Strengthening Science Diplomacy for Reducing Biodiversity Loss and Restoring Degraded Ecosystems

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"Addressing the challenge of halting ongoing losses of species and genetic diversity and the damage to our ecosystems will determine the well-being of humanity for generations to come. Protecting nature's invaluable contributions to people requires that we harmonise our policies and actions at every level. The global biodiversity framework, based on the best available science and evidence, is fundamental to meeting these needs."

-Elizabeth Maruma Mrema
Deputy Executive Director of the United Nations Environment Programme

Introduction

Anthropocene is crippling with multiple environmental concerns like pollution, land degradation, and escalating disaster risks, with climate change exacerbating these issues. One huge risk in all this chaos is that we are crossing some severe lines that keep our planet running smoothly. One of these lines is biodiversity – the incredible variety of life around us. When we mess with it – by wiping out habitats or making species vanish – it is like pulling out pieces from a complicated puzzle that keeps everything in balance. Of late, there is a clear growing global consensus and acknowledgement of the fact that biodiversity is a cross-cutting concern and has the potential to solve many of these complex challenges of the Anthropocene that are interconnected.

The Convention on Biodiversity (CBD) in 1992 marked a pivotal moment, gathering global support and involving many countries, including India, who became signatories to it. India was one of the few countries that became early signatories and also ratified the convention that led to the legalisation and development of the National Biodiversity Act in 2002.

The conclusion of the Aichi targets in 2020 initiated discussions for more rigorous post-2020 goals; however, the pandemic created major hurdles, delaying these discussions. Finally, in December 2022, the Kunming-Montreal Global Biodiversity Framework (GBF) was agreed upon after more than ten days of negotiations. India has numerous policies and guidelines to ensure the preservation of biodiversity in various natural ecosystems – on land, in water, and in marine environments. These regulations aim not only to control and manage the loss of biodiversity but also to restore degraded ecosystems by incorporating native biodiversity elements.

Despite setbacks due to the COVID-19 pandemic, online meetings and novel approaches bolstered diplomatic relations among scientists and experts worldwide, emphasising the interdependence of pandemics and biodiversity loss. One health concept emerged during the pandemic, stressing the need to reduce land

degradation, loss of ecosystems and biodiversity to prevent zoonotic outbreaks in future, highlighting the necessity for interdisciplinary cooperation among ecologists, veterinarians and medical professionals.

IPBES Efforts in Protecting Biodiversity

Since its inception in 2012, the Intergovernmental Panel on Biodiversity and Ecosystems (IPBES) has mirrored the Intergovernmental Panel on Climate Change (IPCC), driving the attention of nations, governments and policy planners toward conserving biodiversity and ecosystems. This effort has emphasised that biodiversity is not just a single nation's responsibility but a crucial global interest requiring transboundary commitment and collaboration through science diplomacy by bringing scientists, policymakers and diplomats together for a common goal.

IPBES has released reports highlighting the alarming risk of biodiversity loss. IPBES's first assessment report on Pollinators was released in 2015. Later, Regional Assessment reports for Asia-Pacific, Africa, America and Europe were released in 2018, followed by Land Degradation and Restoration in 2018 and the Global Assessment report in 2019. IPBES also brought in global experts to review and prepare the report on global thematic assessment for Sustainable use of wild species and Values of Biodiversity published in 2022. This highlighted the crucial relevance of involving indigenous and local communities and supporting interactive governance approaches to address local livelihood and socio-economic concerns to ensure sustainable use. These reports served as a wake-up call, urging policymakers worldwide to base decisions on more than just market values, thereby addressing the ongoing biodiversity crisis.

IPBES reports are not merely academic; they convey key policy messages to policymakers in over 140 member states, ensuring that decisions are grounded in the evidence presented by global biodiversity experts. This global initiative has motivated serious efforts towards conserving biodiversity, employing novel methodological approaches, such as modelling and integrating indigenous knowledge. Upcoming IPBES reports will delve into crucial global biodiversity issues like invasive species, water, food, health nexus, transformative changes and the intersection of business and biodiversity.

The 2015 IPBES assessment on Pollinators spurred attention to fast-depleting pollinator diversity, leading to the formulation of policies in several countries to protect pollinators. USA was the first country to launch a threatened list of bumble bees after this assessment. There were three policies in the USA, four in the UK and five in France related to raising pesticide regulatory standards, promoting integrated pest management (IPM), incentives to help farmers benefit from ecosystem services acknowledging pollination as an agricultural input, promoting diversified farming systems, conserving and restoring pollinator habitat in agricultural and urban landscapes, long-term monitoring, participatory research on improving productivity from organic, diversified, and ecologically intensified agriculture. This has been particularly relevant for developing countries like India, where regional transboundary cooperation can help address the loss of pollinator habitats and their diversity. Furthermore, the IPBES Global assessment influenced the 2022 Global Biodiversity Framework (GBF), emphasising inclusivity and transformative change.

Global Biodiversity Framework (2022-2030)

The GBF lays out a plan to halt & reverse biodiversity loss, aiming to restore nature by 2030. One key goal is the conservation of 30% of land, inland waters, and oceans by 2030, also called 30x30. India is already committed to it as a member of the High Ambition Coalition of 113 countries. India also pushed for Digital Sequence Information (DSI) under CBD's access and benefit-sharing mechanism.

