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The Changing Arctic – Asian Response

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Planet Earth experienced the tenth-warmest recorded temperature in 2011 and the concentrations of greenhouse gases (GHG) in the atmosphere touched new levels. At the same time, the extent of the Arctic Sea ice was the second-lowest recorded and its volume was the lowest ever. It is forecast that the Arctic region may be ice-free in the early part of the current century and would therefore require robust mitigation and adaptation measures sooner than anticipated. The Intergovernmental Panel for Climate Control (IPCC) has noted that

> In the Arctic, during the 20th century, air temperatures over extensive land areas increased by up to 5°C; sea ice thinned and declined in extent; Atlantic water flowing into the Arctic Ocean warmed; and terrestrial permafrost and Eurasian spring snow decreased in extent.[1]

The adverse impacts of climate change are therefore quite visible in the Arctic region.

This paper highlights the impact of global warming on the Arctic region and the opportunities and challenges that have emerged from this phenomenon for Asian countries. It begins by highlighting the climate-induced changes and the impact of greenhouse gases in the Arctic region. The paper argues that melting of the Arctic ice and the evolving politico-economic and strategic developments in the region have been noted by Asian countries, who see the region as an area of immense economic and strategic importance.

Climate-induced Changes in the Arctic

The Arctic region has been witnessing a steady increase in temperature, resulting in shrinking of the ice cap. Satellite data since 1972 showcase that

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the extent of the Arctic Sea ice has been reducing at 11 per cent per decade.[2] On 9 September 2011, the United States' National Snow and Ice Data Center (NSIDC) announced that the extent of sea ice dropped to 4.33 million sq km (1.67 million sq miles), the lowest in 2011, i.e. 160,000 sq km, only 61,800 sq miles above the record minimum extent in 2007 and 2.38 million sq km (919,000 sq miles) below the 1979–2000 average minimum.[3] NSIDC director Mark Serreze painted a very dismal outlook for the Arctic and remarked that the summer ice cover could disappear entirely by 2030, leaving nothing but a heat-trapping "Blue Ocean".[4]

Another recent study states that the Arctic Sea ice is shrinking rapidly and may vanish altogether by 2015, making the Arctic ice-free.[5] This will impact not only the flora, fauna and indigenous people of the region but will have far-reaching effects on the global weather conditions, causing new patterns in droughts and famine, changes in the intensity and frequency of cyclones, impact on agriculture and human lifestyle, rise in sea level, and mass migrations.

There are also fears that as the Arctic ice melts, it would result in the release of greenhouse gases such as methane that is trapped under the permafrost.[6] Methane is regarded as twenty times more potent in trapping heat than carbon dioxide. It is estimated that currently 1672 billion tonnes of carbon is trapped under the permafrost.[7] According to a report by the British Antarctic Survey, in the past 800,000 years methane had never tipped 750 ppb (parts per billion), but is now 1780 ppb, suggesting that there are signs that permafrost has begun to thaw.[8]

As the Arctic experiences warming and the permafrost thaws, carbon would leak into the atmosphere in the form of methane, thereby generating a cycle wherein carbon is released, causing a rise in temperature. It has been noted that the East Siberian Arctic Shelf, spread over 810,000 sq miles, is a new source of greenhouse gases.[9] Similarly, huge quantities of frozen organic matter, deposited and preserved over hundreds of years, exist in Alaska, United States, and the Far North in Canada. These are indeed very worrying signs.

New Opportunities

Although climate-induced changes have caused much anxiety in the international community, they have opened opportunities too. These emerge in the form of new shipping transit through the Northern Sea Route (NSR), living (new fishing grounds) and non-living resources (oil, gas, coal, iron ore, other metals and minerals) and tourism (cruise liners).

In recent times, shipping companies have shown interest in the Arctic routes. In 2010, 0.25 million tons of oil, gas condensate and iron ore were transported through the NSR,[10] which encouraged shipping companies to increase the volume of traffic through this route in 2011. In 2011, 34 ships followed the NSR and 22 ships sailed through the Northwest Passage.[11]

This is a significant development for the shipping industry, which is now encouraged to plan voyages during the summer through the NSR. Shipping companies are able to cut costs of transport and also save on transit times. For instance, *Sanko Odyssey* (the largest ice-classed bulk carrier and owned by the Danish shipping company Nordic Bulk Carriers) sailed with a cargo of 70,000 tonnes of iron ore concentrate between the Russian port of Murmansk to Jingtang in China through NSR. The voyage was completed in twenty-three days, which corresponds to a saving of 4000 nautical miles passage and twenty-two days when compared to sailing through the Suez Canal. The vessel also saved 1000 tonnes of bunker fuel and nearly 3000 tonnes of carbon dioxide, and operating costs of about Euro 80,000–300,000 on each voyage.[12]

