CONCLUSION

Antarctica is a great wilderness with breathtaking landscape, extreme climate conditions and an extraordinary fauna and flora. It is about 1/10\textsuperscript{th} of the earth’s land surface and its surrounding ocean forms 1/10\textsuperscript{th} of the earth’s ocean. Some 98% of the continent is covered by ice-sheet with an average thickness excluding 2.5 kilometres. Though the continent gives an impression of being a white wasteland, but it is vital to life on earth. The region holds many secrets of the earth’s past. It is also considered the best monitoring zone to monitor global pollution.

The Antarctic region constitutes the Antarctic continent and the surrounding watermass, known as the Antarctic Ocean. The Antarctic Ocean is separated from the watermass of the Atlantic Ocean, Indian Ocean and the Pacific Ocean on the basis of the Antarctic convergence. The Antarctic convergence is a zigzag unbroken circle which is best determined by the rapid change in the temperature of the water. It also marks the northern limit of many planktons, fishes and even bottom dwelling animals.

The physical features of the Antarctica region are quite complex and unique. Distinguished physiographic, metrological, hydrological and ecological features characterize both the continent and the surrounding seas. The continent is geologically a part of the Gondwanaland. It has a number of relief features like elevation and depressions on the land.
surface but they get somewhat smothered by the thick mantle. Only some of the high mountains ranges are visible. Similarly, the Antarctic Ocean has distinctive Oceanic circulation and salinity distribution. Such uniqueness can also be seen in the resources of the region.

The natural resources of the Antarctic region can be broadly divided into the living resources and the non-living mineral resources. The living resources can be broadly grouped into the continental living resources and the marine living resources. The continental living resources are very scarce but the region is blessed with abundant marine resources, as the Antarctic Ocean is probably the biologically most luxuriant province on the surface earth.

The different types of marine living resources include whales, seals, fishes, birds and squids. But the most important of them all is the krill. Krill is a tiny shrimp like crustacean found in abundance in the Antarctic Ocean. Due to its high nutrition value the krill fishing has increased significantly in the recent years. However, it has also raised concerns from the environmentalists as it has been found that the krills play a very vital role in the Antarctic ecosystem. The threat becomes more real in absence of any reliable krill estimates in the region.

The most important fish catch in the region is of the Antarctic cod or the toothfish, which constitute three-quarters of all coastal fish species. Still, the fishing industry is not well developed, but it is potentially a
lucrative industry. Other marine living resources like whales and seals were traditionally hunted from the region. However, their dwindling population and its impact on the fragile Antarctic ecosystem led to the widespread demand of banning their exploitation. This led to the conventions like International Whaling Convention and the Sealing Convention in which selected hunting is allowed.

Unlike the living resources in the region, which has been well researched, the potential of the mineral resources in the region has not yet been scientifically confirmed. The minerals found in the Antarctic Region can be broadly divided into two categories – the metallic mineral resources and the non – metallic mineral resources. The important metallic minerals are copper, nickel, lithium, beryllium, columbium, tantalum, tin, tungsten, chromite etc. These metals are believed to be present in three metallogenic provinces. They are the East Antarctic Province, Transantarctic Metallogenic Province and the Andean Metallogenic Province.

The non – metallic deposits include coal, oil and natural gas. Coal was one of the first minerals to be discovered in the region. It is believed that Antarctica has as high as 11 per cent of the total world reserves. It is also believed that the sedimentary deposits of Cretaceous and Tertiary periods are rich in oil and natural gas. However, because of the technological constraints and high cost involved in mineral exploration and
exploitation, not much progress has been made in terms of actual prospecting. Further, with the Madrid Protocol coming into force, mineral exploitation has been banned for the next 50 years.

The icebergs and tourism in Antarctica can be considered as other resources. None of the treaties within the Antarctic Treaty System (ATS), including the Madrid Protocol, contain any reference to the icebergs. However, lot of debates and discussions are taking place to regulate tourism in Antarctica within the ATS.

The evolution of the ATS can be traced with the developments in the post second World War. There were several factors present in the Antarctic region that could have made it a source of conflict. The most important factor was the territorial claims. Seven countries including United Kingdom, New Zealand, France, Australia, Norway, Chile and Argentina claimed about 85 per cent of the Antarctica. These claims were not recognised by other countries. Further, within it, the claims of Argentina, United Kingdom and Chile overlapped.

