Science and knowledge to support Small Island States conserve and sustainably use marine biodiversity beyond national jurisdiction

Background Paper

27 February 2022

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Executive Summary

Science, technology, and traditional and local knowledge will be crucial for the implementation of a new international legally binding instrument for the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction (BBNJ Agreement) under the United Nations Convention on the Law of the Sea (UNCLOS). This paper: (i) illustrates challenges with current approaches to capacity building and technology transfer (CBTT) for Small Island Developing States (SIDS), focusing on science and technology, (ii) discusses the role of traditional and local knowledge practices in the implementation of the BBNJ Agreement, and (iii) outlines opportunities for the BBNJ Agreement to meet the needs of SIDS.

Although the specific needs of SIDS will need to be self-determined as they will likely vary by State, the general importance of science, technology and knowledge, and their application to policy, is clear. Deep- and open-ocean scientific research and technology (such as for monitoring, control, and surveillance) is required to understand marine biodiversity, and designate, implement, and monitor management measures such as area-based management tools and environmental impact assessments. Scientific and technological capacity will be an important factor determining the equitable sharing of benefits from marine genetic resources. Traditional and local knowledge and practices could also play important roles in ocean research, monitoring and management, including in understanding ecological and cultural connections to ABNJ, and are a strength many SIDS can draw from for the broader benefit of the global community as a whole. There is also a need for further research and knowledge sharing to understand the social, cultural and economic importance of BBNJ to humans, and examine implications for conservation and sustainable use of marine biodiversity. This is especially relevant for SIDS as large ocean States, given their close relationship to, and dependence on, ocean areas both within and beyond national jurisdiction.

Yet persisting challenges faced by SIDS, for example, in relation to deep-ocean research and sustainable finance, raise doubts about the sufficiency of current CBTT approaches to meet the needs of SIDS. Ineffective CBTT undermines sustainable development in SIDS, for example: (i) the one-off donor-driven nature of many CBTT efforts that consist of single workshops or training courses; (ii) donations of technological equipment that require maintenance and calibration to be done overseas, posing more of a burden than a benefit; (iii) cruise participation that is tokenistic or exposes a person to harassment or discrimination, and (iv) the stop-start nature of funding that is unable to provide longevity to promising projects. However, increasing scrutiny on problems such as ‘parachute science’, and efforts to ‘co-design and co-develop’ research and capacity-building partnerships to counteract these problems suggest that approaches to CBTT are evolving.

The BBNJ Agreement is an important opportunity to meet the human, technical, financial, and institutional capacity needs of SIDS in relation to marine conservation and sustainable use, and to strengthen the implementation of UNCLOS. However, it is uncertain whether the framework for CBTT in the BBNJ Agreement will move beyond UNCLOS Part XIV. Questions remain regarding key issues such as specific modalities and institutional arrangements for CBTT, the provision of financial resources, the role of the clearinghouse mechanism, and monitoring and evaluation. There are also questions remaining regarding the role of traditional and local knowledge and practices. The aim of this background paper is to provide a contribution to ongoing discussions regarding these issues.

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Acknowledgements

The authors gratefully acknowledge Ms Asha Challenger (Permanent Mission of Antigua and Barbuda to the United Nations), Mr Bryce Rudyk (AOSIS) and Mr Ismail Zahir (AOSIS) for contributing to the paper, and Dr Katy Croff Bell (Ocean Discovery League) for sharing data from the Global Deep-Sea Capacity Assessment.

1. Introduction

Small Island Developing States (SIDS) are faced with the unique challenges that come with being isolated and with having limited land area, but their marine areas and resources are extensive with rich biodiversity. Thus, many SIDS are reliant on a healthy ocean system for their economic growth, as a primary source of protein and as an intrinsic part of the culture and identity of their people. Science, technology and traditional and local knowledge are critical to ensure that SIDS have the required capacity to conserve and sustainably use marine biodiversity in areas within and beyond national jurisdiction (ABNJ) (Harden-Davies et al., 2020; Vierros et al, 2019; Mulalap et al., 2020). Traditional knowledge and scientific data can be used together, and respectful knowledge co-creation can result in a deeper understanding of ecosystems, species and their relationships, including to people, than is possible through science alone. However, it is also important to recognise that traditional knowledge is different from scientific data in that it has a cultural context from which it should not be separated.

It is crucial to ensure that the needs of SIDS are met by the capacity building and technology transfer (CBTT) provisions of a new international legally binding instrument for the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction (BBNJ Agreement) under the UN Convention on the Law of the Sea (UNCLOS). The negotiations for the agreement are in the final stage, after almost two decades of development.[1] The importance of CBTT for SIDS to participate fully and fairly in the implementation of the BBNJ Agreement has been consistently highlighted over more than a decade by SIDS representatives (Wright et al., 2019), including through the proposed Article 43 bis put forward by AOSIS recognising the special requirements of SIDS (UN, 2020).

However, the well-documented capacity constraints experienced by SIDS in undertaking marine scientific research and accessing the technology and other resources necessary for management of the marine environment (IOC, 2020) casts doubt on the adequacy of current approaches to CBTT. Scientific institutions in the global north continue to serve as gate-keepers of ocean science in ABNJ (Tolochko and Vadrot, 2021). Underrepresented groups face systemic barriers in participating in science (IOC, 2021; Amon et al., 2022), and the human, institutional, technical and financial resources required to undertake ocean science are concentrated in high income countries (Uku et al., 2020; Amon & Rotjan et al., in press; Bell et al., submitted). Given the challenges involved in deep and open ocean research, there are particular concerns regarding SIDS' capacity in relation to marine areas beyond national jurisdiction (ABNJ).

Some initiatives aiming to transfer technology and build capacity have failed entirely, perpetuating problems such as lack of finances, technology, opportunity, expertise and ability of SIDS to undertake scientific marine research in ABNJ, and access and utilize technology in the long-term (Harden-Davies et al., 2020; Polejack 2021). Increasing scrutiny from the research community on problems such as 'parachute science' (Stefanoudis et al., 2021), and efforts to

[1] The fourth session of the intergovernmental conference for the BBNJ agreement is scheduled for March 2022, further information is available at https://www.un.org/bbnj/ . For an overview of the development of the agreement, see Wright et al., 2018.

'co-design and co-develop' research (Woodall et al., 2021) and capacity building partnerships to counteract these problems suggest that approaches to CBTT are evolving. Since SIDS do not always benefit from marine scientific research conducted in their own waters (Hind et al. 2015), it is critical to consider what would be needed to ensure that SIDS can meaningfully participate in, and benefit from, science in ABNJ. It is important to consider and learn from prior relevant experiences in SIDS, so that the development of the CBTT provisions of the BBNJ Agreement does not repeat unsuccessful approaches, but instead innovates on finding new ways of working collaboratively towards increasing capacity in the long term.

Part V of the draft BBNJ agreement is dedicated to CBTT (Box 1). The types of CBTT outlined in Article 42 and 46 and Annex II of the draft BBNJ agreement (UN, 2019) include a wide range of capacities (human, technical, institutional, financial, technological) and the objectives of CBTT incorporate priorities such as access to technology, inclusive and effective participation, and knowledge sharing. However, it remains unclear whether the framework for CBTT under the BBNJ Agreement will add much to the existing legal framework established by UNCLOS Part XIV (Harden-Davies and Snelgrove, 2020). A key criticism of UNCLOS provisions for marine technology transfer and capacity development (including in Parts XIII and XIV) is the lack of financial and institutional mechanisms for the implementation (Long, 2005; Harden-Davies, 2020; Coehlo, 2021). Addressing this gap has been identified as a critical opportunity for the BBNJ Agreement to strengthen the implementation of UNCLOS. Yet the modalities for CBTT in the draft BBNJ Agreement (UN, 2019) focus on international cooperation (Articles 43, 44, and 45) and are very light on the details on how this will be achieved (Box 1). The issue of funding the BBNJ agreement, including CBTT, is addressed in [Article 52], yet it remains unclear if this will be voluntary or mandatory, whether there will be a financial mechanism, how it would be managed, and by whom, as well as whether there might be a special fund for SIDS.

Traditional knowledge of Indigenous Peoples and local communities is increasingly identified as relevant to implementation of the BBNJ Agreement. Its inclusion was originally championed by Pacific Island countries and other supportive delegations, including AOSIS, and the draft treaty text now contains multiple mentions of traditional knowledge (Section 3; Annex A). For example, traditional knowledge and practices have been passed from generation to generation to live sustainably and in harmony in the Pacific. People are interconnected and social and ecological systems are linked, interdependent and co-evolving (Berkes, 2017). When Pacific indigenous peoples speak about traditional knowledge, it is to speak about the past, the present, and the future; the interconnectedness between human beings, the environment, and the social values each holds. It is to speak about integration, or like the weaving of voivoi (Pandanus) leaves, in a harmonious attempt to bring about balance from the past, to the present and create a future that will safeguard generations and be woven firmly like a mat. It is imperative to understand the social value of the environments in which potential activities in areas beyond national jurisdiction will affect.

This paper:[2] (i) illustrates challenges with current approaches to CBTT for Small Island Developing States (SIDS), (ii) discusses traditional and local knowledge practices, and (iii) outlines opportunities for the BBNJ agreement to meet the needs of SIDS. This paper draws on an analysis of the BBNJ Agreement (UN, 2019) and textual proposals (UN, 2020), in addition to peer-reviewed literature and other relevant sources of information. The focus of this paper is scientific and technological capacity, though it is important to recognize that this is only one aspect of capacity, and that legal and policy capacity, as well as public awareness, will also be critical.

Box 1: The framework for Capacity Building and Technology Transfer in the draft BBNJ Agreement

Part V of the draft BBNJ Agreement (UN, 2019) concerns CBTT (Articles 42-47). There are also relevant provisions in Part VI (institutional arrangements, [Part VII] (financial mechanism) and [Annex II]. There are also references to CB in relation to the objectives (Article 7) and benefit-sharing provisions (Article 10) of marine genetic resources. However CBTT does not feature in Parts III (area-based management tools) or IV (environmental impact assessments) of the draft BBNJ Agreement. Key questions include:

- Will the **definition of technology** be sufficiently broad to ensure SIDS can access all forms of technology required for the conservation and sustainable use of marine biodiversity in ABNJ?
- Is there a **common understanding and definition of capacity building?**
- The current modalities are heavily reliant on **cooperation,** which is not a given (Article 46);
- Will there be a **funding/financing mechanism** for CBTT, whichSIDS can benefit from (Article 52)?
- What, if any, **institutional** arrangements will facilitate CBTT?
- What will be the level of obligation of CBTT, and will there be any **mandatory** provisions?
- What form will the **clearinghouse mechanism** take, and will it be appropriately designed/resourced/managed to fully support SIDS in accessing the CBTT required?
- What is the role of **traditional and local knowledge** in CBTT?
- Will the **special needs of SIDS** be recognized in the CBTT framework of the BBNJ Agreement (e.g.,draft Article 42(f) and Article 43bis)?
- How will assessing and meeting country needs work in practice, and will there be **a financial mechanism** to undertake gap analyses and needs assessments?
- What will be the effect of the provisions on terms and conditions including **Intellectual Property Rights**?
- How will enhanced **cooperation to** deliver CBTT **be facilitated and by whom?**.
- How will CBTT be implemented and **monitored**?

[2] This paper was commissioned by the Alliance of Small Island States (AOSIS) with the support of the Government of Norway, and produced by the University of Wollongong This paper is part of the project "Marine Science in Small Island Developing States: Challenges and Recommendations" (May 2021 – April 2022) being undertaken by a team convened by the University of Wollongong for the Alliance of Small Island Developing States (AOSIS). The content of this report does not intend to reflect negotiating positions of AOSIS.

2. Challenges relating to scientific and technological capacity

This section discusses challenges relating to scientific and technological capacity in SIDS, including: equipment (section 2.1), institutional capacity (section 2.2), access to data and samples (section 2.3), training (section 2.4), partnerships (section 2.5), needs assessments and strategies (section 2.6), financial resources (section 2.7), monitoring and evaluation (section 2.8).

