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Abstract

2020 Elsevier Ltd Capacity building and technology transfer (CBTT) are vital for the success of a new international legally-binding agreement for marine biodiversity beyond national jurisdiction. Without effective CBTT, many developing countries are unlikely to be able to fulfill their obligations in areas beyond national jurisdiction (ABNJ), including by undertaking area-based management, evaluating environmental impact assessments, and benefiting from the utilization of marine genetic resources - or to realize their rights. Meanwhile, several other international commitments require varying forms of CBTT at global, regional and national levels. This article analyses areas where synergies are possible for implementing CBTT, and those where additional, ABNJ-related capacities will need to be mainstreamed for holistic ocean management. We argue that CBTT is more meaningful, effective and resource-efficient if it corresponds to the ecological realities of an interconnected ocean by linking initiatives relating to ABNJ with those within national jurisdiction. We discuss why and how CBTT is also more useful on the national level if it maximizes synergies between international policies and agreements, and allows countries to concurrently participate in a BBNJ agreement and fulfill national priorities related to sustainable development, for example by enhancing livelihoods, eradicating hunger and poverty, and building capacity for science and innovation as part of national blue economies based on healthy ocean ecosystems. The Decade of Ocean Science for Sustainable Development offers a timely opportunity to operationalize robust CBTT measures under the BBNJ agreement and maximize synergies with other international commitments - as part of broader efforts to achieve Agenda 2030.

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Capacity building and technology transfer for improving governance of marine areas both beyond and within national jurisdiction

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Abstract

Capacity building and technology transfer (CBTT) are vital for the success of a new international legally-binding agreement for marine biodiversity beyond national jurisdiction. Without effective CBTT, many developing countries are unlikely to be able to fulfill their obligations in areas beyond national jurisdiction (ABNJ), including by undertaking area-based management, evaluating environmental impact assessments, and benefiting from the utilization of marine genetic resources – or to realize their rights. Meanwhile, several other international commitments require varying forms of CBTT at global, regional and national levels. This article analyses areas where synergies are possible for implementing CBTT, and those where additional, ABNJ-related capacities will need to be mainstreamed for holistic ocean management. We argue that CBTT is more meaningful, effective and resource-efficient if it corresponds to the ecological realities of an interconnected ocean by linking initiatives relating to ABNJ with those within national jurisdiction. We discuss why and how CBTT is also more useful on the national level if it maximizes synergies between international policies and agreements, and allows countries to concurrently participate in a BBNJ agreement and fulfill national priorities related to sustainable development, for example by enhancing livelihoods, eradicating hunger and poverty, and building capacity for science and innovation as part of national blue economies based on healthy ocean ecosystems. The Decade of Ocean Science for Sustainable Development offers a timely opportunity to operationalize robust CBTT measures under the BBNJ agreement and maximize synergies with other international commitments - as part of broader efforts to achieve Agenda 2030.

(1) Introduction

The ocean is an ecologically interconnected space, with species and water masses crossing jurisdictional boundaries, and migratory species ranging from coastal or inland areas to the high seas. Actions, whether for conservation or economic development, taken in areas beyond national jurisdiction can potentially impact coastal communities in far-away countries (Popova et al, 2019a and b) and vice versa.

Effective ocean governance of rapidly increasing human uses (Merrie et al, 2014; Jouffray et al, 2020) and overlapping global and local-scale stressors that act cumulatively (Halpern et al, 2015) requires an approach that is holistic, ecosystem-based, precautionary and adaptive. Cooperation and coordination among ocean users and stakeholders is key to overcoming the current sector-based and fragmented ocean governance regime (Ban et al, 2014; Rochette, et al, 2014) and to ensuring that all ocean stakeholders have the capacity to participate effectively in ocean governance. With a new international legally binding instrument for the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction (BBNJ agreement; United Nations General Assembly, 2017a) now being negotiated under the 1982 United Nations Convention on the Law of the Sea (UNCLOS), it is important that capacity building and technology transfer (CBTT) undertaken in the context of a potential future treaty corresponds with holistic ocean governance.

Worldwide, there are disparities in capacity regarding BBNJ, including in ocean science (Salpin et al., 2016; IOC, 2017a) and access to genetic resources (Arnaud-Haond et al., 2011; Blasiak et al., 2018) as well as implementing and monitoring area-based management tools such as marine protected areas and environmental impact assessments. These capacity gaps are not limited to ABNJ. The United Nations first Global Ocean Assessment (United Nations, 2016) identified general capacity gaps in regards to marine scientific research, equipment and infrastructure, as well as ecosystem-based assessment and management, including bringing together: “(a) environmental, social and economic aspects; (b) all the relevant sectors of human activities; and (c) all the components (fixed and living) of the relevant ecosystems.” Addressing capacity gaps in this way would require collaboration between specialists from many different fields, and coordination amongst agencies working in environmental, social and economic issues, as well as those dealing with sectors of human activities in the ocean. The BBNJ negotiation process provides an opportunity to reflect on how CBTT could be undertaken in a manner that is more coherent and responds to current challenges in ocean governance.

CBTT that is effective and well-funded, and that acts to build human and institutional capacity, including in the acquisition and application of science and technology, is vital for the success of a new BBNJ agreement (Mohammed, 2017; Cicin-Sain et al, 2018; Harden-Davies and Snelgrove, 2020). If disparities in capacity and technology are not addressed, many developing countries will be unable to fulfill their obligations and realize their rights under a future BBNJ agreement. Their participation may be limited by lack of human, institutional and societal capacity, or by the lack of appropriate science and technology and/or the presence of more pressing problems closer to shore. Without the participation of all countries, the BBNJ agreement is unlikely to be successful.

A mandate for CBTT already exists in UNCLOS and in other international agreements. More recently, Agenda 2030 put forward ambitious global aspirations towards sustainable development and urges countries to “leave no one behind”. Similarly,

mandates for an ecosystem approach and holistic ocean governance already exist in the preamble of UNCLOS, as well as in the Convention on Biological Diversity (CBD) and other international agreements, representing existing obligations for most States currently negotiating the BBNJ agreement. These pre-existing obligations and efforts offer a basis to consider synergies in CBTT and inform the development of new measures under the BBNJ agreement. In addition, the debate on how to best provide for meaningful and long-term CBTT can be framed in the context of current discussions within the CBD and the Nagoya Protocol on responsible research and innovation (Laird and Wynberg, 2016), with CBTT providing a pathway for furthering equity and social inclusion.

This paper examines the ways in which maximum synergies can be developed in the delivery of CBTT, with the aim to avoid duplication and maximize effectiveness and the use of resources. A background to CBTT in the marine context is provided, highlighting contemporary issues for the BBNJ negotiations and the need to consider synergies with existing frameworks (Section 2). Areas of potential synergies in the delivery of CBTT under the BBNJ agreement and under other relevant agreements and bodies are outlined (Section 3). Areas where additional, ABNJ-related capacities will need to be mainstreamed for holistic ocean management are highlighted, as well as how these efforts could contribute to national blue economies in the context of Sustainable Development Goal (SDG) 14 and other SDGs (Section 4). Given that science is critical not only to inform but to deliver technology transfer, and to build scientific and technological capacity, the paper also explores how the UN Decade of Ocean Science could provide a vehicle for delivering CBTT, in line with UNCLOS, that addresses ocean science needs both within and beyond national jurisdiction. While keeping in mind that some CBTT needs for ABNJ are unique, we argue that ultimately, a synergistic approach will increase cooperation and collaboration between agreements and bodies, in accordance with UNCLOS Article 242, and will strengthen the implementation of ecosystem-based ocean governance (Section 5). We argue that such an approach could link improved ocean governance with national priorities such as the development of sustainable blue economies, eradication of poverty and hunger, innovation, gender inclusion, stronger institutions, and climate resilience. We propose concrete mechanisms to support such an approach.

(2) Background to CBTT

2.1. What is CBTT?

While ‘capacity building’ (CB) and ‘marine technology transfer’ (TT) are often referred to collectively (see for example Part V of the President’s draft BBNJ text), these two terms have different meanings and incorporate different elements. Neither term is defined in UNCLOS, but their meaning can be inferred from the contexts in which they are used including in the President’s draft text of the BBNJ agreement

(United Nations General Assembly, 2019a) and other international instruments (e.g. IOC, 2005).

