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EDITORIAL

This issue comes at a time when the conflict in Ukraine continues to rage, with no signs of an early end. The conflict threatens to impose severe hardships in Ukraine over the winter months and choke off gas and oil supplies to Europe during the winter season. The impact on scientific collaboration continues to take its toll. Increasing restrictions on scientific cooperation with Russia by the US, the G7 and others is reducing the scope for science diplomacy as a communication channel. While these restrictions may have minimal impact on the conflict, they could result in irreversible and long-term damage to the framework of science collaboration to deal with global challenges such as climate change, space debris, ocean biodiversity, etc.

Science Diplomacy has in the past managed to serve as a channel of communication between the US and the USSR during the Cold War. In the present conflict as well, there is scope for science diplomacy to preserve global scientific collaboration, especially for global challenges. Also, in the case of the Arctic, the US, Russia, and European states have much to gain by maintaining collaboration. Science collaboration on global challenges should be spared from actions such as sanctions that might result from the conflict. A good example is the cooperation with Russia at the International Space Station (ISS) which continues and remains on a very high professional level, and there is the prospect of operation of the Russian segment of the ISS until 2028.

We present an article on India's policy and engagement with the Arctic, which has gained importance due to the climate change effects in the Arctic, and the announcement of India's Arctic policy this year. In the context of the European Union's call for a new strategy for science diplomacy given the growing geopolitical challenges due to the conflict in Ukraine, the second article reviews the Europe's Horizon 2020 project 'Inventing a Shared Science Diplomacy of Europe' (InsSciDE) which officially came to an end in June 2022. The third article examines the orbital space around the earth and its increasing population by human space objects and the consequent risks and challenges, and the need for better management of the global commons.

We present under perspectives, an account of a lecture by Dr El Baradei, former Director General of the IAEA, who addresses a wide range of issues concerning India and the World, including the challenges in the nuclear domain. The reports section on events covers the summer school on Science Diplomacy: Improving Capacity of Science to Inform Policy held at Venice International University, Venice, Italy. We also cover a lecture on Data Diplomacy and its increasing importance, as the world moves towards the

generation of enormous amounts of data, and issues such as regulation, use, security, and control over this resource assume greater salience.

Also presented in this issue is a review of the 2022 edition of the Global Sustainable Development Report, and a review of a book that focuses on the challenges and prospects of Turkey's Water Diplomacy also adds value.

We hope that the New Year will bring new possibilities of ending the conflict in Ukraine and ending the suffering of the affected population.

ARTICLE

India and the Arctic: Evolving Engagements

Nitin Agarwala*

Nitin Agarwala

Introduction

The Arctic region that is home to eight nations (Canada, the United States, Russia, Finland, Sweden, Norway, Iceland, and Denmark that represent Greenland and Faroe's islands and Iceland) has become a topic of discussion ever since the reduction of the ice-cap in this region has been aggravated by climate change.

As the ice-cap reduces, it opens the region for activities for various environmental and scientific studies[1] and commercial activities such as terrestrial and offshore mining for minerals[2] and petroleum, shipping, tourism, infrastructure development and exploitation of fishes. In addition, access to the biodiversity of the region, understanding the biogeochemistry of the Arctic sea-ice, and access to numerous marine species, most of which are unknown, have now become possible. The ice-cap reduction has opened trade routes connecting the seaports of East Asia with Europe (by the Northern Sea Route) and the western coast of America (by the Northwest Passage).

This growing interest has ensured the involvement of other world nations in the region, so much so that 13 of them have been granted Observer status in the Arctic Council and allowed the establishment of numerous permanent research stations in the Arctic region.[3] The members of the Arctic Council and those with Observer status as of 2021 are seen in Table 1.

The available resources and varying strategic interests of nations in the Arctic have created a geopolitical competition for control and possible conflict[4] and militarisation[5] to preserve their respective interests. Though most of the

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academic literature regarding this is focused primarily on the activities of China in the Arctic, the evolving engagement of India has been debated little. The recent 'Arctic Policy of India', however provides the contours of India's engagement with the region and is considered a step towards developing a whole-of-government approach.

It is with this understanding that the present discussion aims to provide a broad-brush view of India's growing activities in matters Arctic with a focus on improving its future prospects in the region.

India's Engagement in the Poles

India's engagement with the Arctic is not new. Their engagement dates back to the 1920s as a part of the British Empire when the Svalbard Treaty was signed.[6] However, India's involvement with the Poles began in true earnest only in 1981[7] when it launched its expedition to the South Pole (Antarctica) to study the physical and environmental changes of the Earth and then established the research stations 'Dakshin Gangotri' in 1983, followed by 'Maitri' in 1989 and 'Bharati' in 2012. These expeditions were motivated by an interest to counter territorial claims on Antarctica by some nations for possible mineral exploration and commercialisation and India's interest to study the impact of the Antarctic on India's lifeline, its monsoons.[8] What began as a scientific expedition gave India access to international forums and an opportunity to prove its dominance in faraway expeditions.

The tryst with the South Pole (Arctic) began in 2007 with the launch of the International Polar Year (IPY),[9] which allowed the Indian scientists to camp at the International research village at *Ny-Ålesund* on Spitsbergen Island. The camp that began with studying shrinking snow and ice-cap in the Poles, the linkage of the Poles and the rest of the Earth and the resilience of local communities to the environment and social change allowed India to establish their dedicated research station 'Himadri' at *Ny-Ålesund* in 2008 to study climate change and the relationship between the Arctic climate and the Indian monsoon. This was followed by the deployment of a multi-sensor underwater moored observatory IndArc in the Kongsfjorden Fjord in July 2014[10] and the Gruvebadet Atmospheric Laboratory at *Ny-Ålesund* in 2016.[11]

Strategic Interest of Arctic Nations

If one studies the Northern Sea Route (NSR) and the evolving strategic interest of the Arctic nations along this route, one notices that the primary interest of the

Table 1: Members of the Arctic Council as on 2021

Arctic states (8)	Canada, Denmark (representing Greenland and Faroe Islands), Finland, Iceland, Norway, Russia, Sweden, the United States (US).
Observer states (13)	Germany, the Netherlands, Poland, United Kingdom (UK) (1998) France (2000) Spain (2006) China, India, Italy, Japan, South Korea, Singapore (2013) Switzerland (2017)

nations is that of access to hydrocarbons and other mineral resources of this region and the ability to diversify their trade in terms of markets while reducing travel time to European markets. For countries like China, the route is not only economical but also allows them to overcome the Malacca Dilemma.[12] On the other hand, countries like Russia see the opening as a means of integrating their Arctic territories and cities with the global economy.

It is envisaged that the NSR would allow the movement of nearly 50 million tons of hydrocarbons from coastal and offshore areas of the Barent and the Kara seas, nearly 5 million tons of minerals such as nickel from Norilsk (Russia) and iron-ore from Scandanavia and an unknown volume of containers by 2030.

While the strategic interests of nations have increased their involvement in this region, numerous challenges make these involvements difficult. These challenges evolve from the intention of exploiting the resources of this Pole, unlike that in Antarctica, which is protected by the Madrid Protocol of 1991(which provides environmental protection to the Antarctica Treaty). Such an interest has resulted in disagreements regarding overlapping claims by the Arctic littorals, thereby forcing the militarisation of the region. This is further fuelled by the increasing involvement of Observer states, thereby upsetting the existing delicate balance amongst nations of this region. In addition, with the possible opening of sea routes, there is a risk of pollution and piracy, which would need to be addressed as the volume of commercial ships on this route increases.

India's Evolving Engagements

On realising the importance of the Arctic and the growing geopolitics of other nations in the region, India too has begun to increase its engagements here. After participating in the IPY and establishing the Arctic research base at Ny-Ålesund, in 2012, India was elected to the Council of the International Arctic Science Committee (IASC)[13] and subsequently granted observer status to the Arctic Council in 2013 and then re-elected to the Arctic Council in 2019.[14] In addition, some steps taken by India to increase its involvement in the Arctic are:

(a) *Establishing a Scientific nodal agency*. In 2018, the National Centre for Antarctic and Ocean Research (NCAOR), established in 2000, was rechristened as the National Centre for Polar and Ocean Research (NCPOR), thereby indicating the growing interest of Indian policy-makers towards both the Poles.

(b) *Bilateral Scientific research cooperation*. India established the Norwegian programme for research cooperation (INDNOR) in 2010 to study international political issues, environment and climate, clean energy and social development.[15] India also signed a Memorandum of Understanding (MoU) with Sweden in Dec 2019 for cooperation on Polar Science[16] and another one with Polar Knowledge Canada (POLAR) in Feb 2020 for scientific collaborations.[17] These agreements indicate the interest of India to strengthen science and technology in the region as it has done in Antarctica.

(c) *Business opportunities*. With an intention to increase business with the nations of the region, Indian companies were permitted to invest in the Arctic in energy and minerals, and ship LNG from Russia in 2018.[18] Accordingly, ONGC Videsh bought a 26 per cent stake in Russia's Vankorneft and 20% in Sakhalin-I. In addition, a Joint Venture between Coal India and Vostok Coal was established to mine coal in the Arctic.[19]

(d) *Cooperation with Russia*. To increase trade, a maritime route is being established between Chennai and Vladivostok.[20] This

link would provide increased access for Indian goods to Russia. Similarly, for increased access to the region for scientists, India and Russia have agreed to set up a research station in Russia.[21]

(e) *Diplomacy through military engagement*. Since the military has been used as a tool to shape foreign policy by India for many years,[22] the friendly visits of Indian Naval ships have been maintained in this region. In 2013, INS Sindhurakshak was the first submarine to sail in the Arctic Sea.[23] In 2016, three IN ships, Sahayadri, Shakti and Kirch, visited Vladivostok and in 2019,[24] while INS Tarkash visited 4 Arctic nations viz. St Petersburg (Russia), Began (Norway), Karlskrona (Sweden) and Helsinki (Finland)[25] on the same visit.

Though India's engagements in this region have been ongoing and evolving, some researchers[26] have often blamed these involvements to be either tilted towards treating the Arctic as a global common[27] or the other extreme of being a means to achieve its own interest.[28] However, India has maintained a middle path of forging relationships with the Arctic nations in science and environment to meet its growing demand for resources on the lines of '*Vasudhaiva Kutumbakam*' (The World is one Family). In order to remove this ambiguity in appreciation, the Government of India released India's Arctic Policy in March 2022[29] after debating and refining the content of the draft policy originally released in Dec 2020.[30]

India's Arctic Policy

India's Arctic Policy,[31] as released in March 2022, is considered as a timely policy that provides a broad direction to its policy-makers on the contours of India's engagement with this region. While the policy may not be considered perfect, it is surely a positive first step towards providing a whole-of-government approach to India's engagement with the region. Eventually, it would help raise awareness about the Arctic in India and abroad, bringing greater synergy amongst stakeholders to work together for the greater good of the Arctic region.

The policy aims to enhance India's cooperation with the Arctic region, harmonise polar research with the Himalayas, increase understanding of the Arctic region, encourage international efforts to combat climate-change and protect the environment, and advance studies of the Arctic in India. To achieve these targets, it uses the six pillars of science and research, climate and environmental protection, economic and human development, transportation and connectivity, governance and international cooperation and national capacity building.

As mentioned, while the Indian government has released an 'Arctic Policy' for India, it provides only the basic contours for the policy-makers and for the entrepreneurs of the nation. Since the devil is usually in the details, which currently are still at the implementation stage, the following are considered as an essential to ensure that this policy moves from being merely a policy to implementation. Some of these recommendations are:

(a) *Need of a desk in MEA*. Currently, 8 Arctic nations and 13 observer states are associated as a minimum with the activities in the Arctic. All these states are handled by different desks in the MEA, and a holistic picture related to the Arctic cannot be appreciated when taking decisions. To do so, a single desk that deals with the Arctic issues, including the need of an 'Arctic ambassador/ representative' who can voice India's perspective on Arctic affairs, is considered essential. This desk and ambassador can be supported by a dedicated expert committee to plan, monitor, steer, implement and review

India's Arctic activities as proposed in the Arctic Policy.

(b) *Encourage scholarship*. In order to ensure that the understanding of the Arctic region increases in India, it is essential that research fellowships are constituted. This could be done akin to the Prime Ministers Research Fellows (PMRF) scheme under the aegis of NITI Aayog. In order to further the awareness about this region university level research through MoUs, conferences and conventions need to be encouraged while ensuring that the bureaucrats, policy-makers and thinkers are educated alike in issues related to the Arctic.

(c) *Scientific*. Currently, India has its scientific station in Norway, with some future collaboration planned with Russia and Canada. However, it is essential that India collaborates with Finland, Sweden and Denmark to provide greater versatility to its scientific involvement in the region. This collaboration could be bettered by establishing satellite data-receiving Earth stations in these countries as done in Antarctica[32] to encourage and support environment monitoring while making communication available and accessible even to isolated habitation in these countries.

(d) *Monetary and Technical support*. While India has the requisite human resources in matters technical for the Arctic, it needs to encourage the much required monetary support through the New Development Bank under BRICS.[33]

(e) *Trade*. The main advantage of the reducing Arctic ice-cap is towards a shorter maritime trade route. Since India does not stand to gain from this shorter maritime route due to its geographical location, it needs to look at alternative means of encouraging trade with the Arctic nations. One possible method is to extend its 'Act East' policy beyond the Far East to the Arctic. Furthermore, it can look at extending its International North–South Transport Corridor (INSTC) corridor beyond St. Petersburg to the Arctic,[34] Nordic[35] and the Baltic[36] nations. This would permit trade and cultural exchange, considered critical for greater cooperation and cohesiveness between two nations.

Science Diplomacy in India's Policy and Engagements in the Arctic

Science diplomacy is considered to consist of three linked strands. Science in Diplomacy, where science is used to inform and support foreign policy objectives; Diplomacy for Science, where diplomacy aims at facilitating international scientific and technical cooperation; and Science for Diplomacy, where scientific cooperation is used as a source of soft power to strengthen or foster foreign relations.[37]

Accordingly, with an intention of using science diplomacy through creating international scientific partnerships by means of dialogue, negotiation, and cooperation with like-minded nations,[38] India aims to use its Arctic Policy to promote a peaceful world and address common issues such as climate change while ensuring sustainability in the region. It aims to do so by utilising its vast pool of scientific human resources and expertise in both Himalayan and Polar research combined with the best practices recommended by the Arctic Council.

Similarly, by using its strength and expertise in the digital economy and by creating data centres for commerce in the region, it would allow its businesses both public and private, to engage more closely in the fields of ports, railways, airports, mining, and mineral exploration. Another area where it aims to use science diplomacy is by way of encouraging interdisciplinary research through collaborative and innovative human resource development that would help generate innovative ideas through conferences, faculty and student

exchange through academic programmes. Such an effort would help develop a better understanding of the region and its issues and help assist the indigenous communities of the Arctic to cope with issues such as the disruption of unique ecosystems and loss of traditional knowledge. All of these are aimed at a perfect understanding that the region is governed by numerous domestic laws, agreements, treaties, conventions, and customary laws, many of which are bilateral and accordingly demand that cooperation with nations of the region have to be within the framework of both national and international regulations.

