Opinion



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Significance of Science Diplomacy

Science diplomacy enables bringing countries together to develop international scientific partnerships to address universal challenges and achieve sustainable development goals. The recent example of the COVID-19 pandemic has shown that the problems faced by humanity can be effectively countered by robust scientific collaboration at the regional and global levels. Science diplomacy has facilitated cooperation between various governmental and non-governmental agencies on diverse scientific agendas like clean energy, combating climate change, food security, health and biodiversity and provided high-quality scientific advice to resolve the issues. The combined efforts aid in tackling global threats which cannot be fixed by individual countries. Science diplomacy goes beyond geographical boundaries to improve international relations even during hostile situations.

Best Practices to Strengthen Science Diplomacy

Science, technology and innovation (STI) are deeply intertwined with issues of global concern like climate change, health, and food and energy security. There is a need to bridge the gap between the different stakeholders of science diplomacy to equip them to deal with the universal challenges. Linkages may be strengthened by ensuring dialogue and cooperation amongst scientists and diplomats and bringing scientists who work in a bottom-up atmosphere within the top-down hierarchy in foreign missions. Building trust and confidence between different players is a vital aspect of achieving the goals of science diplomacy.

A synergistic relationship between scientists and diplomats contributes to the progress of science and technology (S&T), sustainable development of human society and solving overarching issues. Close coordination between scientists and diplomats has facilitated evidence-based positioning of the country on matters of global significance. Cooperation between higher educational institutions and S&T organisations in curiosity-driven research and innovation (R&I) is critical to developing mutually beneficial collaborative programs between the countries.

Creating a pool of science diplomats from various science departments/ Ministries would be immensely useful to leverage the advantages of science diplomacy on global fora. Recruiting scientists at an

early stage of their career and providing them with the requisite training in foreign policy skills and nuances would be a step in the direction of creating a pool of science diplomats. It would create alternative career options for the accomplished scientists who wish to get involved with science diplomacy objectives. The number and the geographical reach of science diplomats need expansion to ensure that almost all major regions/ countries of the world are connected.

Desirable Skills for a Science Diplomat

By being apolitical and by their universal brotherhood, scientists support building bridges between the countries' leadership and people to search for solutions. A dedicated scientist with a clear understanding of the issues affecting the world and their plausible answers is best suited for a science diplomat's role. They should be able to facilitate and promote collaborations by following the latest S&T developments, breakthroughs and innovations in the host countries and linking the various stakeholders with those from their country of origin. An accomplished and well-connected scientist can extend connections across diverse disciplines and monitor and report on the latest cutting-edge research in the host country.

Moreover, a prospective/ aspiring Science diplomat must possess a deep understanding of the R&I policies at the national and international level and hold good intercultural communication and writing skills coupled with scientific credibility and experience. Having excellent negotiation skills and cross-disciplinary awareness is a must. Of late, R&I has emerged as an essential engine for the economic prosperity of a country and science diplomats must be trained to play a significant role in realising the economic and technological capabilities. There are cultural differences between scientific institutions and diplomatic missions, and hence to be successful, science diplomats must be able to adjust to the new work culture and environment.

Areas of Common Interests for Indo-German Science Diplomacy

India and Germany share a lot of commonalities in the R&I landscape and can consider research collaborations for achieving mutual goals and providing scalable solutions for global challenges. Germany's R&I ecosystem broadly consists of universities and non-university research organisations, research-based companies and its federal and state research institutions. Germany's ~400 higher education institutions (which include 120 universities and >200 universities of applied research), with ~3 million students, offer a broad range of research activities, including basic research and applied research and development (R&D).

The non-university research institutions spread across Germany, focusing on fundamental and applied science research, are funded mainly by the Helmholtz Gemeinschaft, Max-Planck-Gesellschaft, Fraunhofer-Gesellschaft and Leibniz-Gemeinschaft, and Federal and Länder (State) governments. Apart from these institutions, private sector companies like Volkswagen, Bayer, BMW, Continental, Bosch, Siemens, etc., also invest heavily in R&I. Germany, due to its strong support for research, infrastructure and institutions and university-based cutting-edge research has emerged as one of the leading nations in R&I. One-third of Germany's R&D budget (~3.1% of the country's Gross domestic expenditure on research and development, GERD) is provided by the public sector and the remaining by the private sector.

S&T cooperation between India and Germany is implemented under an inter-governmental agreement on "Cooperation in Scientific Research and Technological Development" signed in May 1974. The Department of Science & Technology on the Indian side and the Federal Ministry for Education and Research (Bundesministerium für Bildung und Forschung, BMBF) from Germany are the nodal agencies for the overall coordination of the programme. Various modes are in place for the implementation and intensification of S&T cooperation between India and Germany, which include joint research projects between institutions and scientists, project-based personnel exchange programme with an emphasis on the exchange of young PhD scholars, joint workshops/symposia, networked partner research groups, mega-science projects like FAIR and DESY, etc.

To make this decade, India's Techade, powered by Jai Anusandhan and for AtmaNirbhar Bharat, India can foster cooperation with Germany in the National Mission areas, like green hydrogen, deep ocean exploration, quantum computing and in areas of emerging technologies like artificial intelligence, Internet-

of-Things, 5G/6G wireless communication and electric vehicles, and in biodiversity, biosciences and human health. Both countries can join hands in exploring deep oceans for resources and develop deep-sea technologies for sustainable use of ocean resources. India and Germany have great potential to collaborate to achieve energy security and tackle climate change concerns. Cooperation in green hydrogen to leverage India's land mass and solar and wind energy potential to produce low-cost green hydrogen for export to the rest of the world must be considered on priority. In quantum computing, which promises a significant leap in computing power, cooperation can be considered in areas like R&D, translation and infrastructure generation.

Both countries could gain a lot by cooperating in establishing joint mega-science infrastructures in strategically important areas. Diplomacy can help the scientific fraternity in facilitating multilateral cooperation in mega-science projects and undertake peaceful research in domains that come under international law like Antarctica, Deep Oceans and Outer Space. Increased communication between scientists and policymakers, and the opening of strong collaboration channels, have enabled science diplomacy in resolving contentious issues and building confidence between the countries. Therefore, building a close relationship between scientists and diplomats is critical to achieving the objectives of science diplomacy.