According to company sources, "It is a good alternative to the Suez – especially for goods leaving countries like Norway, Finland, northern Russia or the Baltic countries."[13] However, it was also noted that "This route will never be the Suez. It would be like having a Suez that was only open four months a year, and you didn't know which months those were because it depended on the weather."[14] According to Canadian and American maritime experts, nearly 2 per cent of global shipping could be sailing through the Arctic by 2030, which could further grow to 5 per cent by 2050.[15] Likewise, Russia's Ministry of Transport has forecast that shipping volume through the NSR will increase to 64 million tons by 2020.[16]

While these are very encouraging signs for the international commerce and shipping industry, there are several challenges to make this route cost-effective through the year. These are: (i) the NSR is currently open for only four to five months; (ii) an icebreaker must escort the merchant vessel to clear the ice, which adds to costs; (iii) underdeveloped navigation aids along the route could add to the risk of unsafe transit; (iv) accurate navigational charts are yet to be developed; (v) search-and-rescue arrangements are still to be developed; (vi) the crews are inadequately trained; (vi) only limited numbers of ice-classed vessels are available; and (vii) repair facilities are poor. These limitations have precluded other shipping companies from exploiting the NSR. However, as the cargo volume grows along the route more companies are likely to deploy vessels to cut costs and save on transit times. Much of the NSR lies along the Russian coast and Russia has drawn up plans to develop

the route. It has announced setting up of a number of search-and-rescue centres along its coast at Murmansk, Arkhangelsk, Naryan-Mar, Vorkuta, Nadym, Tiksi, Pevek, Provideniya and Anadyr.[17] Prime Minister Vladimir Putin has observed:

> The shortest route between Europe's largest markets and the Asia-Pacific region lies across the Arctic. This route is almost a third shorter than the traditional southern one ... I want to stress the importance of the Northern Sea Route as an international transport artery that will rival traditional trade lanes in service fees, security and quality.... States and private companies who choose the Arctic trade routes will undoubtedly reap economic advantages.[18]

Marine Living Resources

The warming of the Arctic region has created greater opportunities for fishing, particularly during the summer months. The Norwegian waters are rich in North-East Atlantic cod, herring, and northern shrimp; Russian waters contain North-East Atlantic cod; Iceland waters hold Atlantic cod and capelin; Greenland waters have Atlantic cod and a variety of marine mammals and halibut; North-East Canada is rich in capelin, polar cod, Atlantic cod and halibut; and North Pacific waters are rich in Walleye pollock, Pacific cod, flatfish, salmon and crabs.[19] A recent study by the University of British Columbia researchers estimated the fisheries catches during 1950–2006 in the Arctic at 950,000 tonnes, which is nearly 75 times the amount reported to the United Nations Food and Agriculture Organization (FAO) during this period.[20] At another level, there are fears that overexploitation of fish in the Arctic could adversely impact on the marine biodiversity of the region and efforts should be made to prevent further expansion of fisheries in the region. It has been argued that

> Conservation efforts in the Arctic have so far focused on the exploitation of marine mammals – Seals and Polar Bears are frankly easy on the eye and plain to see … None of them would survive, however, if we allow over-exploitation of fish in this delicate but so-far neglected ecosystem.[21]

Metals, Minerals and Hydrocarbons

Russian Arctic is rich in mineral wealth and is valued at $1.5–2 trillion and twenty-five mines for extraction of nickel-copper, iron ore, tin, uranium, gold and phosphate are reported to be operational. There are also placer deposits

on the continental shelves, which contain gold, tin, diamonds, amber and fossil ivory.[22]

In 2009, the Canadian government announced Canada's Northern Strategy, which aims at exercising sovereignty over the Canadian Arctic and also to advance economic development of energy and minerals in the Far North.[23] Although the full extent of the natural resources potential in the Arctic is still unknown, Canada has earmarked $100 million to be spent over five years (2008–2013) in its new Geo-mapping for Energy and Minerals (GEM) programme and build "geoscience knowledge for private sector exploration companies to guide investment decision, as well as for government to inform land-use decisions such as the creation of parks and other protected areas".[24] The Canadian strategy emphasizes exploitation of natural resources and promotes mining activities, particularly diamond mining, which contributes C$2 billion annually to the economy of the Northwest Territories.

