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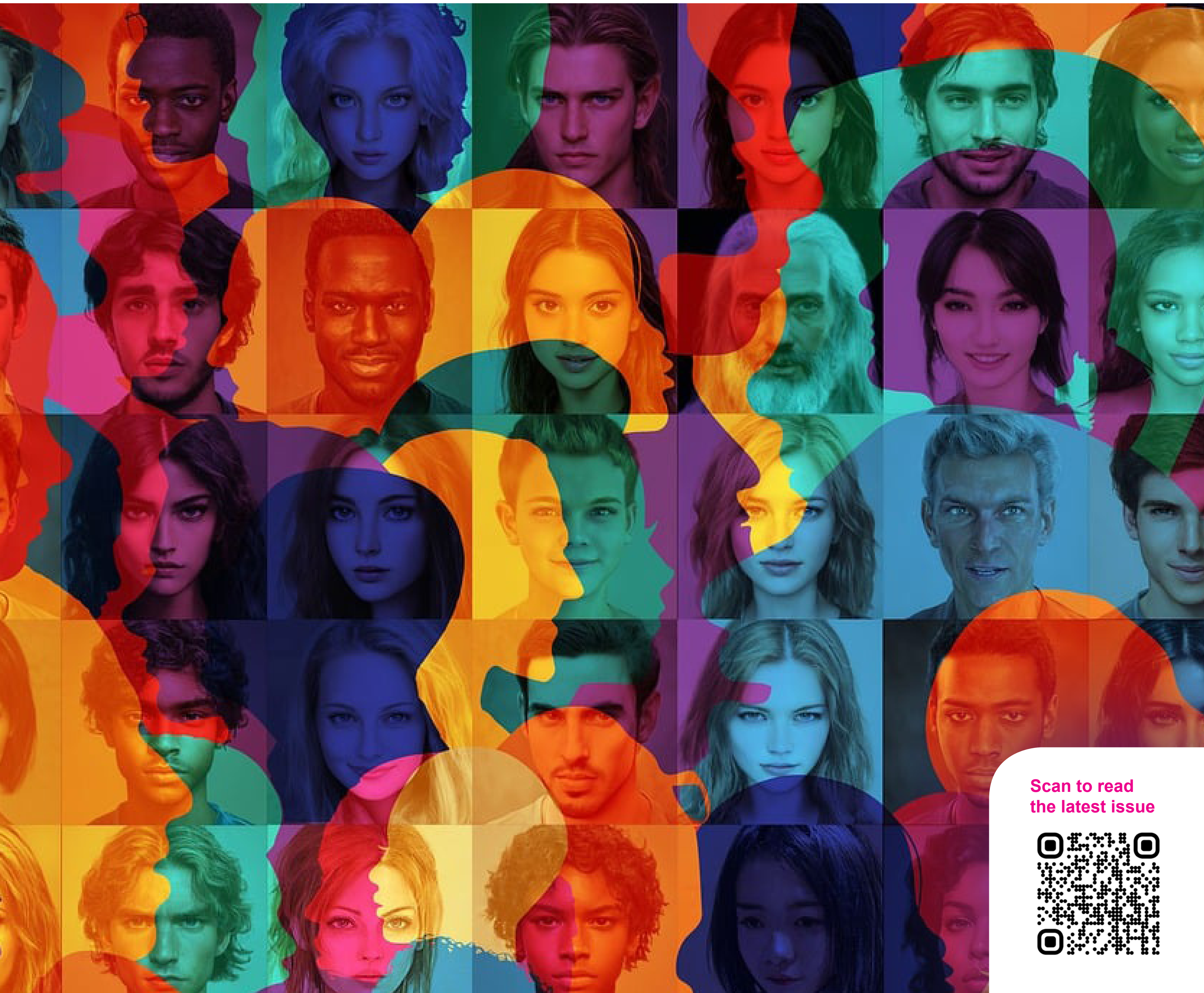
# Science Diplomacy

*India's Global Digest of Multidisciplinary Science*



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# Science Diplomacy

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Director
**Dr Ranjana Aggarwal**

Editor
**Dr Monika Jaggi**

Design and Layout
**Manender Singh**

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Council of Scientific & Industrial Research (CSIR)
Vigyan Sanchar Bhawan,
Dr K.S. Krishnan Marg, New Delhi-110012, India

+91-11-25841143
scidip@niscpr.res.in
www.niscpr.res.in
csir_niscpr
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# Editorial

The United Nations has designated 'Invest in Women: Accelerate Progress' as the theme for 2024, emphasising the urgent need to address the economic disempowerment faced by women worldwide. Despite over a century of advocacy since its inception in 1911, International Women's Day remains crucial, underscoring the persistent struggle for women's rights and equality. Sustainable Development Goal 5 underscores the importance of gender equality, yet projections by experts in gender equality offer varying timelines for achieving this goal. UN Women estimates a daunting 285 years to close the gender gap, while the World Economic Forum predicts at least 131 years until gender parity is achieved. In this context, prioritising gender equality becomes not just a matter of justice but also a strategic imperative for building resilient societies and thriving economies. Science diplomacy emerges as a vital tool in this pursuit, bridging gaps and fostering inclusivity. The latest issue of the *Science Diplomacy* Digest explores the nuances of gender parity and participatory processes crucial for science diplomacy.

One of the articles examines the Gender Advancement for Transforming Institutions (GATI) program in India, initiated by DST in collaboration with the Advance Higher Education & British Council. This initiative evaluates the inclusivity of policies and practices, raises awareness, and promotes gender equality within research institutions nationwide, emphasising the significance of engaging stakeholders to foster gender equity.

Another article discusses the outcomes of a symposium series that addresses marginalisation in India's science, technology, and innovation sectors, highlighting the importance of tailored policy solutions grounded in intersectionality. Promoting gender equality in STEMM education, workforce, and leadership is crucial for cultivating a diverse talent pool and fostering a broader range of perspectives.

The role of science diplomacy in achieving gender equality is paramount. By fostering collaboration among nations and stakeholders, science diplomacy creates opportunities to exchange knowledge, best practices, and resources to address gender disparities effectively. The Athena SWAN (Scientific Women's Academic Network) Charter is a global framework to promote gender equality in higher education. Through diplomatic channels, countries can share insights on successful initiatives and coordinate efforts to implement gender-inclusive policies and programs. By leveraging the power of science diplomacy, nations can accelerate progress towards achieving gender parity and creating a more equitable and inclusive world for all.

As we celebrate International Women's Day, let's continue striving for gender parity and inclusive decision-making processes in science diplomacy to create a more equitable and sustainable future for all.

Monika Jaggi

# Participatory Processes for the Design of Science Diplomacy Initiatives: Perspectives from Emerging Economies

**Luisa F. Echeverría-King[a,*], Claudia Alarcón-López[b], Julián Prieto[c], Luz M. Cumba Garcia[d], Susan Benavides-Trujillo[e]**

[a]Universidad Simón Bolivar, Barranquilla, Colombia; [b]EPFL and ETHZ, Switzerland; [c]Penn State University Pennsylvania, USA; [d]American Association for the Advancement of Science (AAAS) Science & Technology Policy Fellow / Inter-American Institute for Global Change Research (IAI) Science, Technology, Policy (STeP) Fellow; [e]Universidad de América in Bogotá, Colombia

**Corresponding author: luisa.echeverria@unisimon.edu.co*

## Introduction

Science diplomacy involves the intersection of scientific collaborations, technology, international relations, and public policy, emphasising how science can foster cooperation and address global challenges.[1] Participatory processes enhance science diplomacy by involving diverse stakeholders[2], including scientists, policymakers, and the public. This inclusive approach ensures a broader range of perspectives, promotes transparency and helps craft more effective and culturally sensitive science diplomacy strategies. By engaging various stakeholders, participatory processes enrich decision-making, facilitating the creation of policies and projects that better align with the needs and priorities of all involved parties, thereby boosting the impact and success of science diplomacy endeavours.