The barriers for SIDS in participating in deep ocean research are illustrated by "The Global Deep Sea Capacity Assessment".[3] This baseline survey of the technical and human capacity for deep-sea science and exploration in every coastal nation with deep waters (200m+) around the world, has illuminated glaring inequities - particularly for SIDS (Figure 1). Survey respondents for the forthcoming report highlighted that despite deep-sea research and exploration being of importance to SIDS, many do not yet have the in-country expertise to undertake this, with even fewer SIDS having the in-country tools or technology (Figure 1). Compared with developed States, very few respondents from SIDS agreed that their country had the capacity to conduct deep-sea research and exploration. These results raise questions about the adequacy of efforts for CBTT for SIDS.

[3] The assessment is led by Dr. Katy Croff Bell, Founder of the Ocean Discovery League (ODL), which aims to increase access to deep-sea exploration and research worldwide. The report will be released in mid-2022. Further information about ODL and the Global Deep-Sea Capacity Assessment can be found at www.oceandiscoveryleague.org. Survey responses were received from 32 of the 49 SIDS.

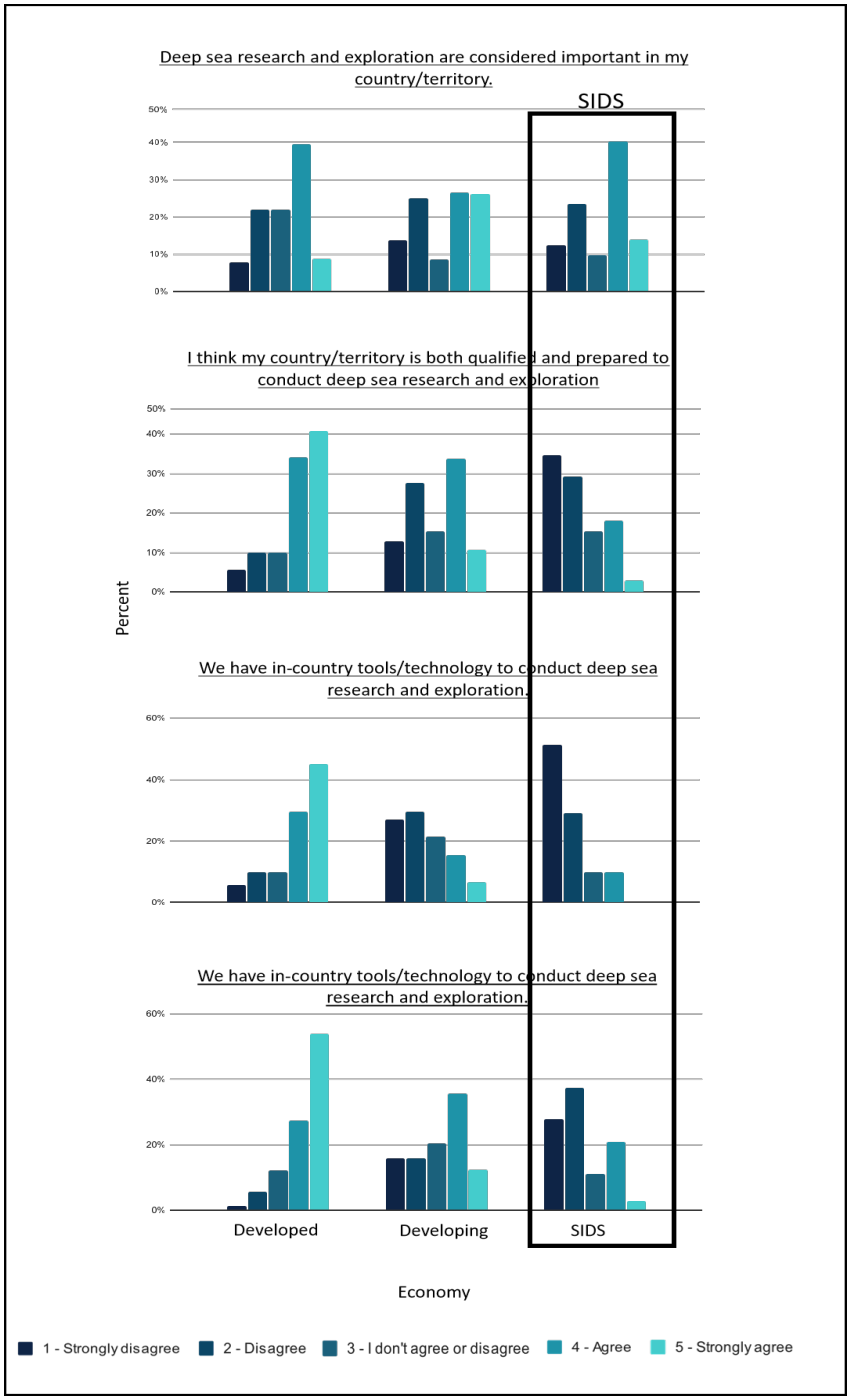

Figure 1: As part of the Global Deep-Sea Capacity Assessment,[3] survey respondents were asked how strongly they agreed or disagreed with the statements related to the question "How would you assess the status of deep sea research and exploration in the country you responded for?". The full report will be released in mid 2022.

2.1. Equipment

Equipment donations can pose more of a burden than a benefit for SIDS. Some problems are caused by no (or not enough) corresponding access to the required technical equipment, or expertise and financial resources to maintain and calibrate donated equipment and fix it when broken. For example, a pilot project in 2018 to explore and research Trinidad and Tobago's deep ocean used lower-cost deep-sea drop cameras on loan from the USA. This was problematic for two reasons: The equipment required repair during the course of the project but foreign in-person assistance was necessary for this. This hindered use and meant the camera was out of action for long periods. This combined with the camera only being in-country temporarily lowered the chances of success of the project and prevented it from proceeding at the pace desired by in-country researchers (Amon & Rotjan et al., accepted). This example illustrates that when transferring technology, it is imperative that this is done based on needs and accompanied by the necessary training and resources (technology, equipment and finances) to maintain, repair and utilize technology in the long term.

Emerging initiatives from the international marine scientific research community highlight growing recognition of this problem. For example, the Ocean Discovery League[1] is in the process of testing and deploying camera systems that allow the user to image the deep sea (down to 1500 m) and also repair and replace parts (Bell et al., submitted), this process includes feedback from scientists using equipment in the field in various locations around the world.

Although many SIDS have sophisticated science facilities such as laboratories (Harden-Davies et al., 2020) there are still challenges facing SIDS to fully participate or lead marine scientific research in ABNJ, such as lack of open-ocean and deep-ocean technology (e.g., offshore research vessels), and/or on-shore laboratory and housing facilities (e.g., museums) for marine genetic resources and other biological samples (Harden–Davies et al., 2020; Rabone et al., 2020; Rogers et al., 2021). Long-term investments are crucial to sustain capacity in SIDS countries and region, for example for biological-sample housing infrastructure. Regional hubs with shared resources have been proposed as a way to enable many more scientists and students within the region to gain skills and participate in ABNJ marine scientific research.

2.2. Access to data and samples.

Access to timely and relevant data and knowledge about the deep- and open-ocean is critical for ocean management in SIDS and more generally for promoting international marine scientific cooperation in ABNJ (Rabone et al., 2019; Rogers et al., 2020). There are already several data clearing-houses and/or data repositories in SIDS (Annex B, Table 1). However, data and information related to the deep-sea and open ocean is not always easily accessible to SIDS.

Unpublished data may remain at institutions outside of the region, published articles may be behind a paywall and not accessible, and scientific information may not be available to policymakers in a format that is understandable, relevant and timely. In the cases where data is shared, a lack of expertise, accessible software, or other support in-country can make it difficult to interpret and translate the data into policy relevant products such as management

strategies. Data sharing from marine scientific research, especially from large, foreign-led expeditions, have generally been exclusive in participation with the resulting data difficult to access. For example, bathymetric maps of Seychelles seafloor exist from historic surveys, however these raw files are stored in databases outside of Seychelles (Woodall et al. 2021). In other cases, laws and regulations do not exist to be able to ensure that data is shared with SIDS.

There are similar concerns regarding access to biological samples, including in relation to marine genetic resources. For example, Seychelles has a natural history museum that is currently under renovation but there is no dedicated space (including with climate control) for housing biological resources or expertise required to maintain such a collection. Yet there are also examples of how ownership of samples can be clearly negotiated with willing parties, and agreements can be made to ensure that SIDS do not lose out on marine scientific research, including in relation to marine genetic resources. This requires partnerships and pathways to maintain access. For example, an expedition undertaken by Nekton working together with the Seychelles Government, highlighted the need for the Seychelles to maintain ownership over MGR samples collected from the Seychelles EEZ (Woodall et al., 2021). Therefore, whilst the Seychelles cannot currently store these samples due to the lack of a bio-bank, they will be held at a partnered institution on a long term loan until Seychelles will be able to upgrade their bio-housing capabilities.

2.3. Training and capacity building

Training is often conducted as a short-term activity (e.g., a workshop, participation in a research cruise, or a brief training exchange) with a range of different timelines (a few hours to a few weeks). Whilst short-term activities can be useful, they cannot be the sole route to building capacity. Short-term activities generally build specific capabilities, techniques or skills and are most useful if identified by the end users themselves. In addition, short-term activities and skills building should be appropriately paired with long-term capacities already on the ground. For example, there would be no long-term benefit in curating and carrying out a workshop that focussed on fixing submersibles in many SIDS, as this is not currently a skill that can be practiced locally as there is little to no access to those specific technologies. There are also concerns regarding activities that might not result in benefits, for example, reports of discrimination, bullying and harassment have prompted calls for a critical conversation about safety at sea for underrepresented groups (Amon et al., 2022).

An example as to how training and capacity needs to be informed from the ground-up, and/or conducted in partnership with local organizations is the Western Indian Ocean Marine Science Association (WIOMSA)[4] partnership with Rhodes University (South Africa) that now offers an

[4] WIOMSA, an organization within the Western Indian Ocean demonstrates that: capacity development, scientific research, information dissemination and communication, resource mobilization and partnerships/networking can be successfully implemented. Whilst the majority of projects occur within a countries EEZ, there is an interest in conducting more work within the high seas and the open ocean. https://wiomsa.org/wiompan/mpa-managers-course/.

MPA Management course to any MPA professional. This course was designed after understanding the needs on the ground via a needs assessment.[5]

2.4. Partnerships

The growing calls to end 'parachute' or 'colonial' marine science where research is undertaken by foreign entities without meaningful involvement of local people (de Vos, 2020; Partelow, 2020; Stefanoudis et al., 2021) has gained traction in an array of scientific research fields including geosciences (North et al. 2020), soil science (Minasny et al. 2020), ecology (Maas et al. 2021) and coral-reef science (Stefanoudis et al. 2021). Science projects do not necessarily bring benefits to local people, and the outcome will depend on factors such as whether the partnership is genuine and meaningful.

Co-development has emerged as a way to recognize limitations of outdated approaches and the importance of ensuring that SIDS are in the driving seat of the development of capacity building strategies and partnerships, in the long term (Woodall et al., 2021). Co-development can be broadly considered as the production of a project, program or initiative with the equitable input of all stakeholders and partners. It is increasingly regarded as an antidote to the procedural and distributional equity problems of 'parachute' science because it provides a process to ensure that the design, conduct and use of outputs of a program are fair and bring benefits to all partners.[6] However, variation in the terminology used (examples include "co-design", "co-development", "co-production") suggests further effort is needed to ensure a common understanding and approach.

2.5. Needs assessments and strategies

Needs assessments are an established tool and can play an important role in ensuring that SIDS set the agenda of capacity building partnerships and programs. They often start with a gap analysis that might consist of a survey of existing or past relevant CBTT initiatives which could be further built upon (see Figure 1 for example).[7] However, there are several challenges. First, not all programs start with such a gap analysis and/or needs assessment. Oftentimes, a funder will set the agenda, and there is no motivation or support to undertake a preliminary gap analysis, to conduct a needs assessment, or to develop a long-term strategy for the legacy of the program. Second, there is little consistency between approaches which can make tracking long-term trends difficult (IOC, 2020). Information about SIDS science (and other ABNJ-related) needs already exist, though they are not as of yet comprehensive. There may not always be

[5] A further example of how training and capacity should be invested over a long period of time and appropriate to the needs on the ground is the Seychelles Island Foundation. This Foundation invests in different demographics: 1) children - through their eco-school programme; and 2) young adults through scholarships for BSc, MSc and PhD studies that show interest, ambition and talent.