Such efforts have ensured that for India in the near future, science and technology remain the backbone of all activities in the Arctic, thereby making science diplomacy an indispensable part of all multilateral and bilateral diplomatic engagements with nations of the region.

Conclusion

The impact of climate change is here to stay. While world nations have agreed to abide by the Paris Agreement, nations are far behind in meeting their commitments.[39] This has resulted in an enhanced impact on the Earth as climate changes. The melting of the Arctic ice-cap is one such impact that cannot be wished away. Once considered inaccessible, the Arctic is now hosting limited commercial ships only during the summers. The time is not far before a large number of ships move in these waters for a prolonged duration of the year. Currently, factors such as harsh weather conditions, high transit fees, administrative issues and lack of infrastructure in the form of ports and ice breakers impede the growth of the North Sea Route. However, it would not be long before these factors are adequately addressed and the accessibility in the Arctic increases phenomenally driven by both commercial and non-commercial drivers.

In the interim, it is essential that India continues to maintain its relevance in the region through science and trade activities and by taking baby steps in the direction as laid out by the 'Arctic Policy of India'.

Endnotes

1. Ronald E. Doel et al., (2014), "Strategic Arctic Science: National Interests in Building Natural Knowledge – Inter War Era through the Cold War," pp. 60–80, doi:10.1016/j.jhg.2013.12.004
2. Such as coal, iron ore, zinc, lead, nickel, precious metals, diamonds, gemstones, chromium, cobalt, copper, gold, iron, lead, magnesium, manganese, platinum, silver, tin, titanium, tungsten and zinc.
3. No list of research stations in the Arctic is available in academic literature. The closest one can get is the 'List of research stations in the Arctic' at Wikipedia available at https://en.wikipedia.org/wiki/List_of_research_stations_in_the_Arctic
4. Pay, VN and Calvo, G. (2020). Arctic Diplomacy: A Theoretical Evaluation of Russian Foreign Policy in the High North, *Russian Politics* 5, 105-130, https://doi.org/10.30965/24518921-00501005
5. Holland, A, Cunningham, N, and Vagg, X., (2013), Critical Security Challenges in the Arctic, *American Security Project*, September 2013, https://www.americansecurityproject.org/the-arctic-five-critical-security-challenges/; Spohr, AP, Höring, da Silva, J., Cerioli, LG., Lersch, B., Soares, JGA. (2013), The Militarization of the Arctic: Political, Economic and Climate Challenges, *UFRGS Model United Nations Journal* ISSN: 2318-3195, p.11-70 ; Keil, K. (2014). The Arctic: A new region of conflict? The case of oil and gas. *Cooperation and Conflict*, 49(2), 162–190. doi:10.1177/0010836713482555
6. Treaty Database. (n.d). Treaty concerning the Archipelago of Spitsbergen, including Bear Island, https://verdragenbank.overheid.nl/en/Verdrag/Details/004293
7. Gad, SD. (2008). India in the Antarctic. *Curr. Sci.*, 95(2), p. 151, https://www.currentscience.ac.in/Downloads/article_id_095_02_0151_0151_0.pdf
8. Qasim, SZ. (1983). Scientific Report of the first Indian Expedition to Antarctica, *Department of Ocean Development*, http://14.139.119.23:8080/

dspace/bitstream/123456789/126/3/INTRODUCTION.pdf

[9] Allison, I., Béland, M., Carlson, D., Qin, D., Sarukhanian, E., and Smith, C. (2007). International Polar Year 2007-2008, *WMO bulletin*, 56 (4), https://public.wmo.int/en/bulletin/international-polar-year-2007-2008

[10] Venkatesan, R, KP Krishnan, M Arul Muthiah, B Kesavakumar, David T Divya, MA Atmanand, S Rajan, M Ravichandran. (2016). Indian moored observatory in the Arctic for long-term in situ data collection, *The International Journal of Ocean and Climate Systems,* Volume: 7 issue: 2, pp. 55-61, https://doi.org/10.1177/1759313116642898

[11] Thamban, M and Ravichandran, M. (2016). ESSO–National Centre for Antarctic and Ocean Research, *Proc Indian Natn Sci Acad*, 82 No. 3, July Spl Issue 2016, pp. 1145-1161, DOI: 10.16943/ptinsa/2016/48509

[12] Marc Lanteigne, (2008), China's Maritime Security and the "Malacca Dilemma", *Asian Security*, 4:2, 143-161, https://doi.org/10.1080/14799850802006555

[13] A non-governmental, international scientific organisation that aims to encourage, facilitate and promote cooperation in all aspects of Arctic research including interdisciplinary research so as to promote greater scientific understanding of the Arctic and its role in the Earth system. *See*, https://iasc.info/

[14] The Observer status of a nation if for a period of 5 years. After completion of 4 years, the observer nation is required to state its continued interest in being an Observer and is reviewed for its contribution to the work of the Arctic Council through various engagements at the level of Working Groups, Task Forces, and/or Expert Groups or in projects through an Arctic State or a Permanent participant.

[15] RCN (The Research Council of Norway. (n.d). INDNOR – Norwegian Programme for Research Cooperation with India, https://www.forskningsradet.no/en/about-the-research-council/programmes/indnor/

[16] DST. (n.d). India Sweden High-Level Innovation Dialogue announces several Collaborations, https://dst.gov.in/india-sweden-high-level-innovation-dialogue-announces-several-collaborations

[17] MoES. (27 February 2020). NCPOR signs MoU with Canadian High Arctic Research Station on Polar Research, *Vigyan Samachar*, https://vigyanprasar.gov.in/wp-content/uploads/Vigyan-Samachar-MoES-News-2-27-Feb-20.pdf

[18] Rosneft, (2020, February 05), "Rosneft Signs Contract with Indian Oil to Supply 2 Million Tonnes of Oil to India," Press Release, https://www.rosneft.com/press/releases/item/199701/

[19] Mint. (2020). NLC, Coal India form JV to develop solar and thermal power assets, *The Mint*, https://www.livemint.com/industry/energy/nlc-coal-india-form-jv-to-develop-solar-and-thermal-power-assets-11593846508993.html

[20] N. Kapoor, (2020), "East Meets East: An Assessment of the Proposed Chennai-Vladivostok Maritime Corridor," ORF Occasional Paper 286, https://www.orfonline.org/research/east-meets-east-an-assessment-of-the-proposed-chennai-vladivostok-maritime-corridor/

[21] Rao, S. (2020). What Can India Bring to the Table as Great Power Competition Heats Up the Arctic?, *The Diplomat*, https://thediplomat.com/2020/09/what-can-india-bring-to-the-table-as-great-power-competition-heats-up-the-arctic/

[22] IMD. (2015). Indian Maritime Doctrine 2009, updated online version 2015, *Ministry of Defence (Navy) Document*, https://www.indiannavy.nic.in/sites/default/files/Indian-Maritime-Doctrine-2009-Updated-12Feb16.pdf

[23] Sakhuja, V. (31 Jan 2013). "Indian and the Melting Arctic", *Institute of Peace and Conflict* (IPCS), http://www.ipcs.org/comm_select.php?articleNo=3804

[24] IN. (2016). Indian Warships visit Vladivostok, Russia, https://www.indiannavy.nic.in/node/14780

[25] Rao, S. (2020). What Can India Bring to the Table as Great Power Competition Heats Up the Arctic?, *The Diplomat*, https://thediplomat.com/2020/09/what-can-india-bring-to-the-table-as-great-power-competition-heats-up-the-arctic/

[26] Lackenbauer, P. Whitney. (2013). India's Arctic Engagement: Emerging Perspectives, *Arctic Year Book 2013*, https://arcticyearbook.com/images/yearbook/2013/Scholarly_Papers/1.LACKENBAUER.pdf; Pronina, V, Eidemiller, KYu, Khazov, VK, Rubtsova, AV. (2020). *The Arctic policy of India*, IOP Conf.

Series: Earth and Environmental Science, 539, doi:10.1088/1755-1315/539/1/012047

[27] The global commons are areas where no nation exerts sovereign rights. Internationally, three global commons have been accepted. These are the deep seabed, the Antarctica and the outer space. The global common should not be confused with the "Common Heritage of Mankind" which holds defined territorial areas as areas for the future generations that should not be exploited by individual states or people. *See*, Gautam, PK., (2011, September 02), The Arctic as a Global Common, *IDSA Issue Brief*, https://www.files.ethz.ch/isn/135416/IB_TheArcticasaGlobalCommon.pdf; Kumar, Kishore. (2013). Push for a 'Global Commons' Theory, *Indian Foreign Affairs Journal*, Vol. 8(1), http://www.associationdiplomats.org/publications/ifaj/Vol8/vol8index.htm

[28] Nayak, S. and Suba Chandran, D, (2020). Arctic: why India should pursue the North Pole from a science and technology perspective? *Current Science*, Vol. 119(6), 25 September, http://www.currentscience.ac.in/Volumes/119/06/0901.pdf

[29] PIB, (2022, March 17), Union Minister Dr. Jitendra Singh releases India's Arctic Policy in New Delhi today, **https://www.pib.gov.in/PressReleasePage.aspx?PRID=1806993**

[30] Agarwala, N., (2021), India's Evolving engagements in the Arctic, *Maritime Affairs: Journal of the National Maritime Foundation of India*, 17:1, 10-25, https://doi.org/10.1080/09733159.2021.1934969

[31] --, (2022), India's Arctic Policy: Building a Partnership for Sustainable Development, https://www.moes.gov.in/sites/default/files/2022-03/compressed-SINGLE-PAGE-ENGLISH.pdf

[32] An Earth Station, in general, is required to collect data at a variety of spatial, spectral and temporal resolutions for Remote Sensing from satellites for the use, benefit and development of humans. India's Remote Sensing Centre is at Hyderabad which unfortunately cannot acquire data from all its satellites (Geosynchronous Earth Orbit [GEO] and Low Earth Orbit [LEO] combined) due to its physical location. To increase the capability, the Antarctica Ground Station (AGEOS) was established in 2013 and is able to collect data from 10 passes per day per mission due to its location thereby increasing the data acquisition capability and improving the environment monitoring of the ocean and the atmosphere. See, https://www.isro.gov.in/antarctica-ground-station-earth-observation-satellites-ageos

[33] Lagutina, Maria and Leksyutina, Yana. (2019). BRICS countries' strategies in the Arctic and the prospects for consolidated BRICS agenda in the Arctic, *The Polar Journal*, DOI:10.1080/2154896X.2019.1618559

[34] that include Canada, Denmark, Greenland, Finland, Iceland, Norway, Russia, Sweden and the United *States*

[35] that include Denmark, Norway, Sweden, Finland, Iceland, and the Faroe Islands, Greenland, and Åland

[36] that include Estonia, Latvia, and Lithuania

[37] The Royal Society, (2010, January 12), New frontiers in science diplomacy, https://royalsociety.org/topics-policy/publications/2010/new-frontiers-science-diplomacy/

[38] Legrand T, and Stone D., (2018), Science diplomacy and transnational governance impact. *British Politics*,13(3):392–408. doi: 10.1057/s41293-018-0082-z

[39] Agarwala, N. and Polinov, S., (2021), Curtailing Anthropogenic Carbon Dioxide to Meet the Targets of the Paris Agreement using Technology Support Mechanisms, *Journal of Human-centric Research in Humanities and Social Sciences*, Vol.2, No.1, pp.1-24, http://dx.doi.org/10.21742/jhrhss.2021.2.1.01

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Disclaimer: The views expressed by the author are his own and do not reflect the views or policies of the Government of India or the Indian Navy.

ARTICLE

Inventing a Shared Science Diplomacy for Europe (InsSciDE): A Review

Sneha Sinha*

Sneha Sinha

Introduction

The role of science in International Relations and diplomacy has a long history, however their relationship has evolved over time. From the early eighteenth century, much before Britain appointed its foreign affairs secretary, the Royal Society of London had instituted the post of its foreign secretary to enable international exchange (The Royal Society, 2010). One of the earliest professional associations of science in India, the Indian Science Congress Association (ISCA) held its first meeting in 1914. It was modelled on the lines of the British Association for the Advancement of Science. ISCA's annual meetings provided a forum for greater exchange between Indian and European scientists. For its silver jubilee session, ISCA appointed a foreign secretary, and since participation of foreign scientists increased, fostering international networks in science.

Though science remained integral to foreign relations and diplomatic ties during the last century, the first decade of the twenty-first century marks the beginning of the 'new era of science diplomacy' (Lord & Turekian, 2007). Amidst strained ties between the Soviet Union and the United States during the height of the Cold War, their scientists continued to collaborate and delivered life-saving vaccines against smallpox and polio (Hotez, 2017). Scientific partnerships with the Middle Eastern and North African regions were recommended for the United States after the Iraq War and the 9/11 attacks (Lord & Turekian, 2007). Further in 2008,

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the Center for Science Diplomacy was created by the American Association for the Advancement of Science (AAAS), emerging as a leader in conceptualizing science diplomacy, building bridges and strengthening partnerships through science.[1]

One of the momentous events which has contributed significantly to the conceptualization of 'science diplomacy' is the AAAS and Royal Society's joint conference in 2009. Following this, the publication of 'New Frontiers in Science Diplomacy' in 2010 led to the understanding of the term 'science diplomacy' both academically and in policy action. It provided a three-dimensional definition of science diplomacy i.e., science in diplomacy, science for diplomacy and diplomacy for science (The Royal Society, 2010). However, this three-dimensional definition of science diplomacy has been increasingly criticised. The discourse of science diplomacy has been called 'sensationalist' and questioned on grounds of 'talk-action discrepancy' (Flink, 2020; 2022). The need for its 'pragmatic reframing' has been highlighted by several scholars and practitioners (Turchetti & Lalli, 2020; Gluckman et. al., 2017).

The Context

With the efforts of the United States to build bridges through science and international science cooperation, Japan's report 'Toward the reinforcement of Science and Technology Diplomacy' also aimed to link S&T with foreign policy for achieving mutual development. Science Diplomacy was designated important by the Japanese government in its 24th five-year national strategy on STI (Lagenhove, 2017). The European Union during the Sixth Framework Programme (FP6) recognized that the EU's R&I was fragmented, and it was difficult to effectively tackle present challenges. Strategies for international collaboration to strengthen the EU R&I ecosystem became integral to the EU's Framework Programme[2], and were reinforced by the following FP7. Though initiatives like Strategic Forum for International S&T Co-operation (SFIC) were undertaken during FP7, its interim and final evaluation report noted that there was a need for re-looking at the strategy for international cooperation to boost Europe's standing in global science and to take advantage of the opportunities afforded by international collaborative research.[3] The Commission Communication during the FP7 in 2012 mentioned the term 'science diplomacy' once.

