Emerging Trends and Opportunities for the Indian Scientific Diaspora

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The vast Indian scientific diaspora, estimated at over a million scientists and engineers worldwide, significantly impacts global science, technology, trade, and other areas of life. With globalisation, contemporary trends are emerging, offering these scientists opportunities to benefit both India and their host nations. This article explores these trends and the potential of this dynamic community.

Science Diplomacy: A Catalyst for Collaboration

Science diplomacy leverages scientific knowledge to foster international collaboration on pressing global challenges such as climate change and pandemics. The Indian scientific diaspora, with its expansive global network, plays a key role in this endeavour. Indian-origin scientists, especially in the US, Europe, and Asia, are increasingly involved in bilateral and multilateral efforts, acting as bridges for knowledge transfer and collaboration between India and their host countries.

India's growing reputation in the scientific community has further led to science diplomacy initiatives, including bilateral agreements for research and academic exchange with countries like the US, UK, Germany, and Australia. Through these efforts, the Indian diaspora has been instrumental in fostering these relationships, promoting Indian science abroad while bringing back valuable knowledge. Science diplomacy also allows Indian scientists abroad to contribute to global projects like space exploration and artificial intelligence, linking Indian expertise with international advancements.[1]

Boosting Research and Innovation in India

India's recent push for a robust research and innovation ecosystem has created new opportunities for the Indian scientific diaspora. One such initiative is the Pravasi Bharatiya Academic and Scientific Sampark (PRABHASS), launched by CSIR under the Ministry of Science and Technology. This platform facilitates the engagement of the Indian diaspora through mentorship, collaborative research, and networking, linking global expertise with India's development priorities. Another prominent scheme is the Ramalingaswami Re-entry Fellowship, which encourages Indian scientists abroad to return and undertake high-impact research. Such

initiatives foster closer collaboration between overseas Indian scientists and their counterparts in India, bridging the knowledge gap and driving innovation.

There is a growing trend of Indian-origin scientists participating in India-based startups, particularly in biotechnology, artificial intelligence, and space technologies. The Indian government promotes these sectors through initiatives like "Startup India" and "Make in India." These collaborations foster innovation, bridge knowledge gaps, and enable the commercialisation of cutting-edge technologies. Startups led by Indian-origin scientists, especially in biotechnology and pharmaceuticals, are emerging as key players globally. Collaboration between these startups and Indian research institutions presents opportunities for advancing homegrown innovation and technology commercialisation.[2]

Knowledge Diplomacy and Educational Exchange

One of the most prominent areas where the Indian scientific diaspora can contribute is in the realm of education. Educational exchanges, joint degrees, and collaborative research programmes are becoming more common between Indian institutions and leading universities abroad. Indian scholars abroad, through platforms such as the Global Initiative of Academic Networks (GIAN) and the Visiting Advanced Joint Research (VAJRA) Faculty Scheme, can return to India to share their knowledge and expertise. This reverse brain drain phenomenon is increasingly seen as a way to strengthen the Indian education system and improve its global rankings.

Through knowledge diplomacy, Indian-origin scientists and researchers are forming partnerships with Indian universities to create new research initiatives and education models. It could lead to enhanced faculty and student exchange programmes, joint research projects, and co-authored publications. Agreements like the India-EU Science and Technology Cooperation promote joint research and innovation in fields such as energy, health, and information technology.[3] Indian researchers abroad, often involved in innovative projects, bring valuable insights and methods that could be transformative for Indian education and research institutions.[3]

Addressing Global Challenges through Collaborative Research

Global challenges like climate change, health pandemics, and food security have necessitated the pooling of scientific resources and collaboration on an unprecedented scale. The Indian scientific diaspora has a significant role to play in addressing these challenges through international collaborative research. For instance, during the COVID-19 pandemic, Indian-origin scientists were at the forefront of developing vaccines, diagnostic tools, and therapeutic interventions. This collaboration between Indian scientists abroad and institutions back home underscores the potential of joint efforts in tackling global problems.

Climate change research is a prominent area where such collaborative efforts have been visible. Indian-origin scientists, particularly in the US and Europe, are contributing to major research projects that are shaping international climate policies. Collaboration between Indian and global scientists on climate-resilient agriculture, renewable energy, and sustainable technologies is growing rapidly. These joint ventures not only strengthen India's scientific capacity but also provide opportunities for Indian diaspora scientists to make significant contributions to global research efforts.[4]

Additionally, Indian scientists abroad are increasingly involved in addressing food security challenges, working on projects aimed at improving crop resilience, sustainable farming techniques, and food distribution

systems. By collaborating with Indian institutions such as the Indian Council of Agricultural Research (ICAR) and leading agricultural universities, these scientists play a key role in transforming India's agricultural landscape to ensure food security and sustainability.

Digital Technology and Remote Collaboration

The rise of digital platforms and tools for remote collaboration has opened new doors for the Indian scientific diaspora to contribute to India's scientific and technological growth. The COVID-19 pandemic accelerated the adoption of digital tools in science, making it easier for scientists worldwide to work together. Virtual labs, online conferences, and collaborative research platforms have allowed Indian-origin scientists to stay connected with their peers in India without needing physical presence.

Moreover, initiatives like the National Digital Library of India (NDLI) and Science and Technology Information Platform (STIP) have created repositories of scientific knowledge and research that scientists can access worldwide. Indian-origin scientists, particularly those in computer science, biotechnology, and data analytics, are increasingly collaborating with Indian institutions to work on projects remotely. This trend is likely to continue with digital technology, further democratising access to scientific research and making it easier for the Indian scientific diaspora to contribute to projects back home.[5]

Opportunities in International Scientific Organisations

International organisations such as the United Nations, World Health Organisation (WHO), and World Bank offer opportunities for Indian-origin scientists to contribute to global research and policy-making efforts. With India's growing influence on the global stage, Indian scientists abroad are increasingly taking leadership roles in these organisations. This involvement not only enhances the profile of Indian science globally but also provides opportunities for Indian scientists to shape international scientific discourse.

Indian-origin scientists are often involved in advisory roles in these organisations, offering their expertise on matters ranging from global health to environmental conservation. These scientists also engage in science advisory panels and committees that influence global policy decisions. This leadership in international organisations creates pathways for furthering India's scientific and technological interests on the global stage.[6]

Rise of Philanthropy in Science and Technology

Philanthropy, particularly in science and technology, has emerged as another avenue for the Indian scientific diaspora to contribute. Indian-origin philanthropists, especially those based in the US, have begun to make significant contributions to scientific research in India. These contributions are being channelled into building world-class research facilities, funding scholarships, and supporting technology transfer between India and other nations. The establishment of research centres funded by Indian-origin philanthropists is helping bridge the gap between India's growing scientific potential and the availability of resources.

For example, the Tata Institute for Genetics and Society (TIGS), supported by Indian-origin philanthropists, focuses on addressing global challenges like malaria through advanced genetic research. Similar initiatives funded by Indian philanthropists abroad are also focusing on climate change, health, and food security, offering immense opportunities for collaboration between Indian scientists abroad and research institutions in India.[7]

Conclusions

The Indian scientific diaspora represents a powerful force in the global scientific community, with its contributions spanning multiple fields and regions. Emerging trends such as science diplomacy, digital collaboration, and philanthropy are unlocking new pathways for these scientists to engage with both India and their host countries. By leveraging their unique position, the Indian scientific diaspora can continue to drive scientific progress and innovation, not only for the benefit of India but for the global community. As India's scientific ecosystem grows, the diaspora's role in shaping the future of science and technology will only become more significant.

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