols. The Act has provisions to give permits for commercial activities like tourism, being a peaceful activity. Further, under the Antarctic Treaty System, mineral resource (non-living resources) activities are prohibited indefinitely, except for scientific research, due to the Madrid Protocol (Environmental Protocol) of 1991. Although the current ban of mineral activities is for 50 years (until 2048), any changes to this clause also require unanimous consent to modify, making future mining also unlikely in the foreseeable future. Compared to this, fishery (living resources) exploration and exploitation is governed by the CCAMLR Convention (Convention on the Conservation of Antarctic Marine Living Resources) under the Antarctic Treaty System. The prime objectives of CCAMLR are the conservation of living resources of Antarctica while permitting sustainable levels of exploitation of resources, focusing on an ecosystem-based approach to protect predators and the environment. India is a Member of CCAMLR and, therefore, has the rights for sustainable exploitation of marine living resources in the Antarctic Treaty region (south of 60°S Latitude). Therefore, the Indian Antarctic Act 2022 has no impact on India's role in CCAMLR and future exploitation of living resources in the Antarctic Treaty region."

(b) Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR Convention)

18.18 India has been a member of the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) since 1985 and has consistently contributed to its conservation mandate. India has participated actively in deliberations to strengthen conservation measures and has hosted CCAMLR Working Group meetings in Kochi in 1998 and 2023.

18.19 CCAMLR is the apex body for regulating fishing activity in the Southern Ocean in an environmentally sustainable manner. CCAMLR decisions and catch quotas are based on and backed by the findings of its Scientific Committee. CCAMLR is widely recognised for its science-based management approach, balancing conservation with sustainable use. Particular emphasis is placed on protecting keystone species such as Antarctic krill through precautionary harvest limits and strict monitoring.

18.20 Regarding the conservation measures taken under the ambit of CCAMLR, the Ministry of External Affairs has informed that a key Conservation Measure (51-07) requiring krill catches to be spatially dispersed was not renewed at a CCAMLR annual meeting, as the Commission failed to reach consensus on this matter. The total catch

limit of 620,000 tonnes still applies, but without spatial allocation controls across the subareas of Region 48.1–48.4 (*Atlantic Sector of the Southern Ocean*).

(c) Antarctic Krill Fishing

18.21 Current krill harvest levels remain below 1% of estimated biomass. Fisheries in Antarctic waters are managed under an ecosystem-based, precautionary framework designed to ensure long-term sustainability. Furthermore, apart from fishing, the variability in krill biomass and availability is governed by multiple factors such as sea-ice dynamics, oceanographic processes and broader climatic factors. Variability in krill availability observed in some regions is under scientific study and may be influenced by these factors.

18.22 The Committee have been informed that India is preparing a facilitative administrative and policy framework to promote the participation of Indian entities in Southern Ocean fisheries in accordance with CCAMLR guidelines and measures. Given the above, urging India to suspend its ongoing initiatives solely in the interest of environmental sustainability risks is an over-simplification of a complex balance between ecological responsibility and socioeconomic progress of the country.

18.23 Sea Shepherd Global, an International non-profit marine wildlife conservation organisation, has submitted as under:

“Krill are a lynchpin species because they occupy a central role in the Antarctic food web, sustaining nearly all higher life in the Southern Ocean as they convert energy from phytoplankton into the vital food sources for polar megafauna. They are the key prey species for baleen whales and are responsible for 99% of the caloric intake of some species of penguins.

Thus, a decline of krill reverberates across the entire marine ecosystem, threatening its stability with cascading effects, especially in a fragile region like Antarctica.

The supertrawlers primarily target this foundational species to produce Omega-3 health food supplements, despite the availability of alternatives.

Ancillary markets include the introduction of krill meal as a fish-feed additive in salmon aquaculture to give the flesh a pink hue, and its incorporation into pet food. In other words, supertrawlers dragging nets large enough to swallow a jumbo jet are taking the food of whales, seals and penguins from remote and vulnerable ecosystems, so it can be fed to dogs and cats at home.

Alarmingly, the density of krill around the Antarctic Peninsula—where much of the fishing effort is concentrated—may have declined by as much as 80% since the 1970s. Researchers believe that this precipitous drop in krill abundance is

also affecting populations of Adélie and chinstrap penguins, whose numbers have fallen by 42% and 68%, respectively, over the past forty years.

A 2023 peer-reviewed study found that krill availability is also limiting and affecting the reproductive rates of humpback whales, specifically naming “continued ocean warming and increased fishing” as responsible for a reduction in krill populations, likely impacting the whales. Pregnancy rates for humpback whales in the Western Antarctic Peninsula dropped from 86% in 2017 to 29% in 2020 following reduced krill availability.

Last year, a critical conservation measure requiring the krill catch limit to be dispersed over a wider geographical area, and aimed at reducing the risk of local depletion, was not renewed at the annual meeting of the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR), the regulatory authority that manages the fishery. The lapse of this longstanding conservation framework without a replacement plan has heightened concern for krill populations, particularly around the Antarctic Peninsula.

Similarly, a proposal supported by the Republic of India to create a marine protected area around the Antarctic Peninsula was blocked by the People’s Republic of China PRC and the Russian Federation, as any conservation measure proposed at CCAMLR requires consensus from all members for adoption.

As crucial conservation measures are either overturned or blocked, and as krill—and the wildlife that depend on it—continue to decline, the krill fishing industry is expanding. The PRC recently licensed a newly-constructed 15,255-ton, 138-meter krill supertrawler that is set to become the largest fishing vessel operating in Antarctic waters.”

18.24 When asked, whether any licensing decisions are under consideration and how such decisions would align with India's conservation commitments and diplomatic engagement within the Commission, including positions previously taken by India on this issue, the Ministry of External Affairs, in their written submission, stated as under:

- “India has remained a non-fishing member of CCAMLR despite being eligible to participate in regulated fisheries. Recently, several entrepreneurs based in Mumbai have approached MoES expressing interest in harvesting toothfish and krill in Antarctic waters. In this context, India is carefully examining the possibility of licensing a few vessels under strict regulatory and scientific oversight. Any such vessels would function partly as research platforms to strengthen scientific understanding of Antarctic marine ecosystems. Decisions regarding pilot-scale licensing would be guided solely by scientific considerations and remain subject to periodic review, with ecosystem conservation as the foremost priority.
- To enable Indian industry's participation in Antarctic fishing, the Ministry of Earth Sciences is preparing the legal provisions for licensing and monitoring of vessels. Efforts are underway to publish the Indian

Antarctic Marine Living Resources (Fishing Authorization) Rules, 2026, under the Indian Antarctic Act, 2022.”

18.25 Further, asked to elaborate the coordination mechanism between the Ministry of Earth Sciences and the Ministry of External Affairs, particularly in view of the diplomatic efforts associated with advancing Marine Protected Area proposals, the Ministry of External affairs, furnished following written reply:

“The formulation of the aforementioned fishing authorization regulations is being overseen by the Committee on Antarctic Governance and Environmental Protocol (CAG-EP), which is chaired by the Secretary, MoES. The Ministry of External Affairs (MEA) is one of the members of CAG-EP.”

(d) Replacement of Maitri Station

18.26 There are an estimated number of around 70 research stations from a very large number of countries who are operating in Antarctica. China has set up five research stations in Antarctica, the latest being added in 2024. The Committee were given to understand that the Maitri Station, built in 1989, has outlived its life and also not consistent with the stringent environmental rules under the Antarctic Treaty as well as the Indian Antarctic Act 2022. Therefore, the Committee desired to know the specific challenges in maintaining a research station in Antarctica, and how does the new station aim to overcome these. Responding to this, the Ministry of Earth Sciences, in their written submission, stated as under:

“Maitri station was initially designed for 10 years of operational lifespan, and has already outlived its lifespan and completed 35 years. Despite ongoing maintenance efforts, the station’s safety risks, marked by scattered makeshift structures and failing systems, fall short of Antarctic extreme weather and environmental standards. The station’s structural integrity, waste management, and sewage treatment systems have been flagged in numerous reports, with calls for urgent remediation.

Proposed new station (Project Maitri II) will address the structural degradation, environmental compliance, energy inefficiency and limited scientific capacity of the current facility. The new station will incorporate modern living and laboratory spaces, energy efficient, advanced communication systems and enhanced logistic support infrastructure, ensuring year-round functionality and better working and living conditions for the scientific community.

Building up a new robust, state-of-the-art station compliant with environmental norms and international protocols shall not only strengthen our long-term scientific presence by supporting advanced research activities but also

strategically place India amongst the selected group of countries seasoned in Polar affairs.”

18.27 Further asked about the status of new research station, the MEA, submitted following in their post evidence written replies:

“India is planning to replace the existing Maitri Research Station with a newly designed Maitri-II Station in Antarctica. The DoE has accorded in-principle approval for Project Maitri-II at an estimated cost of ₹2,150 Crore. Due to the extremely narrow window of access during Antarctic summers, and the need for getting the comprehensive environmental evaluation necessitated by the Committee of Environmental Protocol under the Antarctic Treaty, the project will be implemented over a six-year period (2026–27 to 2031–32). The architectural and design Consultant for Project Maitri-II has already been identified through a Global Design Competition.

The new station will significantly enhance India’s ability to conduct multidisciplinary scientific research in Antarctica. The new Maitri-II Station is conceived as a state-of-the-art, year-round research hub that will significantly elevate India’s scientific capability in biology, earth sciences, glaciology, atmospheric sciences, climate studies and long-term environmental monitoring. The upgraded station will feature modern laboratories, advanced ice-core storage and processing systems, a dedicated biological and microbial research suite and expanded atmospheric observation facilities. A stronger and more dependable logistic backbone will ensure uninterrupted scientific operations throughout the year. These enhancements will greatly expand the scope, precision, continuity and international relevance of India’s Antarctic research, enabling the country to contribute high-quality data and cutting-edge findings to global polar science for decades to come.”

18.28 When asked why the Maitri Station continued to remain operational despite outliving its utility for many years, the Ministry of Earth Sciences, in their written submission, stated as under:

“It is true that Maitri station has outlived its life, but still it is maintained to provide the required infrastructure to continue the basic research. Considering that construction of a new Antarctic station is a long and protracted process, the Maitri station is being used until it is replaced by new station.”

18.29 Asked about the steps being taken to replace Maitri Station and the estimated timeline by which Maitri Station is proposed to be decommissioned, the Ministry of Earth Sciences, in their written submission, informed the Committee as under:

“As the nodal agency for this project, NCPOR has completed the following preliminary steps towards project:

Potential site for Project Maitri II has been finalised and high-resolution topographic maps of the have been generated by the Survey of India.

The specifications of the proposed Maitri-II station.

A Global Design Competition to select the best functional design of Maitri II station was conducted.

Based on the above exercise, a proposal from NCPOR through the Ministry of Earth Sciences for a plan programme towards the Project Maitri II is submitted to the Department of Expenditure for an in-principle approval.

No decision has been made yet on the decommissioning of the existing Maitri station. Since the construction process will require about 5 Antarctic seasons, we need to maintain it till the complete transfer to the new station. Considering the extreme challenges involved in dismantling Antarctic stations, following stringent Antarctic environmental norms, it is desired that the main part of the Maitri station is used as specialised observatories. A decision on the same will be undertaken in due course of time by a duly constituted committee.”

