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The diverse benefits of biodiversity conservation in global ocean areas beyond national jurisdiction

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The end of the long and winding road towards a milestone new treaty focused on the conservation and sustainable use of marine biodiversity beyond national jurisdiction (BBNJ) is near. The BBNJ treaty has the potential to dramatically transform environmental stewardship in the high seas, making it essential that vigorous support towards a strong treaty continues, without weakening the agreement's full potential. Historically, the dialogue surrounding the BBNJ negotiations has focused on the agreement's environmental and conservation-related impacts. Here, we begin to highlight the many diplomatic, economic, and social benefits of a vigorous and equitable BBNJ treaty. We found that strong support for the BBNJ treaty could strengthen multilateral institutions and bolster international cooperation towards common environmental goals. It could also enhance the health of shared marine ecosystems and resources and drive truly sustainable ocean-based economic growth. Finally, the treaty provides an opportunity to engage equity as a key principle, to begin tackling global ocean inequalities in a meaningful way. Together, we find that the new treaty has the potential for widespread and diverse benefits for all member nations. It is past time for the international community to address the global governance gap in the high seas in an ambitious and equitable manner.

KEYWORDS

high seas, biodiversity beyond national jurisdiction (BBNJ), international negotiations, multilateralism, conservation benefits, economic, diplomatic, social

Abbreviations: ABMT, area-based management tool; ABNJ, area beyond national jurisdiction; BBNJ, biodiversity beyond national jurisdiction; CBBT, capacity building and technology transfer; EEZ, exclusive economic zone; EIA, environmental impact assessment; IGC, international governmental conference; IMO, International Maritime Organization; ISA, International Seabed Authority; MPA, marine protected area; RMFO, Regional Fisheries Management Organization; SEA, strategic environmental assessment; UN, United Nations; UNCLOS, United Nations Convention on the Law of the Sea.

Introduction

In an era of global environmental change, the conservation and sustainable use of marine biodiversity beyond national jurisdiction (BBNJ) is a key priority for world leaders. United Nations (UN) negotiations are currently underway to finalize a new, legally binding instrument that could transform how the international community collectively safeguards marine biodiversity in areas beyond national jurisdiction (ABNJ) - the part of the global ocean commonly referred to as the high seas, but which also includes the deep-water column and international seabed below.

After 18 years of discussion and negotiation (UN General Assembly, 2005, 59), the fourth international governmental conference (IGC 4) ended in March 2022 with no consensus. However, there has been a renewed sense of urgency and commitment amongst many States (IUCN, 2022). Nearly 50 countries came together at the One Ocean Summit in February 2022 to form a high ambition coalition on BBNJ, pledging to quickly conclude the treaty within the year (High Ambition Coalition, 2022). In May, G7 foreign affairs and climate, energy and environment ministers committed to strive for a treaty that bolsters ocean health and resilience through proactive and adaptive responses to the cascading effects of climate change and other human impacts, including through protected areas on the high seas (G7 Germany, 2022). More recently, governments reiterated the need for a strong BBNJ treaty at the UN Ocean Conference in Lisbon. Closing statements of the IGC 4 echo the urgency to finalize negotiations in 2022 (IUCN, 2022; Malliet, 2022), signifying some of the highest levels of engagement and commitment to the process to date. But several key countries remain wary of the treaty's economic and legal implications, advocating for a more modest approach. Historically, the dialogue surrounding the BBNJ negotiations has focused on the agreement's environmental and conservation-related impacts. In this paper, we highlight the many diplomatic, economic, and social benefits of supporting a strong and equitable BBNJ agreement.

The BBNJ treaty in context

In the early 1980s, negotiators concluded the UN Convention on the Law of the Sea (UNCLOS), crystallizing the sovereign rights and jurisdiction of states regarding the use and exploitation of marine resources within 200 nautical miles from their baselines (known as the exclusive economic zone; EEZ). However, it also left many issues unaddressed. Despite creating an obligation on all States to protect and preserve the marine environment, UNCLOS contained few mechanisms to address threats other than pollution in high sea areas (Humphries and Harden-Davies, 2020). While a "fragmented system" of global sectoral bodies for shipping (the International Maritime Organization; IMO), seabed mining (the International Seabed Authority; ISA), Regional Fisheries Management Organizations (RFMOs), Regional Seas Programmes, and regional treaties exists, these institutions are largely activity-specific, regional or sectoral in nature, operate independently with limited coordination and cooperation, and/or consider conservation as a secondary priority (Freestone, 2018; Gjerde et al., 2019; Hammond and Jones, 2021). This has resulted in an ocean governance structure that has proven inadequate in stemming environmental degradation and loss of biodiversity in ABNJ (Bigagli, 2016). Without a sufficiently empowered treaty and associated Conference of Parties, the high seas will remain primarily governed by this regime of largely sectoral bodies operating in siloes and failing to work cohesively to address global ocean health (Gjerde and Yadav, 2021).