The 2008 US Geological Survey report notes that over 70 per cent of the undiscovered oil resources can be found in five Arctic areas: Arctic Alaska, Amerasia Basin, East Greenland Rift Basins, East Barents Basins, and West Greenland-East Canada.[25] Likewise, there is more than 70 per cent of the undiscovered natural gas available in the West Siberian Basin, the East Barents Basins, and Arctic Alaska. Further, nearly 84 per cent of the undiscovered oil and gas occurs offshore. This totals up to nearly 90 billion barrels of oil, 1669 trillion cubic feet of natural gas, and 44 billion barrels of natural gas liquids.

The Russian Arctic region may hold up to 20 per cent of the world's hydrocarbon deposits and could give a boost to Russian economy. In 2008, President Dmitry Medvedev released an Arctic strategy paper, which noted that the Arctic region would be Russia's "top strategic resource base" by 2020.[26] According to the Natural Resources Minister Yuri Trutnev, "Our [Russian] sector in the Arctic is estimated to contain up to 100 billions tons of resources." For instance, hydrocarbon deposits in Russia's Kara and Barents Seas are believed to contain as much as 65 and 215 billion barrels of oil equivalent; gas accounts for nearly 80 per cent of the deposits.[27] Russia is likely to spend nearly 2 billion roubles ($64 million) on research over the next three years for oil and gas prospecting in the region.[28] These reserves can potentially boost the Russian economy.[29] However, there is another view that although Russia may be endowed with huge amounts of resources, it is deficient in technology and needs to seek technological assistance from the highly developed Western companies and governments.[30]

In May 2011 the Danish government announced its national Arctic strategy. The document notes that waters off north-east Greenland contain nearly 31 billion barrels of oil and gas and about 17 billion barrels can be expected off the country's western coast.[31] At least seven companies are expected to engage in offshore exploration and drilling operations.[32] In 2010 Cairn Energy started mapping of the area and also commenced exploration and drilling operations; there were plans for exploration and drilling in four more wells in 2011.[33]

Norway is the world's fifth-largest exporter of oil and second-largest exporter of natural gas. In 2010 it exported 90.8 million of barrels of crude oil and 97.3 billion cubic metres of gas.[34] Further, according to the Norwegian Petroleum Directorate, nearly 7.3 billion cubic metres of undiscovered resources are located in the Norwegian Sea and the Barents Sea. It is estimated that the Barents Sea may have 5.9 billion barrels of undiscovered oil and gas. The waters off the Arctic archipelago of Lofoten and Vesteraalen, located about 200 kilometres north of the Arctic Circle, may contain as much as 1.3 billion barrels oil equivalent. The Norwegian oil company Statoil ASA (STL) has been vigorously engaged in offshore oil exploration; in April 2011 it announced its biggest find in years some 200 kilometres offshore, which is estimated to hold about 250 million to 500 million barrels of oil.

Asian Response to the Changing Arctic

Climate-induced developments in the Arctic region have attracted the attention of a number of Asian countries. China, Japan and South Korea, which are closer to the region, are developing strategies to exploit its resources and are also strategizing to use the NSR. India's interest is focused on building scientific knowledge to understand the impact of climate change on the Arctic region.

China Takes the Lead

China has a scientific research facility located at Yellow River Station on the Norwegian island of Spitsbergen since 2004.[35] China joined the Arctic Council as an observer in 2007. China has conceptualized a sophisticated strategy for the Arctic region that envisages scientific studies related to climate change, use of Arctic routes for shipping, and resource exploitation. In July 2010 the Chinese polar vessel *Xue Long* ("Snow Dragon") sailed to the Arctic on a three-month voyage to collect oceanographic and weather-related data, including study of the sea ice.[36] The vessel had onboard a number of scientists, researchers and reporters from China, Estonia, South Korea, and the US.

China sees the Arctic as a resource base for its energy security. In June 2011 Xu Shaoshi, the Minister of Land and Resources, stated that "International competition has grown in promoting the peaceful utilization of polar resources in recent years … As a big, developing country, China should take part in more polar activities through cooperation or independent exploration in the future."[37] In November 2010 the Sovcomflot group (SCF) of Russia and China National Petroleum Corporation (CNPC) signed a long-term cooperation agreement to develop seaborne energy solutions, with the SCF fleet serving the Chinese imports of hydrocarbons. The cooperation envisages transit shipments of hydrocarbons and transportation of oil and gas extracted from the Russian Arctic offshore fields. SCF would also build several VLCC (very large crude carrier) tankers of over 300,000 dwt (deadweight tonnage), as well as examine cooperation on quality and safety standards and maritime specialist training.[38]