[6] For example, Meer-Wissen, a co-operation between the German government and several African countries illustrates the importance of having a co-produced stage to every project knowledge exchange programs can be successfully funded, most importantly showing that should be allowed for and compensated https://meerwissen.org/about.

[7] A further example is the GEF Common Oceans ABNJ Project phase 2, which will have the Pacific Islands Region as one of its pilot regions for assessing and building capacity for cross-sectoral collaboration and coordination.

capacity within a region to undertake a comprehensive assessment, yet bringing in external consultants can exacerbate dependencies on external resources and may not support a full appreciation of the needs. Regional institutions already play important roles in facilitating needs assessments and providing linkages between the global and national levels.

2.6. Funding and financial resources

For the BBNJ agreement, predictable and sustainable financial resources would be required at least to build capacity of SIDS and developing country Parties to implement the Agreement, including scientific, policy and legal capacity and transfer the required technology for implementation. This might include, for example, undertaking ocean science and observation in ABNJ, sustaining laboratories and scientific programs in SIDS, and establishing networks of MPAs and other area-based measures. In addition to being vital for the implementation of the BBNJ Agreement and safeguarding shared ocean and its resources, financial resources could also help build sustainable blue economies nationally and regionally.

Solely project-based financing has proven inadequate to sustain programs in the long-term. Ocean finance overall remains a major impediment for conservation and management (Annex C). At the same time, the ecological and economic impacts of inadequate ocean management are becoming clearer as the value of services provided by the ocean to humankind - at least US$200 billion dollars per year according to the GEF - are better understood (Thiele et al, 2017). Targeted BBNJ finance is critical for the rapid adoption and entry into force of the BBNJ Agreement, and includes putting in place the required physical and institutional infrastructure and technology for science, monitoring, enforcement and innovation in a manner that is transparent and equitable and in the interests of future generations. Targeted BBNJ finance is also cost-effective, as the cost of inaction vastly exceeds the cost of intervention (Global Ocean Trust, 2022).

Examples of funding and financing arrangements

International conventions with mandatory funding requirements have a more stable financial basis for undertaking CBTT and other activities (Cicin-Sain et al, 2018; Annex C). A survey of other environmental conventions demonstrates a variety of different financial arrangements that include: GEF as a financial mechanism (UNFCCC, CBD, UNCCD, Minamata Convention and Stockholm Convention); a standalone financial mechanism tailored for the needs of a convention (Montreal Protocol's Multilateral Fund); and a combination of GEF and a standalone mechanism (UNFCCC with GEF and the Green Climate Fund). There are also cases where there is no financial mechanism operating entity but rather a number of special funds that rely on mandatory contributions (CITES Trust Fund, World Heritage Fund), a combination of mandatory and voluntary (CMS Trust Fund), and voluntary contributions (Basel Convention Trust Fund, Basel Convention Technical Cooperation Trust Fund, Ramsar Convention Small Grants Fund, UNCLOS voluntary trust funds). The BBNJ Agreement could choose to follow any, or a combination of, these models, including a new mechanism such as an international ocean finance institution, which could also be complementary to using the GEF as a financial mechanism (Global Ocean Trust, 2022). However, at least some degree of mandatory funding is required for a predictable and sustainable funding base.

In practice, it may be expedient to follow the UNFCCC model of a combination of the GEF and a standalone mechanism. While a standalone mechanism for BBNJ will allow financing to be tailored to the needs of the Parties implementing the Agreement, it will take time to design. The GEF could be deployed quickly to assist with Needs Assessments and other urgent initial needs, providing countries with time to design and implement a standalone mechanism, which could also incorporate innovative financing.

Special funds

1. *Capacity building and transfer of marine technology:* The special fund envisioned in the currently bracketed text in paragraph 5 (Alt 1) could include funding for capacity building, training, transfer of technology, assistance to States Parties in implementing the Agreement, rehabilitation and restoration of marine biodiversity, conservation and sustainable use programs by holders of traditional knowledge, public consultations and other functions. In addition the fund could provide for protection of marine biodiversity as a more cost-effective option than restoration alone.
2. *For SIDS:* There might be a case to be made for a special fund for SIDS that would provide financing for activities that are vital for SIDS participation in the BBNJ Agreement as guardians of vast ocean spaces. It is likely that such a fund would rely on voluntary contributions, though private sector funding might also be examined, particularly given SIDS' experience in blue economy finance and instruments such as blue bonds and debt-for-nature swaps.
3. *For rapid response* In addition to these, special funds could be established for rapid response (e.g. similar to World Heritage Convention's Rapid Response Facility for World Heritage sites in crisis) to protect, in line with a precautionary approach, and restore key ecosystems and species, or for other specific purposes.
4. *For operations and participation:* An endowment fund is also a possible way to raise capital for operations.

Innovative financing, which creates scalable and effective ways of channeling private money, particularly from global financial markets, is still new for environmental conventions. Innovative financing has been contemplated by the CBD but not acted upon. The UNCCD has recently established an impact investment fund for land degradation neutrality, blending private and public sources of finance. For the ocean, and BBNJ context, it seems that public finance will not be enough, and private sector financing would be needed. This might perhaps be undertaken in a blue economy context, where economic sectors participate in, and contribute to, the implementation of the Agreement through, for example, user fees and partnerships relating to ocean infrastructure, monitoring, innovation and MGR development. The experiences of SIDS in blue economy transitions might be helpful in approaching these types of financing arrangements. For the BBNJ Agreement, a Standing Committee on Finance, similar to the UNFCCC, might help engage potential financing partners and solutions (Global Ocean Trust, 2022).

2.7. Monitoring and evaluation

There are very few critical reviews of capacity-building programs in ocean science, and evaluating the outcomes of programs remains a problem. A lack of common understanding about effective capacity building, weak or absent accountability measures and effectiveness metrics are some of the challenges for capacity building (Kenny and Clarke 2010, Lempert 2015). The voices of the people who are the supposed beneficiaries of capacity building are not always heard in dominant capacity building narratives (Amon et al., 2022). Problems arise where evaluation metrics are established to meet the needs of funding agencies and 'donors' rather than those of ocean-dependent communities such as SIDS (Harden-Davies et al., 2022 accepted). Commonly used measures of evaluation, such as the number of workshop participants, fail to capture long-term outcomes and a complete picture of a program.

A key example where effective monitoring and evaluation could limit detrimental experiences is in regard to training at-sea. Participation in research cruises has become a main focus of capacity-building discussions relating to marine science in the BBNJ negotiations and other fora. However, participating in a cruise is not necessarily capacity building - if a person experiences discrimination, harassment, bullying or assault (Amon et al., 2022). Yet that individual, regardless of the reality of their experience, will be treated as a successful outcome, because of a lack of reporting mechanisms that are safe, holistic and consider participants' wellbeing rather than the 'number of participants' and their 'country of origin' (Amon et al., 2022).

3. Traditional and Local Knowledge and Practices

Traditional knowledge of Indigenous Peoples and local communities is important for the implementation of the BBNJ Agreement (Mulalap et al., 2020), however, the heavily bracketed text demonstrates that some countries still struggle to accept and/or understand the relevance of traditional knowledge to all components of the BBNJ Treaty.

There are many examples of the vital role of traditional and local knowledge in marine management and conservation and upholding cultural connections between people and the ocean. One example is customary fishing areas, such as in Fiji where marine resources in coastal areas are surrounded by customary fishing areas that extend to the outer reef slope, and decisions regarding the coastal areas are made by a group of people and the information is respected and disseminated back to the people (Vietayaki, 2002). Another example of traditional knowledge is whale migration; whales play an important role in the life and culture of the Pacific Islands, serving as guardians of voyagers on the ocean or reincarnated ancestors.

Networking traditional knowledge experts with scientists and marine managers has the potential to provide for good learning opportunities. One example of marine management building on traditional practices is the Locally Managed Marine Areas (LMMA) Network,[8] which started in Fiji but has now expanded to more than 15 countries in the Indo-Pacific, covering a substantial marine area. The LMMA Network builds on traditional practices such as tabu (closed) areas and fisheries measures, working together with communities within their

[8] https://lmmanetwork.org/

traditional marine tenure areas to bring joint livelihoods and biodiversity benefits. The LMMA network is one example of traditional management measures that could be built upon to provide ecological connectivity between national EEZs and area-based management in ABNJ. It is also only one example of how the peoples of the Pacific Islands used, and continue to use, customary practices to advance community livelihoods and marine protection in line with traditional spiritual practices.

Such practices are a broader expression of how the ocean is at the core of the identity of Pacific Islanders, and how people and the ocean are part of the continuity of connections between human and non-human entities (Hau'ofa, 2008; Tilot et al, 2021). The concepts of connectedness and responsibility provide important insights into ocean governance, including in the context of ecosystem approach, stewardship and sustainable use (Vierros et al, 2020). Deep interconnectedness to ocean boundaries and marine species in the Pacific is more than a commodity but central to Pacific peoples identity. It is imperative to understand the interconnections between people and ABNJ, and the social and cultural value of the environments that potential activities in areas beyond national jurisdiction will affect. This has implications for management measures also. For example, environmental impact assessments often focus on biophysical impacts and less attention is given to local communities and livelihoods (Bradly and Swaddling 2018).

There exists a vast amount of potential for traditional knowledge to contribute to the development of MGRs, and to strengthen national blue economies together with environmental management and conservation (Annex A). While no MGRs from ABNJ have yet been commercialized solely based on traditional knowledge, TK has catalyzed the scientific study of bioactive compounds in floating Sargassum weed and the potential held by shark cartilage in cancer treatment. These examples only scratch the surface of what is possible, if traditional knowledge holders and scientific researchers collaborate and co-design MGR-relevant research projects in an equal and equitable way, adhering to the principle of prior informed consent. Polynesian voyaging, for example, could offer exciting opportunities for collaboration and sampling in a manner that co-creates science and traditional knowledge. Traditional voyaging canoes that are capable of traversing into ABNJ may also offer solutions for the development of home-grown oceanographic research vessels for the Pacific region. Finally, supporting local and regional centres of excellence, by building on existing initiatives and facilities located in universities in AOSIS countries, could provide the basis of regional and inter-regional collaborations for biodiscovery-related science and traditional knowledge. The newer MGR-related fields of biomimicry and environmental DNA have not yet been examined from a TK perspective, and potential for new discoveries exist here, too.

Traditional knowledge is different from scientific data in that it has a cultural context from which it should not be separated. Much of traditional knowledge is not freely accessible but belongs to the knowledge holders, who may or may not wish to share it. This is acknowledged in the UN Declaration of the Rights of Indigenous Peoples (UNDRIP) Article 31. This has important implications for the categorization of knowledge and the sharing of information.

In addition to traditional knowledge, traditional practices include marine management practices such as seasonal bans on harvesting, temporary closed (no-take) areas, and restrictions being placed on certain times, places, species or classes of persons. Closed areas include the tabu areas of Fiji, Vanuatu and Kiribati, the ra'ui in the Cook Islands, the kapu in Hawaii, the tambu in PNG, the bul in Palau, the mo in the Marshall Islands, the tapu in Tonga and the rahui in New Zealand (Maori) (Vierros et al., 2010). These practices provide a flexible set of tools to rapidly respond to environmental conditions. From the ABNJ perspective, they offer examples of adaptive management tools, safeguarding migratory species, and preserving the connectivity between ecosystems.

4. Conclusion and considerations for the BBNJ Agreement

Effective capacity building and technology transfer will be critical to meet the self-determined needs of SIDS. Ineffective CBTT undermines sustainable development in SIDS, examples provided in this paper include: (i) donations of technological equipment that require maintenance and calibration to be done overseas, posing more of a burden than a benefit; and (ii) cruise participation that exposes a person to harassment or discrimination. The activities that lead to effective CBTT are determined by a number of factors such as the modality, longevity and equitability of the initiative, as well as whether it caters to the needs of the individual and State.

Changing attitudes to capacity building and the transfer of marine technology are indicated by: growing discussion on the importance of 'co-designing and co-developing' programs and collaborative approaches to knowledge exchange; and increasing condemnation of 'colonial science' and 'parachute science' practices. The commencement of the UN Decade of Ocean Science for Sustainable Development and its aim to eradicate inequality (IOC, 2021) has prompted growing scrutiny on meanings, motivations, mechanisms and measurements of capacity building (Harden-Davies et al., 2022 in review). In the context of the BBNJ Agreement, as an implementing agreement under UNCLOS, it is relevant to reflect upon these developments to ensure that the agreement is fit for the future.