18.30 A query was raised on feasibility of having floating Research station in Arctic and Antarctica. Replying to the query, the MEA, in their post evidence written submission, stated as under:

“India currently does not plan to have a floating research station in the polar regions. A floating station is cost-intensive and requires a dedicated set-up for the transport of personnel when the polar sea is frozen and requires teams to be rotated year-round, requiring dedicated air logistics. Currently, there are only experimental facilities available internationally.

The idea of floating research stations is experimental in nature and is designed to drift across the Arctic ice, enabling continuous monitoring of a rapidly changing environment. A new floating Arctic research station, designed by Tara Ocean Foundation based in France, called Tara Polar Station is expected to be ready by 2026, which is designed to drift with the Arctic sea-ice for long-term climate studies, focusing on sea ice, clouds, and food webs, which will use renewable energy, and features labs and a "moonpool" for sampling, offering a mobile, year-round polar observatory. However, such floating research stations are not feasible to maintain without an exceptional financial and logistics support system.”

(e) Acquisition of Polar Research Vehicle (PRV)

18.31 Lack of a dedicated and ice class vessel is identified as a critical bottleneck for implementing dedicated scientific and operational activities during Indian Antarctic Expedition. In the absence of dedicated polar vessels, the Antarctic programme remains

dependent on annual chartering of foreign vessels for logistics and expedition support. This reliance not only places recurring pressure but also introduces uncertainties in availability of specialised vessels and scheduling, thereby affecting expedition planning and execution. The lack of a dedicated polar research vessel is also identified as a critical hindrance for the expansion of Arctic exploration beyond Svalbard and restricting access to the wider Arctic Ocean, which is the most important and strategic region in Arctic. One major setback for Indian polar exploration was the disruptions from the COVID-19 pandemic which affected fieldwork and research continuity in both Antarctica and Arctic. Since Antarctic stations can't be shut down as there are people from the previous expedition who needs to be evacuated and the critical lifesaving systems of stations also needed to be continued. This huge set back was managed by sending a dedicated expedition vessel following quarantine protocols all the way from Goa to Antarctica. In Arctic, it was impossible to send any expeditions for two years due to stringent protocols of Norway for the Svalbard archipelago. This has created a vacuum in observational data as most systems could not be maintained on time. It took exceptional efforts and planning to repair and make the systems function after the situations became normal. Medical emergencies in Antarctica has given many challenges to Indian Antarctica Program, which was managed with lots of planning and collaborations with other stations and in some cases by medical evacuations, which added a layer of operational complexity. It is proposed that Indian Air Force may establish expertise to undertake emergency landing and take-off in Antarctica for such emergencies.

18.32 Asked about the objectives of the PRV, the Ministry of Earth Sciences, in their written submission, informed as under:

“The major objectives of the Polar Research Vessel (PRV) are as follows:

A Polar Research Vessel will be an ideal platform for the Indian Polar and ocean fraternity for undertaking scientific research and logistic operations in the Polar regions, protection of India's strategic interests in the global framework of nations operating in Antarctica, the Arctic and the tropical seas. The vessel would be the platform for the researchers to carry out Polar research and help the Ministry develop better programmes and implement Polar Research, Southern Ocean Expeditions, and research activities in other unexplored Ocean Areas. The vessel shall also provide logistical support to Indian Antarctic Research stations.”

18.33 When asked to state the challenges in manufacturing or acquiring PRV by India, the Ministry of Earth Sciences informed as follows:

“Challenges involved in manufacturing a Polar Research Vessel (PRV) are:

- Lack of expertise and experience in building an ice-class vessel in the country requires reputed shipyards to collaborate with established global shipyards.
- Extremely limited availability of experienced shipyards in India with potential capability of building such a complex vessel.
- Tie-ups between Indian shipyards with foreign shipyards capable of building polar vessels need to be enhanced.
- Specialised steel requirements that needs to be imported (high-strength and low-alloy (HSLA) steel e.g. NV E36/EH36/DH36).
- Availability of advanced propulsion systems and machinery for polar operations.
- Lack of experience in design and winterization of shipboard systems for polar (sub-zero temperature) operations.
- Lack of “maritime cluster” within the country where specialized components (sensors, reinforced propellers, and polar-grade electronics) are manufactured/available in close proximity, which might lead to significant supply chain delays.”

18.34 Further asked about the time frame within which the PRV is proposed to be acquired, the Ministry of Earth Sciences, informed in their written submission that the proposed timeline for the project is 5 years (2025-26 to 2029-30) at an estimated cost of (including the escalations) Rs. 2685.16 Cr. As regards cost escalation, the Secretary MoES stated following during the course of evidence held on 23 July, 2025:

“Of course, we are going one step ahead and two steps back in Polar Research Vessel. Why is it so? When we estimated earlier, it was about Rs. 400 crore. We went for tendering process and other things. Finally, it has come to a very big amount. Then again, we re-tendered and again there was an approval process. It has gone back and forth. Then finally it was told that it has to be made in India, and unfortunately the ship hull cannot be made in India because it is having unique things. Then we discussed with the Shipping Ministry. In the last week only, in-principle approval has been given by the Finance Ministry because it has escalated to more than Rs. 2,300 crore... Already design is there. Now we only have to go for identifying the shipyard within India. Only hull portion will be helped by other country.”

18.35 Keeping in view the delay in acquiring PRV, the Committee asked the reasons for not going for a hired ship or buying a second hand PRV. Responding to this, the Secretary, MoES further stated the following:

“Sir, we have to build our own. When we have a station, I think it is imperative that we have to build, but simultaneously we will hire it... Research ship is made in India in many of the shipyards. Only the hull is not made in India because it

has to break the ice. For that, workmanship is required rather than the machinery.”

18.36 Explaining the need for owning icebreaker research ship, a non official witness submitted before the Committee as under:

“We cannot do multiple domain science because we are basically cargo ships, as my colleague has told. If we take old junk ships, there are very few countries those who can build the ice-class vessels.”

18.37 However, during the deliberations on the matter, he further explained the constraints as under:

“there is a difference between icebreaker and ice-class ships. The ice-class ships are okay, and you can go up to one-meter thick ice or one year of ice. There is also a question of multi-year ice and one-year ice. One-year ice is okay, for example, summer ice of the Arctic, and ordinary ships can go in for four months and maybe the strengthened ships can go in for a couple of more months but during the winter they cannot go. You have to have an icebreaker. Making an icebreaker is very difficult because of the technology for the hull. Hull is the main thing that is required in the icebreaker ships... That technology is not available in India, that is preventing us from going for the manufacture of icebreakers.”

(f) National Centre for Polar and Ocean Research (NCPOR)

18.38 The Government of India created the Department of Ocean Development (DOD) in 1981, immediately after the successful completion of the first Indian Antarctic Expedition, to focus on ocean development activities. To provide a dedicated institutional support to the Antarctic expeditions, the DOD created the Antarctic Study Centre in 1998 as an attached office in Goa. The same was elevated and dedicated to the nation in the year 2000 as an autonomous institution, named the National Centre for Antarctic and Ocean Research (NCAOR). In 2006, the DOD was elevated to a Ministry, known as the Ministry of Ocean Development. Later that same year, the Ministry underwent reorganisation and the Ministry of Earth Sciences (MoES) was created, incorporating various institutions of Earth System Sciences under its jurisdiction for effective integration of both service-oriented and basic research institutions. Further, with the strong expansion of scientific activities to the Arctic, Southern Ocean and Himalayas, the NCAOR was renamed as National Centre for Polar and Ocean Research (NCPOR). The NCPOR is responsible for planning, coordinating and executing India's Polar programs in Antarctica, Arctic and the Southern Ocean. Towards this mammoth initiative, NCPOR operates two year-round stations in Antarctica (Maitri and Bharati), a station in Svalbard, Arctic (Himadri), and a high-altitude station in the Himalayas (Himansh). While scientific research is the guiding light of NCPOR, conducting science in polar regions and managing polar expeditions involve complex logistics, operations and liaisoning with multiple institutions, making the NCPOR a truly “Indian Gateway to the Polar Regions”.

18.39 The NCPOR activities encompass polar expeditions and frontline research activities in the remote and challenging regions of the Antarctic, Arctic, Himalayas, and Southern Ocean through dedicated logistic operations and undertake state-of-the-art surveying, mapping, and exploring non-living resources in the deep seas within the vast expanse of the Indian Ocean.

(g) Human Resource strength in NCPOR

	Sanctioned/ Filled	Scientists	Scientific/ Technical support	Administrative		
				Group A	Group B&C	Group D
1.	Sanctioned	56	08	03	22	09
2.	Filled	54	08	03	22	09

18.40 On being enquired about the details of manpower available at various levels in NCPOR and whether the current strength is adequate for undertaking research in polar science, the Ministry of Earth Sciences, in their post evidence written submission informed the Committee as under:

“NCPOR being the dedicated institution for the entire polar activities of the country, the manpower allotted to NCPOR is woefully inadequate due to the following reasons: The NCPOR (National Centre for Polar and Ocean Research) was originally established in 2000 as NCAOR (National Centre for Antarctic Ocean Research) to manage the Antarctic program. At that time, NCAOR was handling only one research station (Maitri) in Antarctica and had no activities in Arctic, Southern Ocean or Himalaya. Through the last 25 years, the activities have grown several folds as another Antarctic research station (Bharati) was added in 2012, situated about 2500 km away from Maitri, adding several layers of complicated logistics. Again, initiated expeditions to Arctic and established many facilities in Svalbard since 2007, initiated Southern Ocean program since 2004, Himalayan glaciological studies in 2013 and a new station (Himansh) in high Himalayas in 2016 and many new responsibilities of deep-sea exploration entrusted to NCPOR. However, no any significant addition in manpower happened, except 13 posts sanctioned under the Deep Ocean Mission in 2022. Currently, on top of the ever expanding activities in Antarctica, Arctic, Southern Ocean and Himalaya, NCPOR is responsible for conducting detailed exploration activities for hydrothermal sulphide mineral exploration in the mid-Indian Ocean Ridges as per the contract signed between the International Seabed Authority

(ISA) and Government of India. This has led to significant constraints at NCPOR to undertake serious scientific contributions in polar exploration as most scientists are getting bogged down by the operational activities. A proposal for an additional 77 permanent posts, including 53 scientists has been submitted to MoES, which is under consideration with DoE. Sanction of these posts will be critical for undertaking adequate scientific research and logistic operations in polar regions.”

18.41 When a query was raised about the shortfall in the infrastructural and human resource with NCPOR for carrying out polar expeditions and scientific research, the Ministry of Earth Sciences, in their written submission, stated as under:

“The polar programmes are steadfastly supported by the Government since their inception, enabling NCPOR to expand its activities across the Antarctic, Arctic, Southern Ocean and Himalayas. However, considering the exceptional challenges faced by the polar regions in a warming climate requiring a significant increase in scientific and operational activities, with a substantial increase in scientific and technical manpower. Two of the most critical and high-priority areas that need focus are:

Replacement of Maitri Station in Antarctica – Maitri Station, built in 1989, has outlived its life and is beyond meaningful repair. The station facilities do not allow any modern laboratories and are also not consistent with the stringent environmental rules under the Antarctic Treaty as well as the Indian Antarctic Act 2022.