CB, can be considered to: include human, technical, institutional forms; take place at individual, institutional, national, regional or even global levels; and span science, law, policy, regulation and more. TT could be considered as narrower in scope than CB. For example, the 2005 Intergovernmental Oceanographic Commission (IOC) Criteria and Guidelines on Transfer of Marine Technology (CGTMT) provided a definition of marine technology as covering “instruments, equipment, vessels, processes and methodologies required to produce and use knowledge to improve the study and understanding of the nature and resources of the ocean and coastal areas.” This definition has a heavy focus on marine scientific research as a driver and recipient of TT (Harden-Davies and Snegrove, 2020), which is reflected in the current draft text of the BBNJ agreement (draft Article 1 (11) and ([12])).¹ In the BBNJ agreement, however, this definition may be too narrow and exclude technologies that are relevant to the implementation of the BBNJ agreement but go beyond scientific research - such as monitoring and control and surveillance. While acknowledging these differences between CB and TT, we consider ‘CBTT’ to provide a useful collective focus in considering the BBNJ negotiations and an accurate reflection of the current discussions.

While countries generally agree that marine scientific research and access to appropriate technology are critical for sustainable development, the CBTT provisions of UNCLOS, as well as the IOC Criteria and Guidelines appear to be implemented only in a limited manner (Salpin et al, 2016; Minas, 2018). While significant efforts towards CBTT have been made, as discussed in Section 2 of this paper, including towards ocean science capacity and technology (Miloslavich et al, 2019), many challenges to the success of these efforts remain.

These challenges include the need for stronger alignment with policy and societal needs (Miloslavich et al, 2019), capacity to undertake the multidisciplinary/interdisciplinary research and governance required to solve complex ocean problems (Morrison et al, 2013; Miloslavich et al, 2019), lack of facilities and equipment (Arnaud-Haond et al., 2011; Morrison et al, 2013), and the need to consider follow-up after CBTT has taken place, including through

¹ In the draft text of the BBNJ agreement, Article 1 (11) the following definition of marine technology is provided: “[*Marine technology*]” means information and data, provided in a user-friendly format, on marine sciences and related marine operations and services; manuals, guidelines, criteria, standards, reference materials; sampling and methodology equipment; observation facilities and equipment (e.g., remote sensing equipment, buoys, tide gauges, shipboard and other means of ocean observation); equipment for in situ and laboratory observations, analysis and experimentation; computer and computer software, including models and modelling techniques; and expertise, knowledge, skills, technical, scientific and legal know-how and analytical methods related to marine scientific research and observation.]”. It is also not clear if this definition will be retained in its current form in the final text of the BBNJ agreement. No definition of capacity building is provided, but several examples are given in Annex x and Part V of the draft text.

development of career pathways for those who have been trained (Miloslavich, 2019). A key challenge has also been the short-term and project-based nature of many CBTT efforts and their finance, which has resulted in the cessation of promising efforts as external funding ends (Board and National Research Council, 2008). Building lasting capacity requires long-term partnerships (Bax et al, 2018), including sustainable financial support and mentorship, which may not be easily possible through a project-based approach. Coordination among ocean-related CBTT efforts is also lacking, resulting in missed opportunities to further build on previous achievements. In fact, a full inventory of national marine science capacity is lacking (Isensee et al, 2017), as is an inventory of ocean-relevant CBTT efforts.

The negotiation of a BBNJ agreement provides an opportunity to chart a more comprehensive and coherent implementation of UNCLOS provisions promoting capacity and transfer of marine technology, for example through the promotion of enhanced international co-operation (UNCLOS Article 242) as well as scientific and technical assistance to developing countries (UNCLOS Article 202). During the Preparatory Committee process (2016-2017), there was a broad convergence of views among delegations that CBTT should be country-driven and sustainable, and develop marine scientific and technological capacity of States in accordance with Parts XIII and XIV of UNCLOS. It was proposed that a clearinghouse mechanism would be established “to perform functions with regard to capacity-building and transfer of marine technology, taking into account the work of other organizations,” although the form and function of such a mechanism remains unclear at this stage. However, the Preparatory Committee report noted that “further discussions are required on the terms and conditions for the transfer of marine technology.” (United Nations General Assembly, 2017b).

2.2. How is CBTT addressed in the draft BBNJ agreement?

CBTT is a cross-cutting issue across the current President’s draft text of the BBNJ agreement (United Nations General Assembly, 2019a) – it is seen as the ‘glue’ that binds the elements together and a common interest around which countries can collaborate towards a shared goal. Annex II of the draft BBNJ agreement provides an indicative, non-exhaustive, list of 6 categories of CBTT (Annex II, a-f) including a total of 29 subcategories, broadly reflecting expected country needs and aspirations, and incorporating a variety of topics such as capacity relating to science, monitoring, technology, and infrastructure; governance, policy and legal frameworks; and CBTT related measures such as area-based management tools, environmental impact assessments (EIA), and utilization of marine genetic resources. The current President’s draft text and the list of CBTT categories indicates that States view capacity building as not only limited to a donation from a technologically advanced country to a developing country, but also consider it to include building global capacity to acquire and apply knowledge in the conservation and sustainable use of BBNJ – for example, technologically developed nations can benefit from improved cooperation frameworks for science (Rabone et al., 2019; Collins et al., 2019; Harden-Davies and Snelgrove, 2020). Countries can also benefit from “cooperative links

between regional institutions, for example, North-South and South-South collaboration and collaboration among regional seas organizations and regional fisheries management organizations.” (United Nations General Assembly, 2019a)

The current President’s draft text of the BBNJ agreement (United Nations General Assembly, 2019a), expresses several aspirations relating to CBT, including in regards to: implementing provisions of the Agreement (draft Article 42 (a)); enabling inclusive and effective participation in activities undertaken under the Agreement (draft Article 42 (b)); increasing, disseminating and sharing knowledge about BBNJ (draft Article 42 (d)); developing marine scientific and technological capacities of States Parties (draft Article 42 (e)); and ensuring that developing countries have the capacity to develop, implement, monitor, and manage area-based management tools, including MPAs, and to conduct and evaluate environmental impact assessments [and strategic environmental assessments] (draft Article 42 (f)(v) and (vi)). Currently bracketed text also highlights ambitions by developing countries relating to marine genetic resources (draft Article 42 (f)(i) – (iv)). The draft text also emphasizes the need for cooperation in CBT (draft Article 43), as well as the importance of an ecosystem approach as an overarching principle for implementation of the BBNJ agreement.

There are three main mechanisms for CBT outlined in the draft text of the BBNJ agreement:

- i) a needs assessment, to ensure that CBT is based on and responsive to the needs and priorities of developing States (Article 44(4));
- ii) a clearinghouse mechanism (Article 51); and
- iii) a monitoring and review process (Article 47).

However, several open questions remain regarding the modalities for CBT, set out in draft Articles 44 and 45 of the President’s text. Indeed, these articles set out guiding principles (e.g. “transparent and country-driven”, “effective” and “iterative” (Article 44(3)), and on “fair and most favourable terms” (Article 45(1)), and “appropriate, reliable, affordable...” technology (Article 45 (3))) more than specific mechanisms. The issue of whether CBT should be an obligation or an aspiration continues to be a source of discussion, as indicated by the text in square brackets relating to ‘voluntary’ or ‘mandatory’ CBT Article 44(2), and whether to ‘provide’, ‘facilitate’, ‘promote’ or ‘ensure’ CBT (Article 44(1)). Discussions on funding during the third intergovernmental conference were inconclusive, with several developing States calling for stronger language on CBT and mandatory funding, and many developed nations calling for voluntary approaches (IISD, 2019). Intellectual property also remains a topic of discussion as indicated in Article 45 [2. Alts. 1, 2 and 3]. Square bracketed text in Article 44[5] refers to detailed modalities, procedures and guidelines being developed and adopted by the Conference of the Parties at a later stage, and further illustrates the questions regarding the delivery of CBT. There are therefore pragmatic reasons for understanding synergies in terms of delivery within limited resources.

2.3. Why consider synergies between CBTT for areas within and beyond national jurisdiction?

Many international and regional agreements, bodies and programmes form a part of the ocean governance architecture and undertake work, including CBTT, that is relevant to ABNJ (De Santo et al, 2019; Section 2). Cooperation towards the delivery of CBTT may also involve other relevant stakeholders, in particular intergovernmental organisations (IGOs) and non-governmental organisations (NGOs), academia, ocean industry, philanthropic organizations and the private sector, as well as bilateral efforts, including official development assistance (ODA) (Blasiak and Wabnitz, 2018; Collins et al, 2020;). CBTT can be designed so that it provides for cooperation and collaboration amongst ocean stakeholders and sectors as well as between international agreements, policies and programmes. It is therefore timely to consider how CBTT could create/maximise synergies between a new BBNJ agreement and other international policies and agreements that guide countries' environmental conservation and sustainable development efforts, including in particular the 2030 Agenda for Sustainable Development (United Nations General Assembly, 2015) and the associated Sustainable Development Goals (SDGs), including SDG 14, which aims to conserve and sustainably use the oceans, seas and marine resources for sustainable development.