'Science diplomacy' will use international cooperation in research and innovation as an instrument of soft power and a mechanism for improving relations with key countries and regions. Good international relations may, in turn, facilitate effective cooperation in research and innovation.[4]

As a significant global R&I player, the European Union recognised the evolving global research and innovation landscape and its role in tackling grand societal challenges including issues of sustainability, climate change, disease outbreaks, food security, sustainable development goals (SDGs), etc. The EU viewed Science diplomacy as a significant tool for implementing the communication strategy.[5] Its recent 'Horizon Europe' programme for the period from 2021-2027 has budgeted EUR 95.5 billion, about twenty- five per cent higher than the preceding 'Horizon 2020' programme which concluded last year. The Horizon 2020 was viewed as an important instrument for Union's international research and innovation cooperation actions with about 50 per cent higher funding than the FP7. It sought to address three major building blocks, which

included excellent science, industrial leadership, and societal challenges.[67]

Many of the twenty-first century challenges like environment pollution, climate change, biodiversity loss, disease outbreaks, etc. are transnational in nature and required global solutions. Science lay at the core of finding solutions to these challenges. Therefore, science has become central to informed decision making and diplomacy (The Royal Society, 2010). In 2015, the United Nations adopted the global Sustainable Development Goals which required universal action. Science, technology and innovation also became central to achieving the Agenda 2030.[8] Increasingly, Science diplomacy has begun to be seen as a tool for global governance[9] and a means for strengthening international scientific collaborations and finding innovative solutions to tackle these interconnected societal challenges (Federoff, 2009; Lagenhove, 2017; Gluckman et. al. (2017); Ruffini (2017). This formed the background for the EU's strategic focus on international cooperation in R&I in the Horizon Europe 2020, where science diplomacy was seen as a means to influence and enhance external policy.[10] Thus, science diplomacy in the EU gained greater attention.

Science diplomacy should be used more broadly as an influential instrument of the EU's external policies to underpin good governance, policy making and build mutual understanding and trust. Europe is a global leader in science, and this should translate into a leading voice in global debates. To remain relevant and competitive, we need to engage more in science diplomacy and global scientific collaboration. It is not sufficient to only support collaborative projects; we need to enable partnerships between regions and countries.[11]

In this context, three projects concerning science diplomacy were funded by the Horizon 2020 under the theme 'Societal Challenges: Europe in a Changing World – Inclusive, Innovative and Reflective Societies'[12]. These included 'European Leadership in Cultural, Science and Innovation Diplomacy' (EL-CSID), 'Using Science For/In Diplomacy for Addressing Global Challenges' (S4D4C) and 'Inventing a Shared Science Diplomacy for Europe' (InsSciDE). Further, towards the end of the Horizon 2020 programme, while preparing for the recent 'Horizon Europe', the European Parliament reiterated the need for strengthening international cooperation and spreading science diplomacy.[13]

European Leadership in Cultural, Science and Innovation Diplomacy

The EL-CSID began in March 2016 and continued until February 2019. The project was coordinated by the Institute for European Studies (IES) at the Vrije Universiteit Brussel (VUB) along with other European and non-European partner institutions. The study 'Tools for EU Science Diplomacy' was commissioned by the European Commission to Luk Van Langenhove, who was the scientific coordinator of the EL-CSID project. The study mapped the science diplomacy tools and instruments used by national governments and discussed the best practices and success stories of EU member states as well as the United Kingdom, United States and Japan. It noted the lack of comprehensive and coherent science diplomacy strategy among EU member states. The study also recommended developing an EU strategy on Science Diplomacy to assist science diplomacy initiatives of EU's member states and utilizing S&T towards addressing global challenges, leading to improvement of the EU's regional, foreign and security policy as well as its trade (Lagenhove, 2017). The ELCSID project sought to understand EU's cultural, science and innovation diplomacy and its scope for enhancing

its interests through creating awareness among stakeholders for enhancing EU's external action. They published research and policy publications and organised lectures, workshops, and conferences.[14] EL-CSID laid the foundation for the conceptualization of Science and Cultural diplomacy and sought to understand SD actors in EU as well as collected evidence and provided recommendations for EU's Science and Cultural Diplomacy.[15]

Using Science for/in Diplomacy for Addressing Global Challenges

The S4D4C programme was an initiative that ran between January 2018 to April 2021. It aimed to support present and future European science diplomacy for enhancing European capacities, EU foreign policy objectives and particularly finding solutions for global challenges. S4D4C addressed these goals from practitioners as well as academic perspective.[16] It analysed and published about twenty-three case studies and policy briefs, along with developing a commented bibliography, online knowledge resources for mapping academic and SD- related resources, etc. Science diplomacy is an emerging field with a growing demand for education and training in science diplomacy. Recognizing that there is no dedicated course in science diplomacy provided by higher educational and academic institutions, S4D4C's training courses in Vienna and Trieste are one of the most its important contributions. The training programme in Vienna had twenty-five participants, of which 16 were women. There has been growing consensus on building capability in science diplomacy and an academic curriculum (Holford & Nichols, 2017; Mauduit & Gual, 2020). Recognising this growing demand, S4D4C created an online course on SD in 2020. It was signed up by about 6000 individuals, of which 51 per cent were female and included civil services officials, diplomats, science advisers, science administrators, scientists with or without any diplomatic responsibilities (Meyer, et. al. (2021).

S4D4C has also enabled networking globally and fostered an SD community through its trainings, workshops, webinars, and networking meetings, etc. The first Global Meeting Madrid resulted in the Madrid Declaration on Science Diplomacy in 2018. The second meeting took place in Berlin and the final networking[17] event was held virtually.[18] Key achievements of S4D4C included Madrid Declaration, training workshops in Vienna and Trieste, its report 'Calling for a Systemic Change: Towards a European Science Diplomacy for Addressing Global Challenges' and the virtual science diplomacy course.[19] The policy report recommended committed, collective and integrative EU leadership together with collaborative action of all stakeholders across member states. Recognising the decade of action, the report proposed 'systemic change' to use science diplomacy in dealing with global challenges with a greater focus on STI for SDGs.[20] During the final networking meeting, the Science Diplomacy Alliance was launched so that all the three science diplomacy projects continue to work together with other stakeholders within the EU. Its final report 'the S4D4C Impact Story' summarises the achievements of the project.[21]

Inventing a Shared Science Diplomacy for Europe

The report mentioned earlier 'Tools for an EU Science Diplomacy' underlined the fragmented science diplomacy efforts in EU member states and asserted the need for a more coherent and coordinated strategy. On similar lines, the third project InsSciDE's proposal noted that member states had ample experience in utilising science in undertaking national and transnational initiatives in diplomacy engagements globally. But such efforts

were largely fragmented and lacked a specific model.[22] The name of the project itself highlights its focus on 'inventing a shared science diplomacy for Europe', which was timely and significant. This project, which is the focus of this paper was launched in December 2017 and continued until 30 June 2022. It was coordinated by the Paris-based Centre National De La Recherche Scientifique (CNRS). The fifteen institutions' consortium included universities, research organisations, diplomatic academies across eleven European countries, along with international organisations like United Nations Educational, Scientific and Cultural Organization (UNESCO).[23] InsSciDE during the period has worked very closely with UNESCO. The five core objectives of the project included: (i) Revealing and connecting European member states' experiences for addressing global challenges; (ii) Mapping the knowledge into both theoretical and strategic frameworks; (iii) Generating guidance for policy actions at EU and Member State levels; (iv) Fostering dialogue among stakeholders, and (v) Disseminating learnings to a wider audience.[24]

The Horizon 2020 focused on societal challenges.[25] Some of the issues like health, security and environment are reflected in InsSciDE's work packages, with a cross-cutting of power with science diplomacy and science diplomats. The InsSciDE project investigated science diplomacy under five broad themes (Heritage, Health, Security, Environment and Space) and via two transversal networks (Power with Science Diplomacy and Science Diplomats). The themes are explored in work packages composed of subject-matter experts and researchers from across Europe.

The conceptualization of 'science diplomacy' is often traced to the 2010 American Association for the Advancement of Science (AAAS) and the Royal Society of London's Report entitled 'New Frontiers in Science Diplomacy'. But there have been enough examples of science diplomacy in Europe and across the world before (Muller and Bona, 2018; Kunkel, 2021). It is here that the InsSciDE project becomes significant as it delves into several case studies which sheds light on the historical science diplomacy experience of the European Union, especially in five thematic areas mentioned in the previous paragraph. In its efforts to map the theoretical and practical understanding, InsSciDE has also undertook several historical case studies. InsSciDE has compiled its twenty-eight case studies into a book titled 'Inventing a Shared Science Diplomacy for Europe: Interdisciplinary Case Studies to Think with History'. The book consists of thirty-nine chapters authored by historians, science, technology and political science researchers, and archaeologists. It includes seven sections with four introductory chapters. Eight chapters revolve around the theme of science diplomats, four focus on heritage, five on health, and issues of security have been dealt in the next six chapters, followed by six chapters on environment and five on space. The concluding chapter of the book brings forth InsSciDE's significant contribution, i.e. its education legacy focusing on the Warsaw Science Diplomacy Schools (Mays et. al., 2022).

Historical case studies in the book further the theoretical and practical understanding of science diplomacy. It helps in contextualizing science diplomacy and reimagining its practices. The book tries to bridge the theory and practice gap by delving into 'lessons from history' to form a strategy for European science diplomacy which could strengthen EU's position in the world. Apart from its case studies, InsSciDE has added to the

resources on science diplomacy. It has published six newsletters during 2018-2021 which capture and provide a snapshot of its activities. InsSciDE has also published three interviews with case study leaders on heritage, science diplomats and power with science diplomacy.[26] Academicians and practitioners associated with the project as members, partners, etc. have also contributed academically and added to the literature on science diplomacy and other related aspects of science diplomacy.

As discussed above InsSciDE has not also played a crucial role in contributing towards the theoretical and practical understanding of science diplomacy, it has contributed significantly to shaping a science diplomacy community through its various events, activities, and open conferences and Warsaw Science Diplomacy Schools. The first open conference was held in Krakow, Poland in 2019. It brought together several researchers, experts, and practitioners in science diplomacy and related fields, along with 250 young trainee diplomats from over fifty countries. With experts from institutions like the United Nations High Commissioner for Refugees (UNHCR), United Nations Educational, Scientific and Cultural Organization (UNESCO), eu-LISA, issues and challenges of EU migration were discussed. On the last day of the conference, round tables and fishbowls were organized on science diplomacy strategies in tackling global challenges together with best practices, and lessons learnt. The role of science academies and diplomats was also discussed during these sessions.[27]

The Lisbon Open Conference in 2022 included a special "Academies' Day" prior to the main conference, which brought the topic of science academies back into the spotlight. The second open conference was scheduled for 2020 in Berlin, but it could not happen due to the COVID-19 outbreak. However, together with FAU Erlagen-Nurnberg InsSciDE organised the open conference in hybrid mode during November 2021. The theme of the conference was 'Science Diplomacy as an Intercultural Encounter'. Various panels, flash presentations, workshop, breakout sessions and symposium were organized during the conference to discuss aspects of science diplomacy and interculturality as well as the future of teaching and research in science diplomacy.[28] The concept of interculturality has gained greater attention which recognizes the global knowledge inequalities. Thus, moving towards an approach which is non-diffusionist, intercultural and focus on dialogue (Anderson, 2020).

As the conference recognized the dynamics of intercultural encounter, InsSciDE's following open conference in Lisbon in March this year went further ahead and addressed the theme of 'Science Diplomacy, Diversity and the Global South'. This can be viewed as a significant contribution as most of the theoretical and practical understanding of science diplomacy has largely remained Global-North centric. Thus, the conference focused on the crucial issue of 'diversity' and aimed towards engaging 'new' actors and stakeholders along with greater participation from the Global South. Academies of Science have been viewed key instruments of science diplomacy (Hassan et. al. 2015). Recognising this, the first day of the open conference focused on the international action of science academies taking note of their activities in cooperation, networking, and science diplomacy from the eighteenth century. Most of the studies discussed academies/institutions in Europe, while only about two studies focused on the role of institutions from the Global South i.e., the Indian Science Congress Association and the Network of African Science

Academies (NASAC). During the second day, panels dealt with science diplomacy, diversity, and the global south with respect to issues of open science, anthropocene, technosciences, innovation diplomacy and new actors and definition of SD. However, most of the panelists came from European institutions, with a few from the Global South. The sessions also saw a lower representation of women researchers, experts, and practitioners in science diplomacy. Nevertheless, the conference enabled fruitful and engaging discussions on several aspects of science diplomacy.

Researchers have increasingly stressed the need for education and training in science diplomacy. One of the most significant contributions of the InsSciDE programme is its training course on science diplomacy. During its tenure, InsSciDE organized two editions of the Warsaw Science Diplomacy Schools in 2020 and 2021. Due to the COVID-19 outbreak, InsSciDE along with the European Academy of Diplomacy, based in Poland, co-organised the first edition of its summer school in vitual mode. It was an intensive week-long training programme for 28 professionals and students from diverse cultural and educational backgrounds representing 6 continents and 27 countries, including 10 EU member states during June 22-26, 2020. The class included fresh graduates, early career researchers across disciplines, and professionals trained in diplomacy, international relations, and public policy. Mentors and instructors belonged to InsSciDe consortium institutions and beyond.

WSDS 2020 embodied well-structured lectures, group discussions, team assignments and group presentations. The lectures discussed various aspects of science diplomacy including history and science diplomacy linkages. In addition, the school focused on Risk, Safety and Security (RSS) concerns faced in practicing and strategising science diplomacy. Group were formed and assigned to develop policy advice for strengthening science diplomacy in specific case study themes, which were presented to the EU's External Coordination Group (EXCO). The School thus enabled a unique understanding of history of science diplomacy through case studies which helped not just in contextualising and enhancing the theoretical understanding of science diplomacy but also using it as an effective tool for tackling future challenges. It highlighted the importance of an interdisciplinary outlook in finding holistic solutions through well- informed decisions and policy-making. The Schhol was an eye-opener for understanding issues and challenges in science diplomacy. This helped students to look at present challenges through the lens of history and anthropology, while strategising policies and actions. One of the key takeaways from this course was the need to maintain the balance between competition and collaboration in international engagements, while keeping in mind several risks involved at individual, organisational and state levels.[29]

In the following year, InsSciDE organised the second edition of the School, which brought together twenty-four students from across the world. In 2021, the historical case studies of SD revolved around space diplomacy, nuclear energy research, vaccine diplomacy and archaeological research. [30] Following the school, several Science Diplomacy Ally Talks were organised where alumni discussed issues of science diplomacy and also emphasised on the Global South's perspective on SD.[31] As most of the SD courses were organized by the United States and European institutions, it was noted that they may reflect a restricted approach to SD, and it is here that initiatives like the São Paulo School of

Advanced Science on Science Diplomacy and Innovation Diplomacy (InnSciD SP) and Research and Information System for Developing Countries (RIS) become importanct as they broaden the scope towards a truly global SD discourse by engaging trainers and experts not only from their national contexts but also from across the world (Meyer, 2021).