Construction of a Polar Research Vessel - The availability of an ice-class vessel is a critical requirement for any countries that have meaningful scientific activities in the Antarctic and Arctic. Currently, we manage the Antarctic supplies using ice-class vessels hired through global chartering process. However, there is a huge dearth of available vessels in the market, putting the Indian Antarctic Program at a huge disadvantage. Further, such supply vessels don't have facilities for oceanographic surveys and sampling. Most importantly, to be an important player in Arctic, we must have a polar research vessel with ice-breaking capacity to navigate and undertake Pan-Arctic studies.

Substantial increase in scientific and technical manpower is required to undertake scientific and operational activities in multiple domains of polar regions. Currently, NCPOR has subcritical core manpower.”

18.42 Regarding the shortage of manpower at NCPOR, an expert submitted before the Committee as under:

“More than the budget, what the NCPOR really needs is adequate manpower. We are working with a very critical manpower. I will give you examples. If I am wrong, Dr. Thamban can correct me. For our Arctic operations, we just have three or four people. For our Himalayan operations, we have only two people for more than 12 glaciers in which we are operating and monitoring. You cannot have the

entire Himalayas covered with two people where we have 9,000 glaciers. The manpower is critical or rather subcritical. It is related with the sanction strength of the Institute, which is restricted to 55 or so.”

18.43 On being questioned further about the adequacy of the financial allocation for various Projects undertaken under the aegis of NCPOR, the Ministry of External Affairs, in their written submission, further submitted:

“it is necessary to substantially increase funding support to exploration activities in polar regions. Most importantly, immediate investments are desired for acquiring of a polar ice-class vessel and a new station in Antarctica to replace the outlived Maitri station.”

XIX Polar studies in educational institutions

19.0 Another query was raised about the measures taken to promote participation by Indian academic Institutions in research activities of Arctic and Antarctic areas. In this regard, the Ministry of Earth Sciences apprised the Committee following:

“Under the Indian Antarctic and Arctic Programme, more than 120 organizations and universities have been facilitated to undertake scientific projects in polar regions. This has significantly enhanced the national level capacity in polar exploration. NCPOR annually invites scientific research proposals under identified thematic areas for studies in both Antarctica and the Arctic. These calls are open to researchers affiliated with recognised academic and research institutions across the country and are widely publicised through national newspapers, website, and official social media platforms to ensure broad outreach and transparency. This extensive outreach has led to increased quality and quantity of scientific proposals for implementation in Antarctica and Arctic. Most importantly, two universities—Cochin University of Science and Technology (CUSAT) and Mahatma Gandhi University (MGU)—have established centres of excellence in polar studies in consultation with NCPOR. Further, the University Grants Commission (UGC) offers specialized Massive Open Online Courses (MOOC) on polar studies through the SWAYAM platform, supported by MoES. There are three primary MOOC courses frequently offered in the January and July semesters. Such inclusive capacity building within the country has expanded the participation of Indian academic Institutions in research activities of Arctic and Antarctic areas.”

19.1 The Committee have been apprised that inclusion of Polar science in the educational curricula will further strengthen our capacity to undertake research and studies in this area. A non official witness submitted following in this regard:

“Optimising, operationalising six pillars of Arctic policy, I would say the most important pillar as of now would be, there is a pillar called capacity building. We need to build Indian capacities on the Arctic for which we need to start from the grassroots. So, we must have Arctic and Antarctica included in our secondary, primary and senior secondary syllabus. UGC has started a programme which is called SWAYAM. So, if you undertake SWAYAM, it is an online portal. For any

under-graduate student and post-graduate students, you can take forty lectures and get four credits in your under-graduate or post-graduate programme. But this needs to be started at a lower level as well and we also need to provide employment opportunities to the students who are taking Arctic and Antarctic studies. So, there also, I would request the Committee to actually recommend that in capacity building, we must have a greater thing.

We must set up some Arctic Chair, we must have Department of Arctic studies in some universities.”

19.2 The Committee have been informed that at national level, conferences on Polar sciences (NCPS) have been organized consecutively in 2021, 2023 and 2025 to give platform to young and early career scientists to showcase their findings and research results. Seminars and conferences on science and geopolitics of Arctic-Antarctic (SaGAA) by private think tanks, involving international speakers, have also been held since 2011 biennially.

19.3 Asked to give a brief on input by think tanks to enable the Government in understanding and strengthening India’s role and presence in the region, the Ministry of External Affairs, in their written submission, stated as under:

“Some think tanks engaged, include Science and Geopolitics of Arctic and Antarctic, Vivekanand International Foundation, Manohar Parrikar Institute of Defence Studies and Analyses and Observer Research Foundation. These think tanks conduct regular conferences, events, etc. on the Arctic related issues, which include participation of diverse groups of stakeholders. Their deliberations and reports help all stakeholders, including governmental stakeholders to better understand issues under consideration. This will also help India to calibrate its presence internationally on these issues and engage with relevant international interlocutors.”

19.4 International and national collaborations provide a platform where collaborators can share their strengths and complement their challenges and limitations with the strengths of their counterparts. Indian Antarctic Program is a multi-institutional and multi-disciplinary program in which more than 130 institutions/ universities from India and abroad have contributed so far.

19.5 During the last decade, India has been striving to enhance its international collaborations in Antarctica (and also in other Polar and ocean realms) with Norway, Japan, Belgium, Sweden UK, USA and other countries that are actively involved in polar research, through which new insights in Antarctic research can be unlocked. Towards this goal, it has recently signed or renewed several Memorandum of Understanding with several international institutions. Recently, India has signed an MoU with the United Arab

Emirates (UAE) to mentor its fledgling polar research activities. Further, under the neighbourhood-first policy, India has helped researchers from Bangladesh and Mauritius to undertake Antarctic expeditions as part of the Indian Scientific Expeditions to Antarctica. All these reveal India's increasing clout among countries involved in polar scientific research.

Part II

OBSERVATIONS/RECOMMENDATIONS

1. Overview of India's role and presence in Arctic and Antarctic

The Committee note that Arctic region is considered to be above 66 degrees North Latitude, and the Antarctic region usually refers to areas 60 degrees South latitude. The two regions represent nearly 90% of the ice sheet of the planet and store 70% of fresh water source. While Arctic is a sea surrounded by landmass, Antarctica is a landmass surrounded by Sea. Arctic Coastal States have sovereign rights on their areas including Exclusive Economic Zone (EEZ) and the right over extended continental shelves under UN Convention on the Law of the Sea (UNCLOS), Antarctica has no sovereign control of any nation. The Committee note that Arctic and Antarctic regions have a very important role in global climate system. These areas have been the hotbed of scientific researches. Melting of land ice in Greenland in the Arctic has been predicted to cause rise in sea level by about seven metres while melting of land ice in Antarctica can cause the sea level to rise by approximately 60 metres, which will put our coastal areas under grave danger. The Committee have been informed by the experts that most modelling studies predict that the Arctic will be ice-free at least during the summer months, before 2050 if current emission trends continue, and some studies suggest it may happen even faster. Poles are warming enormously higher than the rest of the world, three to four times higher than global average. The Committee further note that while the warming trend has aggravated the temperature and rainfall fluctuations globally, it has also opened up the hitherto untouched polar areas for further exploration. The changed scenario in the polar regions has given rise to the possibility of navigating the poles, exploring its resources

and utilizing these areas for strategic advantages. The Committee also note that India has been a leading country for scientific researches in these regions and has supported protection of its pristine environment. However, with the promise of new avenues and a desire to control, all the major powers of the world are increasingly drawn towards the polar regions. The Committee note from the information provided by the Ministry of Earth Sciences and the Ministry of External Affairs that India's Arctic Policy 2022 and Antarctic Act 2022 govern India's Policy and Governance framework in Polar Regions. The Committee also note that India's tool of engagements have been science diplomacy, rule-based engagement, diversified partnerships, inclusive multilateralism, energy cooperation and research opportunities. Considering that many broader strategic and economic capabilities are still evolving, the Committee are of the view that India needs to evolve a long-term policy which will take into consideration various emerging challenges and enable India to play a prominent role in the Polar regions.

2. Need for focussed scientific research to mitigate the impact of polar ice melt on India

The Committee observe that India has been an early participant in scientific pursuit in polar regions due to its keen interest in understanding the relation between Himalayan, polar climate and monsoon. Though India is a tropical country, its climate, especially monsoon system, is greatly influenced by the dynamics of polar climate. They note that changes in Arctic Sea ice have been found to be associated with extreme rainfall in India. The Committee note from the submission of experts that thawing of arctic permafrost releases significant amounts of carbon dioxide and methane stored in the frozen soil,

leading to hazards such as accidents on unstable roads and building collapses and a large number of Himalayan hazards are actually related to thawing of land, which is becoming very unstable. The changing climate is also contributing to storm surges, with an increase in extreme weather events, such as cyclones in the Arabian Sea, which we used to see before in the Bay of Bengal. Most of the Coastal regions in India are in vulnerable situation because even a few centimetres of sea level increase can lead to a substantial land loss. Thus, small changes in the sea level can have cascading effects. Melting of ice in the Arctic and the Antarctic regions has been predicted to cause rise in the sea level which will put our coastal areas under grave danger. The Committee are glad to note that India has played a key role in making Antarctica a common asset for the humanity and supporting it as an area of peace which ultimately got reflected in the Antarctic treaty. India became a party to the Svalbard treaty in 1920 giving equal rights of access for scientific research and commercial activity on the Svalbard archipelago in Arctic and became a Consultative Party to the Antarctic Treaty in 1983. They find that India played an important role in polar research and actively participated in all the international endeavours for dealing with related issues. While appreciating India's vision as science-driven and environmentally responsible actor in both the Arctic and Antarctic, the Committee are of the opinion that translating this vision into reality will require a lot of efforts to develop its indigenous capability for more intense scientific research and devising effective measures to minimise the impact of climate change. It may be mentioned here that India is one of the countries working in Antarctica, Arctic and Himalayas, with Research Stations having data of the three regions. This places India in a position to give a holistic picture of the entire cryosphere, such as effects of climate change, impact of glacial ice melt on Indian Monsoon and rise in the sea level, etc. Keeping in view the fact that small changes in the sea level can endanger our coastal regions, it is

necessary that we take active interest in scientific research to understand the impact of polar ice melt on India. This would require sustained scientific research, establishment of more monitoring stations with state-of-the-art infrastructure, promotion of comparative studies of Arctic, Antarctic and Himalaya to understand global teleconnections and development of advanced climate modelling, etc. The Committee recommend that Ministry may actively look into the issues and apprise them of the progress made.

They further note that the Indian research is still facing challenges such as restrictions on research activities due to most of the Arctic territory lying under the jurisdiction of sovereign States, limited access to the central Arctic Ocean for field observations, remoteness and logistic challenges in accessing the various Arctic Research Stations, while ensuring minimal adverse environmental impact, etc. As underlined by the Ministry of External Affairs, many of these issues necessitate long-term approaches and are under consideration of relevant Ministries and Government of India agencies. In this regard, the Committee would like to urge the Ministry of External Affairs to take up the matter with the relevant Ministries within the Government of India agencies, and Member countries of the Arctic Region for removal of various restrictions on research activities.

