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From Negotiations to Conservation:
The Role of Science Diplomacy in the BBNJ Agreement

Juana Jimenez

Background

Protecting oceans has become an urgent global imperative to address what the United Nations calls the "triple planetary crisis"—climate change, biodiversity loss, and pollution (United Nations Human Rights Council, 2021). The ocean, covering approximately 70% of Earth's surface, is an interconnected ecosystem that transcends political boundaries and functions as a unified, three-dimensional environment (Showman & Dowling, 2014). This unique ecosystem supports a diverse range of life forms and provides critical services, such as regulating the climate, producing oxygen, and sustaining countless livelihoods. However, human activities like overfishing, deep-sea mining, and pollution have intensified the stress on marine ecosystems, with global consequences. Overfishing depletes fish stocks and destabilizes food chains (Pham, et al., 2023); deep-sea mining threatens unexplored biodiversity with long-lasting habitat destruction (Ramirez-Llodra, 2020); and pollution—from plastic waste to oil spills—is impacting ecosystems far from the source (Kingston, 2002; Veneral et al., 2023).

Given the global scale of these issues, no single country can independently address the enormous threats to ocean health in the same way. Countries can be accountable for activities in their Exclusive Economic Zones, areas that belong to each member state (Koh, 1988), but a vast area of the ocean lies beyond national jurisdiction or is referred to

Highlights

The ocean plays a critical role in regulating the climate, supporting biodiversity, and sustaining human livelihoods, but it faces increasing threats from overfishing, deep-sea mining, and pollution.

The Biodiversity Beyond National Jurisdiction (BBNJ) agreement provides a legal framework for governing the high seas, covering two-thirds of the ocean and addressing the triple planetary crisis: climate change, biodiversity loss, and pollution.

Science diplomacy has been crucial in negotiating and shaping the BBNJ agreement. It has facilitated neutral, evidence-based discussions, enabling international collaboration despite political and economic differences.

Science diplomacy enhances ocean governance through trust-building, fair data sharing (FAIR and CARE principles), integration of Indigenous knowledge, capacity-building for developing countries, and fostering long-term international cooperation.

Beyond the agreement's adoption, science diplomacy remains vital for implementation, ensuring that policies evolve with scientific advancements and that global cooperation persists in protecting ocean health for future generations.

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as the high seas (Blasiak & Claudet, 2024). In times like this, where tension among some countries is rising, solutions need to be undertaken by multi-sectoral approach. More than ever, scientists, policymakers, academia and society need to advocate with a single voice for common ocean governance – one that accounts for the transboundary nature of these impacts and prioritizes sustainable and equitable solutions. Therefore, a common, binding agreement is essential to ensure the conservation and sustainable use of marine biodiversity beyond national jurisdictions.

The Biodiversity Beyond National Jurisdiction (BBNJ) agreement represents a landmark step in this direction. It aims to create a legal framework that unites countries in setting and enforcing standards for protecting ocean resources and reducing activities that drive biodiversity loss, pollution, and climate change (United Nations, 2024). Besides, it considers that negative impacts can be uneven, for example, Small Island Developing States (SIDS) and coastal communities are particularly vulnerable (Hernández-Delgado, 2024). The BBNJ agreement aligns with principles of environmental justice, ensuring that all countries have a place in decision-making processes and equal benefits (United Nations, 2024).

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International collaboration becomes essential to tackle critical challenges and foster a shift towards policies that protect the high seas. Achieving sustainable ocean health will require transformative action, with all nations working together to respect and preserve the ocean's role in supporting both the planet's biodiversity and human life.

Why is the BBNJ Agreement Relevant for all Nations?

The importance of the BBNJ agreement arises with providing an essential legal framework for the common governance of about two-thirds of the ocean and half of the planet's surface (Blasiak & Claudet, 2024). It is the third implementing agreement the United Nations Convention on the Law of the Sea (UNCLOS) (United Nations, 2024) but the first one to address the triple planetary crisis that humanity currently faces: climate change, pollution and biodiversity loss (Seck, 2023). Furthermore, it aims to reach global goals like the Sustainable Development Goal 14 (SDG 14), particularly target 14.2 (sustainably manage and protect marine ecosystems) and target 14.5 (conserve at least 10% of coastal and marine areas by 2020, a goal still in progress). The BBNJ agreement's provisions offer legal tools to mitigate ocean acidification, over-extraction, and other stressors that threaten marine life and ecosystems, helping preserve marine resources for future generations. By fostering international cooperation, the BBNJ agreement stands as a key advancement in global ocean governance, underlining the importance of the high seas as a shared resource essential for ecological balance and human well-being.