Conclusion

During the final networking meeting of S4D4C, the three projects on science diplomacy launched the European Union Science Diplomacy Alliance for sustaining the impact of their respective projects through joint research projects, capacity building activities and policy advice on SD. The Alliance brings together several institutions and stakeholders across Europe. InsSciDE both individually and together with other programmes, and through its participation in the Alliance has played a significant role in capacity building and strengthening the theoretical framework of science diplomacy as well as the bringing together stakeholders of science diplomacy. It has played a critical role in catalysing a community of those interested in science diplomacy and related fields both in Europe and outside. Given that the European Union has sought to advance a new agenda for science diplomacy as a result of the growing geopolitical tensions, the role of the European SD Alliance can be further strengthened. As most of the challenges today are global in nature, inorder to effectively use science diplomacy as a means to address these challenges, consideration should also be given to including partners from outside the EU.

The three science diplomacy projects funded by the Horizon 2020 have largely remained Euro-centric. Several efforts were made to engage stakeholders and actors beyond EU, but they have remained limited. For science diplomacy to effectively contribute towards tackling grand societal challenges, triple planetary crises, achieving SDGs and resolving issues of the Global Commons, it should be 'inclusive'. For a truly 'shared' science diplomacy for EU which will be crucial for national, regional and global level issues, it should acknowledge the diversities of the EU member states as well the socio-economic-political-cultural context of the Global South. It is also critical to take note of the diversities within the Global South, which too is not homogeneous. There is a necessity to move beyond the present Global-North centric definition of science diplomacy. It should also work towards engaging with diverse stakeholders and identifying new actors in SD both in the Global North and the Global South. Now that all significant EU science diplomacy projects have been amalgamated into the European SD Alliance, it should further widen their contours beyond the EU and its member states, for developing an inclusive, pragmatic and context-specific science diplomacy to address growing geopolitical and societal challenges of the present century.

Endnotes

1. Details about the Centre is available at https://www.aaas.org/focus-areas/science-diplomacy. It appears among knowledge resources on https://www.s4d4c.eu/knowledge_resource/american-association-for-the-advancement-of-science-aaas/.
2. Details are available at https://eur-lex.europa.eu/EN/legal-content/summary/6th-framework-programme-2002-2006.html.
3. See the Interim Evaluation of the Seventh Framework Programme, *Report of the Expert Group*, Final Report, 12 November 2010. Retrieved from https://era.gv.at/public/documents/1045/fp7_interim_evaluation_expert_group_report.pdf.
4. The Commission's Communication

is available at https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52012DC0497&from=en.

5. https://www.ffg.at/sites/default/files/01_progress_report_sep-2014.pdf
6. More details on Commitment and Coherence can be accessed on https://www.ffg.at/sites/default/files/downloads/page/fp7_final_evaluation_expert_group_report.pdf.
7. See the Communication from the Commission to the European Parliament, The Council, The European Economic and Social Committee and the Committee of the Regions enhancing and focusing EU International Cooperation in Research and Innovation: A Strategic Approach/ COM/2012/0497 final. Retrieved from / https://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX%3A52012DC0497
8. Details are available at https://sdgs.un.org/sites/default/files/2022-02/Updates%20on%20STI4SDGs%20Roadmaps_Feb7th_2022_0.pdf.
9. https://cris.unu.edu/sites/cris.unu.edu/files/FOCIRpensament3_LukVanLanghenhove_ScientificDiplomacy.pdf.
10. The aims and strategic plan can be accessed on https://research-and-innovation.ec.europa.eu/strategy/strategy-2020-2024_en.
11. European Commission's 'Open Innovation, Open Science, Open to the World: AVision for Europe is available at http://publications.europa.eu/resource/cellar/3213b335-1cbc-11e6-ba9a-01aa75ed71a1.0001.02/DOC_2.
12. Details on Horizon 2020 can be retrieved from https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-2020_en
13. For details on degining the successor R&I Framework Programme see https://www.europarl.europa.eu/RegData/etudes/IDAN/2018/620215/EPRS_IDA(2018)620215_EN.pdf
14. Details are available at https://www.el-csid.eu/about-el-csid
15. https://www.s4d4c.eu/about/ https://5ec1837c-88ac-4ca1-b478-8bfae7f7f027.filesusr.com/ugd/7dd3ca_88c7506afc0a49e09895bcdef432ec70.pdf https://5ec1837c-88ac-4ca1-b478-8bfae7f7f027.filesusr.com/ugd/7dd3ca_8ef-8b2ebfe25424c94137ba65725f21f.pdf
16. The project details are available at https://www.s4d4c.eu/about/.
17. The review and highlights of the meeting is available at https://www.s4d4c.eu/guest-article-on-the-s4d4c-networking-meeting/.
18. Details are available at https://www.s4d4c.eu/wp-content/uploads/2021/04/The-Impact-Story-of-S4D4C.pdf
19. See https://twas.org/s4d4c.
20. A detailed review of the report can be accessed on https://www.ris.org.in/sites/default/files/2021-09/SDR%20September%202020.pdf.
21. See https://www.interacademies.org/news/impact-story-s4d4c for details.
22. The Project document can be accessed on https://cordis.europa.eu/project/id/770523.
23. Details of partnering institutions are avialble on https://www.insscide.eu/about/about-us/.
24. See project's website available at https://www.insscide.eu/about/about-us/.
25. These concerned health, demographic change, and well-being; food security, sustainable agriculture and forestry, marine, maritime, and inland water research; secure, clean and efficient energy; climate action, environment, resource efficiency and raw materials; Europe in a changing world - Inclusive, innovative and reflective societies; and Secure societies - Protecting freedom and security of Europe and its citizens. More information available at https://cordis.europa.eu/programme/id/H2020-EU.3.
26. Details can be accessed on https://www.insscide.eu/.
27. Details of the First Conference can be accessed on https://www.insscide.eu/results/first-open-conference/.

28. Details of the Second Open Conference can be accessed on https://www.insscide.eu/news-media/news-and-events/article/join-us-open-conference-to-convene-sd-stakeholders-in-erlangen. The recordings are available at https://www.insscide.eu/news-media/news-and-events/article/recordings-science-diplomacy-as-an-inter-cultural-encounter.
29. https://thesciencepolicyforum.org/articles/perspectives/warsaw-science-diplomacy-school-2020-a-flashback/Details of the course is available at https://thesciencepolicyforum.org/articles/perspectives/warsaw-science-diplomacy-school-2020-a-flashback/.
30. Overview of the WSDS 2021 is available at https://www.insscide.eu/results/warsaw-science-diplomacy-school/article/wsds21-recordings-overview-of-the-week.
31. A short perspective on Science, Technology and innovation (STI) Diplomacy: A View from the Global South is available at https://www.insscide.eu/news-media/news-and-events/article/guest-article-global-south-perspective-on-sd-discourse.

References

Andersen, C., Clopot, C. & Ifversen, J. 2020. Heritage and Interculturality in EU science diplomacy. *Humanit Soc Sci Commun* 7, 175. Retrieved https://doi.org/10.1057/s41599-020-00668-8

Fedoroff NV. 2009. Science diplomacy in the 21st century. *Cell*. 136, pp.9–11.

Flink Tim. 2022. Taking the Pulse of Science Diplomacy and Developing Practices of Valuation, *Science and Public Policy*. 49(2). Pp. 191–200. Retrieved from https://doi.org/10.1093/scipol/scab074

Flink, Tim. 2020. The Sensationalist Discourse of Science Diplomacy: A Critical Reflection. The Hague Journal of Diplomacy. Retrieved from 1-11. 10.1163/1871191X-bja10032.

Gluckman PD, Turekian VC, Grimes RW, Kishi T. 2017. Science Diplomacy: A Pragmatic Perspective from the Inside. Sci Dipl. 6. Retrieved http://www.sciencediplomacy.org/article/2018/pragmatic-perspective

Hassan, M., Volker ter Meulen, Peter F. McGrath, and Robin Fears. 2015. Academies of Science as Key Instruments of Science Diplomacy. *Science & Diplomacy*. 4(1). Retrieved from http://www.sciencediplomacy.org/perspective/2015/academies-science-keyinstruments-science-diplomacy.

Holford, M., and Nichols, R. W. (2017). The challenge of building science diplomacy capabilities for early career academic investigators. *Sci. Diplomacy*. Available online a*t https://www.sciencediplomacy.org/perspective/2018/EACIs*

Hotez PJ. 2017. Russian-United States Vaccine Science Diplomacy: Preserving the legacy. *PLoS Negl Trop Dis*. 11(5). Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5444589/

Jan Marco Müller and Maurizio Bona. 2018. Past, Present, and Future of Science Diplomacy in Europe. *Science & Diplomacy*. 7(3). Retrieved http://www.sciencediplomacy.org/editorial/2018/past-present-and-future-science-diplomacy-in-europe.

Kunkel, S. 2021. Science Diplomacy in the Twentieth Century: Introduction. *Journal of Contemporary History*. *56*(3) pp. 473–484. Retrieved from https://doi.org/10.1177/00220094211006762

Langenhove, L. 2017. *Tools for an EU Science Diplomacy*. Publications Office of the European Union. Retrieved from http://cris.unu.edu/tools-eu-science-diplomacy

Lord, K. M., V. C. Turkekian. (2007). Time for a New Era of Science Diplomacy. *Science* 315(5813), pp. 769-770. Retrieved from https://www.science.org/doi/10.1126/science.1139880

Mauduit J-C and Gual Soler M. 2020. Building a Science Diplomacy Curriculum. *Front. Educ.* 5:138. Doi: 10.3389/feduc.2020.00138.

Mays C, Laborie L, Grset P (eds). 2022. Inventing a Shared Science Diplomacy for Europe: Interdisciplinary Case Studies to Think with History.

Meyer, N., R.G. Bertelsenii, N. Czajkowskaiii, E. Dall, A. Elorzav, M. Josten, P. Griset, I. Lacunza, L. Melchor, A. P. Müller, D. Palmberg, C. Mays. 2021. A New Generation of Trainings on Science Diplomacy for Global Challenges: Insights from two European Projects. *Science Diplomacy Review*. 3(1), pp. 25-34. Retrieved from https://fisd.in/sites/default/files/Publication/SDR_April-2021.pdf

Ruffini P. 2017. *Science and Diplomacy: A New Dimension of International Relations*. Palgrave, New York, NY.

The Royal Society. 2010. New Frontiers in Science Diplomacy. London: Science Policy Centre, The Royal Society.

Turchetti, S., Lalli. 2020. R. Envisioning a "Science Diplomacy 2.0": on Data, Global Challenges, and Multi-layered Networks. *Humanit Soc Sci Commun.* 7, 144. Retrieved from https://doi.org/10.1057/s41599-020-00636-2

ARTICLE

Need for Regulating Satellite Mega-Constellation Populations in Earth's Orbit

Chaitanya Giri*

Chaitanya Giri

Introduction: UN Resolution against the testing of Direct-Ascent Anti-satellite Weapons

The world is moving towards commercialization of the Earth's orbits, especially the low-Earth-orbit (LEO) at a pace faster than ever. Commercial earth-observation (EO), communication satellite constellations, singular satellites, co-orbiting ones, active debris removal technologies, space stations, space capsules, and spacecraft awaiting slingshots into interplanetary space, the diversity of objects functioning in Earth's orbits is increasing tremendously. Diverse operators – commercial companies, space agencies, militaries, plurilateral space-based assets – are making orbital operations an economic opportunity, a regulatory challenge and a security risk all at the same time. In December 2022, a necessary global confidence-building measure that aims to assuage some of the security risks was initiated. This measure is the United Nations' resolution to voluntarily abandon testing of kinetic-kill, direct-ascent anti-satellite (DA-ASAT) weapons in the low-Earth orbit (LEO).

This history of ASAT testing by the United States, Soviet Union (later Russia), China, and India, among others, has been well documented.[1] Most of these have been DA-ASAT missiles launched from air-, sea- and land-based platforms. These DA-ASAT tests were often demonstrated to deter an adversary with critical satellites in the LEO. The DA-ASAT has never been used for warfare, but targets predominantly are command, control, computers, communications, intelligence,

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surveillance, and reconnaissance (C4ISR) satellites. In a classical 20th-century ASAT use case, the target for these tests would have been an adversarial military satellite and its use scenario would primarily be a hot conflict. Contrariwise, in the 21st century, the adversarial target can be commercial or dual-use C4ISR satellites, and the ASAT could be used even during protracted cold wars.

The last set of DA-ASAT tests happened in the 2018-20 timeframe, with Russian, Chinese and Indian agencies demonstrating their prowess, India demonstrating it for the first time, and China and Russia showcasing upgrades to their DA-ASAT systems. DA-ASAT has also been symbolic of extremely high-precision striking. This is due to its ability to intercept an object moving at high-hypersonic speeds in the LEO.

This was the same period when numerous military space entities cropped up worldwide. These include the Russian Space Forces (established in 2015), China's People's Liberation Army Strategic Support Force (2015), German Bundeswehr's Cyber and Information Domain Service (2017), the Indian Defence Space Agency (2018), the US Space Force (2019), the French Air and Space Force (2020), The Iranian Revolutionary Guard Corps Aerospace Force (2020), the Italian Space Operations Command (2020), Japan's Space Operations Squadron (2020), and the British Space Command (2021). All these military space entities depend heavily on LEO satellites for their C4ISR needs, and the use of DA-ASAT does not suit their C4ISR operations. This is why many militaries now focus on developing non–kinetic electronic and cyber warfare capabilities, even for ASAT weapons. For instance, the PLASSF operates[2] the Network Systems Department and the Space Systems Department under its umbrella. The US Space Force's Space Operations Command has given equitable weightage[3] to space (C4ISR, satellite navigation, space situational awareness, and electronic warfare) and cyber operations. Military space entities are cognizant of the vast possibilities on the lower escalatory ranks of conflict via non-kinetic means. And that being so, none of them are 'trigger happy' about DA-ASAT.

They are ready to stop DA-ASAT testing on reaching specific preparedness with non-kinetic weapon systems. However, the militaries of democratic countries are not entrusted with responsibilities for setting international governance codes. The same is the responsibility of a government's executive arm, and in some countries, both are taking cognizance of the orbital regulation challenge.

No Global Consensus on Long-Lived Orbital Space Debris

On 6th October 2020, the United Nations General Assembly received a draft resolution titled "Prevention of an Arms Race in Outer Space.[4]" The draft resolution, among many propositions, called upon all states, particularly those with outstanding space capabilities, to contribute to the global objective of peaceful use of outer space, promote international cooperation, stand by the existing treaties, and abstain from activities antagonistic to these expected contributions.

This draft received extensive support and eventually led the UN to adopt it as the resolution on "Reducing Space Threats through Norms, Rules, and Principles of Responsible Behaviours[5]" in December 2021. This adopted resolution made a pertinent mention of the issue of orbital debris. It emphasized that 'long-lived orbital debris' created by the deliberate destruction of space systems, ASAT to be precise, not only heightens the risk of in-orbit collisions but also creates misinterpretation and missteps that could eventually lead to conflicts.