3. The Committee note that India's Arctic policy has laid a solid foundation to strengthen scientific capabilities, expand research network, initiate academic courses and build institutional capacity to study the Arctic. However, the Committee have been informed by the Ministry of Earth Sciences (MOES) that many new restrictions have been brought by the Norwegian Government for undertaking research in Svalbard region of Arctic, such as permission from the Government of Svalbard for any field activities, rules and restrictions

imposed by Norwegian Strategy for Research and Higher Education in Svalbard and Research strategy for Ny-Ålesund Research station. The MOES has further stated that such regulation is making it difficult for them to enhance R&D activities in Svalbard. Taking note of the Prime Minister's recent visit to Norway and the warm relationship between the two countries, the Committee, desire that the Ministry may take up the matter with the Government of Norway to address the issue of increased restrictions faced by the MOES in Svalbard to conduct various R&D activities.

4. Dedicated Polar Ambassador

The Committee note that as far as the polar areas are concerned, Polar Cell in the United Nations Economic and Social (UNES) Division of the Ministry, headed by Joint Secretary (UNES) has been given the responsibility for handling all matters related to India's engagement with the polar region. This division takes care of India's outreach and engagement as well as India's participation in global policy platforms. They further note that with regard to the polar regions, focused and sustained policy approach is adopted after due consultation with the Indian Embassies abroad and Government of India agencies/Ministries. However, as informed by the Ministry of External Affairs, many countries are exploring institutionalized or dedicated mechanisms to handle polar related issues, including appointing a Polar/ Arctic Affairs Ambassador or a dedicated representative/ Committee/ desk to deal with the matter. In view of the Committee, this shows the increasing importance being attached to polar regions by the other countries of the world. The Committee note that the lack of a Polar Ambassador, has also been highlighted by the experts dealing with polar matters who emphasized having exclusive ambassador to align our policy with all other countries taking interest in polar

areas. Taking note of the fact that all Arctic Council Member States and most Non-Arctic Observer States including Japan, China, Singapore and South Korea have Polar/ Arctic Ambassador along with a dedicated Polar/Arctic Affairs Desk or Department, it is imperative that India also has such an ambassador at a level equivalent to other countries exclusively to deal with polar regions. Creating such a position will not only help India project the importance given to these regions in its foreign policy architecture but will also help put across its policy stance in relation to polar areas/ pursue polar diplomacy in a more effective manner. The Committee, therefore, recommend the Government to consider appointing a polar ambassador for polar engagement and facilitating collaboration.

5. Third Pole: The Himalaya connection and India's significance as a leading polar research nation

The Committee note that the Himalayas has been often referred to as the 'Third pole'. It holds 12,000 km³ of ice and has largest concentration of glaciers. Like polar regions, the Himalayas also have a major influence on global climate apart from functioning as a carbon sink and playing a critical role in soil conservation, water purification, etc. The Committee find that various research institutes such as National Centre for Polar and Ocean Research (NCPOR), the Wadia Institute of Himalayan Geology, ISRO, etc. have been undertaking extensive research to understand the climatic impact of melting glaciers in the Himalayas as it is not only the freshwater source for billions of people but also is an important source for their livelihood and economy due to its direct connection with monsoon and rainfall variations which, of late, has been greatly affected by warming of the mountains. The importance of Himalayas can be seen from the fact that it has the largest concentration of snow and ice outside the Antarctic and Arctic Regions. It significantly impacts global climate

by influencing weather patterns, acting as a water tower of Asia, and contributing to regional and global temperature regulation. Keeping in view India's significant contributions to global scientific community in polar research and the important role played by India in understanding the impact of global warming, the Committee feel that India has a crucial role in any discourse on polar regions. The Committee, therefore, are of the view that the Government should pursue its polar diplomacy to project India as one of the leading nations involved in polar research and development and particularly highlight the contribution of Himalayan glaciers and rivers as a source of freshwater and its vast repertoire of medicinal wealth which has great value for humanity. In this regard, the Committee urge the Government to significantly enhance our operational and scientific engagement. The Committee further urge the Government to take a leadership role in some major international programme, such as the UN Decade of Action for Cryospheric sciences (2025-34), InSync Initiative (2027-30) and 5th International Polar year, etc.

6. Membership of the Arctic Council

The Committee note that even though India was an original signatory to the Svalbard Treaty, 1920 and undertook the first Arctic expedition in the year 2007, India joined Arctic council as 'Observer' in the year 2013. They further note that the status as 'Observer' is respected among non-Arctic States as it provides opportunities for closer ties with the Arctic Council States. However, there are several limitations on Observer countries as they cannot take part in decision making process or make financial contribution or undertake research in the Arctic directly. The Committee are happy to note that as an Observer State, India has been actively participating in several Working Groups (WG) of Arctic Council and various International Forums. The Committee note that

Arctic council is composed of eight Arctic Member States (Canada, Denmark, Finland, Iceland, Norway, Russia, Sweden and USA), Permanent Participants (Arctic indigenous groups) and 13 Observer States (France, Germany, Netherlands, Poland, Spain, UK, India, China, Japan, Singapore, South Korea, Italy and Switzerland). Keeping in view the diverse areas of work being taken up by India and adding to the knowledge about the region, the Committee are of the opinion that full-fledged membership of the council will allow India to be more actively engaged and be a representative of the Global South. They also note from the submissions of the Ministries of External Affairs and Earth Sciences that though full membership of the Arctic council is crucial to make a greater impact, the Arctic Council's rules of procedure do not have provisions to incorporate countries outside the Arctic Council as members. In this regard, keeping in view India's potential to play a more effective role in the region, the Committee feel that the need for India to have a voice in the governance and decision-making process in Arctic Council has never been more pressing as at present due to the direct linkage between the change in Arctic climate and climate condition in India. The Committee are, therefore, of the view that the Government should take up the matter of 'member' status whenever there is a review of the Council. Further, as stated by the MEA, India should continue to further deepen its ties with the Arctic nations and other Observers to play a leading role in the development of the Arctic region and seek their support to work as a Member of the Council in future.

7. Arctic Policy 2022

The Committee are glad to note that the Arctic Policy, 2022 has benefitted Indian scientists to explore north polar areas beyond Svalbard, like Canadian Arctic, Central Arctic, East Greenland Sea and North Eastern Greenland. The Committee note that India's Arctic policy, 2022 is based on six

pillars viz. Science and Research, Climate and Environmental Protection, Economic and Human Development, Transportation and Connectivity, Governance and International Cooperation and National Capacity Building. Further, India's policy approach has been focused on adoption of a scientific studies-led, sustainability-focused, and partnership-driven approach to contribute meaningfully to the development of the Arctic. However, evolving landscape of the Arctic due to rapidly changing climate has brought the geopolitics of this area into the centre stage. In the changing geopolitics of this area, major powers have shown a keen interest to secure their strategic, economic, and energy needs. Therefore, to maintain its supremacy as a dominant science based player with active presence in the region since long, the Committee recommend that the Arctic policy should be expanded to include 'Geopolitics and Strategy' as another guiding factor to establish India as an important power in the Arctic.

8. India-Russia relations in the context of Arctic region

The Committee note that Russia is a major Arctic State with more than half of the Arctic coastline within its boundary which is still unexplored. Discussions on joint investment in infrastructure projects in Arctic zone, construction of ice-class vessels in India and training the Indian crews in Polar waters are being discussed between India and Russia. They further note that during the 23rd India-Russia Annual Summit, both the countries have committed to intensify trade and investment cooperation in the Far East and the Arctic zone of the Russian Federation. A Memorandum of Understanding has been signed between the Ministry of Ports, Shipping and Waterways, India and the Ministry of Transport of the Russian Federation on the training of Specialists for Ships Operating in Polar Waters besides MoU between NCPOR and the Shirshov Institute of Oceanology, Russian Academy of Sciences (IORAS)

to promote international academic cooperation and enhance the effectiveness of the joint research investigations in areas of mutual interest across the polar regions and ocean realms. While the steps taken to form stronger partnership with Russia are a welcome move, taking this partnership at the next level may not be an easy task considering the present crisis in Ukraine and the attempt by some countries to isolate Russia. Noting the policy stance adopted by the Government to pursue an independent foreign policy approach with all the countries and its engagements without getting influenced by its relations with others, the Committee recommend that diplomatic channels should be used to impress the other countries on the need for taking Russia on board to work in the Arctic area which is experiencing drastic climate change, the repercussions of which, will be not limited to only Arctic but will be faced across the globe. The Committee also urge the Ministry to explore the possibility of accessing Russian Arctic Research Stations for better understanding of connection between polar warming, ice melt in the Arctic and its impact on the Himalayas.

9. India's engagement with Arctic nations

The Committee note that India has been engaging with Arctic countries to secure its interest in climate resilience, energy security, trade and sea-route governance, while remaining committed as a responsible global stakeholder. However, being an Observer State in the Arctic Council, a lot of challenges are still hindering its efforts in this regard. The Committee feel that collaboration and engagement with the Arctic States should be pursued more intensively to enable India to achieve its goal. However, they find that India's ties with the Arctic nations have not been as strong as other Asian nations such as China, Japan, South Korea and the UAE due to financial, logistical and policy issues viz. lower capacity to invest, lack of adequate number of scientific manpower,

absence of a dedicated polar research vehicle, absence of a polar ambassador or dedicated desks for polar engagement, etc. In this regard, while appreciating the Ministry's submission that India's engagement in the Arctic region has seen a consistent upward trajectory and more partnerships are being formed at political, economic, scientific and institutional level, the Committee are of the view that there is an urgent need to give a further push to India's polar strategy. As the Arctic is going to be the potential area which will see a major contention for power and hegemony, immediate steps are needed to strengthen bilateral and multilateral ties in this region, along with reinforcement of financial and infrastructural capacities of Indian institutions. The Committee are of the view that India needs to expand its scientific, logistical and operational capacities in order to have an important leadership role in the Polar Regions. The Committee, therefore, recommend the Government to take necessary steps in this regard and apprise them of the progress made.

10. Role as a leader of Global South

The Committee have been informed by the Ministry of External Affairs that India has always been committed towards addressing the needs and aspirations of fellow developing countries and has been constructively championing the cause of holistic human-centric development of countries of the Global South. The Committee are of the view that India's membership in key international polar scientific and operational bodies provide an excellent opportunity for India to represent the voice of the Global South in these bodies. The Committee further note that National Centre for Polar and Ocean Research (NCPOR) is currently helping the UAE to undertake scientific activities in Antarctica and has already supported countries such as Bangladesh and Mauritius to participate in the Indian Antarctic Expedition. Further, as the leading voice of the Global South, India's commitment for holistic and human-

centric development of all the countries in the Global South is truly commendable. The Committee hope that the Government will adopt a suitable strategy to further strengthen its role as a representative of the Global South advocating their collective interests in the Arctic and the Antarctic Regions.