To ensure that the framework created by the BBNJ Agreement will enable SIDS to participate fully and fairly in the implementation of the BBNJ Agreement, consideration could be given to the following issues:

(i) Traditional and local knowledge:
The BBNJ agreement could provide an important opportunity to build on traditional practices and connect them, ecologically and culturally, with efforts in ABNJ, for example by encouraging/facilitating **partnerships** with holders of traditional knowledge in capacity building as noted in Article 43(2). Such partnerships should be meaningful, include all aspects of a project from planning stages onward, and be two-way in including mutual learning.
Further, the establishment of a **special fund** as referenced in Article 52 of the draft BBNJ agreement. Coupled with the proposal in Annex II to build capacity on the relevance and

application of traditional knowledge, these provisions have the potential to strengthen the understanding, acceptance and practical application of traditional knowledge as part of global ocean governance.
Questions still remain about how best to operationalize access to traditional knowledge through the global BBNJ clearing-house, as proposed in the draft text, with the importance of prior informed consent highlighted by PSIDS. There are also questions relating to the scientific and technical body.

(ii) Capacity building and the transfer of marine technology

Needs assessments: Needs assessments are a useful tool to drive CB partnerships and programs, and are most usefully complemented by a gap analysis and strategy.
There could be an important role for the BBNJ agreement to facilitate consistency in assessing needs, through providing guidance for example, and through providing technical and financial support to States and/or regional organizations. However, while consistency is important, different regions may need different and tailored approaches for how they undertake the assessments. Once completed, the assessments and any associated strategies can be made available through the clearinghouse mechanism, which will help in the formation of partnerships to meet the expressed needs. It is also important that funding is provided for undertaking a needs assessment, as these assessments may otherwise place an undue burden on small countries. For example, GEF funding has been made available under UNFCCC to undertake technology needs assessments. Yet currently Article 44 paragraph 4, which discusses needs assessment procedures, does not mention resourcing.

Long-term: It is crucial to avoid approaches to CBTT that are only short term, but rather encourage genuine, meaningful, long-term partnerships that meet the self-determined needs of SIDS. The framework for TT should go beyond bilateral hardware donation and go hand-in-hand with CB. CB must go beyond short term activities (such as one-time training course or cruise participation) in order to deliver long-term benefits.

Data: The BBNJ Agreement is an opportunity to strengthen governance and protection of data in collaboration with SIDS. Given the connected nature of the ocean, increase capacity to access data and samples would likely provide insights into the ocean environments and inhabiting species within EEZs adjacent to ABNJ, as well as how to effectively steward them. This is also especially relevant to monitoring for transboundary impacts from activities in ABNJ.

SIDS science and knowledge hubs: have been proposed as a way to enable many more scientists and students within the region to gain skills and participate in ABNJ marine scientific research. More generally, hubs can promote knowledge exchange and networking. Yet while such hubs were envisaged in UNCLOS article 276, they have not yet materialized to the extent hoped.

(iii) Monitoring and evaluation of capacity building outcomes,

Monitoring is important for the long-term success of CBTT. Article 47 of the draft treaty text provides for periodic monitoring and review of CBTT activities. One issue in the current draft BBNJ treaty text is its focus on outputs, whereas experience shows that the effectiveness of CBTT is measured by its long-term outcomes. Monitoring might be carried out by the COP, or by a subsidiary body established by the COP, for example the Capacity-Building and Transfer of Marine Technology Committee proposed in the currently bracketed Article 48 paragraph 4 (d) (ii). A standalone committee on CBTT would be able to give the topic the consideration it needs, and might be a more suitable body to carry out this task than the scientific and technical body, given that CBTT will also encompass legal and policy issues that go beyond science and technology. Active participation by SIDS in the monitoring process, and specifically in the body tasked with monitoring, will be important to ensure the relevance and effectiveness of CBTT.

(iv) Funding and financial resources

In order to be successful, the BBNJ Agreement will need to be able to support SIDS with accessible, adequate, predictable and sustainable funding (see Section 2.7 and Annex C for further discussion).

(v) The Clearinghouse

A clearinghouse mechanism, as provided for in Article 51 of the draft BBNJ agreement, could provide a useful CBTT tool, but will require adequate resourcing and realistic expectations and learning lessons from existing clearinghouse tools including existing regional and national clearinghouses in SIDS regions (Annex B). It would be useful for the BBNJ clearing-house mechanism to be established in such a way that it builds upon and enhances existing regional and national efforts, without placing an undue burden on countries with limited resources, such as SIDS. The current draft text of the BBNJ Agreement recognizing the special circumstances of SIDS with respect to the clearinghouse mechanism could provide the basis for enhanced collaboration. The design and operation of clearinghouses can be informed by existing mechanisms (see Annex B, Table 2). Substantial work, resources and human resources is required to ensure that a clearing-house is successful and becomes a useful resource for countries. For example, the Clearinghouse could usefully be conceptualized as more than a database, but as an accountability and transparency tool.

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Annex A: Traditional and local knowledge

Traditional knowledge of Indigenous Peoples and local communities is increasingly identified as relevant to implementation of the BBNJ Agreement. Its inclusion was originally championed by Pacific Island countries and other supportive delegations, including AOSIS, and the draft treaty text now contains multiple mentions of traditional knowledge. However, the heavily bracketed text demonstrates that some countries still struggle to accept and/or understand the relevance of traditional knowledge to all components of the BBNJ Treaty. There are several references to traditional knowledge in the draft text of the BBNJ agreement (Annex B, Table 1). Traditional knowledge has been proposed for inclusion as a key principle for the treaty, along with best available scientific information. It has also been included in relation to marine genetic resources, area-based management tools including MPAs, environmental impact assessments, and capacity building and transfer of marine technology.

Missing from these sections is any mention of **traditional practices,** which would also seem relevant for multiple parts of the treaty, including as part of interconnected networks of MPAs or other area-based measures; in environmental impact assessment to ensure that proposed activities don't impact on traditional practices; and under capacity building and technology transfer to provide for broader learning opportunities that indigenous practices could offer current efforts in global ocean governance. Traditional practices might also be relevant for marine genetic resources, in terms of traditional uses of specific marine organisms, and their potential present-day applications. However, there have not yet been demonstrated examples of traditional knowledge or practices that would relate to the use of marine genetic resources from ABNJ.

The text includes some highly controversial issues and concepts, including **prior informed consent,** and traditional knowledge in relation to marine genetic resources. Here, it might be important to reference the Nagoya Protocol, which sets out clear obligations to seek the prior informed consent of indigenous and local communities for use of traditional knowledge associated with genetic resources held or owned by them. However, as mentioned above, there are currently no concrete examples of traditional knowledge of indigenous peoples and local communities associated with marine genetic resources from ABNJ, and thus many countries are opposed to this text because of its implications for potential future benefit-sharing.

Traditional knowledge is also provided for under institutional arrangements, through inclusion of expertise in traditional knowledge in the proposed **Scientific Body**. This is important, and some thought should be given to how this might be best undertaken. The experience from UNFCCC, CBD, IPBES and the Arctic Council show that a specific body or committee might be needed to facilitate work on traditional knowledge, and for the appropriate experts to come

together. The participation of Indigenous Peoples and local communities in such a body or committee should be supported financially and logistically by the Secretariat.

Traditional knowledge is also proposed for inclusion in the **clearing-house mechanism**, both in terms of sharing of data and information, and in terms of networks of experts that would include experts in traditional knowledge. Networking traditional knowledge experts with scientists and marine managers has the potential to provide for good learning opportunities and should be supported. In terms of sharing of traditional knowledge itself, it should be noted that traditional knowledge is different from scientific data in that it has a cultural context from which it should not be separated. Much of traditional knowledge is not freely accessible but belongs to the knowledge holders, who may or may not wish to share it. This is acknowledged in the UN Declaration of the Rights of Indigenous Peoples (UNDRIP) Article 31. The current text cites **prior informed consent,** which would address the concerns about sharing of traditional knowledge only with the consent of the knowledge holders. That text, however, is bracketed. The issue re-surfaces in Annex II, which includes types of capacity building and transfer of marine technology, including sharing of scientific data and traditional knowledge.

The Article on financing, though heavily bracketed, includes an interesting proposal to establish a **special fund** to support conservation and sustainable use programmes by holders of traditional knowledge of indigenous peoples and local communities. This could provide an important opportunity to build on traditional practices and connect them, ecologically and culturally, with efforts in ABNJ. Coupled with the proposal in Annex II to build capacity on the relevance and application of traditional knowledge, these provisions have the potential to strengthen the understanding, acceptance and practical application of traditional knowledge as part of global ocean governance.

Marine Genetic Resources and Traditional Knowledge

Marine genetic resources (MGRs) include the genetic information marine organisms host enabling them to produce a wide range of biochemicals (Jaspars et al, 2016; Rogers et al, 2021) that have beneficial applications such as for the discovery of pharmaceuticals, enzymes and other industrial processes, cosmetics, nutritional supplements, and research tools. In addition, MGRs include adaptive solutions in marine organisms that can inspire new designs and materials (Rogers et al, 2021). MGR-related applications also include tools and technologies such as environmental DNA (e-DNA) that can be used for assessment and monitoring of species, including invasive species, and to support ocean conservation and management.

There have been relatively few developments related to MGRs collected from ABNJ. Some examples include an enzyme used in biofuel development and a cosmetic face cream product. However, traceability of MGRs from collection through research and development to a finished product is notoriously challenging (Rabone et al, 2021). Patenting offers some indication of commercial interest, although not all patents result in marketable products. Sequences from a wide range of organisms from whales to microbes have occurred in patents. The majority of all ocean-related patents are associated with microbial species, which are still poorly researched. A considerable portion of patent sequences are derived from species associated with deep-sea and

hydrothermal vent ecosystems, many of which occur in ABNJ (Blasiak et al, 2018). Plankton (including zooplankton, phytoplankton, bacteria and viruses), which represent 95% of marine biomass, including in ABNJ, are still poorly researched but likely to yield new discoveries (Abida et al, 2013). The jellyfish *Aequorea Victoria*, which occurs both in ABNJ and within national jurisdiction, yielded Green Fluorescent Protein, used widely as a marker in genetic engineering and emerging areas of science and technology such as synthetic biology, and led to the award of the 2008 Nobel Prize in Chemistry (Oldham et al, 2014). Bioluminescence is a key property of interest in biotechnological research, as are organisms from extreme hot and toxic environments such as hydrothermal vents or extreme cold environments like polar seas. Marine microbes in the water column and in the deep seabed also have undiscovered potential yet to be explored.

Interestingly from a BBNJ and traditional knowledge perspective, patents and applications also relate to migratory species that cross jurisdictions, and include, for example, several patents relating to shark cartilage for treatment of various ailments, based on traditional Chinese medicine.[9] International databases also contain a patent application related to a protein derived from the shell of a hawksbill turtle for the development of artificial shell material, though this patent is likely now expired.[10]

The floating Sargassum seaweed, which crosses jurisdictions, also has a large number of patents attached to it, and its harvesting has been proposed for purposes ranging from fertilizers to biofuel development. The floating Sargassum weed has traditionally been used as a fertilizer in Bermuda, the Caribbean and Western Africa (Milledge and Harvey, 2016), while different Sargassum species play an important role in traditional Chinese, Japanese and Korean medicine (Liu et al, 2012). Not surprisingly, Sargassum weeds harvested in Asian countries have been found to contain biologically active metabolites that may be useful for their anticancer, anti-inflammatory, antibacterial and antiviral activities (Liu et al, 2012). The floating Sargassum weeds (*Sargassum natans* and *Sargassum fluitans*) have also been found to contain bioactive compounds that include flavonoids, tannins, terpenoids and saponins, demonstrating that these species, too, could be useful for their medicinal properties (Oyesiku and Egunyomi, 2014).

Traditional knowledge and MGRs from ABNJ

Traditional knowledge relates to MGRs from ABNJ through at least two different pathways: (i) through direct observations of relevant environmental conditions or species undertaken as part of traditional voyaging, either present day or historical; and (ii) through traditional knowledge, uses or practices relating to a specific species, which may directly or indirectly contribute to the discovery and development of MGRs. The following discussion examines each of these two pathways in more detail.