The adopted resolution in its next iteration, which came out in December 2021, decided to convene an open-ended working group (OEWG) on the same issue with the attendance of civil society, commercial entities, and international organizations. Since then, two UN OEWG on Reducing Space Threats sessions, in May and September 2022, have convened in Geneva[6]. These OEWG sessions have been concurrent with a few other unilateral steps on reducing space threats taken in consonance with commercial entities. But what brings so many countries to conclude similarly when geopolitical consensus-building has become difficult? The answer is simple – the rapid commercialization of LEO and all of them seek crucial stakes in it.

The upper (600 to 2000 km) and lower (100-600 km) LEO have become a gateway for numerous economic undertakings that are both outbound – towards what is known as cis-lunar (between Earth and Moon) or interplanetary activities – and inbound – civilian, commercial, and military C4ISR activities. All the contemporary prefixes to the global economy – digital economy, circular economy, blue economy, agriculture economy, environmental economy, solutions to climate change, domestic governance, banking, insurance and finances, maritime trade, land management, water resource management, global Sustainable Development Goals, and fulfilment of net-zero commitments – are all intimately linked with C4ISR platforms fixated in LEO. Each of these applications has at least two or more competing satellite constellations, each consisting of 100s to 1000s of satellites, vying to offer commercial services to various end users. These end-users are governmental agencies, militaries, and businesses. The modality of trade of data and services is happening on government-to-government, business-to-government, and business-to-business tracks. Most constellations are coming up in the satellite-communications domain and aim to add tens of thousands of satellites unsustainably in the LEO.

Uncontrolled growth of the satellite

population, due to mega constellations, in LEO has been long articulated to lead to Kessler Syndrome[7]. The syndrome is a scenario where the Earth's orbit gets overpopulated with satellites, their active payloads, spent launch vehicle stages and adapters, defunct payloads, empty propellant tanks, and collision fragments, rendering the orbits inoperable. Commercial space players do acknowledge the challenge at hand. They now find opportunities to mitigate the orbital debris challenge through technological solutions.

More recently, commercial space players and governments with influential commercial players to serve have begun to self-regulate. This self-regulation can be seen as a correction to make space activities more sustainable and economically rewarding. The concern for economic rewards did not exist earlier, before the surge of LEO commercialization activities, when the satellite populations were low, satellite constellations did not exist, space businesses were in their nascence, and orbital debris was not a pressing challenge.

Systemic and satellite-specific mechanisms to prevent runaway collision cascades have been in the works. Various satellite manufacturers and their operators have attempted to develop autonomous collision avoidance mechanisms to re-orient a pre-empting satellite collision from incoming objects. However, collision avoidance mechanisms are not full-proof[8]. For example, since they cannot enter and burn in the Earth's atmosphere, satellites from upper LEO may become susceptible to collisions if they lose their autonomy during their end-of-life, technical failure, or non-kinetic ASAT attack. In another scenario, satellites, while avoiding a collision autonomously, may fail to pre-empt other potential collision conjunctions with other objects or may even create new conjunction hazards.

Systemic mechanisms, like SSA and space traffic management (STM), are also gaining prominence in preventing collisions. But they, too, have limitations. For instance, the SSA, currently developed by various private space companies and governmental agencies, is preparing to offer rapid and detailed intelligence about the compositions and dimensions of objects and pre-empt conjunctions. But an over-populated LEO may wane SSA's accuracy in forecasting collisions and mitigating them in a timely manner. Crowding in the LEO is becoming a hazard with on-demand, cost-effective space launches, easy deployment of small satellites, and growing defunct objects and fragments created by collisions in LEO. This crowding needs to be quickly attended to with high international priority.

'Sustainable Development' and 'Net Zero' in Earth's Orbits

In November 2021, the Paris Peace Forum, a newly-established French not-for-profit institution, commenced the Net Zero Space Initiative[9]. With support from the French space agency CNES, the initiative has gathered several commercial satellite operators, space launch companies, consulting firms, downstream service providers, and space agencies worldwide. Together, they pledged to take concrete actions to reduce orbital debris and achieve sustainable use of outer space.

After that, in April 2022, US Vice-President Kamala Harris announced from the Vandenburg Space Force Base US' voluntary commitment to discontinue testing of DA-ASAT[10]. This decision could not have been taken without discussions with US's commercial space industry and international partners. The semantics in the announcement demonstrates the US' emphasis on ensuring permanency, well-being, protection, and a sustainable environment for maintaining the global

primacy of the US commercial space activities in LEO. The lines between commercial space enterprises and conventional military space operators have blurred while ensuring what Vice President Harris mentioned in her April 2022 announcement. In September 2022, the US Department of Commerce and the Department of Defense signed an agreement on basic SSA and space traffic management[11]. In the near term, a resolution could be tabled in the UN General Assembly calling all nations to prevent testing DA-ASAT weapons.

US' Artemis Accords partners have quickly responded with similar relinquishing of DA-ASAT tests[12]. Canada took the pledge in May 2022, New Zealand in July 2022, Japan and Germany in September 2022, and the United Kingdom and South Korea in October 2022. The number of countries making the pledge will increase. Then again, it should be acknowledged that countries with ASAT capabilities have the most number of satellites, and any runaway collisional cascade does not distinguishingly keep their satellites safer. The voluntary decisions must be welcomed wholeheartedly, and so should be some accompanying questions.

Question 1: Is this end of ASAT weaponry for good, and will the world get divided into reasonable and unreasonable users?

Question 2: After giving up DA-ASAT testing, which offensive measures will the numerous newly established space military entities take in times of conflict?

Question 3: Does prohibition on DA-ASAT testing mitigate Kessler Syndrome?

Most of the pledges are on giving up 'testing' of DA-ASAT weapons in space. They cannot be construed as pledges to renunciate the use or also cannot be interpreted as 'no-first-use' pledges. The unrestricted use of DA-ASAT, in today's era of mega-constellations, in case of heightened bipolar geopolitical conflict will not have localized effects and will not remain in the realms of 'mutually assured destruction.' It will lead to a graver scenario akin to that seen in a 'nuclear exclusion zone' that can be deemed an orbital deterioration.[13] An orbital deterioration will be when the Earth's orbits are rendered useless for long periods, restricting humans from carrying out socio-economic, meteorological, communications, exploratory, and astronomical activities and pre-empt natural threats from outer space. Such deterioration will severely blow the global economy and security. Indeed most rational nations will try to keep their conflicts below the realms of such deterioration. Many incremental steps are being taken, including the shifting focus toward non-kinetic ASAT weapons.

Now to answer the second question. The wave of a self-imposed prohibition on DA-ASAT does not account for prohibiting the testing of directed energy, electronic warfare, or cyber-ASAT weapons, which could become a choice of offense for the newly-established military space entities. These non-kinetic ASAT weapon systems cannot be attributed easily, and the attacker remains camouflaged. Furthermore, these weapons do not create collisional fragments but still damage satellites, eliminating their functionality, including collisional avoidance and end-of-life de-orbiting. That non-kinetic ASAT does not generate a collisional cascade scenario is a wrong notion.

Now answering the third question. DA-ASAT or other ASAT acutely aggravates a chronic problem: the scaling likelihood of runaway collisional cascade due to the growing population of LEO satellites. The chronic problem is due to the misconstrued

and short-term business goal of filling up the orbits with as many satellites as possible, functional or defunct, and the over-emphasis on business models based on satellite constellations. The business model of satellite constellations commits to the end-user incessant C4ISR, continuous markets for satellite manufacturers, space launch companies, and numerous downstream service providers. Strong business interests in favour of mega-constellations and over-populating the LEO are the chronic contributors to the Kessler Syndrome than the acute ASATs. It has become imperative now, well before the LEO satellite population swells up to an unsustainable twenty and thirty thousand, to take necessary actions addressing the chronic contributors.

Super-Constellations would make LEO a Powder Keg

The Net Zero Space initiative and allowing private entities to participate in the OEWG are welcome steps for addressing the chronic challenge. On the scientific front, efforts are also being made in Europe[14] and Japan[15] to explore sustainable materials for building satellite buses, especially the use of wood. However, one cannot make electronics and payloads out of wood. Furthermore, wood-based satellites can be helpful only if the satellites can re-enter the Earth's atmosphere from lower LEO. The wood-based satellites in upper LEO will be unable to enter the atmosphere are burn themselves. Despite commendable solutions like collisional avoidance systems, wood-based satellites, better SSA, better STM, and space debris clean-up missions coming to the fore, these are, unfortunately, incremental solutions.

The international governance of outer space is taking small paces when space technologies and applications are progressing in leaps. This widening technology-regulation gap could eventually become detrimental to global cooperation in the LEO. Commercial satellites are now national and transnational critical infrastructure, and as the 2020 resolution aptly mentions, long-lived orbital debris created by premeditated destruction needs to be prevented. But can we only pinpoint the acute causal factor, DA-ASAT, as the only premeditated contributor? No. Overpopulating LEO with unsustainable mega-constellations is indeed a silent killer.

Giving up the DA-ASAT test is likely done to secure the short-term interests of the growing global space economy. This certainly does not mean the end-of-road of testing ASAT of other kinds and not the end of 'using' DA-ASAT. The next-generation weapons could target space businesses and may also become part of industrial warfare. These numerous advertent and inadvertent risks enumerated in this article demonstrate that every mega-constellation committed without review and analyses for sustainable use of LEO makes the LEO a 'powder keg.' This powder keg cannot be prevented from exploding without regulating the number of satellites that the LEO can harbor. The powder keg will remain explosive even if the world chooses to end the use of ASAT weapons of all types. The faster the world grows over the 20th-century notions of space weapons, satellites, and orbital environments, the better it is for the world.

References

Žilinskas, J. and Marozas, T. "Weapons Reviews for ASATs: Assessing Distinction, Proportionality, and Effects on the Natural Environment of Space." *Air and Space Law* 47(2), 209-232 (2022). Retrieved from https://kluwerlawonline.com/journalarticle/Air+and+Space+Law/47.2/AILA2022012.

Ni, A. and Bates, G. "The People's Liberation Army Strategic Support Force: Update 2019." *China Brief – The Jamestown Foundation* 19(10) (2019). Retrieved from https://jamestown.org/program/the-peoples-liberation-army-strategic-support-force-update-2019/.

Retrieved from the US Space Force – Space Operations Command website, https://www.spoc.spaceforce.mil/About-Us/About-Space-Operations-Command#:~:text=SpOC%20West%20serves%20as%20the,Combatant%20Commanders%2C%20Coalition%20partners%2C%20the.

"Draft Resolution: Prevention of an arms race in outer space" Seventy-fifth session, First Committee, Resolution S-10/2, United Nations, *Treaty Series*, vol. 610, No. 8843 (2022). Retreived from https://digitallibrary.un.org/record/3887166?ln=en#record-files-collapse-header

"Agenda item 98 (d): 76/231 Reducing space threats through norms, rules and principles of responsible behaviours." *United Nations Disarmament Yearbook 2021: Part I*, 276-284 (2022). Retreived from https://www.un-ilibrary.org/content/books/9789210014458c055.

"Open-Ended Working Group on Reducing Space Threats" Retrieved from the United Nations Office for Disarmament Affairs website, https://meetings.unoda.org/open-ended-working-group-reducing-space-threats-2022.

Pawel, B. "Orbital satellite constellations and the growing threat of Kessler syndrome in the lower Earth orbit." *Safety Engineering of Anthropogenic Objects* 4, 10.37105/iboa.94 (2020).

Alfano, S., Oltrogge, D.L., & Shepperd, R. "LEO constellation encounter and collision rate estimation: an update."2nd IAA Conference on Space Situational Awareness, Washington D.C., IAA-ICSSA-20-0021, *Analytical Graphics Inc.*, (2020). https://www.documentcloud.org/documents/6747529-LEO-CONSTELLATION-ENCOUNTER-and-COLLISION-RATE.html.

"Net Zero Space" Retrieved from the *Paris Peace Forum* website, https://parispeaceforum.org/en/initiatives/net-zero-space/.

"Fact Sheet: Vice President Harris advances national security norms in space" *The White House,* April, 18, 2022, https://www.whitehouse.gov/briefing-room/statements-releases/2022/04/18/fact-sheet-vice-president-harris-advances-national-security-norms-in-space/.

"Department of Commerce and Department of Defense sign Memorandum of Agreement to advance coordination in space." *U.S. Department of Commerce*, September 9, 2022. https://www.commerce.gov/news/press-releases/2022/09/department-commerce-and-department-defense-sign-memorandum-agreement.

Swinhoe, D. "UK and South Korea pledge not to conduct anti-satellite weapons tests." *Data Center Dynamics*, October 6, 2022. https://www.datacenterdynamics.com/en/news/uk-and-south-korea-pledge-not-to-conduct-anti-satellite-weapons-tests/.

Mahanic, N. "To serve Man: Controlling Humanity's Space Weaponry through Legal Reviews-The Immediate Limitations and Hidden Strengths." *Institute of Air and Space Law, McGill University, Montreal, Quebec*, August 2021. https://escholarship.mcgill.ca/downloads/z316q638w.

"ESA flying payloads on wooden satellite." *European Space Agency*, June 10, 2021. https://www.esa.int/Enabling_Support/Space_Engineering_Technology/ESA_flying_payloads_on_wooden_satellite.

Kanda, A. "Japanese scientists plan to launch wooden satellite in 2023." The *Asahi Shimbun*, September 13, 2021. https://www.asahi.com/ajw/articles/14439277.

India and the World: A Personal Perspective by Mohamed ElBaradei

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The present article reports on the lecture 'India and the World: A Personal Perspective' by Dr Mohamed ElBaradei, Former Director-General, International Atomic Energy Agency, on the 75th anniversary of India's independence. The session was chaired by Ambassador Shyam Saran, and organised by the Centre for Policy Research, New Delhi on 14 June 2022.

Baradei's remarks were personal reflections about a country he admires, a valued culture and cherished friends. He was fascinated growing up by Mahatma Gandhi, a frail, thinly clad man who was able, through non- violent resistance, to wrench his country's independence from the colonial British raj and his enormous influence on millions across the globe craving for freedom and equality.

During his diplomatic career, he forged long, close and wide- ranging associations with India and its people and culture, including diplomats, scientists, scholars, business people, artists, policy makers, and leaders. He interacted with outstanding counterparts in India's Atomic Energy Commission, and with Sundeep Waslekar on the Normandy Manifesto of World Peace. He appreciated Nehru's vision of a modern India: secularism, nonviolence; parliamentary democracy; national unity within diversity; socialism and economic self-reliance; and emphasis on science and technology. Baradei believed that some of the "things of the greatest value" that India could bring to humanity today, at a time, when the global order is challenged and upended, are centred in three key areas: peace and, security; governance and democracy; and economic and social development.

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Nehru, in line with Gandhi's philosophy of nonviolence, was an early advocate of nuclear disarmament. In 1954 he was the first to call for a halt to nuclear testing. In 1962, at an Anti-Nuclear Arms Convention Conference in New Delhi, he reflected on the difficulty and complexity of nuclear disarmament. Nehru understood that nuclear weapons were "part of a larger war" requiring something deeper: "the minds and hearts of men and the spirit of a man rising to somewhat higher levels". But he was pragmatic enough to recognise that "before war goes, we must have full disarmament. All these things are connected."