The consequences of this patchwork approach is clear. Fishers are able to catch greater quantities of resources, traveling further and fishing deeper than ever before (Morato et al., 2006; Bavinck, 2011). Today, industrial fishing is estimated to occur in nearly 50% of the global ocean (Sala et al., 2018); however, regardless of this surge in fishing effort, fish landings and values have stagnated (Merrie et al., 2014). Despite the existence of over 20 RFMOs responsible for managing and conserving fish stocks, the ecological consequences of this unmanaged exploitation have been staggering, with 31% of marine fish stocks worldwide over-exploited (FAO, 2016) and ecosystem-level changes observed in multiple open-ocean areas (Ortuño Crespo and Dunn, 2017). Maritime shipping also occurs over much of the world's oceans, including a sizeable number of routes within ABNJ (O'Leary et al., 2020). These activities introduce additional biodiversity concerns, with vessel collisions among the leading human cause of mortality for many large marine mammals (Rockwood et al., 2017). Although the IMO is responsible for regulating international shipping standards, its lack of direct monitoring or enforcement power means that flag state performance varies greatly (Corres and Pallis, 2008). Further, development of regulations for deep-sea mining in ABNJ is currently underway (O'Leary et al., 2020). Deep sea mining activities are likely to have widespread and long-term impacts on the entire marine ecosystem from seabed to surface (Miller et al., 2018). Importantly, many locations of suitable seabed mining operations overlap with areas that are highly important to biodiversity and may be irreversibly damaged (Jones et al., 2017; Harfoot et al., 2018). Although seabed mining activities are regulated by the ISA, there is rising concern about mining impacts, the lack of knowledge to avoid harm, and non-transparency of certain parts of the ISA, leading to increasing calls for greater precaution, accountability, and stewardship (Niner et al., 2018; Deep Sea Mining Campaign, 2019) . Overall, changes in the scope and magnitude of ocean use today demonstrate a need for new legal and political tools and architecture to govern current levels of exploitation. A robust treaty focused on sustainably managing ecosystems to safeguard

ocean life is not just urgently needed, but has the potential for widespread benefits.

Overview of the treaty and its progress

The current draft of the BBNJ agreement addresses four major aspects: (1) marine genetic resources, (2) area-based management tools (ABMTs) including marine protected areas (MPAs), (3) capacity building and technology transfer (CBTT), and (4) environmental impact assessments (EIAs). In combination, these four parts have the potential to transform how we conserve and manage BBNJ. As the international community prepares for a IGC 5 from August 15-26, 2022, it is critical that swift progress and strong support continues. Finalizing an ambitious BBNJ treaty in 2022, which also marks the 40th anniversary of the adoption of UNCLOS, would be a significant milestone for ocean governance and assist in meeting other global goals. Further, this new global ocean biodiversity agreement can help enhance multilateral cooperation for more effective international response to new threats, both environmental and beyond, that were not initially anticipated when UNCLOS was drafted.

How the BBNJ treaty will benefit nations

The BBNJ agreement not only has the potential to better protect vulnerable ocean ecosystems and species, but also would be consistent with the diplomatic, economic, and social interests of States (Figure 1).

Diplomatic benefits

The BBNJ agreement would offer States an opportunity to strengthen multilateral diplomatic institutions and promote international cooperation towards global conservation efforts. Clearly establishing core obligations and principles for high seas conservation and sustainable management through a new agreement can advance global collaboration around common goals (Gjerde and Yadav, 2021), which was noted as a shared key interest that can revitalize efforts to meet Sustainable Development Goals (European Commission, 2022). While differing priorities and power imbalances have historically hindered progress towards meeting global targets (Morrison et al., 2019), a strong BBNJ treaty would mitigate many challenges and inefficiencies inherent in the current regional