Role of Science Diplomacy in Negotiating an Unprecedented Agreement for Ocean Conservation

The negotiation and further implementation of the BBNJ agreement is an example of science diplomacy in the three dimensions of its definition: diplomacy for science, science for diplomacy and science in diplomacy (The Royal Society, 2010). The prearrangements before the adopted BBNJ agreement consisted of nearly 20 years of discussions in different formats and are a result of the efforts of diplomats, scientists, and the hybrid professionals of both fields (Ruffini, n.d.). At that moment, two of the three dimensions of science diplomacy were executed: science for diplomacy and science in diplomacy. It started at the fifth meeting of the United Nations Open-ended Informal Consultative Process on Oceans and the Law of the Sea. During this 5-day session in June 2004, the discussions were around the topic: "New sustainable uses of the oceans, including the conservation and management of the biological diversity of the seabed in areas beyond national jurisdiction", where threats and risks to marine ecosystems and biodiversity were addressed with science-based information. However, more information and concrete examples needed to be gathered in preparation for strong arguments and address the United Nations General Assembly (United Nations).

Science provides neutral ground: The UN General Assembly established an ad hoc open-ended informal working group to study issues relating to the conservation and sustainable use of marine biological diversity beyond areas of national jurisdiction. After nine sessions from 2006 to 2015,

recommendations were sent to the UN General Assembly on the scope, parameters and feasibility of an international instrument under the United Nations Convention on the Law of the Sea. In this way, science diplomacy played an essential role by providing a shared, evidence-based platform for negotiating the final recommendations. These were the base to the legally binding instrument for the common areas beyond national jurisdiction (United Nations, 2015).

Diplomacy supporting science: There were some doubts about an international legally binding instrument, member states could have different priorities and resources for its implementation. The science diplomacy framework enabled nations with diverse interests, including coastal and landlocked states, to come together and look for common solutions with equality as a core in the 2015 UN General Assembly. Thus, it was agreed that a preparatory committee could draft a preliminary text of this legal instrument. At its fourth session, held from 10 to 21 July 2017, the Preparatory Committee submitted its report to the General Assembly (A/AC.287/2017/PC.4/2). The agreement was finalized in five sessions between 2018 and 2023. Finally, the legally binding text was adopted on 19 June 2023 by the 170 parties in UNCLOS, 169 States and the European Union (United Nations, 1982). Ratification has only been done by 15 countries.

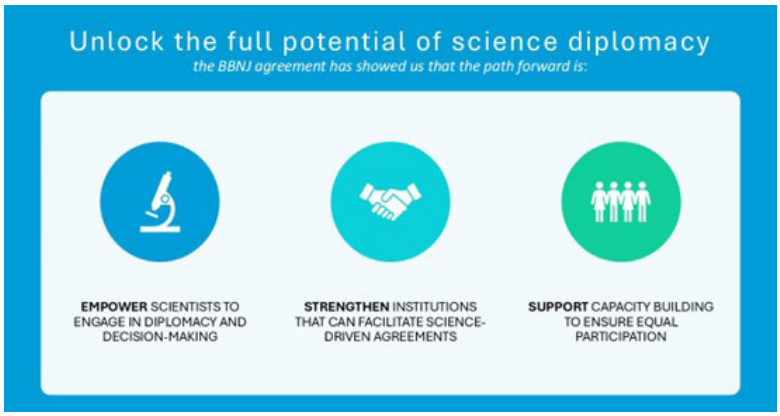

Figure 1. Three ways to unlock the full potential of science diplomacy in the BBNJ agreement process

Path to Implementation is Also Led by Science Diplomacy

Science Diplomacy (SD) has played an important role during the negotiations; however, it will continue to be crucial to finalize ratification and successfully implement it. Science diplomacy facilitates cooperation particularly when addressing transboundary and global challenges. Since the nature of the BBNJ agreement is cooperation with science-based knowledge, here are five examples where science diplomacy contributes to this effort:

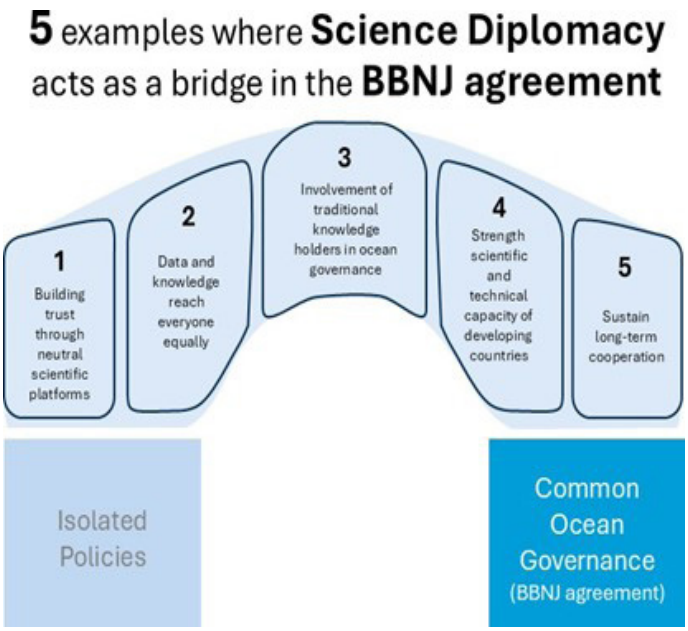

Figure 2. Five examples where science diplomacy acts as a bridge in the BBNJ agreement, moving from isolated policies to common ocean governance
Source: UNCLOS

1. Building trust through neutral scientific platforms

BBNJ context: The high seas are shared by all nations. This statement required a neutral platform for dialogue to ensure cooperation. The BBNJ agreement emphasizes the importance of inclusive decision-making. Here is where science can play an impartial role in guiding a common policy.