For example, in observing synergies between international obligations on marine technology transfer and small scale fisheries, Morgera and Ntona (2017) argue for a partnership-based and integrated approach to technology transfer under UNCLOS that lifts capacity for ecosystem-based management. A growing body of literature highlights opportunities to close the capacity and technology gap, including through more inclusive innovation (Collins et al., 2019), strengthening scientific best-practices to increase access to genetic samples and data (Rabone et al. 2019), sharing technologies for development and conservation of marine genetic resources (Leal et al, 2012), enabling access to vessel movement data (Dunn et al., 2018), transnational cooperation networks (Minas, 2018) and introducing new policy measures to ensure that scientific and technological capacity building is planned and delivered to meet nationally determined needs (Harden-Davies, 2017). The importance of sustainable long-term funding for CBTT has also been emphasized as a basis for building long-term capacity (Cicin-Sain et al, 2018). With an interconnected ocean as its basis, CBTT can provide an important avenue for creating synergies between international and regional instruments and bodies for an improved implementation of holistic ocean governance. Such synergies may be critically important in delivering CBTT given the modalities outlined above.

There are also strategic considerations for taking into account synergies in CBTT between the BBNJ agreement and other bodies and agreements. For CBTT under the new BBNJ agreement to be meaningful for developing countries, including least developed countries (LDCs) and Small Island Developing States (SIDS), it will need to be able to concurrently provide for their meaningful participation, while also

responding to national priorities. In particular, these may be priorities related to sustainable development as articulated in Agenda 2030 and the associated SDGs, including SDG 14 on oceans, and other SDGs, such as those relating to poverty, hunger, economic development and human health; the Aichi Biodiversity Targets (including the new post-2020 biodiversity targets); as well as the SIDS Accelerated Modalities of Action (SAMOA Pathway) (United Nations General Assembly, 2014); and the Istanbul Programme of Action for the LDCs (IPoA) (United Nations, 2011). Underpinning the success of all of these commitments is a healthy and productive ocean ecosystem, and the Agenda 2030 principle of leaving no one behind. Given these overarching common goals, there are likely to be potential synergies in CBTT, on many levels, between a new BBNJ agreement and other ocean-relevant commitments.

(3) Comparing the CBTT requirements of the new BBNJ agreement with the SDGs and other ocean-relevant multilateral agreements

This section explores the synergies between priority areas for CBTT likely required for a new BBNJ agreement and other policies, international agreements and bodies, agencies and programs. Based on the negotiations to date, the priority areas for a new BBNJ agreement are area-based management tools (ABMTs), including marine protected areas (MPAs); environmental impact assessment (EIA) and strategic environmental assessment (SEA), which though not as prominent as EIA remains an important planning tool for informed decision-making; and marine genetic resources (MGRs) and benefit-sharing (United Nations General Assembly, 2019a; Cicin-Sain et al, 2018). In addition, scientific research capacity, knowledge of UNCLOS and other relevant international law, as well as issues such as climate change will be key CBTT topics for successful implementation of a new BBNJ agreement (Cicin-Sain et al, 2018; Cicin-Sain et al, 2019).

3.1. Policy synergies

Overarching synergies in ocean-relevant CBTT can be found in international policies that set the direction for countries' strategies and plans for sustainable development and environmental conservation. For most countries, they include the SDGs (and for the ocean SDG 14 in particular) as well as the Aichi Biodiversity Targets and the post-2020 targets yet to be agreed-upon. In addition, SIDS rely on the SAMOA Pathway for agreed-upon direction towards sustainable and equitable development. For LDCs, the Istanbul Programme of Action for the LDCs for the Decade 2011-2020 (IPoA) aims to support their sustainable development, thus providing an important reference point for CBTT. The IPoA already contains principles and action plans that have been agreed to by LDCs and their development partners, and the implementation of the CBTT provisions of the BBNJ Agreement should strengthen and build upon, rather than undermine, the implementation of the IPoA (Mohammed, 2017).

Table 1 compares the priority areas for CBTT for a new BBNJ agreement, as outlined in the previous section, with the policy priorities of SDG 14, other SDGs, the Aichi Biodiversity targets, the SAMOA Pathway and the IPoA. The table demonstrates that CBTT undertaken in relation to ABMTs including MPAs, EIAs and SEAs, MGRs and benefit-sharing, scientific research capacity, legal issues and other topics, such as climate change, correspond well with the policy priorities of SDG 14 and the Aichi Biodiversity targets. While the EIA/SEA priority area does not directly correspond with the SAMOA Pathway and IPoA priority areas, both incorporate text about sustainable development and management of marine resources, which would benefit from use of EIA/SEA instruments. All policies address science and technology capacity.

In addition, the CBTT undertaken in relation to these topics may help implement a large number of other SDGs. For example, CBTT relating to MPAs may help build climate resilience (e.g. Hopkins et al, 2016), strengthen institutions undertaking marine management (IUCN, 2008), help support livelihoods of fishers through improved catches (e.g. Di Lorenzo et al, 2016), and create jobs relating to marine tourism (Agardy, 1993; IUCN-WCPA, 2008). Similarly, CBTT relating to MGRs and benefit-sharing may help support improved higher education, availability of skilled employment including for women, support industry and innovation (Blasiak et al., 2020), and help build stronger institutions for national blue economies.

The extent to which progress has been made towards SDG 14 varies by country and region. The Secretary General's Background Note for the postponed 2020 United Nations Ocean Conference (United Nations General Assembly, 2019b) notes that progress made "depends on such factors as the availability of science and innovation, capacity-building and financing, as well as the level of intersectoral and interdisciplinary cooperation at the national, regional and global levels." Voluntary commitments registered towards SDG 14 in 2017 came with considerable monetary commitment of approximately \$25.5 billion (Vierros and Buonomo, 2017), but poor reporting hampers efforts to determine their impact, with only approximately 25% of voluntary commitments having reported on their progress to date². Very few of these commitments directly address ABNJ.

The political declaration adopted as part of the SAMOA pathway mid-term review in 2019, however, emphasizes the importance of the negotiations for the international agreement on BBNJ (United Nations General Assembly, 2019c). Considerable priority is placed by SIDS on issues relating to management and protection of the ocean, and implementation has been furthered by, for example, the US\$ 18,998,940 investment made through the Global Environment Facility (GEF) in SIDS marine environment through the International Waters portfolio between July 2014 and June 2018 (United Nations General Assembly 2019d).

² This information is current as of June 16, 2020 according to information in the Registry of Ocean Conference Voluntary Commitments (<https://oceanconference.un.org/commitments/>)

Table 1: Synergies between policy agreements and the BBNJ agreement

| BBNJ CBTT priority areas | ABMTs including MPAs | EIAs and SEAs | MGRs and benefit- sharing | Scientific research capacity | UNCLOS and other legal issues | Other relevant issues, such as climate change |
|---|---|--|--|---|---|---|
| SDG 14 | SDG 14.5 (10% marine areas conserved) SDG 14.2 (sustainable management and protection) | SDG 14.2 (avoiding significant adverse impacts) | SDG 14.7 (increased economic benefits to SIDS and LDCs) | SDG 14.A (increased scientific knowledge, research capacity and transfer marine technology) | SDG 14.C (implement international law as reflected in UNCLOS) | SDG 14.3 (minimize impacts of ocean acidification) SDG 14.2 (strengthen resilience) |
| Other SDGs | SDGs 1: poverty, 2: hunger, 3: health, 4: education, 5: gender, 8: decent work, 13: climate action, 16: strong institutions 17: partnerships | SDGs 1: poverty, 2: hunger, 3: health, 12: responsible consumption and production, 16: strong institutions 17: partnerships | SDGs 3: health, 4: education, 5: gender, 8: decent work, 9: industry and innovation, 10: inequality, 11: sustainable cities, 16: strong institutions 17: partnerships | SDGs 3: health, 4: education, 5: gender, 8: decent work, 9: industry and innovation, 11: sustainable cities, 16: strong institutions 17: partnerships | Potential to address all SDGs, depending on specific topic | 13: climate action |
| Aichi Targets | Aichi target 11: (10% marine areas conserved), target 10: (minimizing multiple antropogenic pressures on vulnerable ecosystems) | Aichi target 10 (minimizing pressures to maintain integrity and functioning) | Aichi target 16: (Nagoya Protocol operational), target 3: (consistency with other relevant international obligations) | Aichi target 19: (improved knowledge, science base and technologies) | Aichi target 16: (Nagoya Protocol consistent with national legislation) | Aichi target 10: (Impacts of climate change and ocean acidification), target 15: (ecosystem resilience, mitigation, adaptation) |
| Samoa Pathway | Oceans and seas focal area supports conserving by 2020 at least 10 per cent of coastal and marine areas in SIDS, and efforts to assess, conserve, protect, manage and | Supports sustainable ocean development | Oceans and seas focal area supports action to engage in national and regional efforts to sustainably develop the ocean resources of SIDS and | Oceans and seas focal area calls for marine scientific research and development of associated technological capacity in SIDS | Reaffirms that international law, as reflected in UNCLOS, provides the legal framework for the conservation and sustainable use of oceans | Climate change focal area calls for building resilience of SIDS Oceans and seas focal area supports cooperation to address the causes of ocean acidification and to further study |