China is also attempting to build close relations with the Arctic littorals as part of its strategy for the region. For instance, Iceland has moved much closer to China, setting aside ideological differences, if any, for a more pragmatic relationship based on political engagements, free trade agreement, and development of infrastructure for strategic pre-positioning astride the future Arctic Sea routes.[39] President Ólafur Ragnar Grímsson has stated:

> In my discussions with the leadership of China it is absolutely clear that they are very keen to cooperate with Iceland and the other countries in the Arctic region on what is happening in the Arctic and the northern regions and also of what are the implications of the northern sea routes opening up over the next few decades.[40]

Meanwhile, Huang Nubo, chairman of the Zhongkun investment group, showed an interest in acquiring on lease 300 sq km of land in Iceland to build a resort hotel, golf course and race course, but the citizens of Iceland objected to the proposal. Consequently, the internal affairs ministry vetoed the project, noting that the national law "imposes strict conditions on corporations wishing to acquire ownership or the right to use Icelandic properties and it's clear that the company in question doesn't fulfil any of the requirements".[41]

Greenland, an autonomously governed territory of Denmark, is however keen to invite China to develop resources. Prime Minister Kuupik Kleist has stated:

> We don't really have that much cooperation for the time being, but I know that Chinese companies are showing a rising interest in Greenland … Greenland is also showing an interest in China. My minister for minerals,

> industry and labour is going to China this day on an official visit. I would see a future cooperation as a very positive one, and we welcome the Chinese interest.[42]

Japan's Growing Interest

Japan, though it is not in the Arctic region, has manifested a strong interest in the Arctic.[43] A viewpoint among some Japanese opinion-makers is that the Arctic …

> should not be left entirely to the five countries bordering that ocean … As long as the Japanese government is committed to intervention, Japanese research institutes and firms should make active contributions by utilizing the knowledge, technologies and operating experience that they have cultivated in the cryosphere.[44]

Japan was perhaps the first Asian country to be associated with the Arctic region. It has an active scientific research programme related to environmental studies and projects relating to NSR and resource exploitation plans, particularly oil and gas. In 2007 Japan applied for, but is still to obtain, observer status in the Arctic Council.

Japan began scientific research of the polar region in the 1970s. In 1973 it established the National Institute of Polar Research (NIPR). In 1993 the Japanese Ocean Policy Research Foundation (OPRF) participated in the International Northern Sea Route Programme (INSROP) in partnership with the Fridtjof Nansen Institute in Norway and Central Marine Research & Design Institute in Russia.[45] Japan initiated the Japan Northern Sea Route Programme (JANSROP), which in 2002 was expanded to include Canada and other countries as partners and was re-designated as JANSROP-II. This project envisaged research on "a transportation system to bring natural resources from the Russian Far East to Japan via the NSR and on the safety of navigation and conservation of the marine environment in the Sea of Okhotsk". This culminated in the JANSROP-GIS (geographic information system) study that provided data on resources in the Russian Far East.

Japan has a research station at Ny-Ålesund, which is manned by about eight to ten scientists, whose research focus is meteorology, glaciology, oceanography, terrestrial biology, and upper atmosphere physics. In 2009 Japan dispatched R/V Mirai on a cruise to the Pacific side of the Arctic Ocean for oceanographic research.[46] This cruise, lasting fifty-nine days including thirty-nine days in the Arctic Ocean, involved observations on Arctic warming, sea

ice reduction and the resultant changes in ocean, atmosphere, and ecosystem.

From the security perspective, Japan is also aware that as the Arctic Sea ice melts, its waters will gain greater strategic salience particularly in the Tsushima Strait, the Sea of Japan, and the Tsugaru Strait. It is noted that

> The emergence of this new sea route might stimulate territorial disputes over the Senkaku Island, Takeshima Island and the Northern Territories, all of which lie along this sea route. Japan will require greater maritime domain awareness capabilities, search and rescue, and environmental protection measures. North Korean ships might also take that route for unlawful activities.[47]

Further, greater number of Chinese naval vessels will also transit through these straits and could potentially jeopardize Japanese security.