(i) <u>Traditional voyaging and MGRs</u>

[9] For example, patents CN 106420892 from 2017; CN 1134793 from 1996; CN 112807416 from 2021.
[10] JP1996266285 from 1995.

Traditional voyaging extended (and continues to extend) far into the high seas. Early Polynesian voyagers were able to find their way across vast reaches of the Pacific Ocean basin navigating by the sun, stars, waves and other natural cues, such as seabirds. This voyaging tradition continues today through, for example, the Polynesian Voyaging Society, whose Hōkūleʻa canoe has sailed worldwide and contributed to Hawaiian cultural rejuvenation. Further, recent research shows that the Maori of Aoteoroa/New Zealand traveled deep into the Southern Ocean and may have reached Antarctic waters and perhaps the continent as early as the 7th century (Wehi et al, 2021). There is also some evidence that Alaskan Inuit may have voyaged to Polynesia, or vice versa, with a highly sophisticated canoe similar to the Polynesian canoes (Schuhmacher, 1988). Additionally, genetic studies suggest early contact between Polynesians and Native Americans, which could only have occurred through voyaging (Ioannidis et al, 2020).

These voyages have contributed to huge repositories of knowledge about the ocean (Wehi et al, 2021), and were based on detailed knowledge of astronomy, oceanography, meteorology and biology, which is passed across generations (Lewis, 1972). The voyagers would certainly have observed and taken note of conditions that might be relevant to MGRs, such as the occurrence of specific species and species aggregations, high productivity areas, plankton blooms and bioluminescence. In regards to bioluminescence, Pacific navigators used patterns in *te lapa* — loosely translated as "underwater lightning" — as an indicator that land was near.

The traditional knowledge also extended to the deep sea. For example, the Haida, an Indigenous nation on the Haida Gwaii archipelago on the west coast of Canada, have oral traditions that link the Haidas' emergence from the ocean to the formation of the SGaan Kinghlas-Bowie Seamount in the North Pacific Canadian exclusive economic zone. The name dates back centuries, if not more, with SGaan Kinghlas considered a supernatural being (Levin et al, 2021). The SGaan Kinghlas-Bowie seamount marine protected area – partly operated by the Haida Marine Planning Program – is emerging as an important example of combining traditional knowledge and science to survey and understand change in the ocean (Mustonen, 2019).

Based on the above examples, there are significant opportunities for future MGR-related collaborative research with Hōkūleʻa or similar voyaging expeditions, which would allow for the co-production of exciting new knowledge drawing on science and traditional knowledge.

(ii) <u>Traditional knowledge and uses as a direct or indirect contributor to MGR development</u>

Indigenous Peoples and local communities hold rich traditional knowledge about marine species and environments, that includes, for example, the use of specific species of algae or marine animals for medical, human health, and other purposes. While most of these species are found in coastal areas rather than in ABNJ, such knowledge is relevant to species that cross jurisdictions or that are closely related to species occurring in ABNJ.

Species that cross jurisdictions include migratory species, but also drifting pelagic species such as jellyfish and other plankton. As an example, sharks undertake migrations across ocean spaces, and are culturally significant for coastal communities around the world, with associated traditional knowledge and practices. In Hawaii, for example, reciprocal guardianship relationships exist between individual sharks and specific families (Puniwai, 2020); hammerhead sharks are identified as a totem for many clans or families in the Torres Strait Islands (Gerhardt, 2018); and the shark callers of New Ireland island in Papua New Guinea participate in a ritual that stretches back centuries to catch shark, providing meat for the entire clan (Wayne, 2021). In China and many other Asian countries, shark cartilage is widely recognized for its health benefits and as part of traditional medicine, a practice which has driven unsustainable shark finning (Dell'Apa et al, 2014), but also the broader research into the medicinal properties of shark cartilage (Loprinzi et al, 2005), as well as the world-wide marketing of shark cartilage supplements globally for their supposed benefits in fighting cancer, arthritis and other ailments.[11] In each of these cases, coastal communities around the world hold intimate cultural knowledge about sharks that has contributed to both conservation and use, as well as inventions relating to new products marketed for their health benefits.

Traditional knowledge from coastal areas can also influence discoveries related to similar species primarily found in ABNJ. One example of this is the case of Sargassum weed, cited above. The last decade has seen the periodic arrival of vast amounts of floating Sargassum weed from the Sargasso Sea at the beaches of the Caribbean and Western Africa, impacting livelihoods and ecosystems. This influx has prompted research into potential uses and economic values of Sargassum, with inspiration drawn from traditional uses, such agricultural (fertilizer) and medicinal uses. The research into pharmaceutical properties, inspired by the traditional use of a coastal species of Sargassum in Asian medicine, found that floating Sargassum from ABNJ also contained bioactive compounds that may have future pharmaceutical uses (Oyesiku and Egunyomi, 2014).

Conclusion and way forward

There exists a vast amount of potential for traditional knowledge to contribute to the development of MGRs, and to strengthen national blue economies together with environmental management and conservation. While no MGRs from ABNJ have yet been commercialized solely based on traditional knowledge, TK has catalyzed the scientific study of bioactive compounds in floating Sargassum weed and the potential held by shark cartilage in cancer treatment. These examples only scratch the surface of what is possible, if traditional knowledge holders and scientific researchers collaborate and co-design MGR-relevant research projects in an equal and equitable way, adhering to the principle of prior informed consent. Polynesian voyaging, for example, could offer exciting opportunities for collaboration and sampling in a manner that co-creates science and traditional knowledge. Traditional voyaging canoes that are capable of traversing into ABNJ may also offer solutions for the development of home-grown oceanographic research vessels for the Pacific region. Finally, supporting local and regional centres of excellence,

[11] See, for example, https://www.webmd.com/vitamins/ai/ingredientmono-909/shark-cartilage.

by building on existing initiatives and facilities located in universities in AOSIS countries, could provide the basis of regional and inter-regional collaborations for biodiscovery-related science and traditional knowledge. The newer MGR-related fields of biomimicry and environmental DNA have not yet been examined from a TK perspective, and potential for new discoveries exist here, too.

Annex A, Table 1: Traditional knowledge in the draft BBNJ agreement (UN, 2019).

Article	Formulation	Comments
Article 5: General [principles] [and] [approaches]	(i) The use of the best available [science] [scientific information and relevant traditional knowledge of indigenous peoples and local communities];	There seems to still be some debate about whether traditional knowledge should be included as a general principle for the treaty, along with science.
PART II marine genetic resources, [**Article 10bis**: Access to traditional knowledge of indigenous peoples and local communities associated with marine genetic resources [collected] [accessed] in areas beyond national jurisdiction]	[States Parties shall take legislative, administrative or policy measures, as appropriate, with the aim of ensuring that traditional knowledge associated with marine genetic resources [collected] [accessed] in areas beyond national jurisdiction that is held by indigenous peoples and local communities shall only be accessed with the prior and informed consent or approval and involvement of these indigenous peoples and local communities. The clearing-house mechanism may act as an intermediary to facilitate access to such traditional knowledge. Access to such traditional knowledge shall be on mutually agreed terms.]	The entire Article 10bis and the associated text is bracketed, meaning that there is no consensus on whether it will be included. **A key issue is the lack of evidence relating to the existence of traditional knowledge related to MGRs from ABNJ**. The second issue may have to do with the "prior informed consent and approval" language that is controversial in some countries.
PART III Measures such as area-based management tools, including marine protected areas, **Article 16**: Identification of areas [requiring protection]	1. Areas requiring protection through the establishment of area-based management tools, including marine protected areas, shall be identified on the basis of the best available [science] [scientific information and relevant traditional knowledge of indigenous peoples and local communities], the precautionary [approach]	The debate here seems to be about whether only science or scientific information and traditional knowledge should be taken into account in identification of areas for protection. **This also raises a question about whether traditional practices should be included in identifying areas for protection,** in order to ensure

	[principle] and an ecosystem approach	that area-based management doesn't impede traditional practices, that it learns from and builds upon traditional practices, for example where networks of MPAs are put in place, and that learning from cultural practices is taken into account in BBNJ governance.
PART III Measures such as area-based management tools, including marine protected areas, **Article 18**: Consultation on and assessment of proposals	"…the Secretariat shall make that proposal publicly available and facilitate consultations thereon as follows: …" (c) Indigenous peoples and local communities with relevant traditional knowledge, the scientific community, civil society and other relevant stakeholders shall be invited to submit, inter alia: (i) Views on the merits of the proposal; (ii) Any relevant [additional] scientific inputs; (iii) Any relevant traditional knowledge of indigenous peoples and local communities; (iv) Any other relevant information.	There seems to be a convergence of opinion about the need to consult Indigenous Peoples and local communities with relevant traditional knowledge about proposals to put in place area-based management measures
PART III Measures such as area-based management tools, including marine protected areas, **Article 20**: Monitoring and review	4. Following the review, the Conference of the Parties shall, as necessary, take decisions on the amendment or revocation of area-based management tools, including marine protected areas, including any associated conservation and [management] [sustainable use] measures, [as well as the extension of time-bound area-based management tools, including marine protected areas, which would otherwise automatically expire,] on the basis of an adaptive management approach and taking into account the best available [science] [scientific information and knowledge, including relevant	The debate about use of science alone, or scientific information and traditional knowledge, also extends to review of area-based measures

	traditional knowledge of indigenous peoples and local communities], the precautionary [approach] [principle] and an ecosystem approach.	
PART IV Environmental impact assessment, Article 31: Scoping	[2. Such scope shall include, the identification of key environmental [, social, economic, cultural and other relevant] [impacts] [issues], including identified cumulative impacts, using the best available scientific information and relevant traditional knowledge of indigenous peoples and local communities [, alternatives for analysis] [and a determination of the potential effects of the planned activity under the jurisdiction or control of a State Party, including a detailed description of potential environmental consequences].]	The paragraph on scope includes both cultural impacts and the inclusion on relevant traditional knowledge. However, the paragraph is heavily bracketed, demonstrating that there is lack of agreement at this stage
PART IV Environmental impact assessment, Article 32: Impact assessment and evaluation	1. A State Party [that has determined that a planned activity under its jurisdiction or control requires an environmental impact assessment under this Agreement] shall ensure that the identification and evaluation of impacts in such an assessment is conducted in accordance with this Part, using the best available scientific information and relevant traditional knowledge of indigenous peoples and local communities [, and an examination of alternatives].	This paragraph includes traditional knowledge in environmental impact assessments. There are no brackets. **Here we might also think about including traditional activities that might be impacted, as well as cultural values**.
PART IV Environmental impact assessment, Article 34: Public notification and consultation	[2. Stakeholders in this process include potentially affected States, where those can be identified, [in particular adjacent coastal States] [, indigenous peoples and local communities with relevant traditional knowledge in adjacent coastal States,] relevant global, regional, subregional and sectoral bodies, non-	This paragraph seeks to include indigenous peoples and local communities with relevant traditional knowledge in EIA notification and consultation. However, the text is bracketed, demonstrating lack of consensus.

	governmental organisations, the general public, academia [, scientific experts] [, affected parties,] [adjacent communities and organizations that have special expertise or jurisdiction] [, interested and relevant stakeholders] [, and those with existing interests in an area].]	
PART IV Environmental impact assessment, Article 35: Preparation and content of environmental impact assessment reports	[3. Further [details] [guidance] regarding the required content of an environmental impact assessment report [shall] [may] be developed by the Conference of the Parties as an annex to this Agreement and shall be based on the best available scientific information and knowledge, including relevant traditional knowledge of indigenous peoples and local communities. [[These details] [This guidance] shall be reviewed regularly].]	Another bracketed paragraph, which includes a reference to scientific information and traditional knowledge
PART V Capacity-building and transfer of marine technology, **Article 43:** Cooperation in capacity-building and transfer of marine technology	2. Capacity-building and the transfer of marine technology under this Agreement shall be [carried out] [promoted] through enhanced cooperation at all levels and in all forms, including partnerships with and involving all relevant stakeholders, such as, where appropriate, [the private sector,] civil society and holders of traditional knowledge, and by strengthening cooperation, coordination and synergies between relevant legal instruments and frameworks and relevant global, regional, subregional and sectoral bodies.	This section is useful in including partnerships with holders of traditional knowledge. **We note that such partnerships should be meaningful, include all aspects of a project from planning stages onward, and be two-way in including mutual learning.**
PART V Capacity-building and transfer of marine technology, **Article 46**: Types of capacity-building and transfer of marine technology	1. In support of the objectives set out in article 42, the types of capacity-building and transfer of marine technology may include, and are not limited to:	While it is important that traditional knowledge is included here, it should also be noted that TK is not data, and that it cannot be divorced from its cultural context. Also, not all TK can be