11. Quadrilateral agreement with Japan, South Korea and Singapore

The Committee have been informed by an expert that China, Japan and South Korea have a trilateral agreement on the Arctic. Accordingly, the expert has suggested that India, Japan and South Korea may also have trilateral agreement on the Arctic. The Committee note that MOU had been signed between India and Japan in 2016 to promote cooperation in the field of marine and earth science and technology, which was renewed again in 2023, by adding three new areas of collaboration viz. modelling of climate variability, marine plastics and glacial hydrology. A Memorandum of Cooperation (MOC) between the National Centre for Polar and Ocean Research (NCPOR), India and National Institute of Polar research (NIPR) Japan was signed in 2019 to promote collaboration in polar research. No such memorandum has been signed between India and South Korea. However, India is engaging with the key stakeholders in South Korea which deals with the Arctic affairs. Taking note of the suggestion of the experts, the Committee are of the view that there should be greater collaboration among Arctic Council Observer nations in Asia viz. India, Japan, South Korea and Singapore to pursue their interests in the Arctic region. The Committee, therefore, recommend the Government to have a quadrilateral agreement among India, Japan, Singapore and South Korea so as to enhance our collective voice in the Arctic Council in which the four countries are Observers.

12. Arctic geopolitics

The Committee have been informed by an expert during the examination of the subject that there has been a renewed interest of the United States to increase its presence in the Arctic. Further, United States is the only Country having a national strategy on the Arctic. The Committee have also been informed by the expert that two third of the Russia's Strategic deterrence is based in the Kola peninsula. A military exercise was held in 2024 by NATO wherein 20,000 military personnel from 13 countries participated including 4,000 military personnel from Finland. The conflict in Ukraine has further complicated the situation in the Arctic region. The Committee further note that due to the conflict, the seven Arctic Council member States which are all members of NATO had paused formal cooperation with Russia in 2022, affecting fieldwork, data exchange and logistical cooperation in the Arctic. No data is now available on permafrost research from Russia, which covers more than 40% of the Arctic. The Committee are of the view that the Arctic is inextricably linked to global affairs and India has an important role to play in it. The Committee, therefore, recommend India to play a more constructive and active role in bridging the gap between the Arctic States and Russia for promotion of scientific research, global peace and harmony.

13. Exploitation of Arctic mineral resources

The Committee have been informed by an expert that the Arctic contains about 30 percent of the world's undiscovered natural gas and 13 percent of oil. It has some of the biggest known deposits of gold, coal, gypsum, nickel and diamonds. Greenland alone possesses about one fourth of the world's rare earth resources. Regarding the requirement of critical minerals in India, from the submissions made before the Committee, it is observed that critical minerals required for two sectors, viz. Active Pharmaceutical Ingredients (API) and Air conditioners (ACs) are stated to be available in the

Arctic. The Committee are of the view that the demand for ACs in India is going to be colossal with global warming. It has to be produced in mass and can no longer be treated as luxury items. Since both pharmaceuticals and the manufacturing of air conditioning appliances have a huge market in India and will only grow in the near future, it is important that India enters into partnerships/agreements for the assured supply of these critical minerals. They find that India has joined the Mineral Security Partnership in June 2023 as its 14th member which include Arctic countries such as the US, Canada, Norway, Finland and Sweden. Further, a new MOU has been signed with US in October, 2024 to expand and diversify critical minerals supply chains. While fully agreeing with the views of the Ministry that the exploitation of resources in this region has to be evaluated from environmental, commercial and technological perspectives before any study can be undertaken about its potential impact on the global supply chain, the Committee recommend that supply of mineral resources for API and Air conditioning appliances, including other critical mineral resources should be an important component of diplomatic dialogue/engagement with Arctic nations.

14. Northern Sea Route and Eastern Maritime Corridor

The Committee note that the melting of Polar ice in Arctic Region is opening up various opportunities. One area where India can participate is the development of the Northern Sea Route. The Arctic navigability has given rise to the prospects of a trade boost in the coming years. India and Russia have formed a Joint Working Group on the Northern Sea Route (NSR) to develop shipping through the Arctic route. Both countries have agreed to conduct a feasibility study to collaborate further on increasing cargo volume to 5 million tons through the NSR by 2030. The NSR can be a very cost effective route for India as compared to existing navigation route of the Suez Canal. The

Committee observe that the new route has the potential to offer many benefits such as reduction in cruising time to one third, avoiding problems of Somali sea pirates and is hence viable in spite of the navigational hazards of icy waters, halting the pressing need for strong ice-breakers, as by 2040, Arctic Sea will become free of multiple year fast ice which will be navigable by ice class vessels, etc. as informed by a non-official witness. They note that Chinese container vessels have recently made several trips successfully through the Arctic Ocean, though, in the summer months. However, they note that increasing human activity in the Arctic will require the creation of a corresponding emergency response infrastructure, which is easier said than done. In this regard, the Committee find that the initiative taken by the eight members of the Arctic Council to address some of these problems through binding agreements, has been halted due to the recent conflict in Ukraine. The Committee further note that India has already started using the Chennai-Vladivostok Eastern Maritime Corridor since November, 2024 and its trade has been benefitted by reduction in shipping time from 40 plus to 24 days, lowering costs, providing direct access to the Russian Far East resources like coal and oil, boosting India's energy security and enabling faster movement of goods like textiles, machinery and fertilizers. Noting that further development of shipment along the NSR is being actively considered between India and Russia, the Committee recommend the Government to pursue the same which will greatly benefit both the economies as well as strengthen further bilateral ties between them. In this regard, the Committee suggest the Ministry to expedite the feasibility study between the two countries to increase the cargo volume to 5 million tons through the NSR by 2030.

15. Outreach to indigenous people

The Committee note that India has been very actively contributing to Arctic science since long. India has also organised dedicated events for locals, holding interactions with students and researchers, promoting yoga and the Indian system of medicine, etc. They find that Singapore has been offering education, scholarships, and opportunities to the Arctic indigenous people who are permanent representatives in the Arctic Council to advance their interests in permanent participation. Though they observe from the submission by the Ministry of Earth Sciences that helping the indigenous population will not entitle permanent membership, the engagement with Arctic ethnic groups is important to advance friendly ties and have a meaningful role in Arctic governance. The Committee are of the considered view that the Ministry should explore taking such initiatives for the benefit of the Arctic indigenous groups which will enhance India's position in the holistic development of the region.

16. Need for an Indian narrative on Arctic

The Committee note that China is defining itself as a 'near Arctic State,' and is taking various steps, such as building the Polar Silk Route as part of their Belt and Road initiative and investing in Arctic Shipping Lane, building strategic partnership with Russia, etc. to increase its role and presence in the Arctic Region. The Committee are of the view that to increase India's role in the Arctic region, there is an urgent need to build a strong narrative on the Arctic. The Committee have been informed by an expert that 90 percent of the resources in the Arctic are confined within the sovereign control of the Arctic States. Besides, there is United Nations Convention on the Law of the Sea (UNCLOS) which provides the legal framework for all ocean and sea activities of nations, defining maritime zones (like territorial seas, EEZs, high seas) and allocating rights for resource use, navigation and environmental protection. In view of

the above, the Committee are concerned that the Arctic, which has been seen as part of Global Commons has not been treated as such, when it comes to the sharing of resources. However, considering that India has been a significant contributor in polar research and has established its scientific linkage with Himalayas giving a wholesome view of the cryosphere of the world, its impact on Climate change and its effect on the Global South, there is a need for India's continuous presence in the Arctic for scientific research to enhance this understanding. The Committee further express their agreement with the Ministry of Earth Sciences submission that in contrast to the strategic considerations of others, India's claim to be an important stakeholder in the polar areas is based on science, sustainability and multilateral cooperation and the same needs to be further propagated to enable appreciation of India's efforts and the acceptance of its leadership in Arctic affairs. The Committee are of the considered opinion that Indian narrative of the Arctic needs to be formulated at the earliest to enhance India's leadership position in polar areas of the world and project the Indian narrative of the Arctic in every platform to firmly establish its stake. The urgency for developing an Indian narrative on the Arctic can be understood from the submission of an expert that by 2070, the Indian GDP rate may fall by over 15% due to increase in temperature attributable to the Arctic.

17. Arctic – Quasi Global Commons

Having observed that Arctic, as opposed to Antarctica, is spread over the territorial jurisdiction of eight States which, therefore, results in not being treated as 'Global Commons' in terms of sharing of resources, the Committee find that there is still a need to recognize its special role. As submitted by a non-official witness, Arctic, like Amazon forest, is an area of the earth which is crucial for our existence. Just as the Amazon forest, sprawling over territorial

jurisdiction of three different countries has been recognised as the 'lungs of the planet', protection of which is so critical for the whole world that in the common law and territorial domestic laws of countries of the Amazon, it has become a quasi-Global Commons, Arctic region also needs to be protected since it is the backbone of global climate system, requiring its protection for the common good of humanity. Taking note of the fact that India has committed itself to a rule based, environmentally sustainable and science driven approach, the Committee recommend that the Government further pursue this aspect in its diplomatic engagements in the Arctic region.

18. Extension of Antarctic Treaty System

The Committee note that the Antarctic Treaty was signed in December 1959 by 12 countries and came into force in 1961. India signed the Antarctic Treaty on 19th August 1983 and soon thereafter received consultative status on 12th September 1983. Since 1959, 46 more countries have signed the Treaty which today has 59 State parties. 29 countries, including India, have the status of 'Consultative Party' with voting rights in the meetings of the Antarctic Treaty Consultative Meetings (ATCM), where 29 non-consultative parties are invited to the meeting but do not have the voting rights. The Committee have been informed by an expert that since 2014, no State party has been elevated to Consultative Party status. The Committee note that extensive debates over the criteria for achieving Consultative Party status without any conclusion are delaying the decision making due to the current geopolitical scenario. In this regard, the Committee are glad to note that India has been making efforts to reach consensus for granting Consultative status to countries that fulfil the criteria. The Committee endorse the view of the expert that more countries that meet the treaty requirements may be included in the Antarctica Treaty system so as to make it more inclusive and democratic.

19. India's leadership role in Antarctica

The Committee note that Antarctic is the only continent that is beyond the purview of the UN and is governed by the Antarctic Treaty system. After joining the Antarctic Treaty System in 1983 as a Consultative Party, India's role has evolved from basic participation to recognised leadership in Arctic science, governance and operations. India has launched 45 annual Indian scientific expeditions to Antarctica involving more than 120 national /international institutions. Due to our long-term engagement in the region, India has assumed leadership roles in key Antarctic research and operational committees, including Scientific Committee on Antarctic Research (SCAR), Council of Managers of National Antarctic Programs (COMNAP), Antarctic Treaty Consultative Meeting (ATCM) and its Committees for environmental Protection. The Committee are glad to note that as early as 1956, India had raised the 'Antarctica Question' in UN, and the stand taken by India probably infused discussion on Article I (Peaceful Use) and Article V (Nuclear Activity) of the Antarctic Treaty, prohibiting nuclear explosion and disposal of radioactive waste. The importance of Antarctica for a country like India can be seen from the fact that Antarctica has an area nearly five times that of India and holding ice sheet as thick as 4.5 km at places, can lead to a potential sea level rise of 60 meters, if it melted entirely. This will have serious economic and strategic implications for India with a coastline of more than 11,000 km. The Committee are aware that while the Arctic area has territorial sovereignty, Antarctica has been treated as a 'Global Commons' as it is not under the jurisdiction of any country. The Antarctic Treaty, which governs Antarctica, does not have any expiry date. Any modification in the Madrid protocol which prohibited mining of mineral resources (non-living resources) indefinitely, except for scientific research, will also require unanimous agreement of all the Consultative Parties

and this will come up after the end of the 50 year term in 2048. In view of the above, the Committee recommend that India continue to promote Antarctica as Global Commons and also actively represent the voice of the Global South by continuing to support the freedom of scientific investigation, environmental protection and international cooperation. The Committee also desire that India may continue to provide leadership to the Global South by supporting their participation in Indian Antarctic Expeditions.