The other important factor was that about one fifth of the continent was not claimed by any nation. It was a land which was owned by no one and perforce was available to claim by anyone. This situation in itself was a potential source of conflict. In addition to it, the post second World War saw the onset of cold war. The world was divided into two power groups under the leadership of the then existing super powers. The development
of blue water navy and long range weapons of mass destruction led to the fear of the extension of cold war to the Antarctic region.

All these factors coupled with the success of the International Geophysical Year 1957-1958 stressed the need of constructive cooperation to ensure peaceful use of Antarctic, its non-militarisation, proper supervision and the continuation of the scientific cooperation that had begun during with the International Geophysical Year. An initiative was taken by the United States President Eisenhower in 1956, which resulted in the signing of the Antarctic Treaty that came into force in 1961. The Antarctic Treaty has two major objectives - peaceful use of Antarctica and scientific cooperation. One of the most significant provision of the Antarctic Treaty is contained in the Article IV. This article has successfully addressed the issue of territorial claim in the region. The article makes it explicit that no acts undertaken during the duration of the Treaty should constitute a basis for asserting, supporting or denying a claim to territorial sovereignty of the continent. Neither new claims nor the enlargement of an existing claim may be asserted while the Treaty remains in effect. Further, nothing contained in the Treaty should be interpreted as a renunciation or denunciation or diminution by any Party of previously asserted rights, claims or basis of claim to territory in Antarctic. In this way, claimant states can continue to dispute their legitimacy.
The Antarctic Treaty can be considered as a landmark since it has been largely successful in peaceful accommodation of differences. Based on the Article IX of the Antarctic Treaty a number of measures and conventions have been adopted from time to time in furtherance of the principles and objectives of the Treaty. These measures and conventions include Agreed Measures of 1964, the Sealing Convention of 1972, the Convention on the Conservation of Antarctic Maritime Living Resources of 1980 etc. These measures and conventions along with the Antarctic Treaty are known as the Antarctic Treaty System.

One of the milestones of the Antarctic Treaty System is the Protocol on Environmental Protection or the Madrid Protocol, which is an instrument specifically devoted to the protection of the Antarctic environment, which came into force in 1998. The Madrid Protocol is the result of the opposition to the proposed Convention on the Regulation of Antarctic Mineral Resources Activities (CRAMRA), increased awareness of environment globally and the efforts of Non-Governmental Organisations like Antarctic and Southern Ocean Coalition (ASOC) and Greenpeace International.

The Madrid Protocol supplements the Antarctic Treaty while ensuring ample protection of the environment. The main objective of the Protocol is to designate Antarctica as a ‘natural reserve devoted to peace and science’. Thus, it underlines the need to conserve the Antarctic ecosystem.
which was not so in the Antarctic Treaty. The Antarctic Treaty aimed to make Antarctica an ‘international land of scientific research and a continent of peace’.

The application of the environmental principles is based on the essence of cooperation among the Parties. There is emphasis on joint programmes for environmental protection, assistance in preparing environmental impact assessments, joint expeditions and selection of sites to establish stations so as to avoid their excessive concentration. Stress is also given to the availability, exchange and circulation of appropriate information, like those concerning with environmental assessments, disposal, emergencies and statistics.

Some of the important features in the Madrid Protocol include a system of individual and collective inspection. Unlike the earlier provisions there would not only be national inspectors but also inspectors appointed by the Consultative Meetings. Another feature is regarding response to emergencies. The Parties are under obligation to establish an adequate response system and necessary contingency plans, all of which should also be subject to prior assessment. Parties will also undertake elaborate rules and procedures relating to liability for damage arising from the emergencies.

The obligations established by the Protocol are specified in details in the five Annexes, which form an integral part of the Protocol. These
Annexes provide a series of structured and coherent environmental provisions and rules in their respective subjects.

The Annex I deals with the Environmental Impact Assessment (EIA). It specifies the criteria and procedures to be followed to fulfil this requirement. All Antarctic activities must be subjected to the EIA, except those that will have no impact or where impact will be minor. The Annex II provides for the conservation of Antarctic fauna and flora. It has further elaborated the criteria contained in the Agreed Measures. Waste disposal is included in the Annex III. This Annex is based on the principle that whoever generates waste is responsible for its disposal. The Annex IV deals with the provision of marine pollution and the Annex V contains the various types of Protected Areas in the Antarctic. Unlike the other Annexes, Annex V was not the part of the Protocol when it was signed. It entered into force in the year 2002.