This article explores participatory processes employed in shaping science diplomacy initiatives in emerging economies. By examining practical cases and methodologies, we seek to identify best practices and opportunities associated with stakeholder participation in designing science diplomacy strategies in Latin America. The intent is to contribute to developing practical frameworks that facilitate the seamless integration of diverse perspectives in formulating and implementing science diplomacy policies and projects. This article presents a case study showcasing the mixed use of participatory processes and offering recommendations for a science diplomacy strategy to safeguard the Amazon region.

## Participatory Processes in Science Diplomacy

Effective science diplomacy strategies are critical for addressing today's complex global challenges.[3] Participatory processes play a crucial role in ensuring transparency, accountability, and legitimacy in implementing these policies. Transdisciplinary and cross-sector collaboration in the design of science diplomacy strategies allows the identification of shared priorities and the building of consensus, essential to confront cross-border challenges.[4] By recognising global interdependence and the need for coordinated action, participatory science diplomacy is positioned as a powerful tool for building bridges between science and politics, as well as between countries and cultures, having networking at its core.[1]

Figure 1 illustrates various participatory processes used in both developed and emerging economies:

A. Stakeholder workshops: These workshops have been proven helpful in driving system innovations towards sustainable practices.[5] In emerging economies, the case of the Argentinian think tank Center for the Implementation of Public Policies Promoting Equity and Growth (CIPPEC) is an example of successful stakeholder workshops that have been used to achieve positive policy outcomes.

B. Scientific tourism: It involves scientists visiting communities for research purposes, contributing to Sustainable Development Goals (SDGs) by sharing scientific knowledge and supporting local socio-ecological development. This emerging field enhances participatory processes by showcasing problematics and potentials in real-world settings. In Ecuador, the SDGs have been achieved through this practice[6], as well as in Mexico with the scientific tourism initiative Ciencia Sí.

C. Community engagement: In Latin America and the Caribbean (LAC) region, initiatives like the Science Diplomacy Network in Latin America and the Caribbean (DiploCientifica) foster science diplomacy practices through community engagement. Events like the Sustainable Research and Innovation (SRI) Congress and the Inter-American Institute for Global Change Research (IAI) capacity-building workshops are two examples that provoke tangible outcomes in science diplomacy strategy ideation in Latin American emerging economies.

D. Consultations with experts: It contributes to evidence-based decision-making and policy formulation, ensuring initiatives align with international standards and best practices. The LAC region has gathered scientific elites to co-produce social processes.[7]

E. Public consultation, networking, and partnerships: These processes provide access to knowledge circulation, resources, and collaborative opportunities, enabling emerging nations to leverage the strengths of the global scientific community.[8]

F. Immersion programs: These programs equip science diplomacy enthusiasts, including trained scientists, with tools and mindsets for multilateral practices.[9] Fellowships like the IAI Science, Technology, Policy (STeP) Fellowship similarly adhere to the principles of immersion programs. However, this specific program focuses on emerging economies in the LAC region, fostering cohorts from these developing nations.

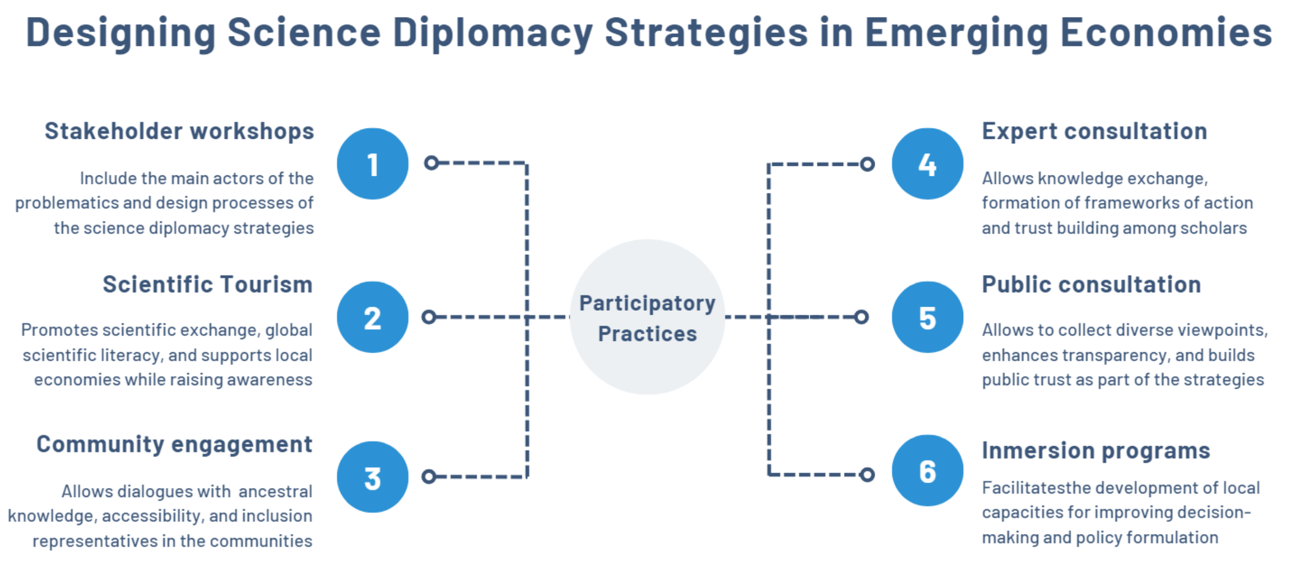


Figure 1. Participatory processes that could lead to the design of science diplomacy strategies

These collaborative spaces empower emerging nations to bridge scientific, diplomatic and socio-economic gaps, facilitating the development and implementation of effective science diplomacy strategies that address their unique challenges while promoting mutual understanding and cooperation with the international community.

### Case Study in Emerging Economies

Science diplomacy is vital for addressing multifaceted challenges and promoting sustainable development in emerging economies.[10] These countries often grapple with limited resources and confront complex global issues such as climate change, public health crises and technological disparities.[11] The Amazon rainforest, spanning 7 million square kilometres across nine countries, is home to over 47 million people, including 500 indigenous communities.[12] Anthropogenic actions such as agriculture, illegal logging, infrastructure development, and livestock expansion have caused the transformation of 17% of the forest, and another 17% has been degraded.[13] In the absence of collective action from all countries, this ecosystem faces the threat of losing its primary function, leading to a tipping point from which recovery may be impossible.[14]

Diplomatic efforts in the region have been initiated since 1987 when the Organisation for the Amazon Cooperation Treaty (OTCA as its acronym in Spanish) was created. Diverse efforts, initiatives, and commitments have been developed to promote equitable and sustainable development. Global engagement in these regional efforts has been fundamental to advancing the understanding of the challenges faced and the potential solutions. The United Nations joined forces to set up the Scientific Panel for the Amazon, which delivered an assessment report in 2021.[15] This report is an example of remarkable science diplomacy efforts involving over 200 researchers from the region to analyse the Amazon as a territorial entity, its socio-ecological transformations, and potential solutions to the current crisis.

The regional and international acknowledgement of the importance of this ecosystem for global climate regulation has triggered significant funding commitments toward reforestation and adaptation efforts. This created a fertile window of opportunity for a participatory process, resulting in a White Paper of policy recommendations to safeguard Amazon in 2023.[16] This case study demonstrates three primary participatory mechanisms for science diplomacy:

1. **Regional science diplomacy networks**: Organisations like DiploCientifica are pivotal in initiating the concept and facilitating broader engagement among leading members in structuring and developing the project.
2. **International Conferences - Stakeholders workshop**: The 2023 SRI Congress in Panama provided a platform for conducting a collaborative workshop to gather valuable input from more than 30 participants, including scientists, policymakers, civil society organisations, and indigenous representatives.
3. **Expert consultations:** The emerging ideas from the 2023 SRI collaborative workshop were organised by clusters and further discussed with regional science diplomacy experts to assess their feasibility.