| | | | | | | |
|-------------|---|--|---|--|---|---|
| | sustainably use the oceans, seas and their resources | | generate increasing returns for their peoples | | and their resources | and minimize its impacts |
| IPoA | Strategy calls for sustainable management of marine biodiversity and ecosystems in line with broader sustainable development strategies. Food security and natural resources management are also priorities | Strategy calls for sustainable management of marine biodiversity and ecosystems in line with broader sustainable development strategies | Strategy supports broadening countries' economic base , private sector development and building productive capacity, as well as sustainable development, including in emerging sectors | Priority areas for action include science, technology and innovation , and building capacity and knowledge base for utilizing technology. The strategy also calls for strengthening marine science institutions | Priorities include Strengthening good governance and rule of law , as well as institutional capacity for good governance | Climate change and environmental sustainability are priority areas for action. This includes addressing challenges to livelihood, food security and health of the people affected by the adverse impacts of climate change |

3.2. Synergies with international conventions, secretariats and CBTT work

Many international and regional agreements undertake CBTT that is directly or indirectly relevant to ABNJ. In other cases, even if current CBTT activities are not ongoing, the convention and/or its secretariat could be viewed as a potential collaborator and provider of information for CBTT activities in one of the ABNJ priority areas. Relevant conventions and their secretariats include the United Nations Division on Ocean Affairs and the Law of the Sea (UN-DOALOS, as the secretariat for UNCLOS), the Convention on Biological Diversity (CBD), the Convention on International Trade in Endangered Species (CITES) the Convention on Migratory Species (CMS) and its instruments, the Ramsar Convention, the International Maritime Organisation (IMO) and its conventions and agreements, and Regional Seas Conventions and Action Plans.

Table 2 provides general information relating to the CBTT activities of a number of international conventions and their secretariats, as well as areas of work that could lead collaborative CBTT in the future. The table demonstrates that a number of conventions and their secretariats either already undertake CBTT activities related to area-based management or have the potential to do so. For example, the CBD's mandate for conservation and sustainable use of biodiversity, and its obligations towards protected areas (Article 8), including in marine areas, as well as the ecosystem approach (CBD COP Decision II/8), makes it highly synergistic with a new BBNJ treaty in regards to area-based management, though its application is mainly

limited to areas within national jurisdiction (Article 4). The Regional Seas Conventions, and the associated Action Plans and Programmes, with their mandates for regional-scale ocean protection, could also be considered as highly synergistic with efforts to conserve and sustainable use biodiversity in ABNJ, though only five of the 18 Regional Seas Programmes extend into ABNJ (OSPAR Convention, Noumea Convention, CCAMLR Convention, Barcelona Convention, and the Lima Convention). Similarly, the Ramsar Convention, the CMS, and the IMO undertake area-based management, with the mandate of CMS including migratory species that cross jurisdictions.

While no CBTT activities directly relating to EIAs and SEAs are apparent from the table, much information exists in different conventions that could support such work. Some of the Regional Seas Programmes undertake relevant work, and Article 8 of Antarctic Treaty's Protocol on Environmental Protection (Madrid Protocol) requires the Parties to conduct environmental impact assessments for their Antarctic activities. The only known MGR-related capacity building is undertaken in the context of the CBD's Nagoya Protocol, although the issue has also been discussed in the context of the Antarctic Treaty. Legal CBTT relating to UNCLOS is currently being undertaken by the United Nations Division on Ocean Affairs and the Law of the Sea (UN-DOALOS). In addition, scientific information exists in many convention secretariats, and capacity building relating to scientific research is undertaken by some, including UN-DOALOS, the Antarctic Treaty, and some regional seas convention secretariats.

Examples of implementation of ABNJ-related CBTT by international conventions and their secretariats include the long-standing United Nations Nippon Fellowship programme, which has since 2004 delivered critical capacity assistance in the implementation of UNCLOS and related instruments, as well as SDG 14 and other related SDGs (United Nations, no date a). An active alumni network provides continued support for the fellows. The Hamilton Shirley Amerasinghe Memorial Fellowship (HSA) has since 1981 provided one or two qualified Government officials or research fellows and lecturers an opportunity to acquire additional knowledge of UNCLOS to further them in their vocations and to benefit their countries (United Nations, no date b). A further BBNJ-relevant example is the CBD's Sustainable Ocean Initiative (SOI), which provides a global platform to build partnerships and enhance capacity to conserve and sustainably use marine and coastal biodiversity (CBD, no date). According to the SOI website, a total of 22 events, including training workshops on tools for conservation and sustainable use of marine biodiversity, have been undertaken to date. These workshops include two dialogues between Regional Seas organizations and Regional Fishery Management Organizations (CBD 2016 and 2018), which serve to build cross-sectoral collaboration between biodiversity and fisheries management.

Table 2: Synergies between international conventions and convention secretariats and the BBNJ agreement

| BBNJ CBT priority areas | ABM including MPAs | EIAs and SEAs | MGRs and benefit- sharing | Scientific research capacity | UNCLOS and other legal issues | Other relevant issues, such as climate change |
|---|---|---|--|---|---|---|
| UNCLOS (UN- DOALOS) | Training topics such as MPAs and ecosystem approach | UNCLOS Article 206 | Work on MGRs and benefit- sharing | - UNCLOS provisions on MSR - Regular Process working on 2 nd World Ocean Assessment | Fellow- ships on UNCLOS, ocean affairs and law of the sea | Work on climate change and the ocean |
| CBD | Capacity building related to identification of Ecologically or Biologically Significant Areas (EBSAs) and associated work on MPAs and ABM | Voluntary Guidelines for the Consideration of Biodiversity in EIAs and SEAs in Marine and Coastal Areas | Capacity building related to Nagoya Protocol | Scientific information relating to marine biodiversity | CBTT on national legislation and policy to comply with the Nagoya Protocol | Work on impacts of ocean acidification on marine biodiversity |
| UNFCCC | | | | IPCC reports and other scientific information relating to climate change. Special report on ocean and cryosphere. Technology Mechanism. | | Capacity building portal, and ongoing climate change relevant capacity building |
| CMS and its instrument s | Area-based management and migratory species that cross jurisdictional boundaries | Information related to impacts of activities on migratory species | | Scientific information related to migratory species | | Working group on climate change |
| CITES | Capacity building on CITES-listed marine species, including sharks and rays | Capacity building on CITES-listed marine species, including sharks and rays | | Scientific information related to CITES-listed marine species | | |
| IMO and its conventions | Information & assistance related to Particularly | Information on impacts of shipping | | | | |

| | | | | | | |
|---------------------------------------|--|---|---|--|--|--|
| | Sensitive Sea Areas (PSSA) and MARPOL Special Areas for pollution prevention | | | | | |
| London Convention and Protocol | | Technical cooperation and assistance programme relating to relevant London Protocol topics | | | | |
| Ramsar Convention | Programme on Communication, Capacity building, Education, Participation and Awareness (CEPA) and Ramsar site management toolkit | | | Scientific information relating to wetlands | | Ramsar considers issues related to climate change and wetlands |
| Antarctic Treaty System | Work relating to developing a representative system of MPAs; methods for identifying VMEs; and encounter protocols for fishing vessels | Article 8 of the Protocol on Environmental Protection to the Antarctic Treaty (Madrid Protocol) relates to EIAs | The Antarctic Treaty Consultative Meetings (ATCM) have discussed biological prospecting in Antarctica | Capacity building, undertaken by Scientific Committee on Antarctic Research (SCAR). CCAMLR has scientific scholarships for early career scientists | | SCAR considers Antarctic climate change |
| Regional Seas Conventions | All Regional Seas work on ABM and MPAs. Most undertake capacity building | Most Regional Seas Conventions have general EIA provisions. Many undertake assessments of biodiversity status and impacts of specific human activities. | | Regional Seas have data and information holdings on biodiversity in the region | | Many Regional Seas work on climate change issues |

3.3. Synergies with international organizations, bodies and programmes

Many international organizations, bodies and programmes also undertake CBTT that is of direct relevance to ABNJ. They include, among others, the Intergovernmental Oceanographic Commission (IOC) of UNESCO, the International Seabed Authority, the Food and Agriculture Agency of the United Nations (FAO), Regional Fisheries Management Organizations; The United Nations Environment Programme (UNEP), the United Nations Development Programme (UNDP), the United Nations Department of Economic and Social Affairs (UN-DESA), and the World Bank.