20. As a consultative member of the Antarctica Treaty with voting rights, where decisions are based on consensus, India has a critical role to play in Antarctic Treaty System (ATS). The need for leadership role in the ATS has never been more demanding in view of diverse interests emerging in the region. The Committee note that while there is convergence among all parties in Antarctic Treaty Consultative Meeting (ATCM) on areas such as use of Antarctica for peaceful purpose, freedom of scientific investigations, environmental protection, sovereignty neutrality, compliance and inspections of research stations of another Member State; there are areas of divergence which could potentially undermine environmental protection, the non-militarised status of Antarctica and effective governance of the region. The Committee note that divergence often stems from differing national priorities, economic interests and differing interpretation of the Treaty's principles. Some of these include granting 'specially protected species' status to the Emperor Penguin largely due to objections from China, engaging in activities by some States that could be interpreted as undeclared resource exploration under the guise of research, establishing large scale Marine Protected Areas in the Southern Ocean, tourism regulation, etc. The Committee observe that India has strongly advocated for Antarctica to remain a peaceful, cooperative, and ecologically protected Global Commons, while focusing on scientific and environmental

issues. While appreciating the above position of the Government, the Committee urge the Ministry of External Affairs to take a more proactive role and address the above challenges by engaging with various member States through diplomatic channels so that Antarctica continues to remain a demilitarised, peaceful zone for scientific research and to promote international cooperation.

21. Inspection of Research Stations

The Committee note that under the ATS, a robust inspection system has been stipulated which allows any member State to inspect the research station/s of another member State. The inspections provide a mechanism to ensure monitoring of activities and research to curb dual use technology and promote adherence to environmental protocols. Through these inspections, information on training, medical capability and emergency planning, etc. is documented helping to identify gaps and disseminate good practices. The Committee note that there is convergence of all parties in the Antarctic Treaty consultative meetings with regard to allowing any member State to inspect the research stations of another member State. Accordingly, Indian 'Maitri' Station has been inspected by several Consultative Parties so far under the provisions of the Antarctic treaty. However, the Committee note that such inspections, usually carried out jointly with other countries, have not been undertaken by India so far due to the costs involved as Antarctic research stations are situated hundreds and thousands of kilometres apart and dedicated chartering of flights is required within the continent. Taking note of the submission by the Ministry of Earth Sciences that it is critically important to initiate the process in the near future that will provide full access to stations, equipment, and vessels for designated observers, the Committee recommend the Government to take early action by addressing the issue of resource crunch and engage with

partner countries for conducting joint inspections. Considering that India has not made use of this provision to assert its rightful position, the Committee urge the Ministry to take necessary measures and start inspecting the research stations of other member States starting with the research stations of those consultative parties which have already visited the Maitri Station.

22. Responsible Tourism in Antarctica

The Committee observe that there were 1.1 lakh tourists visiting Antarctica during the year 2024-25. The Committee note that the rapid growth of Antarctic tourism has raised concerns about environmental impacts and safety. While there is consensus on the need for regulation, there is divergence of views among the parties in the ATCM on the stringency and specifics of a legally binding framework versus non-binding guidelines. Some of the major challenges in enforcing responsible tourism are, increasing numbers of visitors, managing pollution (black carbon, grey water), preventing invasive species, protecting fragile ecosystems from foot traffic, regulation of self-regulating operators, comprehensive monitoring and enforcement across the vast continent, etc. They further note from the submission of the expert that India took a lead role in raising the concept of 'responsible tourism' during the 30th ATCM held under its chairmanship in New Delhi. They also observe that first-ever focused discussions on regulation of tourism were held during the 46th Antarctic Treaty Consultative Meeting and the 26th Committee for Environmental Protection held in Kochi in 2024. However, they notice that while no treaty specifically regulates tourism in the Antarctica, tourism is governed under the binding provisions of Antarctic Treaty System measures, national laws (Indian tourists need to obtain authorisation from NCPOR) and practices adopted by International Association of Antarctic Tour Operators (a self regulated industry body). As decided during 46th ATCM, a framework is

being drafted to develop a robust, compliant and adaptive framework to manage the increasing tourism and non-governmental activities while ensuring environmentally responsible practices. While appreciating the Government's efforts in taking a lead role for sustainable tourism in Antarctica, the Committee recommend that India should make efforts for arriving at consensus for a legally binding agreement for regulation of tourism in Antarctica. The Committee further desire that since Indian tourists need to obtain authorisation from NCPOR to visit Antarctica, Indian Tour Operators and tourists visiting Antarctica may be properly sensitised about the fragile nature of the Antarctic ecosystem, before they undertake any tourism activity, so as to promote responsible and sustainable tourism.

23. Need for enhancing funds for India's polar research programme

The Committee note that the polar research programme is being undertaken through Polar Science & Cryosphere Research (PACER) sub-scheme under PRITHVI Vigyan. National Centre for Polar and Ocean Research (NCPOR) is the nodal agency responsible for conducting India's annual scientific expeditions to the Antarctic and Arctic. Though the Antarctic operations are most challenging and financially expensive programme, the amount allocated for the purpose does not reflect the same. As informed by the Ministry of External Affairs, there is a serious requirement to increase the annual budget outlay by at least 30% under PACER sub-scheme of the PRITHVI Scheme in order to increase scientific and operational footprint across the polar regions. During the year 2026-27, an amount of Rs. 210 crore has been allocated under the PACER scheme, reflecting an increase of only Rs. 10 crore from the previous year. The Committee note that the polar research programme has enabled us to not only enhance our diplomatic stature and influence in polar governance,

but also develop expertise in cold region engineering, enable discovery of cold adaptive microbes which have application in biotechnology, improve understanding the impact of climate change on the Indian monsoon system and agriculture and gathering of data for global climate models to understand the warming trends, etc. They also observe that India plans to join international initiatives like Antarctic RINGS and Antarctic Insync Programme, which would give us a circum-Antarctic reach and undertaking Arctic expeditions beyond Svalbard through collaborations. The Committee note that due to paucity of funds, challenges such as high logistics and transportation costs for personnel, cargo and emergency support, high recurring costs on hired vessels and international infrastructure, ability to invest in expensive Polar-grade scientific instruments, power systems, and safety equipment, high wear and replacement costs due to extreme climate conditions, have affected operations in both Arctic and Antarctic research stations, limiting our capacity to conduct year-round operations and research. The Committee are of the considered opinion that continuous low allocation will hamper the progress of scientific endeavours and thereby affecting our diplomatic influence in these regions. The Committee, therefore, recommend the Government to increase the budgetary outlay under the PACER scheme for effective year round operations of our research stations and to enable us to take up activities with partner countries on equal footing.

24. Exploitation of marine resources of Antarctica

The Committee note from the submission made by Sea Shepherd Global that due to growing fishing, the density of Krill around the Antarctic Peninsula may have declined by as much as 80% since the 1970s, affecting populations of Adélie and Chinstrap penguins, whose numbers have fallen by 42% and 68% respectively, over the past forty years. This also has likely impacted the whales

pregnancy rates for humpback whales in the region from 86% in 2017 to 29% in 2020. As Krill continues to decline, its fishing industry is expanding. The Committee note from the information provided by the MEA that Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) is the apex body for regulating fishing activity in the Southern Ocean in an environmentally sustainable manner, and its decisions and catch quotas are based on and backed by the findings of its scientific Committee. India has been a member of the CCAMLR Commission since 1985 and actively participated in deliberations to strengthen conservation measures. However, despite being a Member of CCAMLR with the rights for sustainable exploitation of marine living resources in the Antarctic Treaty region (south of 60°S Latitude), India has not so far started any fishing activity in the region. The Committee further note that for Krills, the total catch limit of 620,000 tonnes has been fixed, but a key Conservation Measure (51-07) requiring krill catches to be spatially dispersed was not renewed at a CCAMLR annual meeting, as the Commission failed to reach consensus on this matter. The Committee further note the growing attention surrounding the expansion of Antarctic krill fishing at a time when conservation safeguards under the CCAMLR have weakened, and proposals to establish Marine Protected Areas, supported by India, remain pending adoption. Antarctic krill constitute a foundational component of the Southern Ocean food web, sustaining whales, penguins, and other marine species, and underpinning ecosystem stability. The issue, therefore, carries ecological, governance, and diplomatic implications. India has played a constructive role within the Commission, including formally supporting and co-sponsoring proposals in 2021 for Marine Protected Areas in East Antarctica and the Weddell Sea, reflecting its commitment to science-based conservation. It has, however, come to the Committee's attention that India may now be

considering participation in krill fishing operations, including through the issuance of licences. In this regard, the Ministry of Earth Sciences is preparing the legal provisions for licensing and monitoring of vessels to enable Indian industry's participation in Antarctic fishing, and efforts are underway to publish the Indian Antarctic Marine Living Resources (Fishing Authorization) Rules, 2026, under the Indian Antarctic Act, 2022. Formulation of the fishing authorization regulations is being overseen by the Committee on Antarctic Governance and Environmental Protection (CAG-EP), chaired by the Secretary, MoES in which the Ministry of External Affairs is one of the members. As the Antarctic krills occupy a central role in the Antarctic food web, sustaining nearly all higher life in the Southern Ocean, the Committee are of the view that allowing commercial exploitation of marine fishing in Antarctica may further threaten the already vulnerable marine ecosystem. However, taking note of the Ministry's submission that urging India to suspend its ongoing initiatives solely in the interest of environmental sustainability risks constituting an oversimplification of a complex balance between ecological responsibility and socioeconomic progress of the country, the Committee desire that Indians may participate in Antarctic fishing, with due evaluation of the environmental risks, in line with India's commitment for sustainable development. Further, keeping in view the objective of sustainable development of fisheries resources in Antarctic waters, the Committee recommend that the Government continuously pursue the development of Marine Protected Areas in East Antarctica and the Weddell Sea, and renewal of Conservation Measures (51-07) for enforcing spatial allocation controls across the sub areas of the region to promote environmentally sustainable exploitation of marine resources.

