

DRAFT

Policy Brief on

**CAPACITY DEVELOPMENT FOR IMPLEMENTING THE
BBNJ AGREEMENT:**

**Possible Modalities for Addressing Area-based Management,
Environmental Impact Assessment, and Marine Genetic
Resources in the Context of Climate Change**

By

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Table of Contents

List of Boxes and Figures.....	3
1. PURPOSE OF THIS POLICY BRIEF.....	5
1.1 <i>Summary of the Policy Brief on Capacity Development as a Key Aspect of a New International Agreement on Marine Biodiversity Beyond National Jurisdiction (BBNJ).....</i>	5
1.2 <i>Common Elements Relating to Capacity Building and Technology Transfer in a BBNJ Context.....</i>	5
1.3 <i>Purpose of this Policy Brief on Capacity Development for Implementing the BBNJ Agreement: Possible Modalities for Addressing Area-Based Management, Environmental Impact Assessment, and Marine Genetic Resources in the Context of Climate Change.....</i>	7
2. CAPACITY DEVELOPMENT FOR AREA-BASED MANAGEMENT.....	13
2.1 <i>Needs Expressed in the President’s Aid to Negotiations for IGC 2.....</i>	13
2.2 <i>Possible Modalities for Operationalizing Capacity Building and Technology Transfer for ABMTs, Including MPAs.....</i>	14
2.3 <i>Global Considerations for Capacity Building and Technology Transfer.....</i>	15
2.4 <i>Regional Modalities for ABMTs, Including MPAs.....</i>	16
2.5 <i>National Modalities for ABMTs, Including MPAs.....</i>	18
2.6 <i>Additional Considerations Relating to Climate Change and ABMTs.....</i>	18
2.7 <i>Role of the Clearinghouse Mechanism.....</i>	19
2.8 <i>Financial Considerations to Implement the ABMT Component of the BBNJ Agreement.....</i>	19
2.9 <i>Summary of Capacity Development for ABMTs.....</i>	20
3. CAPACITY DEVELOPMENT FOR ENVIRONMENTAL IMPACT ASSESSMENT.....	22
3.1 <i>Needs Expressed in the President’s Aid to Negotiations for IGC2.....</i>	22
3.2 <i>Possible Modalities for Operationalizing Capacity Building and Technology Transfer for EIAs and SEAs.....</i>	26
3.3 <i>Global Considerations for Capacity Building and Technology Transfer Related to EIAs and SEAs.....</i>	27
3.4 <i>Regional Considerations for Capacity Building and Technology Transfer Related to EIAs and SEAs.....</i>	27
3.5 <i>National Considerations for Capacity Building and Technology Transfer Related to EIAs and SEAs.....</i>	28
3.6 <i>Additional Considerations Relating to Climate Change and EIAs/SEAs.....</i>	29
3.7 <i>Role of the Clearing House Mechanism.....</i>	29
3.8 <i>Summary of Capacity Development for EIAs/SEAs.....</i>	30
4. CAPACITY NEEDS FOR MARINE GENETIC RESOURCES.....	31
4.1 <i>Needs Expressed in the President’s Aid to Negotiations for IGC 2.....</i>	31
4.2 <i>Possible Modalities for Operationalizing Capacity Building and Technology Transfer for MGRs.....</i>	34
4.3 <i>Global Considerations for Capacity Building and Technology Transfer.....</i>	34
4.4 <i>Regional Modalities for MGRs, Including the Sharing of Benefits.....</i>	36
4.5 <i>National Modalities for MGRs, Including the Sharing of Benefits.....</i>	36
4.6 <i>Additional considerations relating to climate change and MGRs.....</i>	37
4.7 <i>Role of the Clearinghouse Mechanism.....</i>	38
4.8 <i>Financing.....</i>	38
4.9 <i>Summary of Capacity Development Related to Marine Genetic Resources.....</i>	38
5. CLIMATE CHANGE AND BBNJ.....	43
5.1 <i>The Ocean and Climate Nexus.....</i>	43
5.2 <i>Climate Change and ABNJ.....</i>	44

5.3 Climate Change and Area Based Management Tools..	45
5.4 Climate Change and Environmental Impact Assessments..	47
5.5 Climate Change and Marine Genetic Resources..	47
5.6 Conclusion..	48
6. WAY FORWARD ON CAPACITY BUILDING ON BBNJ AREA-BASED MANAGEMENT VIA THEORY OF CHANGE ANALYSIS.....	49
6.1 Initial Analysis Using Theory of Change Approach Related to Capacity Building Regarding Area-Based Management..	49
7. CONCLUSIONS.....	52
REFERENCES.....	56
ANNEX 1. NOTES ON THEORY OF CHANGE.....	61

List of Boxes and Figures

Boxes

Box 1.	The CBD EBSA Process, Associated Data and Capacity Building	10
Box 2.	Example of Regional Collaboration: Collective Arrangement Between NEAFC and OSPAR	12
Box 3.	PharmaSea Project – International Cooperation in Marine Genetic Resources Research	39
Box 4.	Examples of Scientific Codes of Conduct Relating to MGRs and Access and Benefit-sharing	39
Box 5.	Pacific Natural Products Research Centre, University of South Pacific.....	40
Box 6.	University of Papua New Guinea and University of Utah Collaboration in Drug Discovery	40
Box 7.	GEF Capacity Building Project in Natural Product Discovery in Support of the Nagoya Protocol.....	41

Figures

Figure 1.	Possible Modalities for Linking Global, Regional, and National Levels Regarding BBNJ Capacity Development.....	9
Figure 2.	Summary of Capacity Building and Technology Transfer Pathway for ABMTs, including MPAs.....	21
Figure 3.	Summary of Capacity Building and Technology Transfer Pathway for EIA/SEA.....	30
Figure 4.	Summary of Capacity Needs and Processes Related to Marine Genetic Resources at Global, National, and Regional Levels	42
Figure 5.	Schematic Showing Areas Under Greatest Threat from Temperature Change and Human Activity. (Levin and Le Bris 2015.....	49
Figure 6.	Initial Theory of Change, ABMTs	51
Figure 7.	Initial Theory of Change, Capacity Building and Technology Transfer for ABMTs	52

1. PURPOSE OF THIS POLICY BRIEF

Building on the earlier multi-institutional Policy Brief on *Capacity Development as a Key Aspect of a New International Agreement on Marine Biodiversity Beyond National Jurisdiction (BBNJ)*¹ (<https://bit.ly/2C0FuvD>), the purpose of this Policy Brief is: 1) To develop, in greater detail, possible modalities for addressing capacity building and transfer of marine technology regarding the other three main topic areas of the BBNJ negotiations: **area-based management, environmental impact assessment, and marine genetic resources**; and 2) **To incorporate climate change considerations** (dynamics and impacts on marine ecosystems and on coastal and island peoples) in the development of capacity on the above noted aspects of the BBNJ agreement.