Table 3 provides examples of organizations active in ABNJ issues and of their current CBTT efforts, as well as other areas of current work that might contribute to future ABNJ-related CBTT. CBTT relating to ABMTs, including MPAs and marine spatial planning, is already undertaken by UNEP, IOC, FAO, UNDP, the World Bank and IUCN, among others. In regards to EIAs and SEAs, the ISA as well as the FAO can potentially contribute to CBTT relating to deep sea organisms and fisheries respectively. The IOC's openly-accessible ocean observation data has the potential to underpin EIAs and SEAs undertaken both within and beyond national jurisdiction, and is likely to provide major contributions to work relating to MGRs. IOC is also undertaking a new initiative titled Pacific Islands Marine Bioinvasions Alert Network (PacMAN), which will address a sub-set of issues around marine genetic resources and bioinvasions over the next three years, and as a result increase MGR-related capacity and technology in the Pacific (IODE, 2020a). The ISA's work on deep sea marine taxonomy may also be a contributor to MGR-related CBTT (ISA, no date), while the FAO's Convention on Plant Genetic Resources for Food and Agriculture may provide further models for building capacity for benefit-sharing (FAO, no date).

Extensive scientific work, and associated CBTT, undertaken by the IOC of UNESCO (IOC, 2017b), is notable (Harden-Davies, 2016). The IOC is also undertaking work towards the development of a clearing-house mechanism through their Ocean InfoHub project, an effort which the IOC has proposed could be expanded to support the needs of a BBNJ agreement (IOC, 2017b and IODE, 2020b). The ISA and the FAO, as well as Regional Fisheries Bodies, also undertake scientific work in the areas of their respective mandates. The coordination function served by IOC in linking national and regional organizations offers a relevant delivery model for CBTT under the BBNJ agreement (Harden-Davies and Snelgrove, 2020), while their Ocean Teacher Global Academy provides a model for online delivery (Miloslavich et al, 2019). The UN Decade of Ocean Science for Sustainable Development (2021-2030), coordinated by the IOC, could further contribute to CBTT related to ABNJ through its strong focus on increasing transformative ocean knowledge and capacity.

Other agencies, such as UNDP, UN-DESA and the World Bank bring a human development, economic and social dimension to CBTT, and actively support countries in achievement of the SDGs. The FAO also undertakes legal CBTT in relation to sustainable fisheries.

A practical example of implementation directly relevant to ABNJ is the GEF-funded Common Oceans Program. The five-year, \$50 million program ran between 2014 and 2019. The program was coordinated by the FAO, with UNEP, the World Bank, as well as other executing partners who worked together to achieve efficient and sustainable management of fisheries resources and biodiversity conservation in the ABNJ. The program included a strong CBTT component, executed by the FAO and the NGO Global Ocean Forum, that sought to improve cross-sectoral dialogue, engage high-level decision-makers and enhance capacity for ABNJ management. The Program also established a group of ABNJ Regional Leaders, training representatives and decision-makers from 34 countries in issues of relevance to BBNJ and strengthened their ability to participate in the negotiations for a new treaty (GEF, 2020).

Table 3: Preliminary list of international organizations, bodies and programmes³

| | ABM including MPAs | EIAs and SEAs | MGRs and benefit-sharing | Scientific research capacity | UNCLOS and other legal issues | Other relevant issues, such as climate change |
|----------------------|---|---|---|--|--|--|
| IOC of UNESCO | CBTT on marine spatial planning, including as part of the MSPglobal Initiative, and use of data and modelling | Ocean observation data made accessible through IOC provides source of data for EIAs. MSP programme may also provide linkages to developing SEAs | Biological ocean observation, including in regards to microbes, is under development . Databases on marine species. The Pacific Islands Marine Bioinvasions Alert Network (PacMAN) project provides CBTT on MGRs and bioinvasions | Extensive CBTT on marine scientific research and management through the IOC Capacity Development Programme, the Ocean Techer Global Academy, the Ocean Biogeographic Information System (OBIS) and Global Ocean Observing System (GOOS), among others. The UN Decade of Ocean Science coordinated by IOC Standards | Occasional forum for intergovernmental discussion on MSR, including governance aspects of MSR. | Training relating to ocean acidification |
| ISA | Work on areas of Particular Environmenta | EIA provisions related to exploration | Work on deep-sea marine taxonomy. | Endowment Fund for Marine Scientific | | |

³ It should be noted that this is a preliminary list of organizations, and is not complete.

| | | | | | | |
|-------------------|---|--|--|--|--|--|
| | l Interest (APEIs) and Regional environmental management plans (REMPs) | for marine minerals and draft regulations for exploitation, including EIA | Platform for sharing scientific data | Research in the Area; Secretary General's Award for Excellence in Deep Sea Research | | |
| FAO | ABNJ capacity building through GEF Common Oceans Programme. Capacity building related to VMEs, Ecosystem Approach to Fisheries in deep-sea and other fisheries-related topics | International <i>Guidelines</i> for the Management of <i>Deep-sea</i> Fisheries in the High Seas, including capacity building on implementing guidelines | FAO Convention on Plant Genetic Resources for Food and Agriculture, including education and training materials | Scientific information on deep sea fisheries and vulnerable marine species | Training on legal drafting for sustainable fisheries and biodiversity conservation | Work on impacts of climate change on fisheries and aquaculture |
| UNEP | CBTT on ABM including MPAs | | | Scientific information on marine biodiversity | | Work on climate change, including in relation to marine biodiversity |
| UN-DESA | Work of relevance to SDGs 14.5 and 14.2 | Work of relevance to SDG 14.2 | Work of relevance to SDG 14.7 | - World of relevance to SDG 14.A - Information relating to social and economic aspects of SIDS and marine & coastal areas | Work of relevance to sustainable development , including legal issues | Work of relevance to SDG 14.3 and 14.2 |
| UNDP | CBTT in ABM, including Large Marine Ecosystems (LMEs) and Ridge to Reef projects | Work of relevance to sustainable development aspects of EIA/SEA | The UNDP-GEF Global ABS project will include CBTT | Information relating to sustainable development and marine and coastal areas | | Work on climate change |
| World Bank | Work and CBTT on area-based management and human livelihoods | Work of relevance to economic and livelihoods aspects of EIA/SEA | | Information relating to economic development of marine and coastal areas | | Work on climate change |
| IUCN | Work on CBTT on area-based management, particularly MPAs. Includes work | Some work on EIA/SEA | Work on benefit-sharing modalities | | IUCN Environmental Law Center works on issues | Work on climate change, oceans and MPAs |

| | | | | | | |
|---|--|--|--|--|--------------------|--|
| | on climate change and MPAs and mobile MPAs. | | | | relevant to UNCLOS | |
| Regional Fisheries bodies, including RFMOs | Work related to identification and closure of VMEs, including some CBTT activities | Work in accordance to International <i>Guidelines</i> for the Management of <i>Deep-sea</i> Fisheries in the High Seas | | <ul style="list-style-type: none"> - Have scientific information relating to managed fisheries, and, in many cases, ecosystems. - ICES VME data portal contains information on VME habitats - Some RFMOs provide capacity building on scientific data and information | | |

3.4. Role of other stakeholders

Many other stakeholders either already contribute to ABNJ-relevant CBTT, or have the potential to do so in the future. Studies of funding flows have shown that NGOs, private foundations, as well as official development assistance (ODA) are key contributors to marine conservation (Berger et al, 2019), with many conservation projects also supporting associated CBTT. For example, NGOs such as the Global Ocean Forum and High Seas Alliance, which includes more than 40 NGO members and IUCN, already undertake training on topics of direct relevance to ABNJ, and have strengthened the capacity of negotiators to better understand the complex set of issues that are encompassed within the draft BBNJ treaty. Overall, NGOs are thought to be an important funding source for marine conservation, with those funds sourced from both individual contributors and public expenditures, and amounting to approximately US \$6 million (Berger et al, 2019).