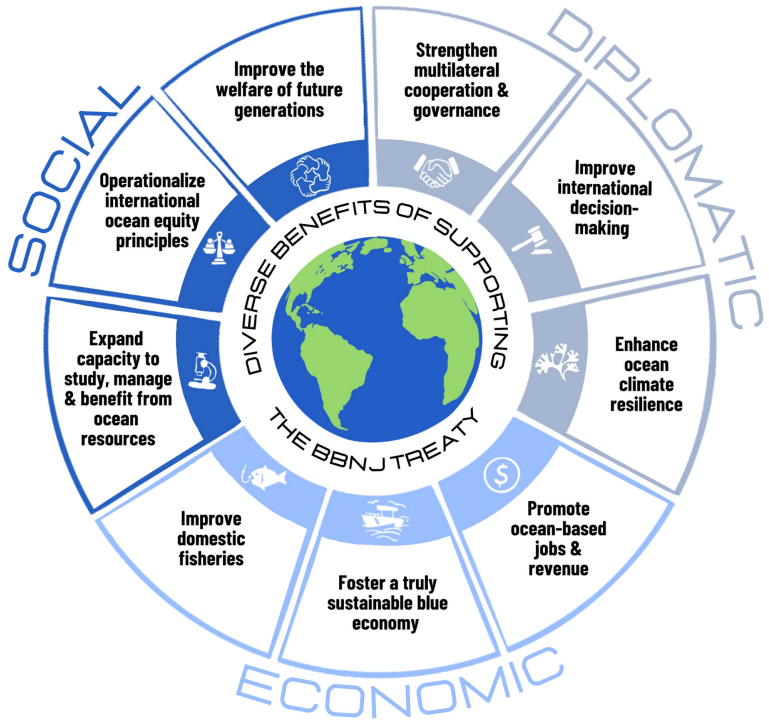

FIGURE 1
Diplomatic, economic, and social benefits for strengthening and supporting the marine biological diversity of areas beyond national jurisdiction (BBNJ) intergovernmental treaty.

and sector-based governance regime (Bodansky, 2010; Tang et al., 2021), by creating a platform for working towards more cohesive integrated management.

UN and European Commission leadership have explicitly called for closer international rules-based cooperation and multilateral governance to address global challenges (European Commission, 2022). The new treaty can signify a new era for multilateralism, modeling how to combat global challenges with internationally coordinated and integrated action. For example, the treaty's framework for implementation can serve as a model for preventing and mediating conflicts, by incorporating common interest building through science-based collaboration as well as formal and informal dispute resolution mechanisms (Gjerde and Yadav, 2021). Developing learning exchange processes can foster coordination, while long-term capacity building can advance integrated ocean management within and across regions more equitably (Gjerde and Yadav, 2021). Formally incorporating such strategies into global conservation approaches can strengthen their use and implementation. These mechanisms could not only catalyze marine research and management in the high seas, but potentially lead to improved science-based decision-making in other global and regional institutions.

The BBNJ agreement can also enhance ocean climate resilience and support nations' commitments to tackling the climate crisis. A healthy ocean is vital to fighting the climate crisis, given its role in the global carbon cycle and aid in slowing the rate of rising temperatures (Denman et al., 2007). The ocean serves as the largest active carbon sink worldwide, sequestering 2.5 billion metric tons of carbon a year and absorbing a quarter of all anthropogenic carbon dioxide emissions (Friedlingstein et al., 2019). Marine vertebrates can move and store carbon in different ways (Wilson et al., 2009) and large animal carcasses, such as whales, can sequester carbon after sinking (Pershing et al., 2010). However, heavy high seas exploitation and overfishing has directly reduced the carbon sequestration potential of our oceans. By removing large quantities of fish, fishing has prevented the sequestration of over 21 million metric tons of carbon since 1950, in addition to releasing at least 0.73 billion metric tons of atmospheric carbon dioxide through fuel consumption (Mariani et al., 2020).

The BBNJ treaty can offer a complementary platform to advance collaboration around international climate goals and agreements, ensuring that climate change is integrated into environmental assessments and area-based management planning, and that proposed new technologies to mitigate climate change consider fully their effects on ocean life and ecosystem services beyond national boundaries. Despite collective pledges by nations to combat climate change (Ghezloun et al., 2017), current levels of ambition are not on track to meet global goals (UNFCCC, 2021). More effective protection of high seas ecosystems is vital for safeguarding habitats and promoting the recovery of fish stocks, which can facilitate the restoration of crucial carbon sequestration processes and support climate adaptation (Gattuso et al., 2018; Mariani et al., 2020). EIAs grounded upon comprehensive strategic environmental assessment processes (SEAs) as elaborated through the BBNJ treaty can ensure that proposed activities consider the effects on biodiversity by evaluating their potential carbon emissions and impacts on carbon sequestration processes. Given the critical link between climate change action and healthy ocean ecosystems, actively supporting the BBNJ agreement could not only directly impact carbon emissions, but also help build momentum towards strengthening multilateral cooperation for this common cause.