Among 23 GBF targets, 1-9 focus on reducing biodiversity loss, 10-13 focus on meeting people's needs through sustainable use and benefit sharing, whereas targets 14-23 focus on developing tools for implantation and monitoring. Achieving these targets demands strictness and substantial funding from governments and private sectors, with a commitment to mobilising $200 billion yearly by 2030. Bringing scientists together for biodiversity conservation will require robust diplomatic efforts, especially in transboundary regions. Collaboration between government departments, private sectors and stakeholders is vital for success. This calls for cooperation among key national ministries and state-level authorities and a strict monitoring mechanism to meet deadlines.

Scientific diplomacy must drive decision-making with data, emphasising the interconnectedness of climate and biodiversity crises. It is crucial to break down silos between these challenges, urging collaboration for a sustainable future in the Anthropocene.

National Biodiversity Strategy and Action Plan (NBSAPs)

India has consistently produced and submitted National Biodiversity Strategy and Action Plans (NBSAPs) to CBD, aligning with Aichi targets. It is now gearing up for the GBF by finalising its NBSAPs by 2023. The key challenge for India is to launch and oversee the framework's implementation and to link the GBF with the NBSAPs, which involves targets like lowering environmentally "harmful" agriculture practices, lowering pesticide risks, and combating invasive species.

To meet these targets, India needs increased financial support by 2030. The GBF's Goal A includes Red Listing of Ecosystems* as a headline indicator that needs to be integrated into India's forthcoming NBSAPs. So far, India has not conducted any ecosystem health assessments despite declining biodiversity and ecosystem structure affecting their functions. It will require North-South and South-South cooperation and transboundary efforts with multi-stakeholder and expert involvement in assessing the ecosystem health of high conservation value ecosystems, including the Himalayas, Western Ghats, and Andamans and Nicobar Islands.

Understanding ecosystem structures, functions, and socio-economic impact is crucial for prioritising nature-based solutions. India's NBSAPs involved diverse stakeholders (public, private, civil society and others) and covered details about biodiversity/ecosystem contribution to the national economy (GDP, income, employment, etc.), potential threats to sectors like agriculture, fisheries, tourism, extraction industry, etc. There was information on sustainable management plans and how biodiversity conservation can improve essential sectors.

India's past NBSAPs were data-driven, showcasing policies like Ujjwala Yojna and LPG subsidy that eased pressure on natural forests for fuel, benefiting marginalised local communities. Among 145 countries that submitted NBSAPs, India has progressively improved biodiversity through these plans and policies.

G-20 Presidency of India

India's G-20 Presidency underscored the importance of involving scientists, experts and policymakers in addressing environmental issues like forest fires and private sector involvement in mining areas for biodiversity and ecosystem conservation. A meeting between the Environment and Climate Sustainability Working Group members and the Environment and Climate Ministers led to the unanimous approval of an Outcome document, the Chennai High-Level Principles for a Sustainable and Resilient Blue/Ocean-based Economy, in July 2023. The report highlighted noteworthy achievements & critical takeaways focused on the Environment and Climate track's major thrusts, including Land and Biodiversity, Blue Economy, Water Resource Management, and Circular Economy, bolstering biodiversity diplomacy efforts among G-20 nations. However, achieving proposed targets will require substantial financial backing and scientific interventions within specified timelines.

Success Story 1: Kailash Sacred Landscape Conservation and Development Initiative

The collaboration among India, China, and Nepal in the Kailash Sacred Landscape showcases successful biodiversity conservation diplomacy. The Kailash Sacred Landscape Conservation and Development Initiative (KSLCDI), launched in 2013 under the guidance of the International Centre for Integrated Mountain Development (ICIMOD), Nepal, has demonstrated effective transboundary cooperation. This initiative fosters sustainable development while conserving biodiversity, ecosystems, and cultural heritage. It focuses on innovative livelihoods, ecosystem management, conservation and monitoring, regional cooperation, and policy enhancements. This joint effort has addressed various issues, including academic collaboration, reducing

* https://iucnrle.org/

illegal harvesting of species like *Cordyceps sinensis*, restoring spring sheds, promoting local culture and ecotourism, and strengthening access and benefit-sharing mechanisms.

Success Story 2: Restoring Trees Outside Forests

India was the first country to develop an agroforestry policy in 2014 and recognised the potential of tree outside forest (ToF) landscapes for biodiversity and climate adaptation managed by local communities. This initiative inspired countries like Nepal, Bhutan and Bangladesh to develop agroforestry policies through the South Asian Regional Cooperation on Agroforestry (SARCOPA). This further promoted neighbouring countries to join cooperation provided by the SAARC Agriculture Centre (SAC), Center of International Forestry Research - the World Agroforestry Centre (CIFOR-ICRAF), and all national governments (India, Nepal, Bangladesh, Sri Lanka, and Bhutan) under SARCOPA as a historic initiative of SAARC countries that are working on incorporating the advantages of agroforestry systems with a special emphasis on nation-specific actions to combat climate change. Trees Outside Forests in India (TOFI) project, initiated in 2022, a collaborative five-year programme of the Ministry of Environment, Forest and Climate Change (MoEF&CC) of the Government of India & the United States Agency for International Development (USAID), aims to expand tree cover outside forests for the betterment of people and biodiversity, involving the support of eight consortium partners partnered under the leadership of CIFOR-ICRAF.

Conclusion

South Asia has been considered one of the sensitive regions because of its threatened biodiversity, depleting ecosystem services and increasing climate risks. Hence, strengthening science diplomacy on crucial biodiversity issues in the Global South and the Global North can help support the efforts to address the most extensive environmental risks by improving cooperation. In conclusion, this article underlines the necessity of concerted efforts, regional collaborations, and tailored approaches to safeguard biodiversity, promote sustainable development, and combat climate change.