Academic institutions including the World Maritime University, International Ocean Institute (IOI), University of Wollongong and Duke University, as well as scientific partnerships such as the Nereus Program and the Global Ocean Biodiversity Initiative (GOBI), have directly contributed to research and training on ABNJ science and policy. For example, GOBI, established in 2008 by a group of marine institutions and scientists, has supported the CBD process of identifying Ecologically or Biologically Significant Marine Areas (EBSAs) by compiling and providing expert interpretation of available scientific information (Johnson et al., 2018). In addition, science-based collaborations on an ocean basin scale, such as the EU-funded trans-Atlantic ATLAS project, increased understanding about complex deep-sea ecosystems and examined

how marine spatial planning might be undertaken at this scale (ATLAS project, no date).

Philanthropic organizations such as Pew Charitable Trusts, the Rockefeller Foundation, the Nippon Foundation and Sasakawa Peace Foundation also already fund, or have funded, ABNJ-relevant work that includes CBTT. Philanthropic organizations play a growing role in funding ocean science projects that bring together nationals of differing levels of capacity (IOC, 2017a). Between 2010 and 2015, the philanthropic sector financed ocean-related work by approximately US \$1.9 billion, with the top five ocean funders being the Moore Foundation, Packard Foundation, Walton Family Foundation, Marisla Foundation, and Oak Foundation (California Environmental Associates, 2017). For example, the Moore Foundation has, since 2005, run the Marine Microbiology initiative, which has invested US \$250 million over 17 years to better understand the diversity, ecology and evolution of marine microbial communities (Moore Foundation, no date). While the initiative will close in 2021, the genetic tools developed and the knowledge gained by the scientists funded through this initiative contributes to a better understanding of MGRs that could potentially benefit implementation of both a BBNJ agreement and SDG 14.

Funding from ODA and private foundations provided approximately US \$800 million in marine conservation funding in 2015 (Berger et al, 2019). While nearly half of philanthropic funding between 2010 and 2014 supported work in North America, recipients of marine-related ODA grants during this time period were primarily located in Africa (45%), Asia (21%) and Oceania (17%) (California Environmental Associates, 2017). ODA funding is international aid intended for development, and the World Bank is the largest donor for marine-related ODA funding. However, for funding exclusively limited to grants, the top donors are country governments and aid agencies mainly through bilateral assistance. From 2010 to 2015, France, Japan, the GEF, E.U. institutions, the United States, Germany, and Norway were the top-ranking donors for marine-related grants (California Environmental Associates, 2017).

In addition to the Common Oceans ABNJ Program described in the previous section, the GEF has, through its International Waters programme, for over 25 years invested in projects that support sustainable governance in 23 of the 66 large marine ecosystems (LMEs) globally, developing human capacity and technical infrastructure for ecosystem-based management of transboundary resources. To date, the investment of the GEF in LMEs has included 124 countries for a total of US\$285 million, with US\$1.14 billion in financing leveraged from other partners (GEF, no date). Some of the LMEs straddle ABNJ, and would thus lend themselves for expanded ecosystem-based management, provided a BBNJ treaty is in place to support such efforts.

ODA may be particularly relevant for the type of CBTT that takes a holistic, ecosystem-based view to ocean management, given that it merges the conservation and development agendas and can potentially help bridge the poverty alleviation and

sustainable development needs of the SDGs with the environmental protection and management needs of a future BBNJ agreement and other relevant environmental agreements. Achieving this would require a better alignment of ODA with a broad range of development goals, including all SDG 14 targets (Hills et al, 2019) and the BBNJ agreement, as well as greater coherence and coordination in the delivery of financial assistance, given that an uncoordinated approach is detrimental to both donors and recipients (Blasiak et al, 2019). One example of addressing both development and conservation needs is the World Bank's PROBLUE initiative, a multi-donor trust fund, supports both the development of sustainable blue economies, including their component sectors, and seascape management (World Bank, no date).

Less explored to date is the role of the private sector in ABNJ-related CBTT. Private sector business entities in sectors such as shipping, marine biotechnology and fisheries are major users of the ocean and its resources, and drivers of national blue economies. Public-private partnerships are a component of new and rapidly expanding "blue" financing mechanisms that may have a greater role to play in the future (Wabnitz and Blasiak, 2019), including in regards to ABNJ. Examples of private sector engagement in ABNJ-relevant CBTT already exist, for example in collaboration between universities and the private sector in use of MGRs (Blasiak et al., 2019), as well as in collaboration between universities and the shipping industry in collection of scientific data about the ocean, for example through the Ships of Opportunity Programme (WMO, no date). The private sector can play an important role through participating in such collaborations, and may also become a funding source for future CBTT efforts. Under the UN Decade of Ocean Science, for example, the private sector is identified as an important sector for partnerships in research and development, data sharing and augmenting ocean observing platforms (see for example, IOC, 2018 p5; IOC, 2019).

While the examples presented here are far from complete, they provide a snapshot of ocean-relevant CBTT activities that are taking place. Collectively, they demonstrate the rich potential of non-governmental, philanthropic, scientific and private sector entities, as well as ODA, to become key players in CBTT supporting the joint implementation of the BBNJ agreement, SDG-14 and other existing frameworks. The examples also demonstrate the need for coordination amongst the different CBTT initiatives of relevance to ABNJ, and to the ocean as a whole, as well as the need to build on these efforts and to scale up successful initiatives in response to expressed country needs.

(3) Summary of areas of synergy and divergence in CBTT needs between the BBNJ IA, SDG 14 and other existing frameworks

Table 1 demonstrates that there is a high degree of synergy between CBTT required for the BBNJ agreement and CBTT required for SDG 14 and its targets, as well as for

the Samoa Pathway, IPoA and the Aichi Biodiversity targets. This synergy is perhaps the greatest in regards to implementing ABMTs, including MPAs, but also exists for EIA and MGR. There are also cross-cutting CBTT synergies relating to science and technology, law and policy, and in addressing common challenges such as climate change.

4.1. ABMTs

As demonstrated in Tables 2 and 3, area-based management actions are already being undertaken to implement a number of international conventions, and are being promoted by a variety of international and regional organizations, bodies and programmes. A variety of CBTT programmes exists, addressing area-based management that is either cross-sectoral or sector based, and that focuses on specific species or entire ecosystems. A new BBNJ agreement could build on these efforts by extending area-based management offshore, for example in the context of some Regional Seas, RFMOs or Large Marine Ecosystem Projects, or as part of existing regional transboundary collaboration (e.g. Costa Rica Dome, Sargasso Sea), and by testing new tools for ABM, such as dynamic MPAs (Maxwell et al., 2020). In this way, CBTT could further the goal of holistic and ecosystem-based ocean management by connecting actions taken in coastal areas with those offshore and in ABNJ. The new BBNJ agreement could also put further emphasis on CBTT for integrated and cross-sectoral area-based management that would bring together all ocean users and stakeholders to create a richer dialogue about tools, approaches and the need to balance conservation and sustainable use, thus realizing the collective goals of a new BBNJ agreement and SDG 14.

4.2. EIA

CBTT relating to the BBNJ EIA/SEA priority area has a clear synergy with SDG 14.2 as it relates to avoiding significant adverse effects, and in fact can work to operationalize this component of SDG 14.2 for deep and open oceans both beyond and within national jurisdiction. This topic is currently not well developed, and while sectoral work and biodiversity-relevant guidelines exist, practical application is lacking. CBTT may be able to help in pulling together existing guidelines, information holdings and examples of practical application both from sectors and from EIA/SEA experiences in coastal areas to foster joint implementation of the new BBNJ agreement and SDG 14.2.

4.3. MGR

CBTT relating to MGRs and benefit-sharing in the context of ABNJ presents an important opportunity for building national blue economies and scientific research and innovation capacity. Marine scientific research, the biodiscovery process as well as subsequent commercial development of MGRs may offer countries with expanded options for sustainable economic development in accordance with SDG 14.7. In addition, new MGR-based 'omics tools have the potential to advance fisheries management, conservation, and monitoring (for example, detecting invasive species), in addition to natural products discovery (NOAA, 2020). IOC's work on the Pacific Islands Marine Bioinvasions Alert Network is already testing such tools in relation to bioinvasions. At the present time, CBTT relating to this topic is mainly ad hoc,

undertaken through collaborations between university researchers and, at times, the private sector. CBTT relating to the Nagoya Protocol does exist, and can provide further lessons related to ABS arrangements.