1.1 Background

The Policy Brief on Capacity Development as a Key Aspect of a New International Agreement on Marine Biodiversity Beyond National Jurisdiction (BBNJ), published in September 2018, underscored that **a well-structured BBNJ capacity building system involving global, regional, and national levels, and with adequate and stable financial support, will be essential for achieving the major purposes of the Agreement on area-based management, environmental impact assessment, and marine genetic resources.** The first Policy Brief was intended to contribute directly to the discussions at the 1st meeting of the

¹Policy Brief on *Capacity Development as a Key Aspect of a New International Agreement on Marine Biodiversity Beyond National Jurisdiction (BBNJ)* September 2018 by Biliانا Cicin-Sain, Marjo Vierros, Miriam Balgos, Alexis Maxwell, Global Ocean Forum; Tina Farmer, FAO, Lead Technical Officer, GEF/FAO/GOF Capacity Development Project; Atsushi Sunami, Miko Maekawa, Iwao Fujii, Ocean Policy Research Institute of the Sasakawa Peace Foundation (OPRI-SPF); Awni Benham, International Ocean Institute; Julian Barbiere, Salvatore Aricò, Kirsten Isensee, Ward Appeltans and Harriet Harden-Davies, Intergovernmental Oceanographic Commission of UNESCO (IOC/UNESCO); Aimee Gonzales, Stephen Adrian Ross, Partnerships in Environmental Management for the Seas of East Asia (PEMSEA); Alfonso Ascencio Herrera, Chapi Mwango, Annakah Mason, International Seabed Authority; Ronán Long, Larry Hildebrand, World Maritime University (WMU); Philippe Vallette, Nausicaa/World Ocean Network; Joseph Appiott, Secretariat of the Convention on Biological

Intergovernmental Conference on development of an international legally binding instrument under UNCLOS on the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction (BBNJ).

This second policy brief, which was presented at the 2nd substantive session of the Intergovernmental Conference in March/April 2019, elaborates on the specific capacity needs and modalities related to the three components of the so-called BBNJ “package”: area-based management tools including marine protected areas, environmental impact assessment, and marine genetic resources including questions on the sharing of benefits. In addition, the present capacity brief brings in the topic of climate change, which is closely interlinked with the ocean, and will be an important consideration for the success of BBNJ governance as a whole, as well as its component management actions.

1.2 Common Elements Relating to Capacity Building and Technology Transfer in a BBNJ Context

While each of the elements of the BBNJ package has unique and differing capacity needs, there are also many commonalities between them. These commonalities include many cross-cutting elements, such as the importance for coordination and coherence; the need for adequate financing in the long term; and the need to assess the impacts of capacity building efforts. This section puts forward some of the overarching requirements for

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successful capacity building regardless of the specific topic.

Capacity building will be both required and delivered at the global, regional and national levels. At the global level, governments, United Nations organizations, international organizations, non-governmental organizations, and scientific and philanthropic institutions will be the likely contributors to capacity building and technology transfer. At the regional level, regional organizations have a primary role. And at the national level, the delivery of capacity and technology needs to be tailored to the unique needs and circumstances of each country.

In order to be effective, capacity building and technology transfer will have to be based on nationally identified needs. To accomplish this, it will be important to develop a systematic mechanism for capacity needs assessment, with regional organizations playing a key role in coordinating such assessments as appropriate. The clearinghouse mechanism can also play an important role in assessing capacity needs, and in connecting those requiring specific capacities and technologies with those providing them. Capacity building is more meaningful and effective if it supports and builds upon home-grown approaches and fits within national and regional cultural contexts.

Capacity is needed for individuals (policymakers, researchers, marine managers), institutions (national government agencies, universities, regional bodies), and society (public awareness, understanding, action). Most past and current efforts have focused on individual capacity. While the individual level is vital, institutional capacity is urgently required to strengthen institutions and to ensure that the benefits capacity building and technology transfer truly benefit the receiving country and region in the long term. Societal capacity will also be required for building broad support for ocean governance, and includes awareness raising in schools, for the general public, and for policymakers. On the individual level, there is a

need to build local expertise and experts, who can play a key role in capacity building within their countries and regions.

Cross-sectoral capacity is vital for governing an interconnected ocean in a holistic manner. Most capacity efforts are undertaken by, and for, sectoral agencies, and collaboration between sectors and organizations is rare. Capacity efforts often happen separately, with little coordination evident. Efforts towards sectoral coordination and collaboration would also need to cover efforts by government agencies, regional bodies, as well as non-governmental organizations and scientific institutions.

Countries will need legal, policy, scientific, and marine management capacity to: implement and comply with the new agreement, participate in global and regional cooperation, develop national legislation, policies and institutional arrangements for the new agreement, undertake marine scientific research and participate in research collaborations, undertake management of the marine ecosystem, including application of tools and approaches such as MSP, MPAs, EIA/SEA etc., develop capacity in MGR bioprospecting, analysis, utilization, and benefits, and support national/regional efforts towards a healthy resilient ocean and sustainable economies and livelihoods.

Scientific capacity is key for effective governance of both ABNJ and national EEZs. Efforts to enhance scientific capacity need to build upon work already underway in coastal waters and EEZs, with the aim of expanding scientific capacity for managing deep and open oceans, including ABNJ. Strengthening the capacity of countries to manage both their national EEZs and to participate in collaborative ocean governance in ABNJ is important for holistic ocean management. Scientific capacity building will need to address all aspects of data collection and analysis, including data management, sharing, analysis, interpretation of results, and translation of results into policy-relevant information.

Assessing the impacts of capacity building and technology transfer efforts is important.