In June 1988, Prime Minister Rajiv Gandhi presented to the United Nations General assembly a bold and comprehensive "Action Plan for a Nuclear Weapon Free and Nonviolent World Order," which sought a universal, comprehensive, and legally binding commitment to a staged elimination of nuclear weapons within a defined time frame (2010 at the latest) and the establishment of a "comprehensive global security system firmly based on non- violence." In his speech, Rajiv Gandhi was extremely critical of the doctrine of nuclear deterrence. He described it as an "ultimate expression of the philosophy of terrorism, holding humanity hostage to the presumed security needs of a few."

Much water has gone under the bridge since then, notably India's development of nuclear weapons in 1998. This was due, Baradei says, to a number of global and regional geopolitical considerations, including the stagnant nature of nuclear disarmament and the restrictive nuclear trade policy it faced as a non-NPT party. India remains today a non-member of the Nuclear Supplier Group (NSG), but in 2008 it was granted access to civilian nuclear technology and fuel through a "waiver" exempting it from NSG rules. Baradei had supported the waiver as Director General of the IAEA, considering India's energy needs and the importance of nuclear safety and international cooperation.

Sadly the prospect for nuclear disarmament does not look bright. A quarter of a century after the end of the cold war, we still have a little under 13000 nuclear weapons in existence, with around 2000 of them on high alert. In addition, most, if not all, the nine nuclear- armed states- the five NPT states (China, France, Russia, UK, US) plus India, Israel, Pakistan and DPRK- are in a race to modernise their arsenals. More ominously, many are developing so-called tactical "usable" nuclear weapons and availing themselves of new cyber and artificial-intelligence technologies, as well as advanced "sci-fi" hypersonic missiles that could trigger a nuclear catastrophe at a speed we cannot even imagine. All this, of course, increases the danger of a nuclear weapon launch, whether intentionally, accidentally, as a result of cyber manipulation or simply as an "act of madness", as president J.F. Kennedy feared. One of the most disturbing developments of the Ukraine war has been the reintroduction of nuclear weapons as a central component of geopolitics, shifting the possible use of nuclear weapons from an unthinkable nightmare to a terrifying prospect.

Given India's long history of serious commitment to a world free from nuclear weapons, Baradei says it still shoulders a certain moral responsibility to lead the charge among the nuclear-armed states and across the world towards nuclear disarmament. India should demonstrate through tangible measures that its acquisition of nuclear weapons was an "interim step", not a permanent policy and that its ultimate commitment to a world free from nuclear weapons remains unwavering. As Nehru and Rajiv Gandhi

pointed out, however, this should be linked to and in parallel with an effort to establish a new global security architecture based on nonviolence.

Baradei said that the global security architecture is in disarray. International relations have become much more "weaponised" than before. The Security Council, entrusted with the maintenance of international peace and security, has become pitifully impotent. Ukraine again is the latest tragic case in point. The global order has become paralysed and polarised; and our world remains marred by poverty, violence, repression and obscene inequality. Over 700 million people live in extreme poverty, with nearly half the world's population struggling to meet basic needs, and it is getting worse. Brutal repression and denial of human dignity are hallmarks of one- third of the world's nations.

The world spends less than one per cent of what we spend on armament ($2 trillion) on humanitarian assistance. Inequality even extends to a cardinal human value, the sanctity of life. This was recently laid bare by COVID-19, the Ukraine war, and the treatment of refugees. 83 per cent of people in the EU/EEA have been fully vaccinated, but only 15 per cent of people in Africa have. The world is strongly reacting, as it should, to the war in Ukraine, but it had mostly limited itself to hand- wringing when hundreds of thousands of civilians were killed or died from hunger in Syria, Yemen, Somalia and other places. While refugees from Ukraine are met with open arms as "one of us", those from Africa and Asia are escaping death and persecution and are left to drown or placed in appalling detention camps! One often repeats the mantra that we should "build back better." Baradei called for building a completely new global peace and security structure based on freedom, equity, and nonviolence. Many people, himself included, look to India's active contribution to this field.

Turning to governance and democracy, Baradei says that India, as the largest pluralistic and secular democracy in the world, has always been the proverbial answer to the skeptics who question whether democracy can work in a developing country and if it is compatible with poverty, illiteracy and other challenges. There is often a philosophical comparison between the "Indian model" and the "Chinese model"; specifically, whether one ought to prioritise economic and social rights or whether human development and human dignity should be approached as an indivisible whole, including civil and political rights. Countries that opted for a democratic system are aware that democracy is not "one size fits all", nor is it instant coffee. It is the product of each country's historical, social and political evolution. Democracy is always a work in progress in terms of its culture, institutions and modalities. It has its flaws and is often slow and messy. And as we know, it is fragile and vulnerable to manipulation and abuse.

But with all these caveats, Baradei said that a democratic system is still the best political system humanity has come up with; it is aligned with people's innate aspiration for freedom, dignity, and equality. It is anchored in transparency and accountability; It advocates for inclusiveness, diversity and equity and, through an independent judicial system, protects the minority from the tyranny of a majoritarian rule, be it national, religious, ethnic or ideological. These are all key values for long-term social cohesion and stability, more so in a country like India with such a diverse ethnic, cultural, religious and linguistic background.

Baradei notes that democracy is under vicious attack by populism and

authoritarianism due to the failure of many democracies to deliver on people's growing economic and social expectations, a failure coupled in many places with gross economic and social inequality. Here also he believed that India, as a primus inter pares of democracies in the global south, has a moral calling to show the world that democracy and economic and social development are not only compatible but also reinforce each other; and that the challenges to democracy should be met with more democracy not less.

Baradei notes that India still faces huge economic and social challenges despite recent strides. A few years back, he had a discussion with Amartya Sen, who explained that the three key elements that contributed most to economic and social development in countries with varied political systems, such as Singapore and Japan, were quality education, a good healthcare system and policies of social tolerance. India has given special attention to education ever since

Independence, although there are still many unfulfilled expectations. One of the farsighted decisions was the establishment of first- class scientific, educational institutions, such as the Indian Institutes of Technology, some 23 of them located across the country. They were rightfully named "Institutes of National Importance" by an act of parliament in 1961. When one looks at the number of CEOs of major US tech companies of Indian origin, one realises how forward thinking India was at a time when the term "information technology" was barely

known.

Information Technology in India accounted for 8 per cent of India's GDP in 2020. With technology considered the Fourth Industrial Revolution and AI and super computers the future, India is well placed in the field of science and technology to establish itself as an important hub and a mecca for the global south. It has many comparative advantages. In the health sector, the Serum Institute of India, the world's largest vaccine manufacturer, has become, for the last three years, the principal supplier of affordable COVID-19 vaccines for low- and middle-income countries and one of the backbones of efforts by WHO and others to cope with vaccine "Apartheid" and protect the health of the poor; this is something India should be proud of and build upon.

Referring to India's foreign policy, he says India should remain a major voice for the global south. During the cold war, India was a champion of the non-aligned movement. It took part in the 1955 Bandung Conference. This was the precursor of the establishment in 1961 of the Non Aligned Movement through the initiative of Yugoslavia, India, Egypt, Ghana and Indonesia. Although the movement now has 120 members, it has lost much of its clout and luster. Since 2003 India has been a founding member of the IBSA Dialogue Forum (India, Brazil, South Africa), established as a tripartite grouping of important democracies of the south to promote South- South cooperation. And since 2010, India has been a member of BRICS (Brazil, Russia, India, China, and South Africa) as the world's five leading emerging market economies. Last year India also joined the Quadrilateral Security Dialogue QUAD with Australia, Japan and the US. QUAD commits itself to a free, open, and inclusive Indo – pacific region and is regarded by many as an effort to counterbalance China's role and influence in the region. The global order is changing fast. The bipolar world has "expired" and is morphing into a multipolar one whose shape and precise constellation are still not defined. India, given its size, culture, demographics and economic clout, will

certainly be one of the principal players.

There are a number of questions on people's minds related to India's foreign policy that, no doubt, will be clarified along the way; is India going to be aligned with any of the existing poles as being a member of QUAD and a participant in military exercises with the US and its regional allies might imply? Is India going to maintain its long- held independence as its vote in the UN on the Russia- Ukraine war suggests? And if so, what are the basic principles, values and laws that are going to inform its policy choices, and how will it strike the delicate balance between its basic values and national interests? While it is often tempting for states to look at their short- term national interests, it is essential not to lose sight of the long- term pillars of the international order, such as the non-use of force and the non acquisition of territory by war. In many cases, this results in winning the battle for some but losing the war for all: forfeiting collective peace and security. Another question is whether India aims to be a "stand alone" pole. And if so, would it continue to be closely associated with the large democracies in the South as well as with other South constellations, the non-aligned movement and G77?

Baradei strongly believed that today's chaotic global order would be well served by an India that is a key spokesman for the "hurt" and the "hope" of the global South. In a global environment overshadowed by an inordinate dose of toxic nationalism, India can be an example of people's quest for a pluralistic, inclusive and nonviolent world. He has for long believed that India ought to be a permanent member of the Security Council. But until that happens, India should continue to speak up loud and clear on major issues that shape and affect our future. India should be a "City upon a Hill"; it can and ought to be a model for some of the best human values.

In the discussion, Baradei addressed several important issues. On the treaty on the prohibition of nuclear weapons (TPNW). Baradei noted that India had until it developed a nuclear weapon, a stellar record of fighting for disarmament-nuclear disarmament, and India continues to believe that nuclear disarmament is the way. India should be at the forefront of disarmament efforts. The use of a nuclear weapons, tactical or whatever, is possible. Everybody knows that once you use a nuclear weapon that's the end of it. There is no small or large nuclear weapon- that's the end of it. He said the nuclear weapons ban treaty was signed or concluded by 122 countries, so it is a large chunk of the human population, and their message is that nuclear weapons are awful, destructive, and cannot be used therefore, we should ban it, in the same way as the chemical and biological weapons. So, it is not something out of the ordinary, and in the case of chemical and biological the world has banned and eliminated them. And why can't the same be done with nuclear weapons? Unfortunately, the attitude of nuclear weapon states and members of NATO and others is quite negative toward the ban treaty. Three of the weapon states, the US, France, and the UK, said they will never be able to become a party to that treaty. They could have agreed to work together but to say this is absolutely out of the question is not a great thing. The first meeting of the parties to the TPNW is going to take place next in Vienna and there is a conference on the humanitarian consequences of the use of nuclear weapons. So, though it's not going to happen overnight, but it would be good to talk to the others, the other camp that some of the NATO members are coming as observers. It would be great if India could come as an observer, make a statement, and express its views, on how India's commitment to nuclear disarmament

remains. It's really important to continue the dialogue.

On the issue of the utility of declarations, bilateral or plurilateral, on the non-first use of nuclear weapons, is something Baradei said that any guarantees to the rest of the world about non- first use are very important, though people do not believe in any commitments, guarantees, negative assurances. But if all the nuclear weapon states make a solemn commitment, a believable commitment that nuclear weapons, no matter what, will not be used first, at least it would be a beginning. What can we do until we reach disarmament to ensure that these weapons will not be used? But, it's the part of a process you cannot just talk about it alone. You have to talk about it in the context of cooperation, dialogue, and trust building, and not just in the context of nuclear weapons. Nuclear weapons reflect our fear and don't reflect our trust. But, yes, we need to talk about it. He noted that China had mentioned that it would never use nuclear weapons first under any circumstances, and he felt that everybody should repeat that. A collective statement by all the nuclear weapon states, even including North Korea. that says, we are not in the best situation, and we need to move forward and let us at least commit ourselves to non-first use.

On the Iran nuclear deal, Baradei said that, ironically, both the parties, the US and Iran, very much want the agreement to come back into force. But domestic politics had created hurdles. He said that the way to resolve the Iranian issue is through dialogue, gradual agreement, and building trust, and not sanctions, which make things even worse. He felt that at least have the agreement in place and then continue the dialogue, and this is where maybe India or some other non-participant in this dialogue right now could bring in some ideas or basically say, we do believe in the agreement, we need the agreement, and we are ready to mediate. He understood that all the technical issues are in place, it is just a question of whether the US will conclude this when they have the mid-term elections, can Iran conclude the agreement with the revolutionary guard labeled as terrorist, but it is necessary to separate domestic politics for the sake of a major security issue. The breakdown would be dangerous for the Middle East. An interlocutor can play a positive role. So, some groups of countries could help the two-parties get together in a compromise despite differences.

Summer School on Science Diplomacy: Improving Capacity of Science to Inform Policy

Radhika Trikha*

Radhika Trikha

Introduction

The summer school on Science Diplomacy: Improving Capacity of Science to Inform Policy was conducted from July 18th 2022, to July 23rd 2022, at Venice International University, Venice, Italy. The summer school was organised in partnership with Duke University, USA; Tor Vergata University of Rome, Italy and Boston College, USA. The summer school described the concept of science diplomacy and its growing importance in the 21st century. The summer school was organised and presided over by eminent faculty members [William Pan, Duke University, USA (Scientific Coordinator); Giulia Costa, Tor Vergata University of Rome, Italy; Philip Landigran, Boston College, USA; Kurt Straif, Boston College, USA; Sonia Silvestri, University of Bologna, Italy; Christian Lara, Duke University Rethinking Diplomacy Fellow – United Nations; Marga Gual Soler, Center for Science Diplomacy, American Association for the Advancement of Science (AAAS) and The World Academy of Science (TWAS)]. There were, in total, 23 participants. The summer school was conducted as a mix of expert sessions, group activities, and case studies to give practical orientation toward science diplomacy.

With the emerging global challenges and increasing risk to humanity, there is an immediate need to bring scientists, diplomats and policymakers together to address emerging issues. Science diplomacy can be used as a soft tool to undertake international dialogues and cooperation across the stakeholders to tackle the problems and challenges that pose a severe threat to humanity and the environment [1]. Several challenges have emerged from human practices, such as agriculture, trade, automation, cryptocurrency, security and

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peace, global health, pandemics, climate change and environmental degradation [2]. To resolve the emerging issues, it is necessary to communicate science in a relevant and reliable manner and to be used as evidence for undertaking steps to mitigate these issues [2, 3]. Science policies worldwide play a significant role in shaping the action plan to address current and emerging challenges at regional, national and global levels. Science diplomacy can bring stakeholders across the globe on a single platform to deliberate on the present situation of critical issues and foresight on possible solutions that can be well integrated with evidence-informed science policy making at regional, national and global levels [1].