4.4. Cross-cutting

Science and technology

Scientific research capacity underpins the implementation of not only a new international agreement on BBNJ, but other environmental agreements as well. It is also considered a cross-cutting SDG 14 target, as reflected in SDG 14.A. CBTT relating to the ocean already exists, particularly at the IOC, but also at sectoral organizations, environmental conventions and other bodies. The IOC's existing networks relating to scientific CBTT could provide a basis for delivery. The challenge may lie in providing CBTT that is cross-sectoral and targeted to addressing the multiple impacts facing biodiversity both within and beyond national jurisdiction. While data exists in many agencies, it can often be difficult to access, and thus open and central data portals are an important component of CBTT. Data and information relating to deep-sea biodiversity and ecology are also still lacking.

Law and policy

Legal CBTT is currently being undertaken through UN-DOALOS, and could be extended to meet the requirements of the BBNJ agreement once it is adopted. Legal CBTT has an important synergy with SDG 14.C. CBTT undertaken in the context of the Nagoya Protocol may also offer important insights, particularly in regards to ABS issues.

Addressing common challenges, including climate change

Finally, all ocean management, whether within or beyond national jurisdiction will be undertaken in the context of climate change due to the accelerating impacts of climate change on the ocean, and the potential for ocean-based mitigation (Hoegh-Guldberg et al, 2019). Thus, factoring climate change as a cross-cutting issue into CBTT related to a BBNJ agreement is likely to ensure that actions, such as area-based management, are dynamic and can be adjusted to respond to changing environmental conditions (Maxwell et al. 2020). This sentiment applies to CBTT under any environmental conventions, and is consistent with SDG 13 as well as SDG 14.3.

(4) Discussion: maximizing synergies for implementation

Maximizing CBTT synergies between different instruments and focus areas is important for holistic, ecosystem-based ocean management, and for making the most of limited resources. Under this scenario, CBTT undertaken as part of a new BBNJ agreement would allow all countries to:

- (a) Improve their capacity to participate in the conservation and sustainable use of marine biodiversity both in ABNJ and within national jurisdiction.

- (b) Participate in cooperative area-based management in ABNJ, and more effectively apply area-based management within their EEZs
- (c) Participate in, and evaluate, environmental impact assessments (EIAs) and strategic environmental assessments (SEAs) both in ABNJ and within national EEZs.
- (d) Acquire the capacity to access and utilize marine genetic resources through collaborative research in ABNJ and as part of national research, development and blue economy agendas.
- (e) Enhance national capacity for scientific research and technological innovation through participation in international collaborations, strengthening scientific institutions, and through generation, dissemination and sharing of knowledge and technologies.
- (f) Strengthen their capacities for developing and participating in sustainable national blue economies, in accordance with SDG-14 target 7.

5.1. The BBNJ agreement can enhance cooperation and coordination between existing entities

Delivery of CBTT as outlined above would require cooperation and coordination amongst a large number of international and regional bodies working on ocean issues (Table 4), a cooperation that could be facilitated through a clearing-house mechanism as currently envisioned under Article 51 of the draft BBNJ treaty. However, effective cooperation and coordination will also require a proactive human component, as a website alone is unlikely to facilitate this task. Ideally, the clearing-house mechanism could additionally be used as a tool to build coherence between CBTT undertaken both within and beyond national jurisdiction.

In the context of a new BBNJ agreement, synergies might be further enhanced by involving in CBTT those agencies that work on topics of relevance to the ocean and human social and economic development. Such agencies (including UNDP, UN-DESA and the World Bank) have not been prominent in the ABNJ discussions for many reasons, including lack of perceived direct and prioritized relevance to their mandates. However, they bring an important sustainable development dimension into the delivery of CBTT, and directly work on SDG 14, where conserving and sustainably using oceans, seas and marine resources are not limited to national EEZ. Thus, they can assist in the design of programs that meet the needs of both a new BBNJ agreement and SDG 14 and other relevant SDGs. In order to do so, the importance of ABNJ to sustainable human development would need to be mainstreamed into the work of these agencies. Table 4 provides a summary of potential key entities, topics currently covered, and gap areas relating to the priority areas for CBTT required for a new BBNJ agreement. For each example, we show that there are existing entities that could play a role in CBTT in certain topic areas, but also that there are still potential gaps to be filled. This highlights that there is a need for robust measures for CBTT under the BBNJ agreement to enhance coordination and to fill gaps.

Table 4: Summary of CBTT in priority areas of the BBNJ Agreement, including existing entities, potential topics and potential gaps to be filled.

| ABM including MPAs | EIAs and SEAs | MGRs and benefit-sharing |
|---|--|---|
| <p><u>Entities:</u> UN-DOALOS CBD, CMS and its instruments, CITES, IMO and its conventions, Ramsar Convention, Antarctic Treaty System, Regional Seas Conventions, IOC of UNESCO, ISA, FAO, UNEP, UN-DESA, UNDP, World Bank, Regional Fisheries Bodies, including RFMOs, IUCN</p> <p><u>Topics:</u> - Ecosystem approach - Marine spatial planning - MPAs - Sectoral ABM</p> <p><u>Potential gaps:</u> - Cross-sectoral CBTT focusing specifically on the deep sea and open ocean, as well as use of tools specific for these areas. Most CBTT relating to deeper ocean areas is sector-specific and/or focuses on specific species - CBTT on linking coastal ABM with that in EEZs and ABNJ</p> | <p><u>Entities:</u> UN-DOALOS, CBD, CMS and its instruments, CITES, IMO and its conventions, London Convention and Protocol, Antarctic Treaty System, Regional Seas Conventions, ISA, FAO, IOC, UN-DESA, UNDP, World Bank, Regional Fishery Bodies, including RFMOs</p> <p><u>Topics:</u> - EIAs related to Antarctica - Consideration of marine biodiversity in EIA/SEA (guidelines) - EIAs related to mineral exploitation (guidelines) - EIAs related to deep sea fisheries in the high seas (guidelines and CBTT) - Information on the impacts of specific activities on specific species/habitats</p> <p><u>Potential gaps:</u> - CBTT relating to practical application of biodiversity-relevant EIAs and SEAs in the deep sea and open ocean</p> | <p><u>Entities:</u> UN-DOALOS, CBD (Nagoya Protocol), IOC, Antarctic Treaty System, ISA, FAO (Convention on Plant Genetic Resources for Food and Agriculture), UNDP, UN-DESA, World Bank, IUCN</p> <p><u>Topics:</u> - Nagoya Protocol CBTT - Benefit-sharing of plant genetic resources - Deep-sea taxonomy - Ad hoc scientific collaboration</p> <p><u>Potential gaps:</u> - Coordinated CBTT related to discovery, development and utilization of marine genetic resources, both from coastal areas and the deep sea - CBTT on benefit-sharing for ABNJ</p> |

| | | |
|--|---|--|
| | - CBTT related to cross-sectoral EIAs and SEAs | |
| Scientific research capacity <u>Entities:</u> UN-DOALOS, CBD, UNFCCC, CMS and its instruments, CITES, Ramsar Convention, Antarctic Treaty System, Regional Seas Conventions, IOC of UNESCO, ISA, FAO, UNEP, UN-DESA, UNDP, World Bank Regional Fisheries bodies, including RFMOs <u>Topics:</u> - CBTT on various aspects of marine scientific research (IOC) - CBTT on deep seabed research (ISA) - CBTT on fisheries data (FAO, RFMOs) - Data and information holdings on science, social science and economics <u>Potential gaps:</u> - Targeted research to support management of multiple impacts - Deep sea and open ocean taxonomy and ecology - Open access to data and information | UNCLOS and other related legal capacity building <u>Entities:</u> UN-DOALOS, CBD, FAO <u>Topics:</u> - UNCLOS-relevant CBTT - Nagoya Protocol - Fisheries law <u>Potential gaps:</u> CBTT relating to Legal and policy issues relevant to the BBNJ agreement, including developing supportive national legislation and policy | Other relevant issues, such as climate change <u>Entities:</u> UN-DOALOS, CBD, UNFCCC, CMS and its instruments, Ramsar Convention, Antarctic Treaty System. Regional Seas Conventions, IOC of UNESCO, FAO, UNEP, UN-DESA, World Bank <u>Topics:</u> - Climate change impacts on biodiversity and specific marine ecosystems - Ocean acidification <u>Potential gaps:</u> - Many knowledge gaps related to impacts and management options - Cumulative impacts and their management |

5.2. CBTT under the new BBNJ agreement could also support national blue economy efforts and SDG 14

Many BBNJ-related activities and proposed CBTT priority areas can also help build national and regional blue economies. National blue economy activities encompass multiple ocean sectors and may extend from coastal areas and EEZs to areas beyond

national jurisdiction. While there are many different definitions and usages for the term “blue economy”, it is generally understood to “promote economic growth, social inclusion, and the preservation or improvement of livelihoods while at the same time ensuring environmental sustainability of the oceans and coastal areas” (World Bank and United Nations Department of Economic and Social Affairs, 2017). As such many countries view the development of a blue economy, consisting of a number of ocean sectors as well as environmental conservation and management measures, as a key activity in reaching the SDGs, including SDG 14 (Voyer et al., 2018). Countries as diverse as the Seychelles, Kenya, Grenada, Mauritius and countries of the European Union are in the process of developing their blue economies.