Currently, few opportunities, if any, exist for reviewing periodic progress and assessing overall effectiveness and impact. The ability to assess impacts of capacity building and technology transfer efforts on beneficiaries is important, so that adjustments in focus and scope can take place as needed. It is also important for undertaking adaptive management in the context of climate change.

A clearinghouse mechanism can play an important role in supporting capacity building and technology transfer.

This role may include access to information about existing capacity building initiatives relating to, for example area-based management, EIAs/SEAs and marine genetic resources. A clearinghouse may have a dedicated capacity building portal or section with its own identity, providing access to publications, training workshops, courses, funding opportunities, online forums, workspaces, toolkits, and webinars. It may also provide access to targeted technical support, a human network of experts, and may include ways for countries to register their capacity building needs and priorities.

Adequate, stable, sustainable and transparent financing is required for effective capacity building and technology transfer in the long term.

Past experience demonstrates that voluntary contributions alone will not be sufficient, and a stable financial mechanism, body or process is required. Public finance is key, although public-private partnerships and innovative financing may also play a role.

Climate and the ocean are closely interconnected, with climate change already impacting ocean ecosystems, productivity, and the distribution, fitness and behavior of marine species.

Thus holistic ocean management will need to be undertaken in the context of climate change, the impacts of which often act cumulatively with other human impacts.

Management, such as area-based management and application of EIA/SEA, will explicitly need to plan for the impacts of climate change. Additionally, BBNJ governance may be impacted by changes in the ability of the ocean to provide goods and services, as well as associated environmental, societal, economic and political consequences.

International prescriptions for capacity building and technology transfer already exist in UNCLOS and other agreements.

The UNCLOS stream (1982 Convention, 1994 and 1995 implementing agreements), the UNCED stream (1992 UNCED, 2002 WSSD, 2012 Rio+20, Agenda 2030), and related agreement such as the Johannesburg Plan of Implementation (WSSD 2002), Convention on Biological Diversity (CBD), and Paris Agreement (2015), to name a few, all contain provisions related to capacity building and technology transfer.

The major challenge thus is not to reconstruct these global prescriptions in the context of ABNJ, but instead to build a tangible system of capacity development and technology transfer, focusing especially on what modalities could be employed, and what funding and follow-up mechanisms could be constructed.

1.3 Purpose of this Policy Brief on *Capacity Development for Implementing the BBNJ Agreement: Possible Modalities for Addressing Area-Based Management, Environmental Impact Assessment, and Marine Genetic Resources in the Context of Climate Change.*

This Policy Brief examines in greater detail the possible modalities for capacity building regarding area-based management, environmental impact assessment, and marine genetic resources, building on the general scheme presented in Figure 1 setting out possible modalities for linking capacity development efforts at global, regional, and national levels. Discussion of each major topic area (ABMTs, EIAs, MGRs) is presented in sections 2, 3, and 4 of the Policy Brief, including,

in each section, a summary diagram depicting the linkages among global, regional, and national levels on each of three major topic areas. Throughout the Policy Brief, the possible impacts of climate change on each of the major topic areas is addressed. As well, section 5 of the Policy Brief addresses the climate change issues in greater detail. In section 6 of the Policy Brief, using the theory of change methodology, the interventions proposed so far in the BBNJ process are assessed as to whether these could bring about the achievement of the proposed objectives of each element. Conclusions will be provided in section 7.