Supported by DiploCientifica and the IAI, the publication of the White Paper incorporated a communication strategy targeting policymakers from the nine countries within the Amazon region, as well as multilateral agencies and donor countries.

### Conclusion

Participatory processes are not only desirable but indispensable for developing effective science diplomacy strategies that are relevant to the complexities of the 21st century.[17] Employing diverse participatory approaches, as seen in the case study of the Amazon region, can provide a robust approach to addressing emerging challenges in a constantly evolving world. This case study underscores the importance of regional and international collaboration in tackling intricate worldwide issues and highlights the role of science diplomacy in fostering mutual understanding and cooperation.

Direct engagement of various stakeholders in formulating science diplomacy strategies ensures that policies are not only scientifically sound but also socially relevant, culturally sensitive and politically viable. This approach enhances the sustainability and efficacy of these strategies in tackling the multifaceted global challenges of our time.

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# Gender Parity in India's Scientific Landscape: Evaluating Science Diplomacy Progress

**Jyoti Sharma[a,*], Sanjeev Kumar Varshney[b]**
[a]Senior Scientist, [b]Former Head & Advisor
International Cooperation Division, Department of Science and Technology,
Ministry of Science and Technology, Govt. of India
*Corresponding author: jyotisharma.dst@gmail.com

India's National Education Policy 2020 places significant importance on achieving gender equality and inclusivity in educational institutions. Simultaneously, gender equality is a pivotal focus area during India's G-20 Presidency and aligns with the UN Sustainable Development Goals. The Department of Science and Technology (DST) is actively involved in various initiatives to advance these objectives. DST is poised to take a central role in fostering gender equity to attain gender equality within the realms of research and development. This will involve not only the development and implementation of gender-inclusive programs at the national level but also the dissemination of best practices drawn from international programs to promote gender equality effectively.

The Athena SWAN (Scientific Women's Academic Network) Charter, established and managed by the United Kingdom's (UK) Equality Challenge Unit (now part of Advance HE) in 2005, serves as a global framework utilised to promote gender equality in higher education (HE) and research institutions. The charter is rooted in its encouragement and recognition of dedication to enhancing the professional trajectories of women in academia and research. It addresses four essential domains: bolstering representation, facilitating students' transition into academic roles, supporting career progression, and cultivating a positive working environment. Guided by ten pivotal principles, the Athena SWAN initiative serves as a framework for institutions to improve gender equality within their academic and research landscapes.

With a growing body of evidence on the efficacy and influence of the Athena SWAN Charter, its membership is rising within the UK, and its impact extends to other nations. The charter was successfully transferred and converted into globally comparable and locally contextualised, including Australia, Canada, Ireland, the United States of America and now India.

The Gender Advancement for Transforming Institutions (GATI) programme in India was initiated by DST in collaboration with the Advance HE & British Council and launched across 30 research institutions and universities during the pilot phase. GATI aims to rectify gender imbalances in Science, Technology, Engineering, Mathematics and Medicine (STEMM) institutions. The program evaluates inclusivity in policies and practices of participating institutions, gauges stakeholders' awareness and perceptions, and seeks to advance gender equality.

The pilot phase of GATI in India involved receiving 190 expressions of interest from institutions. Eventually, 30 Indian institutions were selected and supported by DST for two years, in partnership with six UK institutions in 2021. The British Council provided funding of GBP 25,000 each to six Athena Swan members in the UK, comprising a combination of UK-based higher education institutions and research institutes. This funding is designated to establish collaborative partnerships with selected Indian GATI pilot members to exchange best practices and enhance gender equality in higher education and research. By 31 January 2023, DST had received self-assessment reports from 22 institutions.

Based on these reports, DST segregated the 30 institutions into two categories:

- Level 1 - *GATI Institutions* (18 institutions): These institutes acknowledged the need to work towards achieving gender equality in STEMM fields, accepted the GATI Charter, and demonstrated a high level of commitment to promoting gender advancement with evidence, etc.
- Level 2 - *GATI Achievers* (12 institutions): Besides meeting the criteria for Level 1, these institutions submitted a self-assessment application and developed action plans to address identified gaps within their premises.

Notably, merely applying for the GATI pilot program qualified them for 'Level 1: *GATI Institution*' status. However, becoming a '*GATI Achiever Institute*' required further action beyond the initial application submission. It involved identifying specific gaps and developing action plans to address these deficiencies within their respective institutions.

Based on the assessment criteria available on the GATI website and other sources, Level 2 *GATI Achievers* effectively pursued program objectives revolving around the establishment of a comprehensive database detailing the gender landscape over the past five years within the University's various domains, encompassing undergraduate and postgraduate programs, research and post-doctoral activities, teaching and research faculty, non-teaching staff, as well as officers and leadership roles at different organisational levels. Moreover, the program aims to highlight significant measures and exemplary practices in terms of gender equality while identifying disparities across both the main and satellite campuses.

Additionally, a baseline study conducted by Thinkthrough Consulting assessed the status quo in selected Indian STEMM institutions on behalf of DST and the British Council. The study, spanning five months from May to September 2021, employed a mixed-method and quasi-experimental approach. It involved 59 institutions, with 30 designated as *GATI Institutions* (the study's pilot sites) and the remainder as control institutions. The *GATI Institutions* were broadly categorised into three main types: 1) Academic Institutions, 2) Institutions of National Importance, and 3) Research Institutions. The assessment process was characterised by a highly collaborative approach involving comprehensive quantitative and qualitative data collection to derive meaningful insights.

The study encompassed input from 555 participants, including academic and non-academic staff members, with 296 identifying as female and 259 as male. The study's scope covered diverse roles, such as Faculty members, PhD scholars, Postdoctoral Fellows/Senior Research Fellows, Research Associates, Administrative Staff, and Finance and Human Resources professionals. This comprehensive approach sought a holistic perspective on gender dynamics within treatment and control institutions.

Findings from the study indicated a positive trajectory in female representation in STEMM fields, both in recruitment and leadership roles. However, these promising trends were overshadowed by the underrepresentation of women in GATI institutions compared to men. This imbalance can be attributed to various factors contributing to this situation.

Among the salient factors, one stands out prominently: the impact of societal expectations and the challenge of balancing caregiving responsibilities with work. The study revealed that female faculty members encounter significant obstacles in adhering to the tenure track – a trajectory crucial for the longevity of their careers – due to the demands of care responsibilities. Further exacerbating the situation, inadequate support systems within the workplace compound these difficulties.

Another noteworthy factor affecting the equitable inclusion of women in STEMM is the absence of a flexible career re-entry plan. Consequently, career breaks often lead to a downward shift in employment status, hindering women's professional advancement within these fields. These insights spotlight the intricate interplay of various elements perpetuating gender disparities within GATI institutions and emphasise the need for targeted interventions to foster more inclusive environments for women in STEMM.

As reported by study participants, these challenges were particularly pronounced within research and technology-based careers, primarily due to the rapidly evolving nature of these fields. Moreover, the absence of gender-sensitive facilities, such as on-campus childcare support, significantly impacted women's choices, often causing them to prioritise care responsibilities over pursuing careers in STEMM. The study also identified instances of discrimination and sexual harassment, acting as hindrances to gender equality within *GATI Institutions*. However, recent years have seen the implementation of stringent legislation and increased awareness, which have helped mitigate the severity of these issues. In essence, the study's findings illuminated the presence of covert discrimination and implicit biases within the workplace, aspects that have become ingrained in the organisational culture.