Role of SD: SD facilitates and takes place in neutral forums where scientists, non-governmental institutions, industry, society and policymakers from various countries can co-design solutions based on up-to-date research. Platforms related to the UN general assembly provide an opportunity for multisectoral contributions without political bias. Engagement in these actions can help build trust and find common ground among member states with competing interests.

2. F.A.I.R and C.A.R.E data

BBNJ context: The BBNJ agreement has a key component related to sharing data and knowledge. Effective governance depends on the ability to comprehensively and accurately

collect data on the state of marine ecosystems in the high seas. Data should reach all member states equally. Thus, FAIR and CARE data principles become relevant in this context for their definitions: FAIR (Findable, Accessible, Interoperable and Reusable) and CARE (Collective benefit, Authority to control, Responsibility and Ethics).

Role of SD: SD ensures that countries, especially those with limited resources, can access critical data, information and knowledge to make informed decisions. Diplomatic agreements often establish frameworks for data sharing between governments, international organizations and academic institutions. This transparency fosters trust between countries and enhances the effectiveness of conservation efforts.

3. Integrating Indigenous and local knowledge

BBNJ context: Indigenous people and local knowledge from coastal communities have a long understanding of the ocean and its processes, life at sea is part of their culture and subsistence and recently it has been proved to be an incredible additionality in looking for solutions. Besides, their perspectives are recognized in global biodiversity conservation. The BBNJ agreement emphasizes the need to consider traditional knowledge in ocean governance (Vierros et al., 2020).

Science diplomacy is the bridge to foster and maintain global cooperation and navigate through geopolitical differences

Role of SD: SD can act as a bridge between traditional knowledge holders and the scientific community. Diplomats and scientists can facilitate dialogue between coastal communities, indigenous communities and governments to integrate traditional knowledge with science. As a result, the BBNJ agreement will gain legitimacy and lead to sustainable conservation efforts.

4. Capacity building for developing countries

BBNJ context: Many developing countries face challenges when it comes to scientific research and implementation of conservation measures. To fill this gap and ensure an equal implementation of the BBNJ agreement, capacity-building initiatives are emphasized for the implementation phase.
Role of SD: SD can foster international cooperation to strengthen the scientific and technical capacity of developing countries. Through co-developed projects, training programs, and technology transfer, countries can benefit from different expertise to implement the BBNJ agreement.

5. Long-term global cooperation

BBNJ context: The BBNJ agreement aims for long-term conservation and sustainable management of the ocean. The dynamic and interconnected nature of the oceans puts scientific and diplomatic cooperation in an essential role.

Role of SD: SD helps to sustain long-term cooperation by fostering relationships built on shared goals and complementary interests. As scientific knowledge evolves, diplomacy ensures that the international community remains committed to ocean conservation and sustainable management. Besides, SD allows adaptation to emerging challenges, such as climate change, pollution and biodiversity loss, by updating policies and frameworks like the BBNJ agreement.

Conclusion and Prospects

Science diplomacy is a powerful tool for fostering international cooperation to conserve and sustainably manage the ocean. The BBNJ agreement illustrates how science diplomacy can bring together diverse stakeholders: researchers, indigenous communities, non-governmental organizations and governments to ensure that ocean conservation is based on shared scientific understanding and equitable decision-making. Science diplomacy is a keystone for global efforts to protect the oceans and it should be embraced in its three different dimensions (science in diplomacy, science for diplomacy and diplomacy for science) thus, efforts should come from diplomats and scientists to complement their roles and strengths.

The BBNJ agreement is a landmark in ocean governance, it represents a significant shift towards a cooperative model for ocean conservation. The agreement is expected to be a milestone in protecting ocean health for future generations and it requires that the international community remains committed. Science diplomacy is the bridge to foster and maintain global cooperation and navigate through geopolitical

differences. By leveraging scientific expertise and international cooperation, science diplomacy transcends political and cultural boundaries, enabling countries to unite around the neutral language of science.

To conclude, science diplomacy has played and will continue to play a crucial role in the development and implementation of global agreements like the BBNJ agreement by:

- **Building bridges** between parties, creating a neutral ground for dialogue
- **Accelerating** innovation, as international cooperation often leads to breakthroughs
- **Mitigating** geopolitical tensions, as shared scientific goals emphasize cooperation over competition

In addressing the complexity of a global agreement for ocean conservation and management, science diplomacy is not just a tool – it is a necessity. It underscores the principle that solutions to global problems lie not in isolation but in cooperation, where the shared pursuit of knowledge becomes the foundation for sustainable progress.

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EDITORIAL INFORMATION

About the Authors:
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