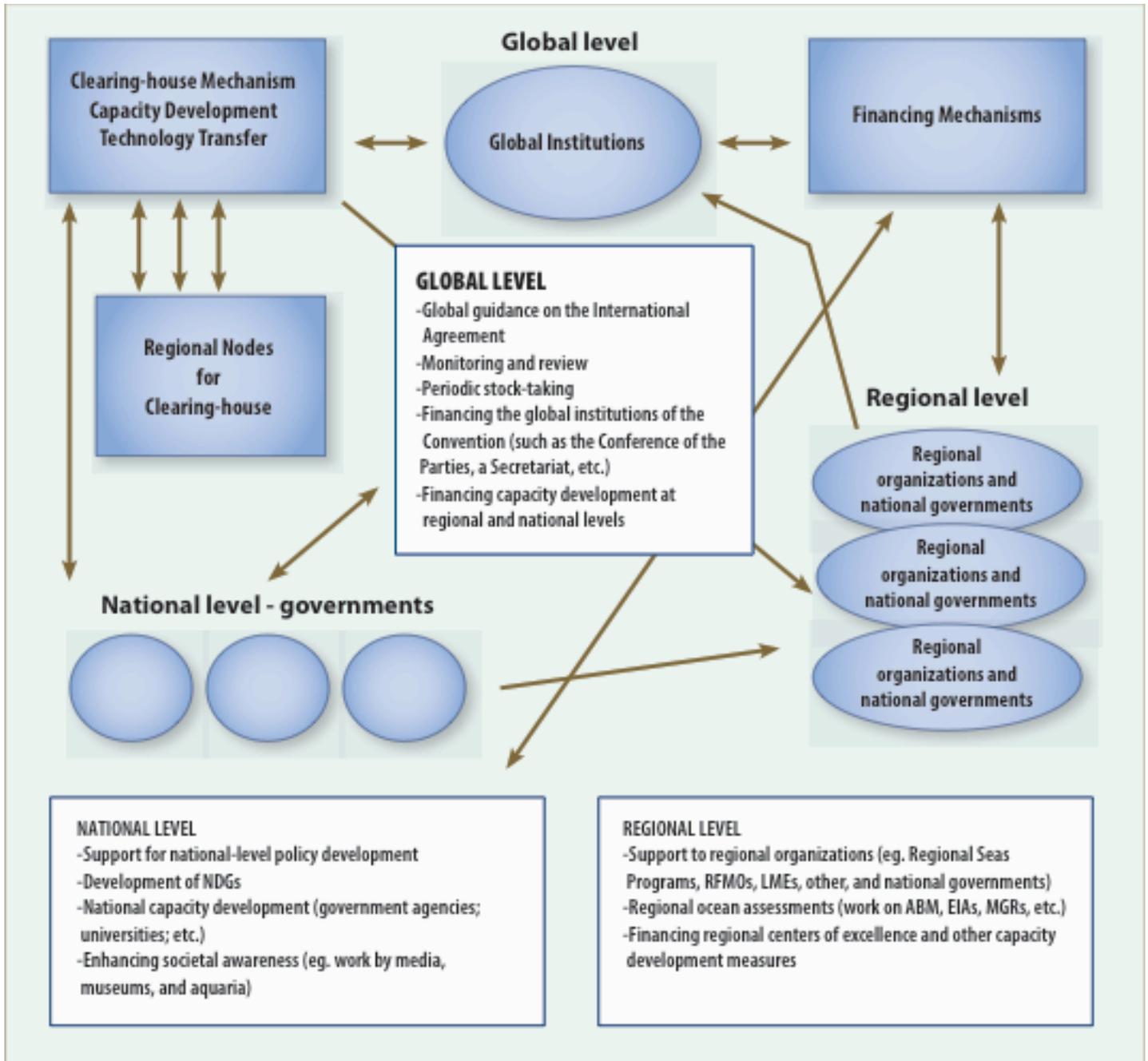


Figure 1. Possible Modalities for Linking Global, Regional, and National Levels Regarding BBNJ Capacity Development

Box 1. The CBD EBSA Process, Associated Data and Capacity Building

Through the EBSA process, the CBD Secretariat has facilitated the scientific description of a total of 321 recognized EBSAs in oceans around the world as meeting the EBSA criteria through regional workshops (GOBI, no date). In 2008, the CBD established seven criteria to be used in the identification of ecologically or biologically significant marine areas (EBSAs) “in need of protection, in open ocean waters and deep sea habitats” (“the EBSA process”).

Data collected in the conduct of the EBSA process includes datasets and thresholds used in the evaluation of the candidate areas against the established set of criteria, using the best available scientific and technical information and, where available, integrating the traditional, scientific, technical, and technological knowledge of indigenous and local communities (CBD Secretariat, no date). The EBSA process has received scientific support from the Global Biodiversity Initiative (GOBI), a voluntary dedicated group of marine institutions and scientists, who have compiled and collated available information, and provided expert interpretation of evidence-based information (Johnson et al, 2019a). At the request of CBD Parties, the EBSA process does not look at or consider threats (Johnson et al, 2018a).

For example, in the South Pacific, the appropriate data and thresholds used for assessing EBSA criteria for seamounts have been determined. Data issues encountered include limitations in data availability, which significantly affects assessment outcomes. Data sets need improvement, e.g., on composition of biological communities and extent of threats from fishing or mining. (Clark et al., 2014) Regardless, the EBSA process as a whole gathered a considerable amount of scientific data relating to open ocean waters and deep sea habitats.

The capacity building activities of the CBD Secretariat’s work on EBSAs as part of the Sustainable Ocean Initiative fall into the following categories: a. CBD regional workshops to facilitate the description of EBSAs; b. Training sessions prior to CBD regional workshops to facilitate the description of EBSAs; c. Dialogue Forum on integrating the perspectives of indigenous peoples and local communities (IPLCs) in the application of the scientific criteria for EBSAs; and d. Training materials to support efforts to describe EBSAs. Moving forward under the new BBNJ agreement, countries may wish to consider the work undertaken and data collected as part of the EBSA process in activities related to ABMTs. This includes materials developed to address capacity needs.

EBSAs information can be used to support area-based planning and decision making, if Parties to the new BBNJ agreement so decide. Five examples of conservation management practices that have incorporated EBSAs and EBSA-like processes into decision-making are:

- 1) Atlantic: Integrating EBSAs, Vulnerable Marine Ecosystems (VMEs) and High Seas MPAs with ‘Blue Growth’ scenarios (EU ATLAS Project);
- 2) Portugal: Proposing the establishment of large national EBSAs on its extended continental shelf.
- 3) Mauritania: EBSA data are being used to support the case at the International Maritime Organization to create a Particularly Sensitive Sea Area on the basis that biodiversity in that area is vulnerable to impacts from international shipping;
- 4) South Africa: A national process ‘Operation Phakisa’ has used EBSA data to contribute to baseline information as part of a holistic planning exercise resulting in conservation measures; and
- 5) North-western Mediterranean Pelagic Ecosystems EBSA: Illustrates how EBSA criteria can underpin advocacy for detailed management options (further research, fisheries gear specifications, seasonal closures, MPAs). (GOBI, no date)

Supporting implementation of integrated management frameworks, using the full range of management tools (such as MPAs in the context of broader management objectives and frameworks, including sustainable development goals) and mainstreaming ecosystem approaches into management through cross-sectoral cooperation (e.g. Regional Seas Conventions and action plans, Regional Fisheries Bodies and Large

Marine Ecosystem projects) and Blue Growth initiatives is also needed. ([HLPF 2017](#))

More information about the EBSA process is available at <https://www.cbd.int/ebasa>

Box 2. Example of Regional Collaboration: Collective Arrangement Between NEAFC and OSPAR

The ‘Collective Arrangement between competent international organizations on cooperation and coordination regarding selected areas in areas beyond national jurisdiction in the North-East Atlantic’ (Collective Arrangement, OSPAR Agreement 2014-09) adopted by the Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR) and the North-East Atlantic Fisheries Commission (NEAFC) in 2014 is a formal agreement between legally competent authorities managing human activities in the Areas Beyond National Jurisdiction (ABNJ) in the North-East Atlantic.

The collective arrangement aims to become a collective and multilateral forum composed of all competent entities addressing the management of human activities in this region unlike the bilateral Memorandum of Understanding (MoU) agreed between OSPAR and NEAFC in 2008. The primary objective of the collective arrangement is to facilitate cooperation and coordination on area based management between legally competent authorities, promoting the exchange of information on each other’s activities and achievements and taking into consideration all conservation and management measures taken in relation to the North-East Atlantic. In addition to keeping under review a joint record of areas subject to specific measures and informing each other of any modification of existing measures or any new measures or decisions, the competent authorities have an opportunity to discuss subjects of common interest and concern.

From the OSPAR perspective, the arrangement will help deliver an ecosystem approach to the management of all relevant human activities in the marine environment. The objectives of NEAFC in adopting measures to protect the marine ecosystem from the potential adverse impacts of fisheries are of great interest to OSPAR in the context of protective, restorative and precautionary measures aiming at protecting and conserving species, habitats and ecosystems of the North-East Atlantic marine environment.