The baseline survey by Thinkthrough Consulting revealed significant gaps within the 30 pilot institutions. Notably, these pilot institutions also compiled data on the gender landscape over the past two years. This represents a commendable step forward for GATI in motivating academic and research institutions to collect baseline data and pinpoint areas where India may lack gender equality in STEMM areas. It is worth noting that all participating institutions have established a distinguished committee known as *GSAT (GATI Self-Assessment Team)*, which is crucial in enhancing gender progression and advancement per the program's stipulations. Many *GATI Achievers* have reported the implementation of diverse initiatives aimed at promoting gender diversity, such as the recruitment and retention of female faculty members at the departmental level, conducting gender sensitisation workshops, and adopting family-friendly policies.

Furthermore, the Indian Institute of Technology (IIT) Delhi is actively working towards creating an inclusive infrastructure to foster a more diverse and equitable campus environment, transcending traditional gender binaries. However, it remains to be seen how other *GATI Achievers* plan to address the identified gap areas and how the survey results by Thinkthrough Consulting will be integrated into the overall process. Further clarification on this aspect is needed to comprehensively understand the program's impact and strategies to address gender disparities within these institutions.

Women's representation in STEM remains inadequate, particularly in higher leadership positions. These initiatives drive change within organisations, provide a structured framework for gender equality efforts, facilitate the exchange of best practices between nations, enhance public perception, and are viewed as cost-effective by research funders, as they are tested programs in other countries. However, there is a critical need for a thorough evaluation of the implementation aspect of such action-driven international programs. The engagement of various stakeholders is crucial for implementing the action plan effectively within institutions. The support from DST for only two years, without significant involvement from other stakeholders like the Ministry of Education and the Indian science academies, may diminish the desired outcomes. The significance of recognition letters issued by DST to recognised institutions, with a validity of five years, serves as a formal acknowledgement of the institution's capabilities & contributions and provides a sense of encouragement. However, the extent to which these recognition letters inspire and facilitate outcomes will depend on various factors, including the institutional context, leadership, and active involvement of the other stakeholders. The role and participation of UK institutions also need to be evaluated and defined by considering the differences in culture between these institutions and those of Indian institutions. Altogether, a robust strategy is necessary to transition the pilot program, initially involving 30 institutions, into a comprehensive plan encompassing all premier Indian research institutions and universities.

**Disclaimer:** The opinions expressed here are those of the authors and do not necessarily reflect the views of the host institute or any funding agency.

# Science-Diplomacy Nexus in Deep-sea Mining: Creation of the Clarion-Clipperton Zone Regional Environmental Management Plan

**João H Bettencourt**
Geophysical Institute, University of Bergen, 5007 Bergen, Norway
*E-mail: joao.bettencourt@uib.no*

## Introduction

The global push for energy transition and the need to secure the supply of critical minerals have reignited the interest in seabed mining for these minerals. Nonetheless, deep-sea mining remains contentious due to its potential environmental repercussions on the pristine deep-sea ecosystems. Mining activities in the seabed beyond national jurisdiction, known as the Area, fall under the International Seabed Authority (ISA) jurisdiction. Established under the auspices of the United Nations Convention on the Law of the Sea (UNCLOS) and the Part XI Agreement, the ISA comprises political organs (the Assembly and the Council), expert organs such as the Legal and Technical Commission (LTC), and administrative organs like the Secretariat.

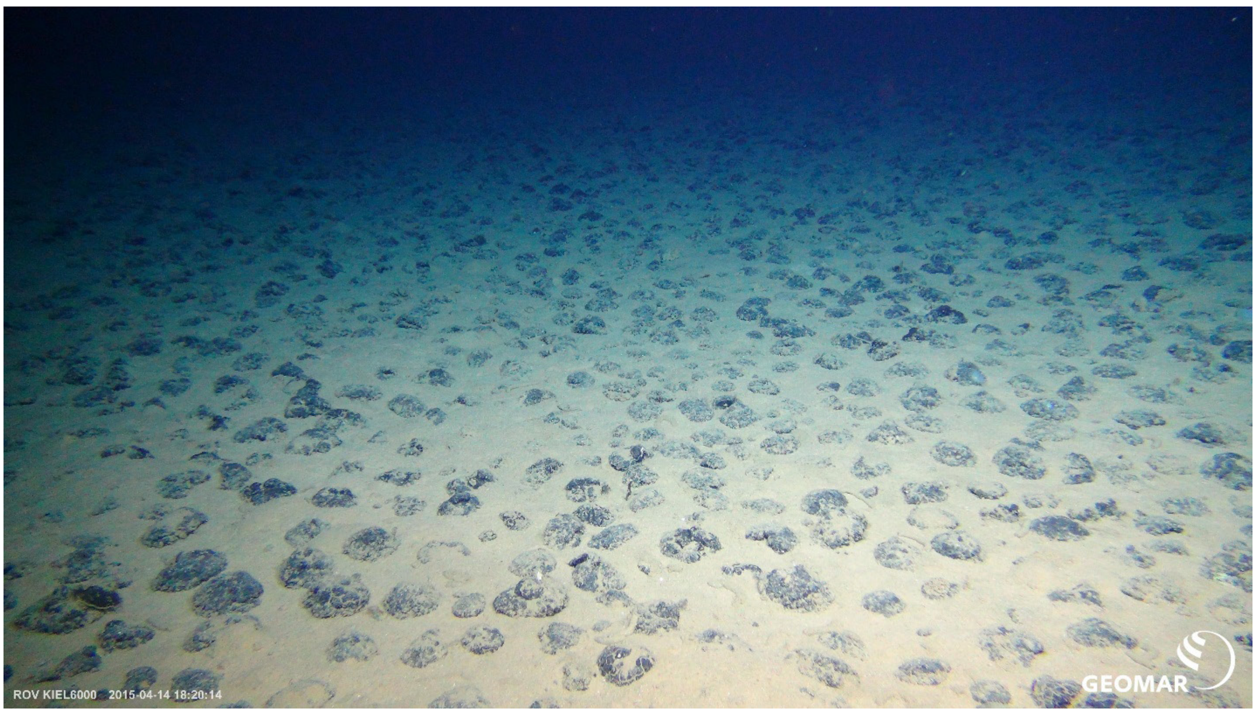


Figure 1. Manganese nodules on the seafloor in the Clarion-Clipperton Zone in more than 4000 metres depth. Source: ROV-Team/GEOMAR (CC BY 4.0)

The legal regime of the Area, as defined in UNCLOS, mandates the ISA to protect the environment from adverse effects related to mining activities. To fulfil this mandate, the ISA has adopted a regional environmental management approach, utilising Regional Environmental Management Plans (REMPs) as area-based management tools to strike a balance between environmental protection and resource development.[1] The only existing REMP so far covers the Clarion-Clipperton Zone (CCZ), a mineral-rich deep-sea province of the Area located in the Northeast Pacific. The CCZ REMP designates a network of nine Areas of Particular Environmental Interest (APEI) within the CCZ where mining activities are prohibited. Guided by principles such as the precautionary approach, the protection and preservation of the marine environment and environmental impact assessments, the CCZ REMP aims to employ integrated ecosystem management principles.

The development of the CCZ REMP exemplifies the intersection of science and diplomacy, known as the science-diplomacy nexus.[2] This nexus represents the integration of scientific advice into diplomatic processes to achieve desired outcomes. An effective science-diplomacy nexus should create the necessary conditions for two processes[2]: hybridisation, where scientific insights merge with policymakers' perspectives, leading to co-evolved diplomacy informed by scientific knowledge and policy considerations.

The creation of the CCZ REMP involved scientists interacting with diplomats and other stakeholders (contractors, NGO), falling under the realm of Science Diplomacy's *"science in diplomacy"* element. This paper traces the development of the CCZ REMP as a case study of a working science-diplomacy nexus, elucidating its key aspects and underlying reasons for its success.