India was an active participant in the negotiations leading to the signing of the Protocol. India signed it on July 2, 1992 and ratified the Protocol on April 26, 1996. India’s interest in the Antarctic Treaty in general and Madrid Protocol in particular is due to a number of factors. These include geographic scientific factors like Antarctic and India are believed to be the part of Gondwanaland, which was linked together some 200 million years back. Further, the atmospheric and oceanic circulation over the Antarctic region has a bearing on the Indian monsoons. There
are security apprehensions and geostrategic concerns as well. India’s location exposes her to any destabilising activity in the Antarctic region. Even if there is a conflict in the region not involving India, there are chances of spill over effect that may pose a threat. Similarly, any non-war military activity like nuclear tests, dumping of radioactive waste or military exercise may have an impact on the security as well as environment of the Indian subcontinent.

Another factor responsible for India’s interest is the natural resources in the Antarctic region – both proven and potential. By being the part of the Antarctic Treaty System (ATS) India has ensured that its claim of the Antarctic region cannot be ignored in the future. In addition to it, by participating in the negotiations of the Madrid Protocol and being member of the ATS helps India in enhancing her national prestige among the world community.

The Madrid Protocol is considered a step forward in terms of providing for a comprehensive approach to the protection of the Antarctic environment. It is a coherent framework which replaces the ad hoc arrangements adopted at different times within the ATS. It also represents the changing ideas and values within the Antarctic regime on how protection of the Antarctic environment can be achieved. However, the signing of the Protocol has also raised several geopolitical issues and concerns.
There is a widespread concern regarding the security of Antarctic environment under the Madrid Protocol. The Antarctic Treaty was not an environmental treaty as it was primarily designed to prevent conflict among states over territorial claims and to manage potential tensions between the then superpowers. But the Madrid Protocol has not only brought the issue of the conservation of the Antarctic environment into forefront but also tried to present a regime that could be successful in conserving the fragile Antarctic ecosystem within the framework of the ATS. The Protocol is legally binding agreement and voluntary compliance has been replaced by a system of stronger compliance procedures.

Doubts have also been raised about the effectiveness of the Protocol. Beyond the formal area of making available a better organised set of rules, there is a contribution of substance of a limited nature. Some of the major challenges for the Protocol to function effectively are as follows:

- The Protocol provides for banning the mineral activities in the region. However, the same set of countries had adopted CRAMRA only three years back. Thus, the intention of these countries can be questioned.
- The Protocol allows its Parties to depart from some of its provisions under exceptional circumstances. Such exceptional circumstances may be misused.
• In order to get the consultative status within the Treaty, the number of scientific stations has been increasing. In certain areas their concentration has itself become an ecological threat.

• The Madrid Protocol encourages scientific research activities in the region. However, these research activities are not only expensive but create environmental impact.

• The growing number of tourists is also becoming a threat to the fragile ecosystem in the Antarctic region. The Protocol has failed to address this problem effectively.

• The unclear language used in the Annex relating to the Environmental Impact Assessment (EIA) and the decision making authority regarding EIA completely in the hands of the involved Contracting Party has also been criticised.

• There is absence of regulations for liability for damage caused by Antarctic activities.

• The inspection system within the Protocol is too weak. The number of inspections is low, which is approximately one inspection each season. Further, those who undertake inspection may be influenced by political considerations of their government.

Despite these concerns, it should be appreciated that the Protocol has tried to present an effective and comprehensive regime for the
environmental protection in the region. There may be some shortcomings but provisions have been made to overcome them within the Madrid Protocol like the amendment procedure and the inclusion of new Annex. This is also evident when we examine the changes in the ATS with the implementation of the Madrid Protocol. The impact of the Protocol upon the ATS has been suitably moulded to ensure consistency and to present comprehensive environmental regime.

The Madrid Protocol also appreciates the role of Non-Governmental Organisations (NGOs) in the ATS. It is seen as an instrument to further strengthen the Protocol. One of the salient features of the Protocol is the continuing interaction among states and non-state actors so that the impetus for institutional change and adoption is maintained.

Further, the Protocol has also been successful in taking the bite out of most of the issues being raised about Antarctica in the United Nations. By bringing the issue of environment in the forefront and by banning the mining activities in the region, it has been successful in bringing the United Nations in its favour.