Economic benefits

Strengthened biodiversity protections through a strong BBNJ treaty can enhance ecosystem health, preserve genetic diversity, and improve fish stocks, leading to economic benefits for ocean-related industries. The ocean supports a wide-range of renewable economic activities, generating millions of jobs and revenue in sectors including fishing, energy, tourism, shipping and biotechnology (Colgan, 2004; Teh and Sumaila, 2013). In addition, the ocean provides intangible goods, services, and non-market benefits such as atmospheric regulation, carbon sequestration and storage, and global temperature control (Hoegh-Guldberg, 2015). Many coastal countries are motivated to explore how to grow their ocean-based economies, however, the benefits of a growing blue economy will only be realized if regulations and governance adequately protect the ocean's capacity to provide ecosystem goods and services in a holistic manner. While most of this ocean-based economic value comes from coastal areas, biodiversity protection in the high seas will enhance ecosystem services stemming from ABNJ, with benefits that can spillover and lead to more prosperous coastal sectors.

Given the highly interconnected nature of ocean ecosystems, appropriate conservation and management measures must consider levels of risk and protections across all habitats (Dunn et al., 2019). For example, only 1.5% of commercially-targeted taxa are found exclusively within international waters; many more species frequent both the high seas and EEZs of individual nations (Sumaila et al., 2015). These species spend the vast majority of their lives in ABNJ (Harrison et al., 2018), thus, mismanagement in these high sea areas can have cascading impacts that affect the profitability of nearshore fisheries within national jurisdiction. Safeguarding important habitats in adjacent high sea areas can greatly influence the health and availability of migratory marine stocks that spillover to domestic fleets. For example, Sumaila et al. (2015) suggests that closing the entire high seas to fishing could lead to more than an 18% increase in the catch of straddling stocks, improving catch and revenue for at least 120 coastal States. Thus, even the moderate

creation of new and expansive high seas ABMTs could lead to economic benefits for coastal nations.

Investing in the protection of biodiversity in the high seas through protected areas and stronger environmental oversight mechanisms would help high seas ecosystems to rebuild, leading to cascading benefits for coastal economies. The restoration of marine biodiversity loss has been projected to lead to a 23% increase in species diversity, a 21% decrease in community variability, and a fourfold growth in fisheries productivity (Worm et al., 2006). This can result in considerable extractive (e.g., fish catches) and non-extractive (e.g., tourism) revenue (Worm et al., 2006). Fish stocks have greatly improved in areas where fisheries are intensively managed and scientifically assessed, while regions that lack extensive fisheries management systems, such as the high seas, have stock statuses and trends that are much worse (Hilborn et al., 2020). The BBNJ treaty has the potential to enhance the sustainability of existing fisheries management systems, by coordinating spatial efforts, building connectivity into ABMT design, and strengthening capacity for science-based management within current regional and/or sector-based regimes (Crespo et al., 2019). For example, providing common principles and enabling comprehensive assessment processes, coupled with a more robust global review to assess progress and assist with implementation, can aid in ensuring RMFOs are applying a consistent ecosystem-based management approach across ocean areas (Crespo et al., 2019). The BBNJ treaty can also provide a mechanism to address current management gaps within regional fisheries bodies, both geographical and taxonomical (Crespo et al., 2019). Strong BBNJ treaty provisions around ABMTs, EIAs and SEAs can serve as a platform for organizations to comply with global obligations around biodiversity conservation (Haas et al., 2021), aiding to make more robust high seas fisheries management possible.

The economic advantages of strengthened high seas biodiversity management would outweigh the costs for most nations. ABMTs established by the BBNJ agreement will likely have little direct impact on most global fishing catch and revenue. The vast majority of global catch occurs in domestic waters (Sea Around Us, 2016). High seas fishing was estimated to account for only around 6% of global catch and 8% of fishing revenue in 2014, with fishing effort dominated by six countries (Sala et al., 2018). Many of these nations depend on harmful fuel subsidies to be profitable (Sumaila et al., 2021), however, without subsidies and/or low labor compensations, over half of the high seas areas that are currently fished may be unprofitable at present rates (Sala et al., 2018). These former subsidies for high seas fishing can be invested instead in better managing domestic fisheries, further protecting biodiversity, reducing pressures on fishing stocks, and supporting ecosystem health.