## Development of the CCZ Regional Environmental Management Plan

The genesis of the CCZ REMP can be traced back to a workshop convened at the University of Hawaii in October 2007, aimed at deliberating the delineation of Marine Protected Areas (MPAs) where seabed mining activities would be prohibited.[3] Central to this discussion were the principles of ecosystem-based management and the geospatial analysis of physical, biological, and social datasets[3]. The outcome of this workshop was a proposal for establishing a network of MPAs in the CCZ, submitted to the LTC during its 14th session.[4] Subsequently, the LTC recognised the need for further clarification on issues related to MPA configuration and coordination with existing contractor obligations, forming a group of ecological and legal experts from the LTC to address these matters.

In the 15th session in 2009, the LTC reviewed the expert group's findings[5] and decided to convene a workshop to refine the MPA proposal and formulate a regional-scale environmental management plan for the CCZ. This workshop, held in November 2010, resulted in a draft REMP for the CCZ[6], which was recommended to the Council by the LTC in its 17th session in 2011. The Council requested an additional workshop to peer review and critique the proposal and any new data and information from the contractors. Subsequently, the Secretariat informed the Council that no further data had emerged in the interim[7], leading to the Council's approval of the CCZ REMP during its 18th session in 2012, to be implemented over an initial three-year period.[8]

Two key aspects of the science-diplomacy nexus emerged throughout this developmental process: hybridisation and co-evolved diplomacy. Hybridisation began with the 2007 workshop, up to the submission of the draft REMP to the Council, and the co-evolved diplomacy occurred during the two Council sessions where the draft REMP was negotiated.

## Analysis of the Science-Diplomacy Nexus

Analysing the science-diplomacy nexus in developing the CCZ REMP highlighted several key aspects.

Firstly, the participatory nature of the 2007 workshop ensured representation from a broad consortium of stakeholders, including the ISA, consultants, NGOs, and the scientific community. This inclusivity guaranteed that the interests of all stakeholders were taken into account. The subsequent 2010 workshop continued this trend by extending stakeholder representation to include mining contractors.

Secondly, the initial recommendation aligned with the legal framework of the ISA. During the hybridisation process, the expert group tasked with reviewing the existing legal framework found a legal basis for the designation of areas exempt from mining activities in Article 165 of UNCLOS, which grants the LTC the authority to make recommendations to the Council regarding marine environmental protection. The expert group reviewing the legal framework proposed that the LTC could implement the proposal by designating areas within the CCZ as APEIs to exempt them from mining activities.[5]

Thirdly, efforts were made to minimise the socioeconomic impacts of the proposal, aiming to maintain scientific relevance while reducing overlap with existing mining claims in the CCZ.[3] These considerations were crucial in garnering support for the recommendation and its eventual adoption by the LTC.

Hybridisation, achieved through collaboration among stakeholders and the expert group, played a pivotal role in the development process. The participatory nature of the workshops facilitated this hybridisation, enabling the LTC to embrace the proposal. Subsequently, in the Council, a process of co-evolved diplomacy occurred, marked by explicit requests to incorporate the latest scientific knowledge. This process ultimately led to the adoption of the draft CCZ REMP.

**Conclusion**

The development of the CCZ REMP can be considered a successful process driven by a functional science-diplomacy nexus. Despite modifications to the original proposal, the REMP retained most of its characteristics, showcasing the effectiveness of the process. This success can be attributed to the participatory nature of the hybridisation process and the explicit commitment to adhering to the ISA legal framework while minimising socioeconomic impacts.

From a broader perspective, the overarching framework of UNCLOS, particularly its provisions regarding marine environmental protection and the use of marine scientific research in the management of mineral-related activities in the Area, also contributed to the success of the process.

In our opinion, this case study illustrates the conditions necessary for an effective science-diplomacy nexus to thrive. A comparative analysis with other instances of science in diplomacy could offer valuable insights into the challenges faced by this dimension of Science Diplomacy.

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# Equity and Inclusion in Indian STI: Insights from a Symposium Series

**Hemant Kumar[a,*], Manasi Singh[b]**

[a]Department of Studies in Science, Technology and Innovation Policy, School of Social Sciences, Central University of Gujarat, Gandhinagar, Gujarat, India

[b]Department of Security Studies, School of National Security Studies, Central University of Gujarat, Gandhinagar, Gujarat, India

*Corresponding author: hemant@cug.ac.in

**Introduction**

The draft Science, Technology and Innovation Policy (STIP) 2020 underscores the importance of equity and inclusion within India's science, technology, and innovation (STI) sectors. This topic received widespread international attention, particularly during India's G20 Presidency in 2023. At the second meeting of the G20-Chief Science Adviser's Roundtable (G20-CSAR), centred around the theme of 'Diversity, Equity, Inclusion, and Accessibility (DEI&A)', attendees acknowledged the significance of lingual diversity and the inclusion of traditional indigenous knowledge systems in policy discussions. An integral aspect of DEI&A is ensuring the involvement of socially and historically marginalised sections in the STI sectors. Marginalisation may stem from various factors, including gender, race/ethnicity, caste, disability, culture, language, region, religion and political leanings.

Despite ongoing scholarly and policymaker interest, the Science, Technology, Engineering, Mathematics and Medicine (STEMM) field remains non-inclusive for individuals from different backgrounds, a situation prevalent worldwide. This is exacerbated by binary frameworks, such as gender (female and male), race (black and white), and caste (upper and lower caste), which often limit scholarly discourse. Similarly, policymakers