	(a) The sharing of relevant data, information, knowledge and research; (b) Information dissemination and awareness-raising, including with respect to relevant traditional knowledge of indigenous peoples and local communities; (c) …	openly shared. Thus, **sharing of TK should only be undertaken with the permission of the knowledge holders.** For example, UNDRIP Article 31 states that "Indigenous peoples have the right to maintain, control, protect and develop their cultural heritage, traditional knowledge and traditional cultural expressions, as well as the manifestations of their sciences, technologies and cultures…" CBD also has text related to free and prior informed consent.
PART VI: Institutional arrangements, Article 49: Scientific and Technical Body	2. The Body shall be composed of experts, taking into account the need for multidisciplinary expertise [, including expertise in relevant traditional knowledge of indigenous peoples and local communities], gender balance and equitable geographical representation.	Expertise relevant to traditional knowledge is still bracketed, meaning that its inclusion in the work of the scientific body is under debate. **We would advocate including traditional knowledge, as well as knowledge holders, and possibly establishing a specific body or committee under the Scientific and Technical Body to facilitate this**, learning from experiences of UNFCCC, CBD, Arctic Council and others. **Secretariat support for such a body would also be required**.
PART VI: Institutional arrangements, Article 50: Clearing-house mechanism	3. The clearing-house mechanism shall serve as a centralized platform to enable States Parties to have access to, [collect,] [evaluate,] [make public] and disseminate information with respect to: [(a)….] [(b) Data and scientific information on, as well as [, in line with the principle of prior informed consent,] traditional knowledge associated with, marine genetic resources of areas beyond national jurisdiction, including through lists of databases, repositories or gene banks where marine genetic resources of areas	The text relating to the principle of prior informed consent is bracketed due to its controversial nature. **It is important to have such a qualifier here since not all traditional knowledge can be openly shared through a platform like the clearing-house mechanism.** TK is owned by those Indigenous Peoples and local communities that hold it, and their permission and involvement is a prerequisite for its use (e.g. UNDRIP Article 31).

	beyond national jurisdiction are currently held, a registry of such resources, and a track-and-trace mechanism for marine genetic resources of areas beyond national jurisdiction and their utilisation;] [(c)…] …	
PART VI: Institutional arrangements, Article 50: Clearing-house mechanism	[4. The clearing-house mechanism shall: (a)… [(b) Promote linkages to relevant global, regional, subregional, national and sectoral clearing-house mechanisms and other databases, repositories and gene banks [, including experts in relevant traditional knowledge of indigenous peoples and local communities];] …	This section promotes linkages with experts in relevant traditional knowledge, which is a better approach than just linking to the knowledge itself. **It might be good to additionally include the word "knowledge holders" here, as an expert may not necessarily be a knowledge holder**.
[PART VII: Financial resources [and mechanism]], [Article 52: Funding]	[Alt.1 5. In addition to the voluntary trust fund, a special fund [may] [shall] be established by the Conference of the Parties to: …. (e) Support conservation and sustainable use programmes by holders of traditional knowledge of indigenous peoples and local communities; …]	Everything to do with finances is heavily bracketed. Paragraph (e) would provide support for conservation and sustainable use programmes by Indigenous Peoples and local communities, presumably based on traditional knowledge and practices. **This would allow for traditional practices close to shore to be linked with those in ABNJ for ecological and cultural connectivity, which is vital for marine governance in an interconnected ocean.** It would be good to have an explicit mention of traditional practices here, if possible.
[**ANNEX II** Types of capacity-building and transfer of marine technology]	[Under this Agreement, capacity-building and the transfer of marine technology initiatives may include, and are not limited to: (a) The sharing of relevant data, information, knowledge and	The inclusion of Annex II is still under discussion. The item on sharing of relevant traditional knowledge is included, with a bracketed principle of prior informed consent. **Including the bracketed qualifier is important**

	research, in user-friendly formats, including: … (iii) Relevant traditional knowledge [, in line with the principle of prior informed consent]; …]	**to ensure that the traditional knowledge holders approve of the sharing and use of their knowledge**.
[**ANNEX II** Types of capacity-building and transfer of marine technology]	(e) The development and strengthening of human resources and technical expertise through exchanges, research collaboration, technical support, education and training and the transfer of technology, such as: (i) … (ii) [Short-term, medium-term and long-term] [Education] and training in: a. The natural and social sciences, both basic and applied, to develop scientific and research capacity; b. Technology, and the application of marine science and technology, to develop scientific and research capacities; c. Policy and governance; d. The relevance and application of traditional knowledge; (iii) The exchange of experts, including experts on traditional knowledge;	Paragraph (ii) d. **provides for strengthening capacity in the relevance and application of traditional knowledge, which is an excellent idea that should be supported**. Given the bracketed text and sometimes limited understanding about the relevance of TK for ABNJ governance, such capacity building seems to be much needed. Paragraph (iii) provides for **exchange of experts, including those in traditional knowledge, which could provide a basis for building partnerships and better understanding between traditional knowledge, science and marine management/governance**.

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Annex B: Clearinghouse

Data and information related to the deep-sea and open ocean is fragmented and not always easily accessible to SIDS. Unpublished data may remain at institutions outside of the region, published articles may be behind a paywall and not accessible, and scientific information may not be available to policymakers in a format that is understandable, relevant and timely. Access to timely and relevant data and knowledge about the deep- and open-ocean is critical for ocean management in SIDS and in ABNJ, and it is hoped that the establishment of a clearing-house mechanism, as provided for in Article 51 of the draft BBNJ agreement, will support and enable such access.

There are already several data clearing-houses and/or data repositories in SIDS (Annex A1), it is important that the BBNJ clearing-house mechanism is established in such a way that it builds upon and enhances existing regional and national efforts, without placing an undue burden on countries with limited resources, such as SIDS. There are concerns that the global BBNJ clearing-house may be built without due regard for existing regional and national clearinghouses in SIDS regions, and as a result may displace or duplicate work that has already been done.

The BBNJ instrument may provide an opportunity to address gaps in existing clearinghouse mechanisms and repositories in SIDS and SIDS regions, by promoting enhanced collaboration between countries, including through sharing and making available data and information, and potentially collaborating on common capacity building and technology transfer need. Regional BBNJ portals could also provide high visibility for regional and national needs assessments and provide the basis for building partnerships to meet those needs. For example, while Table 1 above is not comprehensive, it also points to certain gaps, such as the lack of common marine biodiversity-related databases for the AIS region.

The current draft text of the BBNJ Agreement recognizing the special circumstances of SIDS with respect to the clearinghouse mechanism could provide the basis for enhanced collaboration. The draft text refers to the special circumstances of SIDS - in order to facilitate their access to the clearing-house mechanism without undue obstacles or administrative burdens, and include information on activities to promote information-sharing, awareness-raising and dissemination in and with those States, as well as provide specific programmes for

those States. While this text is still bracketed, it could provide the basis for enhanced collaboration by, for example:

- Supporting, enhancing, and building upon existing data and information sharing efforts in SIDS regions.
- Supporting the creation of data and information sharing, as well as common CBTMT initiatives, in SIDS regions, in particular the AIS region, where information sharing relating to marine biodiversity and associated human activities could be strengthened.
- Supporting the creation of further data and information sharing between all SIDS regions, including common CBTMT activities.

Questions still remain about how best to operationalize access to traditional knowledge through the global BBNJ clearing-house, as proposed in the draft text. Traditional knowledge is not the same as scientific data because it has a cultural context from which it cannot be separated. Traditional knowledge also belongs to the knowledge holders, and cannot necessarily be made public. The best way to use traditional knowledge is with the involvement of the knowledge holders, or with their prior informed consent. Thus, special processes would need to be put in place to ensure that proper protocols are adhered to in the dissemination of traditional knowledge. At the same time, CBTMT activities hosted by the BBNJ clearing-house can help build awareness about the importance of traditional knowledge for ocean governance.

Lessons for the BBNJ agreement

Many questions remain about how the BBNJ clearing-house mechanism might work in practice to meet the needs of SIDS. While work on this is still ongoing, a study of existing clearinghouses (see Table 2) yields the following points relating to how they are operationalized:

- Most clearing-house mechanisms make relevant information available to users to enable them to better **comply** with the requirements of a specific convention or a protocol, or to undertake selected environmental management activities.
- Some clearing-houses also require that users provide updated information to the clearing-house. For example, Parties to the Nagoya Protocol to the Convention on Biological Diversity have an **obligation** to make relevant national information available to the Access and Benefit-Sharing (ABS) Clearing-house, making it a key tool for monitoring the utilization of genetic resources along the value chain.
- Many clearing-houses require countries to nominate a **national focal point** (NFP) who is responsible for national coordination and for making national information available on relevant topics.
- Participation in certain aspects of a clearinghouse may be **mandatory** (e.g. certain aspects of CBD, ABS and BCH clearing-houses), while participation in others is **voluntary** (e.g. Joint Clearing-house Mechanism for the Basel, Rotterdam and Stockholm Conventions)

- Most clearing-house mechanisms also allow provision and/or entry of **specific categories** of information by non-Parties, including by organizations, NGOs and the scientific community
- For provision of information into a clearing-house, **standards and pre-determined formats** are developed to dictate the format in which information is provided, in order to make it compatible and searchable across the platform
- **Models** for operation:
    - Centralized approach: Information providers send information to a coordinating secretariat for uploading to ensure consistent format.
    - De-centralized approach: Distributed network of national, regional and thematic nodes, including data repositories, host their own data locally. A central node is maintained by a secretariat to provide an entry point to information and data across all nodes. Typically, the secretariat develops tools and protocols for interaction, and there are many models for inter-operability (e.g. UNESCO-IOC data repositories). This approach has become more common with advancement of information sharing tools. This approach might work well in SIDS regions by allowing regional clearinghouses and databases (Table 1) or sections of them to become nodes in the global BBNJ clearing-house, while maintaining control of their own data. Where data or information is sensitive, metadata can be made available instead.
- Most clearing-house mechanisms offer **capacity-building functions**. Some have a dedicated capacity-building portal to centralize access to relevant information and activities (e.g. UNFCCC, BCH). In addition to publications, many provide access to training workshops and courses (either organized by the Secretariat or other affiliated entities), online forums and workspaces, toolkits, webinars and targeted technical support on specific topics. Many also offer access to a human network of experts. There are fewer good examples of match-making functions between capacity and technology needs, and available support.

It is also important to note that substantial work, resources and human resources is required to ensure that a clearing-house is successful and becomes a useful resource for countries. Experience with existing clearinghouses (Table 2) demonstrates that in order to be successful, the following conditions are needed:

- Sufficient **resourcing**, including funding, as well a strong **human element** to coordinate the work (e.g. Secretariat or dedicated entity). Quite a lot of work goes into developing the architecture and content of a clearing-house, and to maintaining it and keeping it up to date. Dedicated staff with appropriate expertise will be required to make the clearing-house effective. In addition to development and maintenance activities, this might include a person or persons to contact users and respond to requests and queries; a help desk to answer questions; proactive searching for information and making it available; and active facilitation that will bring people together to work towards a common goal. A strong clearing-house mechanism **coordinator** can help build

partnerships around important BBNJ-related topics, champion the CHLM, and support users through individual attention. All of this will require sufficient and steady **funding and human resources, as well as a secretariat or dedicated entity** to house it.