25. Replacement of Maitri station in Antarctica

The Committee observe that there are two Indian research stations 'Maitri' and 'Bharati' in Antarctica. While Maitri was built on a stable ice-free land at Schirmacher Oasis and is operational since 1989, another very modern research station, 'Bharati' has been established at Princess Elisabeth Land situated at about 2500 km east of the Maitri station, in 2012. The Committee were given to understand that the Maitri Station, built in 1989, has exceeded its intended lifespan of 10 years, and has therefore outlived its life and is no longer consistent with the stringent environmental rules under the Antarctic Treaty as well as the Indian Antarctic Act 2022. The Committee have been informed by the Ministry of Earth Sciences that the station's structural integrity, waste management, and sewage treatment systems have been flagged in numerous reports, with calls for urgent remediation. The proposed new stations (project Maitri II) will address the structural degradation, environmental compliance, energy efficiency and the limited scientific capacity of the current facility. This will significantly enhance India's ability to conduct multidisciplinary scientific research in Antarctica and enable the country to contribute high quality data and cutting-edge findings to global polar science for decades to come. The new station Maitri II is proposed to be built near the existing Maitri station because this area is connected to air support from other continents and also most countries have research bases here. The proposal has been accorded in-principle approval by the Department of Expenditure at an estimated cost of ₹2,150 Crore. The project will be implemented over a period of six years (2026–27 to 2031–32) due to the extremely narrow window of access during Antarctic summers, after comprehensive environmental evaluation necessitated by the Committee of Environmental Protocol under the Antarctic Treaty. The Committee note that the architectural and design consultant for project Maitri – II has already been identified through a Global

Design Competition. The Committee recommend expeditious construction of a new Maitri station that will not only strengthen our long-term scientific presence, but will also strategically place India amongst the select group of countries in polar affairs.

26. Acquisition of Polar Research Vehicle (PRV)

The Committee note that India needs to have ice class Vessels or Polar Research Vessels (PRV), as such high-end vessels are required to conduct operations in the polar Regions – the Arctic, the Antarctic and the Southern Ocean. The Committee have been informed by an expert that while all our Asian counterparts active in Polar Region such as China, South Korea and Japan, possess multiple research vessels, India depends on chartered research vessels. The Committee note that in the absence of dedicated polar vessels, the Antarctic programme remains dependent on annual chartering of foreign vessels for logistics and expedition support. This reliance not only places recurring pressure on operations but also introduces uncertainties in availability of specialised vessels and scheduling, thereby affecting expedition planning and execution. The lack of dedicated polar research vessel is also identified as initial hindrance for the expansion of Arctic exploration beyond Svalbard and restricting access to wider Arctic Ocean, which is the most important and strategic region in the Arctic. They note that both in Arctic and Antarctica, scientific research was disrupted during COVID pandemic as observational data were halted due to lack of timely maintenance of most of the systems. They find that this has also affected our medical evacuations as in the absence of our own ship, such emergencies required planning and collaborations with other stations. However, now, it is proposed that Indian Air Force may develop expertise to undertake emergency landing and take-off in

Antarctica in such exigencies. The Committee note that an in-principle approval was obtained from the Department of Expenditure for the acquisition of a PRV at an estimated cost of Rs. 2329.40 crore in July 2025. During the evidence, the Committee have been informed by the Ministry of Earth Sciences that while the design of the ship has been completed, they are in the process of identifying the shipyard within India to build the ship. The ship will be made in India, however, collaboration with other countries will be required only for the hull portion, as India currently does not have the expertise to build the hull. The Committee find that the proposal started with a cost estimate of Rs. 400 Crore which has now increased to more than six times due to non-finalization of the project. Keeping in view the requirement of polar research, it is high time that a polar research vehicle is manufactured at the earliest as the programme has already suffered huge time and cost overruns. Considering that there is huge shortage of ice class vessels for hiring, which is seriously affecting India's Polar research and scientific activities, the Committee fully endorse the view of the experts that acquisition of Polar Research vessels with ice breaking capacity is a critical requirement for undertaking both scientific and logistical activities in Arctic and Antarctic regions and hope that it shall be completed in a time bound manner.

27. Manpower strength of National Centre for Polar and Ocean Research (NCPOR)

National Centre for Polar and Ocean Research is the main institution for planning, coordination and execution of India's polar research programme. It operates the two research stations viz. Maitri and Bharati in Antarctica, Himadri in the Arctic and Himansh in the Himalayas. The Committee find that this institution has been entrusted with the responsibility for complex

planning, arrangement of logistics and execution of scientific expeditions and research with a strength of only 56 scientists sanctioned along with only eight technical support staff. They note that only 54 scientists are currently handling all the activities of NCPOR which, as admitted by the Ministry of Earth Sciences, is woefully inadequate with manifold increase in activities under the purview of NCPOR. NCPOR undertakes research and expeditions not only to Antarctica but also to the Arctic and Himalayan research stations along with many other new responsibilities such as deep-sea exploration, detailed exploration activities for hydrothermal sulphide mineral exploration in the mid-Indian Ocean Ridges, etc. They note that request for an additional 77 permanent posts, including 53 scientists is under consideration of the Department of Expenditure. They are particularly astonished to note that a very few scientists are looking after Indian scientific operations in Arctic and only two scientists are engaged to see operations in the Himalayas where there are 9000 glaciers. The Committee note that the manpower requirement at NCPOR which is 'India Gateway to the Polar Regions' is at critical level. In this regard, the Department of Expenditure may be urged to grant necessary approval for creation of additional 77 permanent posts, including 53 scientists for undertaking adequate scientific research and logistic operation in Polar regions. Keeping in view the serious need for strengthening manpower strength of NCPOR, the Committee recommend the Government to take early action in the matter to enable NCPOR to undertake its work more effectively.

The Committee would further like to emphasise the need for giving incentives to polar studies and research by providing research fellowships and grants to PhD scholars for undertaking research and other training programmes so that more young scholars are encouraged to pursue Arctic

studies and to specialise in polar and cryosphere sciences, creating a steady pool of skilled manpower in the long term.

Including Polar studies in educational curriculum and promoting wider discussion

28. The Committee note that under the Indian Antarctic and Arctic Programme, more than 120 organisations and universities have been facilitated to undertake scientific projects in polar regions. Cochin University of Science and Technology (CUSAT), and Mahatma Gandhi University (MGU) have established Centre of Excellence in Polar studies. Further, the University Grant Commission (UGC) offers specialised massive open online courses on polar studies through the SWAYAM System, supported by MoES. The Committee note that Arctic and Antarctic studies have been included in Under graduate and Post graduate programmes as a credit-based incentive. They find from the views submitted by experts that apart from such incentives, there is a further need to provide employment opportunities to the students who are taking Arctic and Antarctic studies. Taking note of the fact that capacity building in polar research and polar science, including adaptability to the new possibilities in the wake of changing landscape, is necessary for India to retain its leadership role, the Committee are of the view that creating awareness about relevance of the polar areas is the need of the hour. They, therefore, recommend the Government to explore further expansion of studies in this area from the lower level to help develop interest in polar areas at younger age. They would like to be apprised of the measures taken in this regard at the earliest.

29. The Committee observe that National Conference on Polar sciences (NCPS) have been organized in the years 2021, 2023 and 2025 to give platform to young and early career scientists to showcase their findings and research results. Further, private think tanks are also organising seminars and conferences including international speakers to help discuss the polar matters. The Committee are of the view that the conferences and seminars should be held regularly to enable exchange of information and adoption of suitable measures for addressing scientific and operational challenges in polar regions.

NEW DELHI

21 July, 2026

30 Asadha, 1948 (Saka)

Dr. Shashi Tharoor,

Chairperson,

Committee on External Affairs

MINUTES OF THE TWENTY FOURTH SITTING OF THE COMMITTEE
ON EXTERNAL AFFAIRS (2024-25) HELD ON 23 JULY, 2025

The Committee sat on Wednesday, 23 July 2025 from 1600 hrs. to 1725 hrs. in Committee Room No. 53, Samvidhan Sadan, New Delhi.

Present

Dr. Shashi Tharoor- Chairperson

Members

Lok Sabha

- 2 Shri Mitesh Patel Bakabhai
- 3 Shri Arun Govil
- 4 Shri Deepender Singh Hooda
- 5 Shri Navaskani K.
- 6 Shri Brijendra Singh Ola
- 7 Shri Sanatan Pandey
- 8 Dr. Pradeep Kumar Panigrahy
- 9 Shri Ravi Shankar Prasad
- 10 Shri Y. S. Avinash Reddy
- 11 Smt. Aparajita Sarangi
- 12 Shri Arvind Ganpat Sawant
- 13 Ms. Praniti Sushilkumar Shinde
- 14 Ms. Bansuri Swaraj
- 15 Shri Naveen Jindal

Rajya Sabha

- 16 Dr. John Brittas
- 17 Smt. Kiran Choudhry
- 18 Dr. K. Laxman
- 19 Ms. Kavita Patidar
- 20 Shri A. D. Singh
- 21 Shri Ratanjit Pratap Narayan Singh
- 22 Dr. Sudhanshu Trivedi
- 23 Shri Rajeev Shukla

Secretariat

1. Shri Anjani Kumar - Joint Secretary
2. Smt. Reena Gopalakrishnan - Director

MINISTRY OF EXTERNAL AFFAIRS

Sl. No	Name of the Officer	Designation
1.	Shri Tanmaya Lal	Secretary (West)
2.	Shri Srinivas Gotru	Joint Secretary (UNES)
3.	Ms. Pratibha Parkar	Joint Secretary (Parl. & Coord.)
4.	Shri Dharmendra Singh	Deputy Secretary (UNES)

MINISTRY OF EARTH SCIENCES

Sl. No	Name of the Officer	Designation
1.	Dr. M.Ravichandran	Secretary
2.	Shri D. Senthil Pandiyan	Joint Secretary
3.	Dr. Vijay Kumar	Scientist 'G'
4.	Dr. Thamban Meloth	Director, NCPOR
5.	Dr. Vandana Chaudhary	Scientist 'G',
6.	Dr. Aparna Shukla	Scientist 'F'
7.	Shri Keshav Kumar	Director (Parliament)

2. At the outset, Chairperson welcomed the Members and the representatives of the Ministries of External Affairs and Earth Sciences to the sitting of the Committee convened to have briefing by the representatives of the two Ministries on the subject '**India's Role and**

Presence in the Arctic and Antarctic Regions’. In view of India’s Arctic policy 2022, Indian Antarctic Act 2022, Indian Antarctic Environmental Protection Rules of 2023 etc., the Chairperson requested the representatives of the two Ministries to brief the Committee on geopolitical aspects of Arctic and Antarctic region and role of India in scientific explorations, collaboration with the countries in these regions, availability of adequate talent pool to carry out scientific research and polar expeditions, sovereignty disputes in Antarctica and its impact on India, threat of nuclear weapon testing in the region, international cooperation in Arctic areas against the backdrop of Ukraine conflict, etc. Thereafter, he drew the attention of all the representatives of the two Ministries to Direction 55 (1) of the Directions by the Speaker, Lok Sabha pertaining to maintaining the confidentiality of the proceedings and Direction 58 of the Directions by the Speaker, Lok Sabha.

3. The Secretary (West), Ministry of External Affairs then made a power point presentation highlighting *inter alia* diverse geographical expanse of Arctic in the North Pole and Antarctic in the South pole; Svalbard Treaty of 1920 which was signed by India in 1920, Arctic Council comprising of eight Member States viz. Russia, Canada, Sweden, Finland, Denmark, Norway, United States, Iceland, 13 Observer States including India, and Permanent Observers (indigenous population), functioning of Arctic council, etc. With regard to Antarctic Region, the Committee have been informed that the Antarctic Treaty was signed in 1961 by 12 member states. Today, there are 58 member states consisting 29 consultative parties and 29 non consultative parties. The consultative party takes part in decision making. The Antarctic Treaty basically aims at retaining this continent as a zone of peace and no military activity and at

the same time, facilitate international collaboration in science and technology. India became a consultative party in 1983.