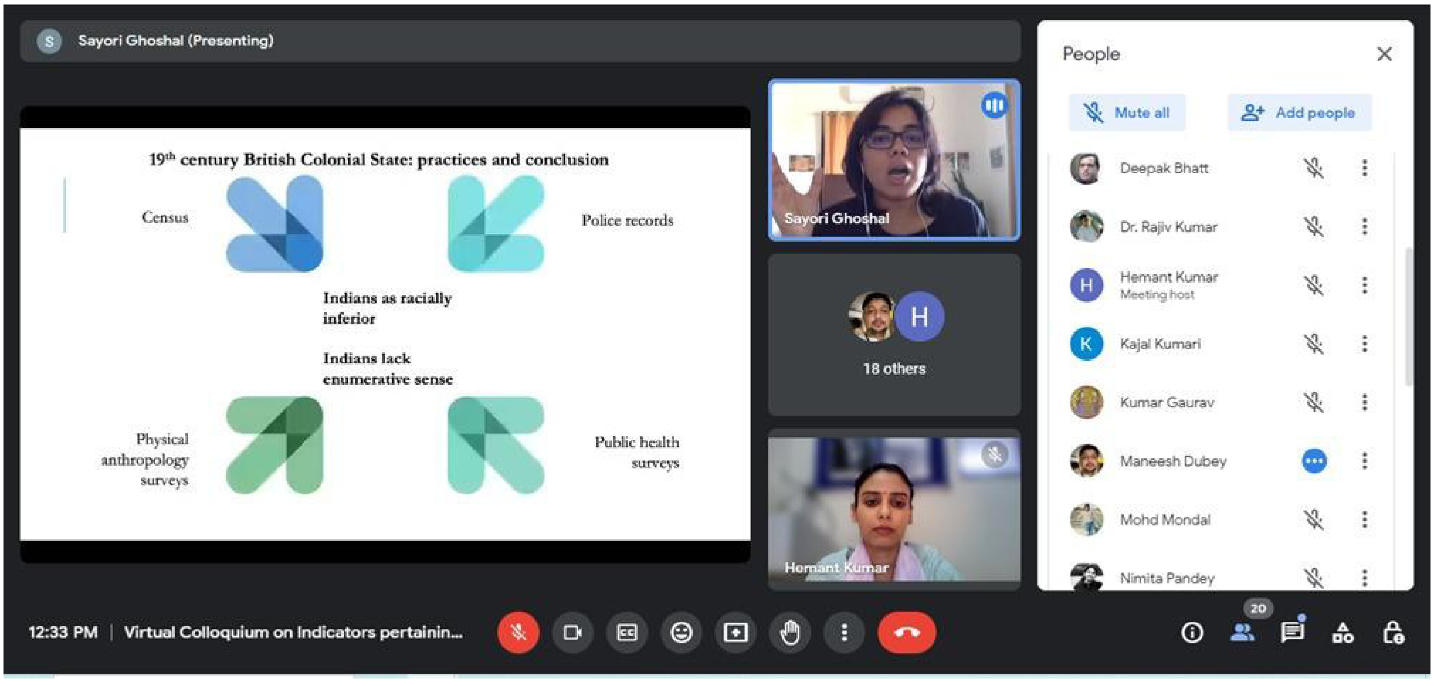

Photo Credit: DST-CPR, DSSTIP, CUG

tend to adopt a top-down approach based on quantitative data to address issues related to marginalisation, especially in India. There is a lack of policy measures that are grounded on qualitative data or the lived experiences of marginalised groups. With this context in mind, the Department of Science and Technology-Centre for Policy Research (DST-CPR) was established in April 2023 at the Department of Studies in Science, Technology and Innovation Policy (DSSTIP), School of Social Sciences at the Central University of Gujarat (CUG), India. Its research focuses on developing indicators, using both quantitative and qualitative measures, to assess marginalisation levels and formulate evidence-based policies for India's STI sector.

This report compiles discussions held during a symposium series organised by DST-CPR. The series comprised three events held in December 2023, January and February 2024, featuring academics and researchers from diverse institutions of higher learning and civil society organisations across India. These speakers provided insights into various forms of marginalisation in the STI sector, offering diverse perspectives to address challenges related to access and equity.

Prof. Pranav Desai, former Professor, Centre for Studies in Science Policy, Jawaharlal Nehru University, New Delhi, emphasised the significance of developing relevant indicators in general and specifically for mapping marginalisation in the STI sector. In addition, he contextualised the narrative of measurements in STI by placing it within its historical framework and chronicled the development of different widely used STI indicators while providing insights on what may be gleaned from them. Furthermore, he contended that instead of replicating these measures formulated in a Western framework, our attention should be directed towards creating indicators appropriate for the Indian context. It is necessary to incorporate the informal sector, such as grassroots innovations and social audit of STI, focusing on proper indicators that accurately represent evolving patterns and encourage diversity.

Prof. Geeta Chadha, Obaid Siddiqi Chair at National Centre for Biological Sciences, Bengaluru, identified gender marginalisation as a critical factor in addressing issues of access and equity in STI sectors. She pointed out that the feminist distinction between 'gender' and 'sex' has led to the 'naturalisation of femininity'. She further stated that it is necessary to acknowledge the existence of gendered marginalisation in the STI sector, which encompasses a range of various genders rather than just the binary categorisation of female and male.



Dr Sayori Ghoshal, Post-Doctoral Fellow, Krea University, looked at the gender bias in STI from the post-colonial perspective and highlighted how the colonisers looked at Indians as an inferior race. Further, Dr Namita Pandey, faculty at Entrepreneurship Development Institute of India, Ahmedabad, stressed that the field of science is not value-neutral and factors, including social, cultural, economic, and institutional, lead to a bias against women in the STI sector. She also highlighted the importance of gender and suggested that promoting gender equity in STEMM education, workforce, and leadership ensures a richer talent pool and a broader range of perspectives.

Dr Astha Jaiswal, Project Manager, Shri Rang Foundation, Vadodara, Gujarat, raised concerns towards the working environment in STI, which is highly biased towards women. Beginning with the fundamental difference between sex and gender, she elevated to equity issues, gender ratio, underrepresentation of women in the STEMM field/ scientific profession, leaky pipeline, meritocracy, and above all, how women have the double burden of managing home and workplace. To address the issues related to women, she emphasised exploring these issues through lived experiences or phenomenological methods rather than using quantitative measures.

Dr Pawan Kumar, Assistant Professor, SRM University, Sonepat, argued that gender exclusion is rooted in neo-liberal capitalism, and there is a need to underline the critical importance of understanding the relationship between capitalism, democracy, and gender dynamics. He proposed structural changes and advocated for a nuanced approach that not only addresses historical and immediate crises but also challenges the underlying structures of exclusion within the neo-liberal framework.

Dr Sherin Sabu, Assistant Professor, Indian Institute of Technology (IIT) Jodhpur, discussed the sociological evaluation of indicators related to gender equity and inclusion within the IITs, with a focus on insights derived from the Gender Advancement for Transforming Institutions (GATI) pilot project conducted at IIT Bombay in 2022. The GATI project, initiated by the DST in 2021, aims to promote gender inclusivity in STEMM across higher education and research institutions in India. Concerns were raised over low percentages of women faculty hired annually, especially in STEMM fields, indicating challenges in translating increased female graduates into corresponding job opportunities.

Referring to the electronic vehicle (EV) sector, Dr Rajeev Kumar, Post-Doctoral Fellow, DSSTIP, CUG, urged to establish a thorough framework to cultivate an inclusive environment for innovation. He further emphasised that collaboration with diverse stakeholders, including researchers, policymakers, industry experts, community representatives, and advocacy groups, is essential for obtaining an impartial perspective

Photo Credit: DST-CPR, DSSTIP, CUG

in merging areas of STI, such as EV. Dr Manish Dubey, faculty at Dr Babasaheb Ambedkar Open University, Ahmedabad, raised his concern over marginalisation in the education sector and suggested inclusiveness of educational technologies among users.

Another aspect of marginalisation during the discussions was related to disabilities, which has not been largely emphasised thus far. Dr Zarana Maheshwary, Assistant Professor, Department of Comparative Literature and Translation Studies, CUG, pointed out that individuals from historically marginalised groups, particularly those with disabilities, frequently encounter systematic exclusion, leading to a lack of varied viewpoints and untapped resources. Moreover, mental disability can potentially manifest alongside physical disability, and both can affect anyone at any given moment.

Prof. Anita Ghai, Former Professor, Ambedkar University, New Delhi, highlighted three key points. Firstly, she addressed the challenges posed by a lack of knowledge and understanding regarding disability in terms of epistemology and ontology. Secondly, she pointed out the oversight in the advancement of STI research, which fails to prioritise individuals with disabilities as beneficiaries. Lastly, she asserted the potential benefits of adopting a post-humanist approach to comprehend disability better and develop a more inclusive knowledge system.

Prof. Chandri Raghava Reddy, Department of Sociology, University of Hyderabad, spoke about well-known models like the Person Assistive Technology Model (MPT Model) and Human Activity Assistive Technology Model (HAAT) that propose ways to address the needs of persons with disabilities and create an inclusive environment. Dr Priya Ranjan Kumar, Assistant Professor, Department of Studies in Gandhian Thought and Peace Studies, CUG, emphasised seven principles, namely *Equitable use, Flexibility in use, Simple and intuitive use, Perceptible information, Tolerance for error, Low physical effort, Guidelines, and Size and space for approach and use* of Universal Design for Learning (UDL), a framework developed by North Carolina University. Citing various lived experiences, he emphasised the behavioural issues of marginalisation towards persons with disabilities in higher education and research institutions.

**Conclusion**

The symposium series provided a platform for stakeholders to voice concerns and propose solutions regarding marginalisation in India's STI sector. The deliberations proved helpful in identifying challenges to equity and inclusion in the dynamic STI landscape, particularly in the Indian context. A key highlight of the three-part discussion series was Prof. Chadha's intervention on the need to develop a better methodology for studying marginalisation, mainly by applying the concept of 'intersectionality'. A concurrent view was that rather than using the 'one size fits all' approach, policy solutions should be designed based on the needs of different STI sectors for strengthening diversity, equity and inclusion.

**Acknowledgement**

The authors thank the Department of Science and Technology (DST), New Delhi, for funding DST-CPR at DSSTIP, SSS, CUG.