Republic of Korea: Commercial Activity

The Republic of Korea began its polar research in 1985 after it acceded to the Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR). In 2001 it set up the Korean Arctic Science Council (KASCO). In 2002 it joined the International Arctic Science Committee (IASC) and inaugurated its Dasan Station at Ny-Alesund. In 2008, fifty-seven Korean scientists carried out research in atmospheric sciences and biology at the Dasan Station and also commissioned the Research Icebreaker *Araon*. South Korea, benefiting from its sophisticated shipbuilding capability, is building several "ice-strengthened cargo ships and tankers, many of them with dual-directional technology that enables them to sail normally on open seas, then use their propellers to chew their way through sea ice."[48]

Indian Initiatives

India's engagement in the Arctic dates back to nearly nine decades: it signed on 9 February 1920 in Paris the Treaty concerning the Archipelago of Spitsbergen (the Svalbard Treaty), which entered into force on 14 August 1925. At that time, India was part of the British overseas dominions and the King of Britain and the Earl of Derby signed the treaty.

On 30 July 2007 India established a scientific research station, *Himadri,* at Ny Alesund, which conducts its operations under the guidance of the National Centre for Antarctic and Ocean Research (NCAOR), under the Ministry of Earth Sciences. Since 2007 India has undertaken seven expeditions to the

Arctic. It has also placed orders for a dedicated vessel for polar expedition, which is expected to join the NCAOR in 2012.

India has drawn long-term plans to invest in scientific research in the Arctic. The draft approach paper for the Twelfth Five Year Plan (2012–2017) of the Earth System Science Organization of the Ministry of Earth Sciences notes that Indian scientists would focus on the study of the modern biogeochemical cycling in the snow packs and sea ice to identify the possible triggers in the seemingly less understood but crucial linkage in the controlling mechanisms in the response of the ice cover to the warming trend.[49] The other areas of research would be the deployment of a multi-sensor ocean-atmosphere mooring in Kongsfjorden, Svalbard, for long-term climate variability studies. India also plans to publish a composite geological map of the Arctic.[50]

Although India has developed an advanced scientific programme in the Arctic, there is limited interest among the Indian strategic community about the evolving politico-economic and strategic dynamics in the region. Nevertheless, an Indian analyst has raised issues such as: (a) If there are significant shifts in the world's shipping and, therefore, trade patterns, what will this mean for countries like India?; and (b) will the exploitation of energy resources in the Arctic improve India's energy security or complicate it even more than currently is the case?[51] These are significant questions and merit attention.

It is estimated that the NSR will witness 5–6 million tons of cargo movement in the eastern direction and 2–3 million tons to the west.[52] In the short term, the NSR is likely to be popular among the shipping companies for transporting critical energy resources from the Arctic to Asia, particularly to China, Japan and South Korea for a short period of two to three summer months. However, it is still cheaper to transport cargo via the Suez or the Panama Canal as against the NSR, because shipping through the NSR involves additional costs of chartering ice-classed vessels that need to have double hulls, ice breaker escorts, specialist crew, and entails higher insurance premiums.

As regards energy security, India has been bidding for stakes in oil and gas fields in Brazil, Colombia, Congo, Cuba, Egypt, Iran, Libya, Myanmar, Nigeria, Russia, Sudan, Turkmenistan, Venezuela, Syria and Vietnam. ONGC Videsh Limited (OVL) global search has now taken it to the Arctic. OVL has approached Rosneft of Russia for exploration in the Yamal peninsula in Arctic Russia, which is estimated to have gas reserves of over 50 trillion cubic metres and can produce 360 billion cubic metres annually for many years. In June 2010 India's Commerce Minister Anand Sharma stated: "We have

enormous interest in enhancing investments in Russian oil and gas assets, including Sakahlin-3 project, and an ONGC team will be visiting Russia shortly to assess the Yamal gas fields offered by Moscow." Russia's second-largest gas company, Novatek, has also invited OVL to participate in the Yamal LNG project. Reports suggest that OVL has submitted its indicative bid on behalf of an Indian consortium to take 15 per cent interest in the project and that Novatek has invited OVL for further discussions.[53]

Conclusion

This paper has attempted to showcase that there are significant climate-induced changes taking place in the Arctic region. The ice cap is rapidly shrinking, raising concerns that the Arctic could be ice-free in the next three to four decades. At the same time, the melting of the ice cap has created several opportunities for resource exploitation and new routes. However, there are several challenges to make this route cost-effective through the year.

The Asian countries are convinced that the Arctic will be the future energy lake and the Arctic waters new fishing grounds that would merit sophisticated resources diplomacy by Asian countries. They would like to contribute to the resource exploitation initiatives through joint ventures with the Arctic states. The Asian countries are also exploring ways to develop technological capability to use the NSR and to support transportation of cargo through this route. In essence, the Asian Arctic strategy goes well beyond scientific, atmospheric and oceanographic research.

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