For NEAFC, cooperation can also focus on measures within the broader ecosystem that OSPAR can take within its competence to support NEAFC’s objective to ensure the long-term conservation and optimum exploitation of fishery resources, providing sustainable economic, environmental and social benefits.

Source: OSPAR Commission (no date) and NEAFC and OSPAR, 2015.

2. CAPACITY DEVELOPMENT FOR AREA-BASED MANAGEMENT

2.1. Needs Expressed in the President's Aid to Negotiations for IGC 2

The President's Aid for Negotiations puts forward a number of options for the objectives of area-based management tools, including marine protected areas. Overall, it envisions that *“Area-based management tools, including marine protected areas, shall contribute to the objective of the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction.”*

The president's Aid for Negotiations also put forward options for objectives that include the following:

- Enhancing cooperation and coordination in the use of area-based management tools, including marine protected areas, among States and existing relevant legal instruments and frameworks and relevant global, regional and sectoral bodies;
- Effectively implementing existing international obligations, in particular those under the Convention, and international commitments;
- Promoting a holistic and cross-sectoral approach to ocean management;
- Conserving and sustainably using areas designated to have special value under existing relevant legal instruments and frameworks and relevant global, regional and sectoral bodies
- Establishing a connected network of effective and equitably managed, ecologically representative marine protected areas;
- Rehabilitating and restoring ecosystems and biodiversity, including with a view to enhancing productivity, health and building resilience to stressors, including those related to climate change, ocean acidification and marine pollution;
- Supporting food security and other socioeconomic objectives;

- Creating scientific reference areas for baseline research;
- Safeguarding aesthetic, natural or wilderness values.

While the options included in the President's Aid may or may not find their way into the International Agreement, they provide an indication of the types of activities that States, and international and regional bodies may be required to undertake, and thus areas where capacity building and technology transfer may be required.

More specifically, the President's Aid also includes options for outlining the process in relation to ABMTs, including MPAs, which may consist of the following:

- Identification of areas, supported by best available scientific information, traditional knowledge and internationally accepted scientific standards and criteria (with options for standards and criteria, and their development provided in the document)
- Designation process, with options provided for submission of proposals, format and elements of proposals, consultation on and assessment of proposals, and decision-making.
- Implementation, with options given for the roles of States parties and relevant global, regional and sectoral bodies.
- Monitoring and review, including monitoring and review of the implementation ABM of measures, assessment of their effectiveness, and potential amendment of measures based on adaptive management.

The section of the President's Aid for Negotiations related to capacity building and technology transfer also highlights several topics that are applicable to ABMTs, including MPAs, including (but not limited to):

- Increasing, disseminating and sharing knowledge on the conservation and sustainable use of marine biodiversity of areas beyond national jurisdiction
- Developing the marine scientific and technological capacity of States parties in

accordance with Parts XIII and XIV of the Convention;

- Strengthening cooperation and coordination and synergies between relevant organizations
- The development, implementation, monitoring and management, including enforcement, of any area-based management tools, including marine protected areas;
- Undertaking and participating in measures to conserve and sustainably use marine biological diversity of areas beyond national jurisdiction, inter alia, through the establishment of area-based management tools, including marine protected areas.

Finally, the document also provides proposals on modalities, including the need for capacity building and technology transfer to be based on/responsive to expressed needs, and which include (but are not limited to) the following measures related to ABMTs:

- Technical support
- Infrastructure
- Institutional capacity, including governance, policy and legal frameworks and mechanisms
- Scientific and research capacity and its application, as well as scientific and technical cooperation
- Information and knowledge sharing concerning area-based management tools
- Collection and exchange of data and the capacity to translate it into effective and efficient policies
- The acquisition of the equipment necessary to sustain and further develop research and development capabilities in the context of area-based management tools
- The development of manuals, guidelines, criteria, standards, reference materials
- Training programs on all required aspects of ABMTs
- The development of regional centres of excellence, skill development and national and regional centres for scientific research

- Increasing cooperative links between regional institutions, for example North-South and South-South collaboration and collaboration between regional seas organizations and regional fisheries management organizations
- The development of human resources and individual capacity-building, including in natural and social sciences, both basic and applied, through exchange of experts, short-term, medium-term and long-term training and the establishment of a global scholarship fund;
- The provision of scholarships or other grants for representatives of small island developing States in workshops, programmes or other relevant training programmes in order to develop their specific capacities
- The establishment of a networking mechanism among trained human resources
- The exchange of experts
- Assistance in the development, implementation and enforcement of national legislative, administrative or policy measures, including associated regulatory, scientific and technical requirements on a national or regional level;
- The raising of awareness on stressors on the oceans that affect marine biodiversity of areas beyond national jurisdiction
- Mechanisms for financing

Collectively, the needs put forward in the President's Aid for Negotiations provide an indication of the types of capacity and technology that may be required in relation to ABMTs, as well as the modalities for their delivery. However, the President's Aid is not exhaustive, and while the proposals put forward in the present policy brief take their guidance from it, they also further elaborate on specific topics and put forward additional and more specific proposals relating to capacity building and technology relating to ABMTs.

2.2. Possible Modalities for Operationalizing Capacity Building and Technology Transfer for ABMTs, Including MPAs

In accordance with the President's Aid for discussions, it is envisioned that capacity building and technology transfer will enable inclusive and effective participation of all States and other stakeholders in the process of implementing ABMTs, which would include identification of areas, designation of measures, implementation of measures, and monitoring and review. These measures would be applied in the broader context of an ecosystem approach, and may include tools and approaches such as marine spatial planning (MSP) and marine protected areas (MPAs).

Capacity building of regional and sectoral bodies will also be required to enhance cooperation and coordination in the use of ABMTs, in order to ensure cohesive, holistic and integrated implementation of the new International Agreement. In addition, regional organizations themselves have a key role in coordination and capacity building involving countries in the region.

On the global level, international organizations, including a possible secretariat or scientific body for the new International Agreement, will address specific global-level capacity needs related to implementation of global ABMT processes.

On the national level, the needs and unique circumstance of countries will drive the capacity development effort, and national needs assessments could be seen as a first step in the process. At the same time, many countries already have considerable experience in applying area-based management tools, and these experiences can inform both global and regional levels.