Key Learnings from the Summer School

The summer school focused on how science diplomacy could be explored to address a diverse set of challenges existing worldwide. The key takeaways from the summer school were as follows:

Understanding Science Diplomacy: To implement science diplomacy, it is first necessary to understand what science diplomacy is. Diplomacy is regarded as undertaking international dialogue and engagements through negotiation, forming alliances and agreements by identifying areas of common interest and addressing conflict areas. Science diplomacy has emerged as one of the essential attributes of a country's foreign policies. Science diplomacy lies on the cusp between the enlightened self-interest of the country and its direct national interest. It is widely acknowledged now that science can be used as soft power and for diplomacy between nations. There are three dimensions of science diplomacy that have to be followed, *Science for Diplomacy, in which* science is to be used as a universal language to open channels for dialogues between the nations and ease the tension across borders; *Diplomacy for Science*: using diplomatic channels for facilitating science cooperation and sharing resources and *Science in Diplomacy*: Science is used as a tool for governance of international and transboundary issues.

Need for Formal Science Advice and Effective Science Communication: For practical scientific advice, the barrier between the scientist and policymakers must be streamlined and effective, and reliable scientific communication should occur. In general, policy and decision makers ask the scientists to provide advice that goes beyond evidence-based science and is regarded as value judgements. The other aspect that needs attention is how practical science is communicated to policymakers. Science must be properly and effectively communicated to policymakers so that it gets the required attention and action is taken.

Science Diplomacy to address Waste Management: Climate change and environment management are becoming one of the focus areas for countries across the globe. These issues have reached a global scale, and the international community has come forward to define planetary boundaries for safe operating space for society, ecology and humanity. Planetary boundaries are now placed at the forefront of policy-advisory processes leading up to the agreement of the global Sustainable Development Goals. Science diplomacy is used for addressing worldwide environment and climate change issues by exploring the international community's role in coming up with intergovernmental panels to define the global concerns and possible frameworks to be followed by countries to address global challenges.

Science Diplomacy for Global Health: Science diplomacy initiative named International Agency for Research on

Cancer (IARC) was established in 1965 as a specialised agency of the World Health Organization to address the global cancer threat. IARC comprises of a governing council and scientific council and has representatives from nearly 26 countries. IARC is one of the science diplomacy examples used widely to address the global challenge associated with cancer. It is widely contributing to Hazard Identification, Risk Assessment and Risk Management for Cancer.

Science Diplomacy for Pandemics: Science diplomacy can play a crucial role in addressing pandemic preparedness by promoting the concept of one health where global, national and local 'whole of society' response has to be generated. There should be provisions for global early warning systems that require increased local vigilance, early detection and rapid validation. As observed, COVID-19 continues to mutate, and assessing potential variants of concern takes months. Therefore, countries must come together to generate and share data based on which rapid analysis can be done. Globally, governments have to unite further to bring about behavioural change in addressing the global pandemic concerns, like countries which have joined together to get a behavioural shift to accept the vaccination against COVID. Science diplomacy should be used to develop one health competency in public health by prioritising one health approach.

Science Diplomacy in War Times: Further, due to the war situation, a dire humanitarian crisis and food security has emerged, and refugees are facing turmoil. It is time that the international community stand together to address the catastrophic humanitarian crisis. It's time for the scientific fraternity to stand up for their scientific friends in Russia and Ukraine to have opportunities to continue their research and technology projects and professionally ensure their stability. Science diplomacy should also be used to negotiate the terms between different countries involved to reach to best-suited solution for one and all.

There is a need to pave the way for stronger South-South and South-North science diplomacy engagement and establish organisations for science diplomacy relevant to the South. For this, the south has to come forward with institutionalising science diplomacy in their education and training modules, especially for the diplomats.

Conclusion

The emerging challenges have led to the evolution of science diplomacy, especially in the sectors such as health diplomacy, ocean diplomacy, climate diplomacy, disaster diplomacy etc. Science is regarded as a common ground for building international relationships, managing common resources and addressing the shared challenges faced by the countries. It is also widely explored for improving and strengthening political relations between countries. The covid pandemic has opened a new era for science and technology in foreign policy, global governance and geopolitics. Science diplomats are one of the emerging professionals. The role of science diplomats in connecting the world of Science with the world of diplomacy is more and more recognised. Countries should make possible efforts to institutionalise and build capacity in science diplomacy.

References

Flink, T., Taking the pulse of science diplomacy and developing valuation practices, *Science and Public Policy*, 2022, 49 (2), 191–200.

Flink, T., Kaldewey, D., The New Production of Legitimacy: STI Policy Discourses beyond the Contract Metaphor. *Research Policy*, 2018, 47, 14-22.

Ruffini, P., Conceptualizing Science Diplomacy in the Practitioner-driven Literature: A Critical Review. *Humanities and Social Sciences Communications*, 2020, 7, 1-9.

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Data Diplomacy: Emerging Contours by Amb. Shyam Saran

Anup Kumar Das*

Anup Kumar Das

Introduction

The Information and Communication Society of India (ICSI), New Delhi, organized the Second Prof. B. Guha Memorial Lecture on Data Diplomacy in virtual mode on 13th May 2022. In her opening address Dr Usha Mujoo Munshi, President of ICSI, appraised the speaker and audience on the ICSI mission and activities for the broad sections of the society. ICSI started its journey in November 2000 as a scientific society. ICSI is one of the signatories of the Lyon Declaration on Access to Information and Development. ICSI convene its activities by fulfilling some of its stated Aims and Objectives, including (a) to collect and disseminate relevant knowledge on information and communication; (b) to initiate projects, studies, surveys, data analysis and other allied activities on its own behalf or on behalf of other agencies; (c) to provide editorial and technical supports for the publication of print and electronic materials; (d) to impart training on information, communication and related areas and promote studies thereof; (e) to maintain liaison with similar national and international organizations; (f) to publish and distribute materials devoted to information, communication, and related areas; (g) to promote automation, networking, application of internet and advanced information and communication technologies; and (h) to associate with such programmes and activities as may be considered necessary and useful for promoting the Aims and Objects of the Society. ICSI carried out two research projects supported by the Research Council for History of Science at the Indian National Science Academy (INSA). Dr Munshi further informed the audience that ICSI's founder

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president Prof. B. Guha (1926-2019), was a teacher par extraordinary[1]. Late Prof. B. Guha, a Scientist at CSIR-Indian National Scientific Documentation Centre (now CSIR-NIScPR) and later Professor and Head, the Department of Library and Information Science, Banaras Hindu University, is widely known for his many contributions in the disciplines of scientific documentation, library and information management. He passed away at the age of 92 in January 2019, and until his demise, he led a very active life, contributing tirelessly to the discipline till the last years of his life.

Prof. B Guha Memorial Lecture Series

ICSI launched the Prof. B Guha Memorial Lecture Series in 2020 to recognise his manifold contributions and keep Prof Guha's legacy and memories alive. The inaugural memorial lecture on "National Education Policy and its Implications on Higher Education in India" was delivered by Prof. V. Ramgopal Rao, Director, Indian Institute of Technology Delhi, on 11th November 2020. The speaker of the 2nd Prof. B. Guha Memorial Lecture, Ambassador Shyam Saran is a career diplomat and former Foreign Secretary, the Government of India. He is presently the President of India International Centre, New Delhi. Amb. Saran began his lecture by introducing data diplomacy in a lucid manner, describing how the data-driven society emerged post-World War II.

Defining Data Diplomacy

Data Diplomacy deals with foreign policy formulation, and its execution. As the data may be a weapon, digital devices, tools, and communication systems may be considered as diplomacy systems. While we speak of data diplomacy in reality, big data impacts both foreign policy formulation, and its execution in the forms of diplomacy. As data diplomacy is a comparatively new subject, there are very few definitions available in the true sense. In the 2015 AAAS Conference, a speaker Timothy Dye defines "Data diplomacy as an emerging construct that integrates concepts from data science, technology, and computing with social science, international relations, and diplomatic negotiation, and in some cases, offers a new diplomatic tool that facilitates global (and local) relationships" [2].

Working with Data Diplomacy

Data diplomacy got emboldened over time, more particularly in the post-cold war era, as access to information and knowledge-resources got strengthened, and internet-based products and services penetrated across the lengths and breads of the world. Many of the intergovernmental, multilateral and bilateral discourses and deliberations carried out on the issues of data governance, data sovereignty, data localization, data privacy, data exchanges, and data protection in the last three decades, where professional diplomats and other professionals got engaged in policy formulations and their executions. The intergovernmental forums such as the Internet Governance Forums (IGF), ICANN Policy Forums (IPF), Asia Pacific Regional Internet Governance Forum (APrIGF), and ITU Regional Development Forums have dealt with the above issues in detail and country-level commitments were also discussed with different stakeholders. These forums have ensured equitable participation and engagement with civil society actors. Over the years, the voices of the youths and women are also heard. The decision- makers and national-level negotiators agreed to work together to bring a participatory governance model for the internet and to mitigate challenges of data sovereignty, data security, and data privacy. However, some of the said challenges can be further addressed through the bilateral, trilateral, or multilateral negotiations and agreements.

Ensuring A Safe Cyberspace

Across the World, we also see increased instances of cyber-attacks, and more particularly state-sponsored cyber-attacks, to damage the critical information infrastructure of a country, or a military establishment, or an enterprise. The country's critical information infrastructure needs state-of-the-art information security, data protection, and data privacy principles and practices across the governmental, diplomatic, military and business enterprises. In an interconnected world, the collapse of one entity by a means of a data breach or cyber-attack incident can lead to collapse or near-collapse or severe loss of other entities as well. Thus, the data and science diplomats are relentlessly engaged in bilateral and multilateral negotiations and the preparation of policy instruments towards safeguarding cyberspace from rogue elements and ensuring the protection of vulnerable communities, such as children, women, indigenous and differently-abled people, from the cyber-harms. In the intergovernmental forums, the data and science diplomats are engaged with the public policymakers and subject matter experts to proceed further on matters related to information security, data protection, data privacy, data governance, data sovereignty, data localization, and data exchanges for implementing standardized protocols and practices across the regions and countries. Ever-increasing citizen participation through social media platforms is ensured in India and other countries when we provide them with a safe cyberspace and protect them from cyber-harms. Internet intermediaries should also play a responsible role to protect the common citizens and other entities in the digital environment. In India, these intermediaries are now covered under the Information Technology (Intermediary Guidelines and Digital Media Ethics Code) Rules, 2021.

Audience Interactions

The Talk drew a number of questions and observations from the esteemed audience. The Q&A session was moderated by Dr Nabi Hasan, Chief Librarian at the Indian Institute of Technology Delhi. Amb. Saran discussed further how Indian embassies in different countries handle matters related to data and science diplomacy, even during the COVID-19-induced lockdowns around the world when the Indian diplomats ensured continuity of access to consular and diplomatic services. He also discussed how the world's largest technology enterprises can play vital roles in safeguarding diplomatic and personal data from cyber-attacks, and data breaches. He appraised the information and data science enthusiasts about the nuances of data diplomacy from the viewpoint of a career diplomat. The Second B Guha Memorial Lecture concluded with a vote of thanks offered by Dr Nabi Hasan.

References

Sen, B.K. (2019). Prof. Bimalendu Guha: The teacher extraordinaire. *Annals of Library and Information Studies*, 65(2), 95-95.

AAAS (2015). *Scientific Drivers for Diplomacy: Summary of Science Diplomacy 2015*. Retrieved from https://www.aaas.org/sites/default/files/Summary%20of%20Science%20Diplomacy%202015-Scientific%20Drivers%20for%20Diplomacy.pdf

Sustainable Development Report 2022 From Crises to Sustainable Development: The SDGs as Roadmap to 2030 and Beyond

Authors: **Jeffrey D. Sachs, Guillaume Lafortune, Christian Kroll, Grayson Fuller and Finn Woelm**

Vandana Maurya*

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Sustainable development as a concept finds its roots in the balancing act of socio-economic development within ecological constraints. Fulfilling 'needs' (redistribution of resources to ensure the quality of life) (Tomislav, 2018) of the people, while ensuring inter-generational and intra-generational equity is the essence of sustainable development. In 2015, United Nations[1] adopted the 2030 Agenda for Sustainable Development, that provides a shared blueprint for peace and prosperity for people and the planet, at present and in the future, which can be achieved through 17 Sustainable Development Goals (SDGs).

The Sustainable Development Report (SDR), 2022, authored by Jeffrey D. Sachs, Guillaume Lafortune, Christian Kroll, Grayson Fuller and Finn Woelm, is an interesting and important read for policy makers and academicians alike as it provides SDGs priorities and trends in the form of index and dashboards. It provides a roadmap for achieving sustainable development for 163 nations till 2030 and beyond. SDR (formerly the SDG Index and Dashboards) is the first world- wide study to assess where each country stands in terms of SDGs. It is not an official monitoring tool and uses data published

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by various official data providers and organisations. The first SDR was published in 2019 and since then, three reports have been published annually. Earlier reports have given an interesting compilation of data and indices which have motivated governments for policy- making towards the achievements of SDGs in a time-bound manner. But as uncertainties are certain, governments need to change their course of action due to socio-economic variations caused by the COVID-19 and ongoing Russia-Ukraine conflict, as well as changing fuel prices, and economies slipping into recession. Therefore, the pace to achieve SDGs may reduce if countries fail to take precautionary measures. The other annual report, 'Sustainable Development Goals 2022' issued by the UN Department of Economic and Social Affairs (DESA), also highlighted the same concern and warned of '*cascading and interlinked crises*' due to COVID-19, climate change and international conflicts that have already reversed years of progress of various SDGs and poses a great threat to sustainable development.

SDR 2022 begins with an executive summary followed by five major sections, which include the global plan to finance the SDGs, SDG index and dashboards, policy efforts and commitments for SDGs, SDG data systems and statistics. Last and the most detailed section includes profiles of SDGs in the form of indexes and dashboards of 163 countries. The report significantly underlines the *need for peace, diplomacy and international cooperation*. It also highlights how the absence of these will lead to delaying of results of SDGs targets. The present uncertain global situation has led to decline in the average SDG index score in 2021. SDR 2022 shows that the performance of various SDGs have remained below the pre-pandemic level, mainly in low-income countries (LICs) and lower-middle-income countries (LMICs) that have created a global setback for already delayed targets. The Sustainable Development Report (SDR) of 2020 and 2021 has already discussed the impact of COVID-19 on key metrics (Sachs et. al., 2020; 2021). SDR 2022 is in line with the observations of these reports mentioned above, though time lags in data reporting due to COVID-19 are reflected in the 2022 report.

As raised repeatedly on various platforms i.e. Paris summit, Addis Ababa Action Agenda on finance, G-20 summit, and COP-26, finance is the priority and needs urgent global focus specifically towards low-income countries and lower-middle income countries. The SDR 2022 proposes a new 'SDG investment Compact' with Bretton Woods institutions to provide a framework for increasing SDG financing along with long-term debt sustainability. For increasing public finance, domestic tax revenues, sovereign borrowings from international development finance institutions and international private capital markets, increasing official development assistance, funding by private foundations, and debt restructuring are proposed. Though the suggestions are welcome, the pathways for sustainable financing of SDGs need to be discussed further to apply the proposals mentioned above in action.