Social benefits

Finally, a strong and well-designed BBNJ agreement can promote global equity, a goal of the UN and many of its member States. The legal status quo in the high seas is highly inequitable, where opportunities to explore, extract and acquire wealth from ocean-based resources are not fairly considered or distributed among nations. Only a few wealthy nations possess the legal, institutional, or research capacities to access high seas areas, leading to disproportional benefits from an internationally shared area (Sumaila et al., 2015; Tolochko and Vadrot, 2021). For example, only five of the twenty-two countries within the Southeast Atlantic are active in the high seas, generating 1% of global high seas fishing revenue (Spiteri et al., 2021). Constrained by lack of resources (Tydecks et al., 2018), many of these countries rely heavily on coastal and nearshore artisanal fishing, sectors that may benefit from increased protections in the high seas.

Improving high seas management can benefit developing countries in various ways. Establishing an ocean governance framework that explicitly and carefully addresses equity as a key principle can foster cooperative efforts to tackle current global inequalities. Addressing these issues within the negotiations through both substance and process is critical, given that the new treaty can have direct implications for how ocean science and management are conducted. But references to the common heritage of humankind principle as a legal foundation have been controversial (Vadrot et al., 2022). This debate has primarily centered around the regulation of MGRs, where normative arguments on benefit sharing and equity have come into conflict with concerns about the principle's practical effects on scientific research and international intellectual property law (Harden-Davies, 2017).

Recognizing the interconnectedness of our one ocean, there is a need for financial and other resources to enable capacity building for implementation of all aspects of the BBNJ agreement, from legal and institutional needs for administration, to technical and human resource needs for conducting and reviewing environmental impact assessments, and to the proposal and potential management of high seas MPAs (Cicin-Sain et al., 2019; Harden-Davies et al., 2022). And from a pragmatic perspective, many developing nations, such as small Pacific Island countries, will have limited benefits from marine genetic resources without provisions within the BBNJ treaty that meaningfully supports CBTT (Harden-Davies, 2017).

While an obligation for CBTT already exists, the BBNJ treaty is an opportunity to operationalize principles of both intergenerational and intragenerational equity. Bolstering international cooperation in addition to well-coordinated sharing of knowledge, training, and infrastructure is needed to overcome persisting intragenerational inequalities in global

science capacity (Harden-Davies and Snelgrove, 2020) and resource use. However, without careful consideration of how to address these social issues, developing nations may not be able to thoroughly implement the BBNJ agreement or fully realize its benefits. Countries opposed to the common heritage of humankind can still endorse concepts of intergenerational equity within the treaty. For example, this can include text around investing in activities that enable positive outcomes for future generations, creating meaningful partnerships co-designed to meet local needs, and ensuring open access for acquiring, interpreting, and acting on obtained knowledge (Harden-Davies et al., 2022). In addition, countries that may not have the means to access high seas resources should still be able to meaningfully participate in conversations around their sustainable management, and the interests of all humankind – including Indigenous Peoples and local communities – should be represented in these conversations. The BBNJ treaty could protect the rights of all nations to be involved in decision-making, and set a global expectation for meaningful, widespread participation in international environmental management. Further, the treaty can be used to create an expectation in developing low-cost and accessible high seas technologies to support a wider use, establish funding mechanisms to aid in financing CBTT within the developing world, and support data systems that can integrate traditional and local knowledge.

A central component of the UN 2030 Agenda for Sustainable Development is a commitment for member nations to ensure that no nation is left behind. Given that our ocean is a shared resource, the BBNJ treaty will not be successful in contributing to this global priority without strong provisions that operationalize principles of equity, making this agreement a timely opportunity to launch meaningful progress towards social reform and global ocean equity (Claudet et al., 2021). Policies that promote equity can reduce poverty, promote long-term sustainable economic growth, reduce political discourse, and impact the welfare of future generations (Gupta et al., 1999). A truly sustainable ocean management framework should improve the well-being of all people, shifting historical trajectories that exacerbate inequities in resource and scientific use and access.

Conclusion

Commitment towards a strong BBNJ treaty will have diverse benefits for nations, including those that are diplomatic, economic, and social in nature. While this discussion is not meant to be exhaustive, it highlights reasons beyond conservation as to why it is within the national interests of countries to advocate for a strong and equitable agreement. Bold international support is urgently needed to usher the BBNJ agreement through its final stages, ensuring its terms will sufficiently protect biodiversity and enhance global equity, so that its widespread benefits can be fully realized by all ocean life and nations around the globe.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material. Further inquiries can be directed to the corresponding authors.

Author contributions

BS and SD conceptualized and co-wrote the sections of the manuscript. All authors edited and contributed to manuscript revisions, as well as read and approved the submitted manuscript.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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