- Building on relevant **existing clearing-houses and networks** globally, regionally, nationally and thematically; the BBNJ Agreement is not starting in a vacuum. There are already many publicly-accessible databases, including clearing-houses, with relevant data and information that operate globally, regionally and nationally. There are also many existing human networks, including professional networks, networks of practitioners, monitoring networks and youth networks. It is important that these initiatives are built upon, linked to, and collaborated with, rather than replaced. Annex I provides examples of some existing data repositories and clearing-houses.
- **Keeping in mind that the clearing-house mechanism is about people as much as it is about data and information.** A successful clearing-house mechanism actively facilitates, encourages and empowers users to access support networks, including networks of practitioners for expert advice and for sharing of experiences. There may be workspaces for people to come together, post questions, and discuss. There might be webinars and events to further build knowledge around specific topics, as well as the opportunity to use social media for some aspects of quick communication. These efforts will need to be actively facilitated and supported.
- **Keeping it simple and user-friendly.** A successful clearing-house will have few, if any, barriers to entry. It will have a user-friendly and intuitive interface, where relevant information is easy to find, and where there is little or no learning curve. If the clearing-house mechanism is too complex to log into and to use, it will stay underutilized. Making information available and searchable in several languages is also important. Submission of data to the clearing-house is likely to require either creation of an authorized account and/or review of information by a moderation team before publication, but again, barriers to participation should be minimized.

Annex B Table 1: Examples of clearinghouses and/or data repositories in AOSIS member States

Clearing-house or database and region	Aims/goal	Components	Some interesting functions
The Pacific **Pacific Data Hub** *https://pacificdata.org/*	The Pacific Data Hub (PDH**)** is a central repository of data about the Pacific and from the Pacific**.** The platform serves as a gateway to the most comprehensive collection of data and information about the Pacific across key areas including population statistics, fisheries science, climate change	Data covered includes education, fisheries, geoscience, climate change, economic development, energy, environment, health, land resources, human rights, and gender and youth	Mapping function, SDGs dashboard, links to the Pacific Environment Portal (including coastal and marine), documents, stories

	adaptation, disaster risk reduction and resilience, public health surveillance, conservation of plant genetic resources for food security and human rights.		
The Pacific **Pacific Environment Portal** https://pacific-data.sprep.org/	Hosted by SPREP, the Pacific Environment Portal provides an easy way to find, access and reuse regional and national data. Its main purpose is to provide easy access and safe storage for environmental datasets to be used for monitoring, evaluating, and analysing environmental conditions and trends to support environmental planning, forecasting, and reporting requirements at all levels. It is linked to the Pacific Data Hub.	Includes information and data on atmosphere and climate, land, biodiversity, built environment, coastal and marine, culture and heritage, inland waters, and nuclear energy.	The portal links to national environment data portals, documents, stories, and a mapping dashboard called PacGeo.
Caribbean **Clearing-House Mechanism LAC** *http://portete.invemar.org.co/chm#/*	Pilot project: Provides interested users in Member States with direct and rapid access to relevant sources of information, practical expertise in the transfer of marine technology, as well as to facilitate effective scientific, technical and financial cooperation to that end.	Information on experts, documents, training, laboratories, institutions, geospatial information, vessels	Will also allow linkage to IOC UNESCO resources such as OceanExpert, Ocean Teacher Global Academy, ODISCat and others
Caribbean **Caribbean Marine Atlas** https://www.caribbeanmarineatlas.net/	The purpose of the CMA is to identify, collect and organize available geo-spatial datasets into an atlas of environmental themes for the Caribbean region, under the sponsorship of the Intergovernmental Oceanographic Commission's (IOC) International	Regional and national data layers. Data themes include coastal habitats, fisheries, environmental quality, climate change and sea level rise, oceanography, as well as socio-economic aspects	Downloadable data. Database built using open source technologies and will be based on international standards to enable the sharing of technological knowledge and resources. The Atlas will encourage the wide dissemination of key datasets by providing

	Oceanographic Data and Information Exchange (IODE) and Integrated Coastal Area Management (ICAM) Programmes. The CMA will include geo-spatial data from national and regional projects and programmes, related to the sustainable development and integrated management of marine and coastal areas in the region.		access and visualization of these data
Caribbean **CLME+Hub** *https://clmeplus.org/*	A regional, collaborative platform providing access to information, knowledge, resources and tools to support all people and organizations working towards a healthier marine environment in the Caribbean and North Brazil Shelf Large Marine Ecosystems.	Information on state of the marine environment, projects, documents library, contacts database, and CLME+ training portal. Links to other Caribbean databases such as Caribbean Marine Atlas, CAMPAM MPA database, and Caribbean Science Atlas.	A central hub to a large amount of regional ocean-relevant information.
AIS **The Indian Ocean Observing System (IndOOS)** *https://www.clivar.org/clivar-panels/indian/IndOOS*	CLIVAR, in collaboration with IOGOOS and the IOC-UNESCO, is working to design and implement an integrated observing system for the Indian Ocean. This is still work in progress.	Oceanographic data	Work in progress
AIS **The Indian Ocean Biodiversity Information System (IndOBIS)** *https://obis.org/node/1a3b0f1a-4474-4d73-9ee1-d28f92a83996*	IndOBIS is a regional OBIS node operated by the Centre for Marine Living Resources and Ecology in India.	IndOBIS collects data sets of occurrences of identifiable marine species at a specific time and place collected mainly in the Arabian Sea, Bay of Bengal and the Indian Ocean. It is one of the more than 20 regional nodes of the Ocean Biodiversity Information System OBIS.	Data centre, library, publications, links to OBIS mapping functions. Data includes records of deep sea organisms from certain areas.
AIS **The Nairobi Convention Clearinghouse**	The Nairobi Convention Clearinghouse is a sustainable 'data shop', providing accurate and	Access to data and information; information about projects, partnerships, resources,	Searchable interface; Western Indian Ocean MPA Interactive Dashboard.

https://www.nairobiconvention.org/clearinghouse/	relevant data and information for improved management and protection of the coastal and marine environment in the Western Indian Ocean region. The Nairobi Convention Clearinghouse goal is to improve the data sharing, coordination and participation of the Western Indian Ocean countries.	and coastal and marine experts.	

Annex B Table 2: Examples of global clearing-house mechanisms.

Clearing-house	Aims/goal	Components	Some interesting functions
The CBD Clearing-House Mechanism (CHM) *Convention on Biological Diversity (CBD Secretariat)* https://www.cbd.int/chm/	Providing effective information for implementation of the CBD and its Strategic Plan both globally and nationally	- Website (central node) and net-work of national clearing-houses - Partner institutions - 6 languages	Large, long-standing clearing-house mechanism with a distributed model, information dissemination, information uploading by national nodes, capacity building functions and toolkits
The ABS Clearing-House (ABSCH) *Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the CBD* *(CBD Secretariat)* http://absch.cbd.int	Facilitating the implementation of the Nagoya Protocol by: - **Enhancing legal certainty, clarity, and transparency** on procedures for access and for monitoring the utilization of genetic resources along the value chain, including through the internationally recognized certificate of compliance (IRCC). - **Making relevant information regarding ABS available** - **Connecting providers**	Website (central information hub) to enable, primarily Parties, but also non-Parties, indigenous people and local communities, international and non-governmental organizations, research institutions and businesses to make information available in an organized global repository - Ability to be interoperable with	The CBD Secretariat operates a **help desk to provide on-demand technical support**, answer questions and receive feedback on the use of the ABSCH. - **Outreach and engagement campaign** to provide personalized, engagement, raise awareness and make all relevant information available. - **Training, workshops and webinars** to build capacity for the use of the ABSCH.

	and users of genetic resources and associated traditional knowledge.	relevant national or partner databases or information systems - 6 languages	- **Training website** to support trainings and workshops by providing users with a safe place where they can submit "practice" records and get familiarized with the functionalities. - **Information about relevant capacity development initiatives and capacity development material** - **Model Contractual Clauses, Codes of Conduct, Guidelines, Best Practices, Standards, Community Protocols and procedures, customary law**.
The Biosafety Clearing-House (BCH) *Cartagena Protocol on Biosafety to the CBD (CBD Secretariat)* http://bch.cbd.int/	Facilitating the exchange of information on Living Modified Organisms (LMOs) and assist the Parties to better comply with their obligations under the Cartagena Protocol on Biosafety.	- Website in the public domain (central node), where registered users can register, update, delete or correct information and participate in online activities. - Ability for national nodes to provide decentralized information - 6 languages	- Information about the Biosafety Protocol and its implementation - **Collaborative Portal** to allow interaction among users on specific thematic areas - **Biosafety Capacity-Building Portal** that includes: - Capacity-Building Online Forums - Biosafety Education Online Forums - Capacity-Building Collaborative Network - Restricted workspaces for specific groups
UNFCCC Capacity-building Portal *UN Framework Convention on Climate Change (UNFCCC Secretariat)* https://unfccc.int/topics/capacity-building/workstreams/capacity-building-portal	The capacity-building portal is an **interactive tool that gathers and presents active information on projects, tools, courses and other resources that enhance the capacity and ability of developing countries to respond to climate change** at national and regional levels	Website, mapping, database	**Good example of a capacity-building oriented clearing-house** with: - E-learning - Projects, case studies and tools - Resources - Capacity-building events - News and blogs

Joint clearing-house mechanism (Basel, Rotterdam and Stockholm conventions) *BRSMEAS (BRSMEAS Secretariat)* http://www.brsmeas.org/Implementation/KnowledgeManagementandOutreach/Clearinghousemechanism/tabid/5382/language/en-US/Default.aspx	Facilitating the exchange of information and expertise relevant for the Basel, Rotterdam and Stockholm conventions.	Website with the following components: -Information; community in the form of a global network of information providers; and tools to further disseminate information provided by the user community - Ability for stakeholders to provide decentralized information	The scope of information covered includes: - Scientific information; - Regulatory information - Capacity development information -Information on the status of implementation of the conventions
IOC Ocean InfoHub (OIH) Project *IOC-UNESCO* https://oceaninfohub.org/	The OIH aims to improve access to global oceans information, data and knowledge products for management and sustainable development**.** The OIH will link and anchor a network of regional and thematic nodes that will improve online access to and synthesis of existing global, regional and national data, information and knowledge resources, including existing clearinghouse mechanisms.	Website with an interoperability layer and supporting technology to allow existing and emerging ocean data and information systems, from any stakeholder, to interoperate with one another. - The project will not be establishing a new database, but will be supporting discovery and interoperability of existing information systems	**Interoperability of existing information and databases**, including: 1. Experts and institutions/organizations 2. Documents 3. Spatial data and maps 4. Research vessels 5. Education and training opportunities 6. Projects

Annex C: Financial Resources for CBTT under the BBNJ agreement

The issue of funding the BBNJ agreement, including CBTT, is addressed in [Article 52] of the draft BBNJ Agreement (UN, 2019). In order to be successful, the BBNJ Agreement will need to be able to support SIDS and other developing countries with accessible, adequate, predictable and sustainable funding. Yet it remains unclear if funding will be voluntary or mandatory, whether there will be a financial mechanism, and whether a special fund for CBTT might be established, and if so, how it will be managed, and by whom.

Ocean finance overall remains a major impediment for conservation and management. At the same time, the ecological and economic impacts of inadequate ocean management are becoming clearer as the value of services provided by the ocean to humankind - at least US$200 billion dollars per year according to the GEF - are better understood, (Thiele et al, 2017). Thus, while substantial finance is required to ensure the conservation, sustainable use and restoration

of ocean resources, the cost of inaction in loss of ecosystem services would be far greater (Global Ocean Trust, 2022). Duarte et al (2020) estimate that at least $10 billion to $20 billion per year is needed to extend protection actions to reach 50% of the ocean space, and substantial additional funds for restoration. While this figure is not specific to ABNJ, nor does not take into account capacity building and technology transfer for equitable participation and benefits, it does give an order of magnitude for the type of finance that is required for the entire ocean. To put the figure in context, it was estimated by the Our Shared Seas report that approximately US$ 3.1 billion in funding was allocated to marine conservation in 2019 from philanthropic, development aid, NGO discretionary funding, and private finance sources (CEA consulting, 2021). Yet the economic return from better ocean funding would be considerable, projected to be around $10 per every $1 invested, and creating in excess of one million new jobs (Duarte et al, 2020).