The second part of SDR 2022 raises pertinent questions regarding the setbacks in all SDGs with greater emphasis on SDG 2 (No Hunger), SDG 3 (Health and Well-Being) and SDG 4 (Quality Education) due to the pandemic through the index and dashboards[2], which makes this report a crucial read at present. A fair comparison to earlier reports can bring out a clear picture of gaps and show the trend of the SDGs index. The average global SD index score declined to 66.0 in 2021 and is presently seeing stagnation across all income groups. India's SDG rank is 121

out of 163 nations, with a score of 60.3 in 2022, whereas its rank was 120 with a score of 60.7 in 2021. Finland tops the SDG index with a score of 86.5, followed by Denmark (85.6), Sweden (85.2), Norway (82.3) and Austria (82.3). The report also highlights how rich countries generate negative socio-economic and environmental spillovers through unsustainable trade and supply chains in the form of an international spillover[3] index and suggests financing for SDGs, devising technical cooperation, identifying national targets and instruments and develop robust data systems to address international spillovers.

Data is undoubtedly crucial in the future, especially after COVID-19, which has raised the need for new data in time-a bound and efficient manner. It can help carve out the course of action for achieving pre-defined targets e.g. SDGs. These datasets need to be accurate, and appropriate and should be able to provide socio-economic value to the policy makers. There is an emerging literature which shows the interplay of developmental policies and data (Fattahi & Ura, 2022). SDR 2022 is a successful example showing that data will shape decisions making and an eloquent representation can illustrate the robust data in an easily understandable format. It has precisely pointed out the need for data innovations to fill the gaps for greater accuracy, timeliness and granularity during and after the pandemic. The use of non-traditional data sources i.e. citizen science, social media, and earth observation data, is also encouraged to support evidence- based decision making. The inclusion of only the countries for which data is available for at least 80 per cent of the variables included in global SDGs to reduce the biases in the SDG index shows academic accountability towards the public. On the other hand, dashboards and country profiles are available for all UN member states. The methodology used is clear and concise, which allows its replication easy. The SDR 2022 is crisp, lucid and an important document for highlighting the need for policy interventions and changes based on current black swan events which our world is facing and to be aware of the price that our future generations will pay if we do not act swiftly. The partnership between the nations, institutions, organisations and people can ensure no one is left behind and no one is denied the right to fulfil their 'needs'.

Endnotes

1 See details on the website of UN accessed from https://sdgs.un.org/goals.

2 The SDG Index is an assessment of each country's overall performance on the 17 SDGs, giving equal weight to each Goal. The score signifies a country's position between the worst possible outcome (score of 0) and the target (score of 100). The dashboard and trend arrows help identify priorities for further actions and indicate whether countries are on-track or offtrack based on latest trend data to achieve the goals and targets by 2030.

3 Effects are seen when one country's action generate benefits or impose cost on another country that are not reflected in market prices.

References

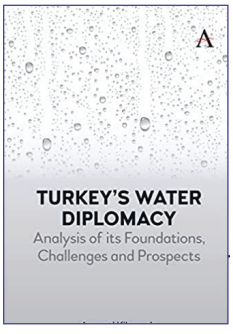
Fattahi, S., &Ura, S. (2022). Decision-Making Using Big Data Relevant to Sustainable Development Goals (SDGs). *Big Data and Cognitive Computing*, *6*(2), 64.

Sachs, J., Kroll, C., Lafortune, G., Fuller, G., &Woelm, F. (2021). *Sustainable development report 2021*. Cambridge University Press.

Sachs, J., Schmidt-Traub, G., Kroll, C., Lafortune, G., Fuller, G., &Woelm, F. (2021). Sustainable development report 2020. *Cambridge Books*.

Tomislav, K. (2018). The concept of sustainable development: From its beginning to the contemporary issues. *Zagreb International Review of Economics & Business*, *21*(1), 67-94.

Regional Transboundary Water Diplomacy and the Need for Common Developmental Goals



Turkey's Water Diplomacy: Analysis of its Foundations, Challenges and Prospects

Author: **Aysegül Kibaroglu**

Harini Madhusudan*

Harini Madhusudan

In hydropolitics, Türkiye is largely an "upstream-power" which makes water a huge asset in water-related politics in its regional and domestic dynamics. In this context, there is an attempt to analyse Türkiye's Transboundary water policy amid the prolonged droughts, regional security dilemma, and the global climate crisis. The book "Turkey's Water Diplomacy: Analysis of its Foundations, Challenges and Prospects," by Aysegül Kibaroglu, prepares a historical, geographical, institutional, foundational, legal and policy-oriented approach to explain Türkiye's evolving position with the International Water Law, the actors and processes engaged in their transboundary water policymaking. Water diplomacy for Türkiye has to be understood as a combination of natural and societal variables, and a product of competition. The author attempts to make policy-relevant recommendations with a focus on the strategically relevant Euphrates–Tigris River basin, from a Science Diplomacy perspective. The geographical location of Türkiye places them in a sensitive geopolitical-diplomatic and security dilemma between its relations with the Middle East and the European Union. How do we interpret the timing and relevance of the book

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on Water Diplomacy? How have the transboundary relations in the Euphrates-Tigris (ET) evolved through recent history? An attempt has been made to review the book by Aysegül Kibaroglu.

By the year 2018, Türkiye had begun to show tendencies of more anti-Western, anti-American, more authoritarian, confrontational, isolationist, pro-Russia, and nationalistic. In recent years, Türkiye has militarily engaged in regional conflicts. In Syria, it carried out three large-scale incursions and one military operation. In northern Iraq, one can observe their growing military presence. In the Armenia and Azerbaijan inter-state conflict, Türkiye was seen being involved. The country has also actively participated in the regional geopolitical conflict- as a party in the conflict between Qatar, UAE, and Saudi Arabia, a strong naval competition with NATO allies France and Greece. In the year 2018, following a presidential decree, the Ministry of Foreign affairs was reorganised giving more power to the principles of the presidential system, leading to an informal overlap of nationalism and Eurasianism into the Turkish politics and foreign policy. The growing authoritarian trajectory has thus affected the country's engagement in regional diplomacy exposing Türkiye to military volatility and isolationist tendencies. In this context, the author brings to the forefront the institutional setting and the roles of state institutions such as the Ministry of Foreign Affairs, the Ministry of Forestry and Water Affairs, and the State Hydraulic Works in the country's transboundary water policies.

The book skillfully traces the evolution of Türkiye's policies and practices of water diplomacy in the Euphrates-Tigris River basin. Additionally, the author highlights the Ministry of Foreign Affairs' well-established approach of having water issues different from security concerns and rightfully deviates from this stance by securitising the water dispute with Syria and other neighbours. Three of the five eastern neighbours of Türkiye have some form of political/military conflict with the country and it would be imperative to call water-related issues a security concern- even if it is different from the official stance of the government. With the elections approaching in 2023, water-based developmental concerns would play a major role in highlighting the economic factors. The opposition party in Türkiye the Republican People's Party (Cumhuriyet Halk Partisi, CHP) is known to place greater emphasis on regional stability, showing an intent to re-establish ties with the Assad regime, and the likeliness of enhanced engagements with the regional leadership.

Türkiye has been one among the three countries that rejected the UN Watercourses Convention (UNWC) in 1997 as it does not favour its interests in the Aegean Sea. The political rhetoric believes in the potential of the country's water resources. Hence, the utilisation of water resources for development remains the core aim of the country's developmental goals. The author has played an active role, as the co-founder of the "Euphrates–Tigris Initiative for Cooperation (ETIC)" a Track II initiative with her colleagues from Syria, Iraq and Türkiye. She has also worked in an advisory capacity with a regional development agency, the Southern Anatolia Project (GAP), and the Regional Development Administration (RDA), which works with the social and environmental development agenda.

Chapter-wise Understanding of the Book

The first chapter analyses the institutional setting by looking at six institutions in-detail on the Turkish side of the ET basin and concludes by recommending the GAP RDA as the

regional coordination agency for the socio-economic development. The second chapter addresses the legal aspects, the minutes-of-meeting, discussion reports, information notes and official manuals published by official ministries, and the statements of relevant officials made in the conferences and other international forums. International Customary Laws are practiced and endorsed by the authorities working with water-diplomacy, where the concepts of 'no significant harm,' and 'equitable utilisation,' are largely applied. The chapter three looks at the state's legal approach towards and since the UN Watercourses Convention, it talks of the reorganisation in its bureaucratic structures and the evolving stance of Türkiye towards the international water law. The author mentions the newly created Turkish Water Institute under the MFWA that has been entrusted with scientific research for the strengthening of national and international water policies. And while geography plays a major role in transboundary engagements, the chapter four analyses the water diplomacy of Türkiye from a historical perspective that led to the creation of their transboundary water policy, from the year 1923, the early years of Türkiye.

The period of smooth relations of Ankara with Damascus and Baghdad between the 1920s and the 1950s observed various bilateral treaties for the delimitation and use of the transboundary rivers. The chapter discusses the impact of the Cold War on Türkiye's regional and bilateral approach to water relations. The author further traces the shift in water policies in the neighbourhood, and the evolving relations with the European Union in the context of Türkiye's ambitions of joining the European Union, requiring them to consider the principles and legalities of "European Environmental Law, namely the EU Water Framework Directive." This harmonising with the European Union water policies has been reflected in Türkiye's policy approach to its Middle Eastern neighbours. Chapter five looks at the non-state actors in water diplomacy and the Track II diplomatic approaches for problem solving, including the NGO, academia, and other private citizens. The direct engagement with the second- tier experts from the riparian countries, that have positively brought forth results that have helped in the water diplomacy framework. The book concludes by making policy relevant recommendations to enhance and address the future approach to transboundary water diplomacy and its challenges.

Contextual Inputs, Analysis, and Conclusions

In the first chapter, when the author recommends the GAP RDA for socio economic developmental goals, the author would need to include the concerns and the institutional representation of developmental institutions of the neighbouring countries for whom the agenda would impact. The GAP agenda of 22 dams and 19 hydro-electric power plants, has been one of the factors of conflicting relations in the region. While the agenda includes urban-rural infrastructure development, agriculture, energy, transportation and other developmental initiatives, the agency will have to engage in the concerns raised by the Syrian side of pollution, and the reduction in the flow of the Euphrates water towards their side of the rivers. In the case of chapter two, the region has unequal power distribution along with an imbalance in the infrastructural development, an equitable approach would need to be further defined. More emphasis on the domestic and regional legal approach, with national laws addressing the concerns of bilateral water

conflicts, would be beneficial. The chapter three takes a peek at Türkiye's principles and practices that were developed in-line with International Customary Law and manages to put in context the Türkiye foundational approach to water policies. The fourth chapter explains the geopolitical challenges faced by the country. However, the regional dilemma faced by Türkiye, as a formal member of the European bloc but a geophysical part of the Middle East does not limit to water policies but also has the potential to make the country face problems of decision-making at various standards. Türkiye could be seen as a regional hegemon with its Eastern neighbours, and thus the power dynamics of such a position would be reflected in their policy-making strategies. The historical-evolutionary approach of the fourth chapter explains this evolution of power dynamics amid its current political regime. The regional responses/ the stance of the neighbours would have broadened the scope of this chapter.

A holistic regional approach to the analysis, while is beyond the structure of the book, would add a perceptional viewpoint to the issue of transboundary water politics. The parties in Track II diplomatic approaches mentioned in Chapter five could also place an emphasis on the positive engagement of the business and infrastructure development industries between the countries. The water diplomacy could essentially evolve to include common water-based/ river-regions' developmental goals. The institutional settings could thus include long-term developmental ambitions as part of the transboundary water policy. Similar developmental standards in the years 1920s-1950s as mentioned in chapter four explains the possibility of engagement for the socio-economic concerns of the region if the diplomatic strategies place emphasis on the same. The role of socio-economic elements would thus work as a parallel element to the water-related issues of the region.

G20: Call for Papers

G20 is gaining importance as a global platform for articulation of economic, social and development issues, opportunities, concerns and challenges that the world is confronting now. Over the years, G20 has witnessed a significant broadening of its agenda into several facets of development. India is going to assume G20 presidency in 2022 which would be important not only for the country but also for other developing countries for meeting the Sustainable Development Goals and achieving an inclusive society. India can leverage this opportunity to help identify G20 the suitable priority areas of development and contribute to its rise as an effective global platform.

In that spirit, Research and Information System for Developing Countries (RIS), a leading policy research institution based in New Delhi, has launched a publication called G20 Digest to generate informed debate and promote research and dissemination on G20 and related issues. This bi-monthly publication covers short articles of 3000 to 4000 words covering policy perspectives, reflections on past and current commitments and proposals on various topics and sectors of interest to G20 countries and its possible ramifications on world economy along with interviews of important personalities and news commentaries.

The Digest offers promising opportunities for academics, policy makers, diplomats and young scholars for greater outreach to the readers through different international networks that RIS and peer institutions in other G20 countries have developed over the years. The interested authors may find more information about the Digest and submission guidelines on the web link: **http://www.ris.org.in/journals-n-newsletters/G20-Digest.**

Guidelines for Authors

1. Submissions should contain institutional affiliation and contact details of author(s), including email address, contact number, etc. Manuscripts should be prepared in MS-Word version, using double spacing. The text of manuscripts, particularly full length articles and essays may range between 4,000- 4,500 words. Whereas, book reviews/event report shall range between 1,000-15,00 words.

2. In-text referencing should be embedded in the anthropological style, for example '(Hirschman 1961)' or '(Lakshman 1989:125)' (Note: Page numbers in the text are necessary only if the cited portion is a direct quote). Footnotes are required, as per the discussions in the paper/article.

3. Use's' in '-ise' '-isation' words; e.g., 'civilise', 'organisation'. Use British spellings rather than American spellings. Thus, 'labour' not 'labor'. Use figures (rather than word) for quantities and exact measurements including per centages (2 per cent, 3 km, 36 years old, etc.). In general descriptions, numbers below 10 should be spelt out in words. Use fuller forms for numbers and dates— for example 1980-88, pp. 200-202 and pp. 178-84. Specific dates should be cited in the form June 2, 2004. Decades and centuries may be spelt out, for example 'the eighties', 'the twentieth century', etc.

Referencing Style: References cited in the manuscript and prepared as per the Harvard style of referencing and to be appended at the end of the manuscript. They must be typed in double space, and should be arranged in alphabetical order by the surname of the first author. In case more than one work by the same author(s) is cited, then arrange them chronologically by year of publication.

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About FISD

As part of its ongoing research studies on Science &Technology and Innovation (STI), RIS together with the National Institute of Advanced Studies (NIAS), Bengaluru is implementing a major project on Science Diplomacy, supported by the Department of Science and Technology. The programme was launched on 7 May 2018 at New Delhi. The Forum for Indian Science Diplomacy (FISD), under the RIS–NIAS Science Diplomacy Programme, envisages harnessing science diplomacy in areas of critical importance for national development and S&T cooperation.

The key objective of the FISD is to realise the potential of Science Diplomacy by various means, including Capacity building in science diplomacy, developing networks and Science diplomacy for strategic thinking. It aims to leverage the strengths and expertise of Indian Diaspora working in the field of S&T to help the nation meet its agenda in some select S&T sectors.

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