4. Highlighting the differences between the Arctic and the Antarctic, the Committee were also informed that the Arctic has indigenous population in the region and the focus of Arctic Council is more on science and research. However, due to global warming there is an increasing speculation about the extraction of the minerals including rare earth, hydrocarbons, opening of shipping routes, fishing, and other resources. With regard to Antarctic region, the Committee have been informed that the Antarctic Treaty sought to treat the continent as a global common, as a common heritage. Today, there are around 70 research stations from various countries in the region. The Committee were also informed of the growing engagements of India with the Arctic Region, unique role of India as a polar research nation; Indian research studies in Arctic, Antarctic and Himalayan region which is considered as 'third pole', impact of polar ice melts on climate pattern, etc.

5. Thereafter, the representative of the Ministry of Earth Sciences briefed the Committee on the importance of the three poles, Arctic, Antarctic and Himalaya which act as global barometer, effects of global warming on Polar regions, global climate tipping points in polar regions and its future impacts, geological connection between India and Antarctica, research station/laboratories set up by India at three polar regions viz. Himadri at Svalbard, Himansh at Lahaul Spiti and two stations Maitri and Bharti in Antarctica, loss of Dakshin Gangotri in 1983, logistic challenges of transporting man and material to Antarctica, science diplomacy, etc.

6. Members of the Committee raised various queries on issues, such as budgetary allocation for maintaining the research stations, delay in

procuring Polar Research Vehicle (PRV), territorial demarcation and exclusive economic zones in Arctic and Antarctic regions, regulation of tourism, conflicting territorial claims in Arctic and Antarctic region, geopolitical influence and India's role in governance model of Arctic and Antarctic region, global climate regulation under the United Nations Framework Convention on Climate Change (UNFCCC), regulation of shipping routes under the provision of United Nations Convention on Laws of the Sea(UNCLOS) and its validity in deciding territorial claims, strategy and plan to increase India's footprints, availability of rare earth minerals and other resources, polar silk route of China, impact of climate change on our coastal regions, India's Arctic Policy, etc. The Secretary of the Ministry of Earth Sciences apprised the Committee about issues, such as teleconnection between Arctic ice melt and extreme rainfall in India, building Indian narrative of making Arctic region as a global common, regulation of tourism in Antarctica, science diplomacy as a basic tenet of India's policy in Arctic and Antarctic region. Secretary, MoES also informed the Committee about the six pillars of India's Arctic policy viz. science and research; environmental protection and climate; economic and human aspects; transport and connectivity; governance and international cooperation, including geopolitics and strategy; and national capacity building, etc.

7. The representatives responded to the queries of the Members. The Chairperson then thanked the representatives for giving valuable and insightful inputs on the subject and giving important information on mostly unknown parts of the world.

The Committee then adjourned

(The witnesses then withdrew)

A verbatim proceeding of the sitting has been kept on record.

Appendix- II

MINUTES OF THE THIRD SITTING OF THE COMMITTEE ON EXTERNAL AFFAIRS (2025-26) HELD ON 30 OCTOBER, 2025

The Committee sat on Thursday 30 October, 2025 from 1130 hrs. to 1430 hrs. in Samanvay '3', Parliament House, New Delhi.

Present

Dr. Shashi Tharoor, Chairperson

Lok Sabha

1. Shri Arun Govil
2. Shri Naveen Jindal
3. Shri Brijendra Singh Ola
4. Shri Asaduddin Owaisi
5. Dr. Pradeep Kumar Panigrahy
6. Shri Arvind Ganpat Sawant

Rajya Sabha

7. Shri Ayodhya Rami Reddy Alla
8. Shri Raghav Chadha
9. Dr. K. Laxman
10. Shri A. D. Singh
11. Dr. Sudhanshu Trivedi

Secretariat

- | | | | |
|----|---------------------------|---|------------------|
| 1. | Shri Anjani Kumar | - | Joint Secretary |
| 2. | Ms. Shanta Banerjee Datta | - | Deputy Secretary |

WITNESS

Name of the Experts/Non official	Organisation
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Sl. No.

- | | | |
|-----------|---------------------------|---|
| 1. | Dr. Rasik Ravindra | Secretary General, Society for the Geopolitics of Arctic, Antarctic & Himalayan Areas (SaGAA). |
|-----------|---------------------------|---|

- | | | |
|----|--|--|
| 2. | Dr. Thamban Meloth | Director, National Centre for Polar and Ocean Research (NCPOR), Ministry of Earth Sciences. |
| 3. | Ms. Zerín Osho | Director of India Program, Institute for Governance & Sustainable Development (IGSD). |
| 4. | Captain (IN) Anurag Bisen (Retd.) | Senior Fellow, Vivekananda International Foundation. |

2. At the outset, Chairperson welcomed the Members and the experts to the sitting of the Committee convened to hear their views on the subject 'India's Role and Presence in the Arctic and Antarctic Regions'. Thereafter, he informed the Committee that interaction with experts will be the concluding discussion as the Committee already took the oral evidence of the Ministries of External Affairs and Earth Sciences on the above mentioned subject. Then, inviting attention to the letter received from Shri Milind Deora, Member of Parliament from Rajya Sabha, and also a member of Arctic Circle wherein India role in Arctic region and measures required for deeper engagement in Arctic area has been highlighted, the Chairperson stated that the Committee desire to be further enlightened by the views of the experts on various issues and aspects involved in examination of this subject.

3. Taking note of the geopolitical and economic significance of the Arctic and Antarctic regions, the Chairperson requested the experts to present their views and suggestions on the impact of rising temperature of polar regions on Indian monsoon, agriculture and trade, exploitation of resources, future military build up in the area, India's strategic role in geopolitics of this region, India's participation in international institutions related to Arctic and Antarctic areas and polar governance, operational facilities and capabilities of Indian institutions involved in polar research and need for higher budgetary allocations, etc. Thereafter, the Chairperson drew the attention of the witnesses to Direction 55(1) and Direction 58 of the Directions by the Speaker, Lok Sabha regarding confidentiality of the proceedings and treating evidence tendered before the Committee as public.

4. At the outset, Dr. Rasik Ravindra, Secretary General, Society for the Geopolitics of Arctic, Antarctic & Himalayan Areas (SaGAA) briefed the Committee *inter alia* on significant role played by India in the Antarctic and Arctic regions, research stations in Antarctica, role of India in Antarctic governance as a consultative member state of Antarctic Treaty Consultative Committee (ATCM), policy making and scientific research in Antarctica, articulation of principle of 'responsible tourism in Antarctica' during the first ATCM chaired by India, participation of India in the scientific platforms like Scientific Committee on Antarctic Research (SCAR), Convention on Managers of National Antarctic Programme (COMNAP) and Asian Forum for Polar Science (AFoPS), etc.

5. Then, Dr. Thamban Meloth, Director, National Centre for Polar and Ocean Research (NCPOR) briefed the Committee about the global tipping points, most critical tipping points situated in Arctic and Antarctic regions, tele connection between Arctic ice melts and Indian monsoon, integrated approach of India towards Arctic and Antarctic areas, connection between polar amplification (faster rise in temperature of polar areas) and sea level rise resulting in coastal vulnerabilities, challenges of operating research stations in both north and south pole, (two in Antarctica) which are 2500 kilometers apart, proposed establishment of a new research station in Antarctica, geographical linkages between India and Antarctica, release of carbon dioxide and methane due to melting of Arctic permafrost and consequent hazards such as building collapse and unstable roads, emergence of new shipping routes, exploration of living and non living resources, etc.

6. The Committee were further briefed by Capt. Anurag Bisen, Senior Fellow, Vivekananda International Foundation about governance of Arctic by eight Arctic States who are members of Arctic Council, observer status of India in the Arctic Council where by participation in Arctic Council and International Arctic Science Committee is allowed only through Working Groups, India's role in Arctic post conflict between seven member States and Russia, halt in sharing of data between Russia (having 40% area of Arctic) and other Arctic States, India's potential in bridging the gap in information sharing about entire cryosphere as it is the only country having research stations in all the polar areas of the world including Himalayas, etc.

7. The Committee further heard the views of Ms. Zerín Osho, Director, the Institute for Governance & Sustainable Development (IGSD) who informed about the IGSD study regarding data and evidence of climate change linkages associated with rise in temperature in polar areas and associated economic challenges facing the country. She further apprised about the relation between loss of Arctic sea ice and increased flooding in Western, Central and Southern India, impact on yield losses of staple crops of India, which are part of rain fed agriculture, fall in GDP growth rate due to rain fed agricultural loss including labour loss, etc.

8. During the course of the briefing, Members raised several queries which *inter-alia* included air connectivity between North and South Pole research stations operated by India, possibility of setting up floating polar stations, adequacy of budgetary support, polar research vehicle, need to have a Polar Desk or a Polar Ambassador, exploration of rare earth minerals, environmental threat due to increase traffic through northern sea route, militarization of Arctic, acquiring of icebreakers, repercussions of polar warming on Indian agriculture and economy, expansion of membership of Arctic Council, initiative taken to engage with the indigenous population in Arctic who are permanent participants in the Arctic Council, India's response to force projection in Arctic, support to new members of the Antarctic treaty, mitigation measures needed to protect coastal population, need for more international collaborations, establishment of continuous monitoring systems, observatories, research vessels, field stations and state of the art systems, need for substantial increase in scientific and technical manpower, need to take leadership role in major international programmes, etc.

9. The representatives responded to the queries of the Members. The Chairperson then thanked them for valuable and insightful inputs on the topic.

*The Committee then adjourned
(The witnesses then withdrew)*

A verbatim proceedings of the Sitting has been kept on record.

Appendix- III

MINUTES OF THE TWENTY FIRST SITTING OF THE COMMITTEE ON EXTERNAL AFFAIRS (2025-26) HELD ON 21 JULY 2026

The Committee sat on Tuesday, 21 July 2026 from 1630 hrs. to 1730 hrs. in Committee Room No. 2, Extension Building, Parliament House Annexe, New Delhi.

Present

Dr. Shashi Tharoor, Chairperson
Lok Sabha

- 2 Smt. D. K. Aruna
- 3 Shri Mitesh Patel Bakabhai
- 4 Shri Arun Govil
- 5 Shri Naveen Jindal
- 6 Shri Navaskani K.
- 7 Shri Sanatan Pandey
- 8 Shri Ravi Shankar Prasad
- 9 Shri Arvind Ganpat Sawant

Rajya Sabha

- 10 Dr. John Brittas
- 11 Shri Satnam Singh Sandhu
- 12 Shri Ratanjit Pratap Narayan Singh
- 13 Dr. Sudhanshu Trivedi

Secretariat

1. Shri Shangreiso Zimik - Director
2. Ms. Shanta Banerjee Datta - Deputy Secretary

2. At the outset, Chairperson welcomed the Members to the Sitting of the Committee and apprised them of the agenda for the day.

3. The Committee took up for consideration and adoption of the draft Report on the subject 'India's Role and Presence in the Arctic and Antarctic Regions'.

4. The Chairperson, invited the Members to offer their suggestions, if any, for incorporation in the draft Report. After deliberations, the Committee adopted the Draft Report with minor modifications suggested by the Members.

5. The Committee authorized the Chairperson to finalize the draft Report by incorporating the suggestions made by the Members and present the same to Parliament.

The Committee then adjourned