Scientific research capacity and technology underpins national blue economies, but is also central for the sustainable management of ABNJ and national EEZs. Participation in area-based management measures in ABNJ requires countries to build their human and institutional capacities, not only in regards to tools and approaches for ABM, but also for research into ocean ecosystems and species. Scientific research capacity and knowledge is also required to develop and evaluate EIAs and SEAs both in ABNJ and in national EEZs. In order to be environmentally sustainable, national blue economies will need to be based on sectoral practices that avoid significant adverse impacts on the environment in accordance with SDG 14.2. To achieve integration, the diverse sectoral practices of a blue economy will need to be brought together with marine conservation measures through approaches such as marine spatial planning (MSP), which provides for dialogue between all ocean stakeholders and users (Wright et al., 2018). Ultimately, successful ecosystem-based management in a blue economy is dependent on a national MSP process, which may extend to a regional process when adjacent ABNJ areas are considered.

Marine biotechnology and ‘omics technologies are still an underutilized sector of the blue economy, with considerable potential to provide skilled jobs and strengthen national institutions dealing with innovation as well as drive knowledge advancement. CBTT has a key role in building both institutions and research capacity for marine biotechnology, and this capacity can be linked to non-monetary benefit-sharing from development of MGRs in ABNJ. By creating synergies with national blue economies, BBNJ-related CBTT can build the capacity of researchers and institutions to participate in biodiscovery in ABNJ, as well as in national waters. Building capacity for biodiscovery can also help address existing inequities in access to ocean resources (Österblom et al, 2020), thus helping meeting international commitments outlined in Agenda 2030 and in UNCLOS.

5.3. Long-term sustained support for programs is needed – the UN Decade of Ocean Science is a critical opportunity to foster a holistic approach

The discussion in the previous sections highlights the key role of science and technological capacity in

- (i) enabling countries to fully participate in the BBNJ agreement;
- (ii) enabling countries to reach the SDGs, including SDG 14;

- (iii) enabling countries to participate in the environmental conventions listed in Table 2 of this document; and
- (iv) enabling countries to build national blue economies.

The upcoming UN Decade of Ocean Science for Sustainable Development (2021-2030) (the Decade) has the potential to become a vehicle for CBTT, in line with UNCLOS, that addresses ocean science needs both within and beyond national jurisdiction. The Decade aims to “support efforts to reverse the cycle of decline in ocean health and gather ocean stakeholders worldwide behind a common framework that will ensure ocean science can fully support countries in creating improved conditions for sustainable development of the Ocean” (IOC, 2019). While not specifically designed with the BBNJ agreement in mind, activities taken under the Decade could support its scientific needs by strengthening scientific knowledge of the ocean and the capacity of the scientists and scientific institutions working on its implementation - commitments and sustained support that are needed to go beyond business as usual.

If the Decade is to address the CBTT needs of the BBNJ agreement, other environmental conventions and SDG14, it would need to address both the synergies between them and the specificities of each. The BBNJ agreement, for example, would require CBTT for its unique needs to better govern human uses of deep and open ocean species and ecosystems, and to enhance the scientific understanding of these species, ecosystems and their functioning. At the same time, CBTT aimed at the synergies between SDGs, the BBNJ agreement and other environmental conventions can better support holistic and ecosystem-based ocean management that takes into consideration ecological interconnections and creates greater cooperation in implementation. It is likely that both types of CBTT will be needed in the future. Critical to this would be ensuring that the aims, aspirations and needs from all countries are heard, and that all countries have opportunities to participate in an equitable manner, such as through long-term and meaningful partnerships.

(5) Conclusions

The success of the BBNJ agreement depends on holistic, ecosystem-based management that links effective actions in ABNJ with those taken within national jurisdictions. Given the limited resources available for CBTT, it is important that the delivery of CBTT integrates, where possible, ABNJ priorities with existing national priorities related to conservation and sustainable development. While some CBTT needs are unique, there are also several synergies with CBTT of other agreements, as outlined in this paper.

Addressing synergies provides for greater cooperation and coordination among the many bodies and programmes that could play a role in CBTT for a BBNJ agreement. CBTT that addresses, in a cohesive manner, the common priorities of all agreements through ocean conservation and sustainable use is likely to have the best outcomes

for countries, minimizing duplication and maximizing the use of available resources. A synergistic approach is also likely to allow countries to more efficiently pursue their national priorities for conservation and sustainable development within a framework of international agreements. While the BBNJ agreement will have unique science and management needs not covered elsewhere, fulfilling those needs and mainstreaming BBNJ into other existing agreements is likely to result in stronger ocean governance overall, ensuring that the key Agenda 2030 principle of “leaving no one behind” is applied. The Decade could be an important platform to put policy into practice and to foster new partnerships for ocean CBTT.

There is currently no systematic and comprehensive assessment of all existing ocean-relevant CBTT activities, including ones that could support the implementation of a new international agreement on BBNJ. However, the examples in section 2 demonstrate that there already exists multiple policy mandates for undertaking ocean-related CBTT, and these mandates are highly synergistic with the draft BBNJ agreement as it currently stands. Additionally, many ongoing activities are already being undertaken to implement the mandates, although a more comprehensive assessment could better highlight both gaps and synergies in these activities. A new international agreement on BBNJ would require the addition of a deep and open ocean dimension to existing CBTT activities, as well as increased emphasis on topics that are not yet well covered, such as EIA/SEA and MGRs. A new international agreement on BBNJ would also provide an opportunity for undertaking CBTT in a manner that promotes more holistic, ecosystem-based ocean governance, and that provides an opportunity to connect the dots between actions taken in coastal areas with those in the high seas.

Achieving this goal would require a new level of collaboration and coherence in how CBTT is delivered. The capacities and technologies required are held by multiple agencies, sectors and other entities on multiple levels. While some collaboration exists in regions and countries, and between agencies, there is currently no concrete pooling of efforts towards the delivery of CBTT on a scale that could help countries work together to solve complex issues related to implementing an ecosystem approach to ocean governance. A network of actors covering multiple countries, regions and ocean basins would be required in the global North and South (Minas, 2018). Such a network could build on the currently existing networks, for example, the IOC scientific and CBTT-related networks, existing regional networks and agencies, Large Marine Ecosystems, as well as other ocean science and capacity-related networks.

As a first step, an assessment of ongoing ocean-relevant CBTT activities that is as comprehensive as possible would need to be undertaken as part of a new international agreement on BBNJ. Secondly, an assessment of both the aspirations and needs of countries in regards to the BBNJ and their own EEZs would need to be performed. A clearing-house mechanism can help serve a coordinating function in the delivery of CBTT, as well as help match the identified needs of countries to the delivery of CBTT (Minas, 2018). Ultimately, the effectiveness of a clearing-house

mechanism depends on how well used it is, and whether international and regional bodies and organizations participate by sharing information. For the clearing-house mechanism to achieve its full potential in facilitating coordinated and effective delivery of CBTT, it will likely require a proactive human champion, who provides oversight, and works with organizations and governments to ensure that the required information will be made available and easily accessible.

The building of long-lasting capacity, and moving beyond policy mandates and words on paper, will require more than individual training courses or ad hoc initiatives. It will require investment in both human and institutional capacity, including infrastructure, long-term funding, as well as an enabling environment that prioritizes work towards ocean protection, science and sustainable development. It will also require long-term mentoring and support networks (Bax et al, 2018). CBTT will need to bring national level benefits and ownership of the efforts, while ensuring whole ocean management through regional and global multi-sectoral networks and partnerships. If undertaken in this manner, CBTT in the context of a new BBNJ agreement may help create coherence with other agreements and policies, providing better alignment between CBTT and policy needs, and help countries start building a vision for capacity aspirations and needs for global ocean health and sustainable economies that multiple agencies can work towards.

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