# Navigating Paths: A Geophysicist's Journey with the TWAS-CSIR Fellowship

**Ayodeji Adekunle Eluyemi**
Division of Environment and Earth Science, Centre for Energy Research and Development, Obafemi Awolowo University, Ile-Ife, Nigeria
*E-mail: ay_dot2006@yahoo.com*

Becoming an expert in the siting of a nuclear power plant was an unexpected journey facilitated by the prestigious Council for Scientific and Industrial Research (CSIR) India and The World Academy for Sciences (TWAS) Italy fellowship awarded in 2013. This PhD fellowship provided me with the opportunity to pursue advanced research in India for four years.

Embarking on the TWAS-CSIR PhD Fellowship marked a transformative chapter in my professional odyssey, unveiling avenues for skill acquisition, network expansion, and breakthrough discoveries. Reflecting on my trajectory, I am compelled to recount the serendipitous moments and formidable challenges that shaped my journey.

The fellowship provided a platform for the exchange of knowledge, expertise, and resources, leading to significant breakthroughs in uncovering the potential and adaptability of a geophysicist within the Center for Energy Research and Development (CERD) and, by extension, the activities of the International Atomic Energy Agency (IAEA). My understanding of the roles and capabilities of a geophysicist within my home institution in Nigeria was serendipitously revealed during the experimentation processes of my PhD research project (Figure 1). This exploration illuminated the profound impact geophysicists can have on the fundamentals of nuclear power plant siting and their role as earthquake seismologists/geophysicists in the Comprehensive Nuclear-Test-Ban Treaty Organisation (CTBTO) mandate.

A

B

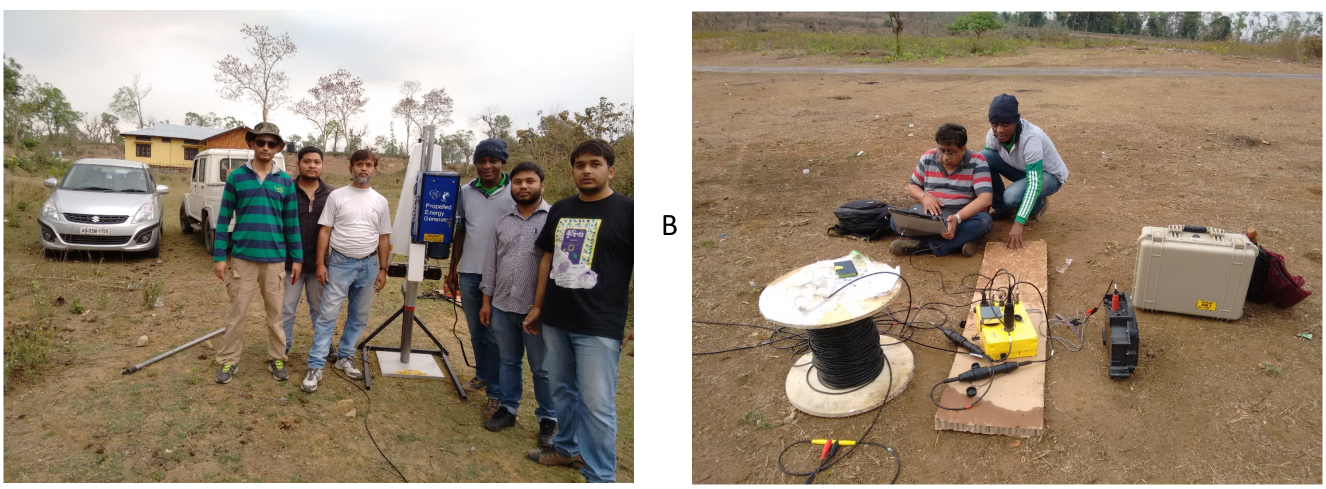


Figure 1. Experimental studies with the research team in India (A), while the instructor demonstrates using Multichannel Analysis of Surface Wave equipment (B)

Having had the privilege of benefiting from one of the esteemed TWAS fellowships, it is incumbent upon me to delineate how the CSIR-TWAS PhD Fellowship programme contributed to my professional growth and development, facilitating the exchange of knowledge, expertise and resources.

My professional journey commenced at the CERD. Initially employed as a geochemist, I spent six years in laboratory tasks, progressing from sample preparation for pellet making to conducting X-ray fluorescence analysis of samples for heavy metals percentage compositions. However, a pivotal moment occurred in 2014 when I joined the CSIR-North East Institute of Science and Technology (NEIST) and enrolled in the PhD program at the Academy of Scientific and Innovative Research (AcSIR), India. For the first three months, I was heavily concerned with the kind of research to undertake that would be relevant to my home organisation.

One fateful day in August 2014, while at the Geoscience and Technology division of CSIR-NEIST, discussions surrounding the Fukushima Nuclear Power Plant disaster sparked a moment of clarity. Inspired by the need for geophysical investigations to identify potential sites for Nuclear Power Plants devoid of seismic or related natural hazards in Nigeria, I formulated the topic: "*Seismic Hazard Assessment through Integrated Approach on Seismotectonics, Geophysical, and Remote Sensing Studies to Identify Suitable Site for Major Constructions in Nigeria*," which eventually became my PhD research title.

However, sourcing earthquake data posed significant challenges due to the following reasons:

(i) Nigeria is not regarded as one of the world's most earthquake- and seismic-prone countries,

(ii) There is no functional seismological station in Nigeria,

(iii) the logistical challenge of going back to Nigeria, if necessary, to gather data on-site,

(iv) Since such a study is regionally based, securing the funds to achieve the stated objectives and goal of the research.


Figure 2. Snapshots from the invited lecture on suitable Nuclear Power Plant sites in Nigeria

However, brainstorming with my supervisor exposed me to the global earthquake seismological data archives of the International Seismological Center (ISC), alleviating a significant obstacle. Yet, proficiency in Geoinformatics was crucial for progress, prompting my enrollment in a two-month certificate course at the Indian Institute of Remote Sensing (IIRS), Dehradun. The rigorous training at IIRS enhanced my expertise in Geoinformatics, enabling me to manoeuvre earthquake seismological data, determine seismogenic sources, assess peak-ground acceleration, and conduct GIS suitability studies. Consequently, I emerged as an expert in nuclear power plant siting.

Upon returning to Nigeria, my newfound expertise garnered recognition, leading to an invitation from the Chairman and the Chief Executive Officer of the Nigeria Atomic Energy Commission (NAEC) to deliver a public lecture on suitable sites for constructing nuclear power plants in Nigeria (Figure 2). This experience epitomised the culmination of my professional journey, underscored by the transformative impact of the CSIR-TWAS PhD Fellowship on my career trajectory.

Yet, amidst the triumphs lay challenges, particularly for married fellows like me. The TWAS-CSIR PhD Fellowship program is exclusively for candidates from developing countries. Therefore, one significant hurdle often faced by recipients of this esteemed fellowship is the separation from their families during their tenure in India.

During the initial eight months of my PhD program in India, I grappled with instability and distractions due to the absence of my wife and two young daughters back in Nigeria. The frequent calls from home compounded the challenge, hindering the progress of my research. Thanks to my supervisor, Dr. Saurabh Baruah (Chief scientist, CSIR-NEIST), for demonstrating remarkable understanding and empathy towards my predicament. Acknowledging the importance of family support, my supervisor advocated for my family to join me in India, which proved instrumental in restoring stability and mental balance. Having my family by my side, I fully immersed myself in my research program. Indeed, the provision for married scientists to access fellowship with their families would undeniably enhance the performance and well-being of awardees. By fostering a supportive environment that values family unity, the TWAS-CSIR Fellowship program can empower scientists to excel in their endeavours, ultimately contributing to greater scientific advancements and societal impact.