Targeted BBNJ finance is critical for the rapid adoption and entry into force of the BBNJ Agreement, and includes putting in place the required physical and institutional infrastructure and technology for science, monitoring, enforcement and innovation in a manner that is transparent and equitable and preserves the rights of future generations (Global Ocean Trust, 2022). For the BBNJ Agreement, which covers 64% of the surface of the ocean and nearly 95% of its volume, funding would be required at least to: (i) undertake ocean science and observation in ABNJ; (ii) establish networks of MPAs and other area-based measures; (iii) build capacity of SIDS and developing country Parties to implement the Agreement; (iv) transfer the required technology for implementation. In addition to being vital for the implementation of the BBNJ Agreement and safeguarding our shared ocean and its resources, the financing could also help build sustainable blue economies nationally and regionally.

Currently bracketed draft text relates to the voluntary or mandatory nature of funding; whether the funding will be sustainable and predictable; the establishment of a special fund; cooperation towards establishment of appropriate funding mechanisms; and whether access to funding shall be open to developing States Parties on the basis of need or taking into account needs for assistance. In this context, currently bracketed wording includes a listing of various country groupings that could access funding, including, among others, least developed countries, small island developing States and middle-income countries. This formulation would ensure that SIDS in the middle-income category would also be eligible for funding.

The draft text envisions a diverse range of potential funding sources, including public and private sources, both national and international. This would include, but not be limited to, contributions from States, international financial institutions, existing funding mechanisms under global and regional instruments, donor agencies, intergovernmental organizations, non-governmental organizations and natural and juridical persons, and through public -private partnerships. The text does not specifically mention innovative funding sources (see discussion below) but does not rule them out either.

The special fund envisioned in the currently bracketed text in paragraph 5 (Alt 1) would include funding for capacity building, training, transfer of technology, assistance to States Parties in implementing the Agreement, rehabilitation and restoration of marine biodiversity, conservation

and sustainable use programs by holders of traditional knowledge, public consultations and other functions. In addition the fund could, and should, provide for protection of marine biodiversity as a more cost-effective option than just restoration.

The nature of contributions to the special fund, whether solely voluntary or voluntary and mandatory, remains under debate. The mandatory sources mentioned, but currently bracketed, including royalties and milestone payments from the use of MGRs, payments to access and utilize MGRs, EIA fees, cost recovery, and other fees, penalties and funding avenues. It should be noted here that it will likely take time before MGRs from ABNJ will produce substantial royalties, and thus it is important that the funding base is broadened as much as possible.

The remaining text in this section will examine the experience of existing environmental conventions in regards to financing, and discuss innovative financing and its potential for the BBNJ Agreement.

Experiences of existing conventions

Environmental conventions have a divergence of financing instruments, which likely reflect the mandates and histories of those conventions. The operating entities of financial mechanisms of conventions, where they exist, can consist of one or more international entities. Conventions may have established special funds for specific purposes or recipients. The UNFCCC, for example, has two financial mechanism operating entities: the Global Environment Facility (GEF) and Green Climate Fund, along with four special funds: the Special Climate Change Fund (SDDF), the Least Developed Countries Fund (LDCF), the Adaptation Fund (AF), and the Capacity development Initiative for Transparency (CBIT). The combination of two financial mechanism operating entities and several special funds has given UNFCCC, the largest amount of financing of all the environmental conventions. Both UNFCCC and the Convention on Migratory Species (CMS) have established a Standing Committee on Finance to assist the COP, and, in the case of CMS, to monitor the budget. A Standing Committee on Finance would also be a useful option for the BBNJ Agreement to help engage with a multitude of potential financing partners and solutions.

In addition to the UNFCCC, the GEF serves as a financial mechanism for the Convention on Biological Diversity (CBD), the Minamata Convention on Mercury, the UN Convention to Combat Desertification (UNCCD), and the Stockholm Convention on Persistent Organic Pollutants (POPs). The GEF receives guidance from the Conference of the Parties of these conventions, which is converted by the GEF Council into operational criteria (guidelines) for GEF projects. The GEF also reports back to the COPs of the conventions on projects financed.

In contrast, the Montreal Protocol chose to go with a standalone entity designed to meet its needs: the Multilateral Fund for the Implementation of the Montreal Protocol, which has generally been considered to have been very effective in assisting developing country Parties obtain both the capacity and technology needed to meet the requirements of the Protocol.

There are also a several conventions that do not have a specific operating entity for a financial mechanism, such as CITES, CMS, Basel Convention, Ramsar Convention, UNESCO World Heritage Convention, and UNCLOS. While lacking a GEF-like financial mechanism, each of these conventions have special funds for CBTT activities and in some cases for the operation of the Secretariat (where this is not covered by other sources). Contributions to these funds are either mandatory (CITES Trust Fund, World Heritage Fund), a combination of mandatory and voluntary (CMS Trust Fund), or solely voluntary (Basel Convention Trust Fund, Basel Convention Technical Cooperation Trust Fund, Ramsar Convention Small Grants Fund, UNCLOS voluntary trust funds). In general, those conventions with mandatory funding requirements have a more stable financial basis for undertaking CBTT and other activities (Cicin-Sain et al, 2018).

The Parties to the BBNJ Agreement have a choice to select one or a combination of several of these models, including a tailor-made funding architecture for its own purpose, such as an international ocean finance institution (Global Ocean Trust, 2022). Choosing GEF as a financial mechanism brings the advantage of an already-established structure consisting of the GEF Council and the GEF Assembly, as well as an independent Evaluation Office. In addition, the GEF has already grappled with and addressed common problems including providing equal formal voice for developed and developing countries on the GEF Council, multiple and diverse lines of accountability, safeguard policies, and transparency. The GEF has also invested considerable resources in learning, self-reflection, and evaluation. For the BBNJ Agreement, it could be presumed that the GEF option might provide some degree of coordination with other international waters, biodiversity and climate change activities, though it would be important to ensure that this happens in practice. Criticism of the GEF in the past has included complexity of the project cycle, long timelines and delays, and relying on international implementing agencies and consultants rather than bringing on board a diversity of national stakeholders (Nakhooda and Forstater, 2013). Choosing the GEF does not preclude the development of another, complementary financing entity for the BBNJ Agreement, such as the international ocean finance institution proposed above. The two entities could operate in a complementary manner, as is the case with the two financing mechanisms under UNFCCC.

Lessons learned from the **GEF, the Multilateral Fund and others** include the importance of transparency, equity between contributing and recipient countries, the need for a country-driven approach, and the importance of monitoring and evaluation of activities. In addition, the Multilateral Fund provided funding for the establishment of national ozone units within each recipient government with at least one full-time staff member, thus enabling countries to take ownership of their national programs and providing a channel for communications. Supporting networks were also established regionally and sub-regionally (Multilateral Fund, 2007). The GEF has provided support for enabling activities, such as technology needs assessments under UNFCCC, as well as the development of National Portfolio Formulation Exercises (NPFE) to help countries set priorities for how they would like to programme available funds. This has allowed strategic allocation of available funds (Nakhooda and Forstater, 2013). These last two points highlight the importance, and potential, for funding needs assessments under the BBNJ

Agreement, and for developing national strategies for implementation to better channel CBTT and finance.

The Parties to the BBNJ Agreement also have the option of establishing a **special fund** for CBTT, as already provided for (among other aims) in the bracketed paragraph 5 (Alt 1). This could be one or several funds, and its administration, purpose and requirements might be different from the main financial mechanism. It should be noted here that most conventions have such funds, and UNFCCC has four of them. Some interesting, and potentially BBNJ-relevant, funds include the UNESCO World Heritage Convention's Rapid Response Facility, a small grants program to quickly and flexibly protect World Heritage Sites in a time of crisis (and which could serve as a model for a similar rapid response fund for protecting, managing and rehabilitating key biodiversity areas in ABNJ); and the International Seabed Authority Endowment Fund to promote the conduct of collaborative marine scientific research in the international seabed area for the benefit of humankind.

From a SIDS perspective, it might be feasible to make an argument for a **special fund for SIDS** that would provide financing for activities that are vital for SIDS participation in the BBNJ Agreement as guardians of vast ocean spaces. It is likely that such a fund would rely on voluntary contributions, as well as, potentially, on contributions from EIA fees, MGR royalties and payment for ecosystem services in SIDS-adjacent ABNJ. It might also receive contributions from private sector partners or market-based mechanisms).

Innovative financing, including private sector involvement

The term 'innovative finance' describes a set of financial solutions that create scalable and effective ways of channelling private money, in particular from global financial markets towards solving pressing global problems (Thiele et al, 2017). In the context of the BBNJ Agreement, some examples of potential innovative financing (from Thiele et al, 2017 and Cicin-Sain et al, 2018) include the following:

- **Financing through marine conservation**, such as visitor entry fees to marine protected areas. This might include MPAs that straddle jurisdictions.
- **Financing generated through user fees**, including fees related to EIAs or other user fees relating to ABNJ.or in-kind fees such as **related to EIAs**.
- **Financing relating to both non-monetary and monetary benefit-sharing** from the exploration and development of MGRs
- **Debt-for-nature swaps or other debt finance**, which mobilize private impact investor resources to swap out high-interest-bearing sovereign debt in exchange for governmental commitments to conservation. Countries might collectively countries use this mechanism to finance, for example area-based management both within and beyond ABNJ.
- **Blue bonds** issued to raise capital and investment for existing and new projects with environmental benefits. They might be used to finance components

of a sustainable blue economy and associated capacity development that have direct bearing on conservation and management of ABNJ

- **Payment for ecosystem services**, which might be raised from direct beneficiaries of ecosystem services through mechanisms such voluntary contributions or taxes/fees. The contributors might be industries such as tourism, fishing, shipping, energy production and extractive industries. This might also include carbon benefits related to conservation/restoration of BBNJ ecosystem services that could be linked to country strategies to implement UNFCCC through Nationally Determined Contributions (NDCs)
- **Public–private partnerships** to develop ocean infrastructure, data collection and capacity for their use, such as remote sensing technologies for monitoring, observation and enforcement, and scientific sampling (including genetic data) that can be used for both industrial and conservation purposes.
- **Financing from integrating ABNJ into carbon markets**. Protection of ABNJ can lead to climate change mitigation by maintaining the "global conveyor belt" and enhancing the biological pump that transports carbon from the atmosphere into the deep ocean water masses.

SIDS have considerable experience with some of these mechanisms, in particular the Seychelles experience with blue bonds and debt-for-nature swaps.

While innovative finance has not been widely applied within environmental conventions, it has been debated for some time. For example, the CBD Parties have since 2008, discussed innovative financing mechanisms as potential funding sources, including payment for ecosystem services alongside with other economic instruments such as biodiversity offset mechanisms, fiscal reforms, the creation of markets for green products, integration of biodiversity concerns in climate funding and biodiversity in international development finance. However, this approach, particularly payment for ecosystem services, has met with resistance from some Parties (Prip, 2018).

The UNCCD has established an impact investment fund for land degradation neutrality (LDN). The LDN Fund is an impact investment fund blending resources from the public, private and philanthropic sectors to support achieving LDN through sustainable land management and land restoration projects implemented by the private sector. In addition to restoring degraded lands, the Fund with generate revenues from sustainable use of natural resources, creating green job opportunities for local communities, increasing food and water security and sequestering CO_2 (UNCCD, 2022). The UNCCD experience, while still new, might provide important lessons for the BBNJ Agreement.

Coalition of funders

By joining together funders from governments, philanthropic organizations, private sector and other sources could increase their impact, and be able to jointly address both areas within and beyond national jurisdiction, including the BBNJ Agreement, SDG 14 and other SDGs. A coalition of ocean funders, similar to the multi-donor ABS Capacity Development Initiative might be able

to accomplish this objective. The Coalition for Private Investment in Conservation (CPIC) launched during the 2016 IUCN World Conservation Congress in Hawaii might provide another model for such a coalition.

International Ocean Finance Institution or an International Ocean Sustainability Bank

There have been proposals for a dedicated International ocean finance institution such as an Ocean Sustainability Bank. Such an institution could help pull together diverse financing solutions for ocean spaces. While it could act as a financial mechanism for the BBNJ Agreement, it could also provide financing for a number of interconnected ocean-related commitments, both within and beyond national jurisdiction, including SDG 14 and ocean action under UNFCCC, thus creating policy coherence in ocean governance. A dedicated ocean finance institution could provide loan guarantees and equity and debt instruments as well as structure transactions and partner new investors (Global Ocean Trust, 2022; Cicin-Sain et al, 2018; Thiele and Gerber, 2017).

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