On all levels, UN and international organizations, NGOs, academic and research organizations, and funding entities will have a role to play in facilitating capacity building and technology transfer. Capacity development will also need to consider the socio-economic context of the ocean, and bring together ocean sectors and stakeholders at both global and regional levels to address any knowledge gaps related to ABMTs.

The modalities for capacity building and technology transfer relating to ABMTs are broken into three sections: (a) global considerations; (b)

possible actions undertaken primarily on the regional level; and (c) actions undertaken primarily on the national level.

2.3. Global Considerations for Capacity Building and Technology Transfer

Principles, criteria and standards

It is likely that the new International Agreement will put in place both overarching principles, as well as criteria and standards that relate to ABMTs, including MPAs. It is important that all States, organizations, bodies and other stakeholders have a common understanding about what is meant by, for example, an ecosystem approach, adaptive management and best available science, including traditional knowledge.

Capacity building, in particular training, may be required to better understand the practical applications of globally-defined terms and concepts, such as:

- Principles related to ABMTs, including MPAs, in the context of sustainable management over the broader seascape
- Application of possible global criteria and standards relating to identification of areas for protection/management
- Application of best available science, including traditional knowledge
- Undertaking adaptive management, including monitoring, in the context of ABNJ
- Including socio-economic considerations into application of ABMTs

Data and information, and their application to ABMTs, including MPAs

International organizations, such as the IOC of UNECO, hold a wealth of data and information of relevance to area-based management. The same is true of many universities and academic institutions. Examples of relevant databases include Ocean Biogeographic Information System (OBIS), the World Registry of Marine Species (WORMS), The Global Ocean Observing System (GOOS), and Global Biodiversity Information Facility (GBIF). The individual organizations

maintaining these databases also often provide capacity building in their use.

Though not an ABMT, but an exercise in identification and description of areas meeting agreed-upon ecological and biological criteria, it is critical to consider the work undertaken by the Parties to the CBD to describe Ecologically or Biologically Significant Marine Areas (EBSAs) through regional workshops. The process includes capacity building as well as facilitation of data collection, as described in Box 1 on the next page.

Capacity building relating to data and information held on the global level may include the following:

- Accessing relevant data and information through the clearinghouse mechanism (CHM)
- Accessing and using individual databases
- Developing data analysis capacities for research, interpretation of research results, and for translation of research results into policy
- Applying these data to the identification, establishment, management and monitoring of ABMTs, including MPAs
- Applying these data to marine spatial planning on scale appropriate for ABNJ, as well as in transboundary situations
- Providing data and training relating to assessing and responding to climate impacts on MPAs and other ABMTs, and deploying MPAs for climate resilience
- Providing data and training to support enforcement of ABMTs
- Providing data and training to support assessing ecological connectivity and representativeness of global and regional networks of MPAs
- Providing socio-economic data and training in support of the application of ABMTs
- Supporting regional universities and centres of excellence with their data, information, training and technology needs

Facilitating transboundary to ABNJ-collaboration in marine spatial planning

Currently the IOC of UNESCO and the European Union are supporting transboundary cooperation in marine spatial planning. At the global level, IOC-UNESCO will act as a technical support agency for Large Marine Ecosystem (LME) partnerships aimed at establishing transboundary management frameworks at a regional level. In particular, through the GEF/UNDP/IOC LME: Learn Project, and in collaboration with other UN agencies, IOC will implement pilot activities in 2 or 3 LME projects in Africa, South America/Caribbean region, and South East Asia (IOC of UNESCO, 2017). Because LMEs often extend beyond national jurisdiction, it may, under the new International Agreement, become desirable for such cooperation to include both areas within and beyond national jurisdiction.

Other early experiences in the application of an ecosystem approach, including MSP and networks MPAs, on a large ocean scale come from the work of CCAMLR in the Southern Ocean, and these experiences are applicable to oceans worldwide. Science-based collaborations, such as the trans-Atlantic ATLAS project, are also examining how fully integrated spatial planning products on basin and regional scales allow stakeholders to explore, and respond to, various scenarios of ocean dynamics and cross-sectoral blue economy (ATLAS project, no date; Johnson et al, 2019b).

Capacity building relating to marine spatial planning over large ocean spaces may include:

- Learning from early experiences in transboundary MSP, including in the context of LMEs, the ATLAS project, the work of CCAMLR in the Southern Ocean, and other large-scale efforts both within and beyond national jurisdiction
- Translating lessons and capacity gained from these experiences to better managing both national EEZs and ABNJ

2.4. Regional Modalities for ABMTs, Including MPAs

Regionally and globally, current efforts to identify priority ocean areas for protection or enhanced management in ABNJ include FAO Vulnerable

Marine Ecosystems (VMEs); IMO Particularly Sensitive Sea Areas (PSSAs), though these have not to date been widely applied in ABNJ; International Seabed Authority Areas of Particular Environmental Interest (APEI) and Preservation Reference Zones (PRZs); and limited MPAs designated by Regional Seas Organizations. Beyond these efforts already undertaken in ABNJ, UNESCO is also considering the designation of World Heritage Sites in ABNJ.

Most area-based management measures currently undertaken in ABNJ only restrict specific sectoral activities. Thus, close collaboration is required to achieve a holistic and cross-sectoral approach to ocean management, as put forward as an option in the President's Aid for Discussions. In addition, regional organizations also play an important role in supporting the countries in the region through data and information, knowledge, assistance and coordination. They themselves are therefore key capacity providers for the countries in the region.

Providing for regional collaboration

Regional organizations as providers of national capacity building, and as links between the global and national levels

Regional organizations have an important function to play as capacity providers, including in regards to data and information, training and coordination. They also provide a link between global policies and national actions, and will play a key role in the assessment of regional and national capacity needs.

One of the greatest limitations to collaboration among regional organizations are the limited mechanisms for information sharing and for coordination of actions. This may also be one of the greatest capacity needs on the regional level. Each region has its own unique environmental, institutional and capacity context, which often includes an established institutional structure for regional cooperation on managing the marine environment and its resources. In this context, many regions often have regional policies, programmes and initiatives that bring together countries to undertake area-based management,

including creating marine protected areas, and to manage fisheries resources. Many of these existing institutions already engage in capacity development, particularly in training on specific topics that are consistent with their mandates.