In conclusion, international fellowships like the TWAS-CSIR PhD Fellowship present a significant opportunity for scientists from the developing world. By offering access to an optimal research environment, state-of-the-art equipment, and invaluable exposure, this fellowship empowers scholars from the global south to cultivate their scientific acumen. These resources serve as fundamental tools necessary for addressing the complex economic and societal challenges prevalent in the global south. Moreover, the TWAS-CSIR PhD Fellowship not only nurtures individual talent but also fosters collaboration and knowledge exchange among scholars from diverse backgrounds. This collaborative spirit enhances the collective capacity to tackle multifaceted challenges, promoting sustainable development and progress in the global south, ultimately contributing to a brighter future for societies worldwide.

# Announcements

**PKU - IIASA Postdoctoral Program 2024**
Submission deadline: 9 May 2024

Further information at:
https://iiasa.ac.at/opportunities/pku-iiasa-postdoctoral-program

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**Call for Papers: Eu-SPRI Annual Conference 2024**
Submission deadline: 17 May 2024

Further information at:
https://www.utwente.nl/en/euspri2024/call-for-abstracts-and-papers/

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**Global Call on Science Missions for Sustainability**
Submission deadline: 31 May 2024

Further information at:
https://council.science/mission-science/

# MoUs Signed

## *Cabinet approves MoU between ISRO and MRIC concerning Cooperation on the development of a Joint Small Satellite*

On 5 January 2024, the Union Cabinet approved a Memorandum of Understanding between the Indian Space Research Organisation (ISRO) and the Mauritius Research and Innovation Council (MRIC). The MoU will help to establish a framework for cooperation between ISRO and MRIC on the development of a joint satellite and for cooperation on the use of the MRIC's Ground Station. Some of the subsystems for the joint satellite will be taken up through the participation of Indian industries and would benefit the industry. Collaboration through this joint development of satellite will help in further ensuring continuous support from the Mauritius Government for the Indian ground station at Mauritius, which is critical for ISRO/India's launch vehicle and satellite missions. In addition, the joint satellite building will also help ensure MRIC's support from their ground station for ISRO's small satellite mission in the future.

## India and Colombia sign MoU on sharing India's open-sourced DPIs

India and Colombia signed an MoU on 16 February 2024 on Cooperation in the field of Sharing Successful Digital Solutions Implemented at Population Scale for Digital Transformation. It was signed between the Ministry of Electronics and Information Technology (MeitY) and Colombia's Information Technologies and Communications. The MoU intends to promote digital transformation through capacity-building programs, the exchange of best practices, the exchange of public officials and experts, the development of pilot or demo solutions and the facilitation of private sector contacts to mutually benefit the digital ecosystems of both countries.

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## NIA signs MoU with Department of Thai Traditional and Alternative Medicine of Government of Thailand

The National Institute of Ayurveda, Jaipur, under the Ministry of Ayush of the Government of India and the Department of Thai Traditional and Alternative Medicine of the Ministry of Public Health of the Government of the Kingdom of Thailand, signed a MoU on the establishment of an Academic Collaboration in Ayurveda and Thai Traditional Medicine in New Delhi, India on 27 February 2024. This MoU will facilitate the exchange of experts for research and training programs, academic and technical activities, conducting research, and the exchange of information, technologies, and best practices of traditional medicine. NIA and the Department of Thai Traditional and Alternative Medicine, Thailand, will share information on regulatory mechanisms, best practices, guidelines of practice and courses of study and training; and organise conferences/meetings alternately in India and Thailand and review the progress of the implementation of the MOU and the evaluation of the results of collaborative programmes.

# New Publications //////////////////////////////


Argüello G, Rafaly V (2023) **Science Diplomacy and Asian States: Transforming the Governance Landscape in the Arctic**. *Polar Record*, 59: e41. https://doi.org/10.1017/S0032247423000281

Baig MAA (2024) **Asian Century: Re-engineering SAARC Via Science Diplomacy**. *Medium*. https://mirzaabdulaleembaig.medium.com/asian-century-re-engineering-saarc-via-science-diplomacy-297f773aac4e

Bigg C, Reinisch J, Somsen G, Widmalm S (2023) **The Art of Gathering: Histories of International Scientific Conferences.** *The British Journal for the History of Science*, 56(4): 423-433. https://doi.org/10.1017/S0007087423000638

Dufour P (2024) **How to Train Your Trade Commissioners in Science Diplomacy**. *uOttawa Blog*. https://www.uottawa.ca/faculty-arts/issp/blog/how-to-train-your-trade-commissioners-science-diplomacy

Dyck C (2024) **On thin ice: The Arctic Council's uncertain future**. *Marine Policy*, 163: 106060. https://doi.org/10.1016/j.marpol.2024.106060.

Heikkilä JP (2024) **Lessons Learned from Frontier Entrepreneurship Education in North Korea**. *Science & Diplomacy*. https://doi.org/10.1126/scidip.ado5059

Lacasa ID, Vogelsang MM (2024) **Enhancing International Collaboration in Science, Technology and Innovation to Achieve Sustainable Development Goals**. *Science and Public Policy*, scad087. https://doi.org/10.1093/scipol/scad087

Langenhove LV, Shendrikova D, Mays C (2024) **Strengthening Science Diplomacy in And for Europe Through Horizon Europe**. *Policy Brief.* https://www.science-diplomacy.eu/wp-content/uploads/2024/02/Policy-Brief_EU-SD-Alliance_Horizon-Europe_Feb-2024_Final-release1.pdf

Mayer K (2023) **Open Science Diplomacy for an Ethical and Trustworthy Global AI**. Zwischenraeume *Policy Brief* 6/2023. https://zwischenraeume.co.at/wp-content/uploads/ZWISCHENRAEUME_POLICY-BRIEF_Open-science-diplomacy-for-an-ethical-and-trustworthy-global-AI.pdf

Olšáková D (2023) **A Review of Science Diplomacy: Theoretical Evolution to a Post-Naïve Approach and Its Relevance for the Czech Republic**. *Czech Journal of International Relations*. https://doi.org/10.32422/cjir.430

Rüland A, Rüffin N (2024) **A Comparison of British and German Parliamentary Discourses on Science Diplomacy Over Time**. *Global Policy*. https://doi.org/10.1111/1758-5899.13338

Sugita N (2024) **Politics and space: Nakasone Yasuhiro and Japanese space programs**. *Acta Astronautica*, 214: 774-780. https://doi.org/10.1016/j.actaastro.2023.08.042

# Call for Proposals

**DBT-EU Cooperation Programme on R&I 'Horizon Europe' Calls 2023-2024**

Last Date: April 13, 2024

Further information at: https://dbtindia.gov.in/sites/default/files/DBT-EU%20joint%20call%20WEBNOTICEWP%202023-24_0.pdf

**Call of the Southeast Asia – Europe Joint Funding Scheme**

Last Date: April 15, 2024

Further information at: https://www.snf.ch/en/BFmiVAFjK0pE5jVR/news/call-of-the-southeast-asia-europe-joint-funding-scheme

**Call for Proposal under IARDP programmes of CEFIPRA**

Last Date: May 31, 2024

Further information at: https://www.cefipra.org/recent-announcements/

**Call for Proposal under CSRP programmes of CEFIPRA**

Last Date: May 31, 2024

Further information at: https://www.cefipra.org/recent-announcements/

# Forthcoming Events

**National Science Policy Symposium**

Date: April 12-14, 2024

Further information at:

https://www.scipolsymposium.org/

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**Johns Hopkins Science Diplomacy Summit 2024**

Date: April 15-16, 2024

Further information at:

https://www.eventbrite.com/e/johns-hopkins-science-diplomacy-summit-2024-tickets-814200705227

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**INGSA2024: The Transformation Imperative**

Date: May 1-2, 2024

Further information at:

https://www.ingsa2024.com/

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**16th Canadian Science Policy Conference**

Date: November 20-22, 2024

Further information at:

https://sciencepolicy.ca/conference/cspc-2024/cspc-2024-call-for-panel-proposals/