In general terms, many regions may have some or all of the following in place:

- Regional Seas Programmes
- Regional Fishery Bodies, including Regional Fisheries Management Organizations (RFMOs)
- Regional Commissions
- Regional universities (e.g. University of South Pacific, University of West Indies)
- Large Marine Ecosystem Projects
- Other regional collaborative projects on area-based management or fisheries
- Regional ocean policies or strategies

These regional structures provide opportunities for capacity development on a regional scale towards improved management both of national waters and of ABNJ. Collaboration and cooperation amongst these regional organizations is key for building improved cross-sectoral capacity, and for exchanging information and experiences. Examples of regional cross-sectoral collaboration include, for example, collaboration between NEAFC and OSPAR in the North Atlantic (see Box 2, below), and the Sustainable Ocean Initiative Global Dialogue with Regional Seas Organizations and Regional Fishery Bodies, coordinated by the CBD Secretariat, FAO and UN Environment.

Collaboration, coordination and improved information sharing between regional bodies and national authorities can be achieved through the following capacity-enhancing mechanisms:

- Joint meetings to coordinate activities relating to ABMTs
- Joint collaborative bodies or structures relating to coordinating activities on ABMTs

- Joint databases of information and data of relevance to ABMTs, or separate databases that can be accessed through a common portal
- Joint training and capacity building in implementation of the new International Agreement, including any standards and criteria related to ABMTs
- Institutional capacity building targeted specifically at those bodies and organizations that require further assistance at specific aspects of ABMTs
- Formal agreements, such as MoUs or the Collective Arrangement between NEAFC and OSPAR described in Box 2

2.5. National Modalities for ABMTs, Including MPAs

On the national level, countries will be required to participate in the global process relating to establishment of ABMTs, ensuring that actions taken within their national jurisdictions are consistent with those in ABNJ. This includes topics related to science, policy, law, as well as social and economic aspects of oceans.

The following capacity building needs may relate to the national level and would be applied by countries individually, collectively and/or together with regional organizations:

- Assessment of national needs in regards to ABMTs, both within and beyond national jurisdiction
- **Identification of areas –**
 - o Assessing which nationally and locally important species and areas would benefit from additional ABMTs in ABNJ
 - o Application of global criteria and standards to select important areas
 - o Strengthening local institutions, data and research capacity, particularly in relation to transboundary species and habitats, and assessment of human activities, including their individual and cumulative impacts
 - o Applying traditional knowledge in identification of areas for ABMTs

- o Identification of stakeholders and socio-economic considerations relating to specific areas
- **Designation process –**
 - o Capacity in collaborating with other countries and regional organizations in developing proposals
 - o Capacity in assessing proposals, including building up necessary data and knowledge
 - o Capacity building in the use of ABM approaches specific to open ocean environments, including mobile MPAs and MSP
 - o Capacity building in the use of ABM approaches specific to migratory species
- **Implementation –**
 - o Participation in the drafting of management plans, and other tasks related to management
 - o Necessary data, information and knowledge for management
 - o Capacity in working with stakeholder groups, including conflict resolution
- **Monitoring and review –**
 - o Capacity for adaptive management, including monitoring and review of the effectiveness of ABMT measures,
 - o Capacity to amend management measures as required, based on adaptive management
 - o Necessary data, information and knowledge for management, both scientific and socio-economic
- **Other general needs –**
 - o Strengthening national policies and laws in regards to ABMTs
 - o Conducting socio-economic assessments and monitoring relating to ABMTs
 - o Understanding and monitoring the connections between measures within national waters and those in ABNJ

2.6. Additional Considerations Relating to Climate Change and ABMTs

The combined impact of ocean warming, acidification and deoxygenation are already having a dramatic effect on the flora and fauna of the ocean with significant changes in distribution of populations, and decline of sensitive species (Bijma et al, 2013). Specific impacts have been observed on growth, long-term fitness, geographic distribution and behavior of species (Turley et al, 2007; SCBD, 2014). Climate change is also expected to affect ocean productivity from phytoplankton to top predators, with the impacts varying geographically (Kearney et al, 2015). In deep and open oceans, including in ABNJ, cold water coral reefs and many planktonic organisms such as pteropods and coccolithophores are particularly vulnerable to ocean acidification, with associated impacts spread throughout food webs (SCBD, 2014). These changes will further impact the goods and services provided by the ocean, including food security. According to the FAO, climate change will lead to significant changes in the availability and trade of fish products, with potentially important geopolitical and economic consequences, especially for those countries most dependent on the sector (Barange et al, 2018). ABMTs, including MPAs will need to be adapted to the realities of climate change, including leaving open the possibility to amend MPA boundaries as the geographic distribution of species shifts. At the same time, it has been proposed that MPAs be applied as tools to increase climate resilience in certain areas, where they act to provide habitat refuges. This approach has already been applied in regards to coral bleaching, and is now tested for ocean acidification in cold water coral reef areas (Jackson et al, 2014). Additional discussion about these approaches can be found in section 5.

It is important that capacity building measures related to ABMTs, including MPAs, also take into account climate change. These capacity building measures may include the following:

- Forecasting how MPA boundaries may need to be amended in the face of climate change, and ensuring that processes are in place to allow for this

- Capacity building in the use of mobile MPAs and other flexible ABMTs, including fisheries closures, in the context of climate change
- Capacity building in the data, information and modelling needs that will improve ABMT responses under climate change

2.7. Role of the Clearinghouse Mechanism

The clearinghouse mechanism can greatly facilitate access to data and information of relevance to ABMTs, including MPAs. It can also provide a central hub for information of relevance to capacity building, including online training courses and webinars, as well as funding information.

The role of the clearinghouse mechanism in facilitating capacity building in ABMTs, including MPAs, may include the following:

- Serving as a central portal for ABMT capacity building, including:
 - o Information related to ABMT capacity building opportunities
 - o Access to webinars, online training courses and other online capacity resources
 - o Information about funding opportunities
 - o Access to peer networks and discussion boards
 - o Roster of experts
 - o Information about exchange programmes and other hands-on opportunities
 - o Access to data and information related to ABMTs, as well as environmental, oceanographic and species-related data and information
 - o Access to ABMT-relevant policy, legal and socio-economic data and information

2.8. Financial Considerations to Implement the ABMT Component of the BBNJ Agreement

The importance of stable and predictable financing to support concerted regional actions vis-à-vis ABMTs

The application of ABMTs by national and regional entities will require access to stable and predictable financing in the long term. Initially, financing is required to bring together groups of stakeholders to develop marine spatial plans, and to collect and assess available data and information to identify areas in need of conservation measures (such as MPAs) and other management measures. Once areas have been designated, management plans need to be developed, and a budget allocated for management and enforcement. Adaptive management will require continuous monitoring and periodic assessment of the effectiveness of management measures. Thus, financing will need to be long term to ensure that the established area-based management measures will achieve their objectives.

Financing for capacity building and technology transfer related to ABMTs is likely to come from several sources, which might include the following:

- Financing mechanism, such as the GEF or other, for the new international agreement, which may include a specific trust fund for ABM-related capacity building
- Public research funding from governments, with the aim to further scientific knowledge about key areas beyond national jurisdiction
- Potential fees paid by ocean users, for example access fees to MPAs by tourism operators
- Private sector collaboration in, and funding of, capacity building and technology transfer, for example in regards to data collection, monitoring and enforcement of MPAs

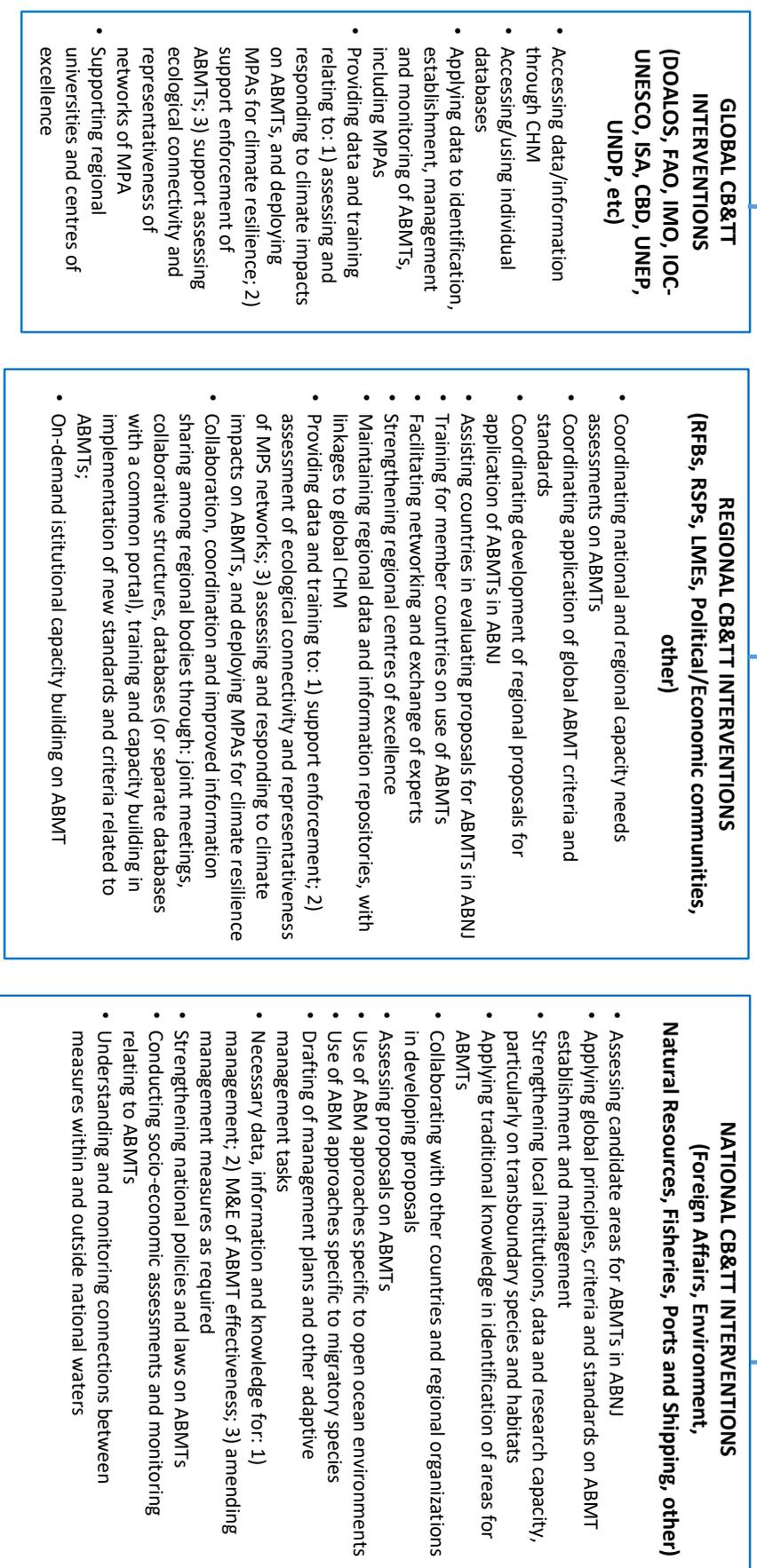
2.9. Summary of Capacity Development for ABMTs

**Capacity Building & Technology Transfer
Pathway for ABMTs, including MPAs**

LONG-TERM GOAL: Conservation and Sustainable Use of BBNJ

INTERMEDIATE OBJECTIVES: Enhancing cooperation and coordination; Effectively implementing existing international obligations; Promoting holistic/cross-sectoral approach; Conserving/sustainably using areas of special value; Establishing connected networks of representative MPAs; Rehabilitating ecosystems and biodiversity; Supporting food security/other socioeconomic objectives; Creating scientific reference areas for baseline research; Safeguarding aesthetic/natural/wilderness values

ABMT PROCESS: Identification, designation, implementation, monitoring and review of ABMTs



3. CAPACITY DEVELOPMENT FOR ENVIRONMENTAL IMPACT ASSESSMENT

3.1. Needs Expressed in the President's Aid to Negotiations for IGC2

The President's Aid to Negotiations contains a number of options for expressing the international law obligation to conduct environmental impact assessments (EIAs) of activities with the potential to affect marine biodiversity in ABNJ and for further operationalizing that obligation. The options included in the President's Aid provide an indication of the types of activities that States, proponents of activities and global and regional bodies may be required to undertake and thus areas where capacity building and technology transfer may be required.

Obligation to Conduct EIAs

The options for expressing the obligation to conduct EIAs include:

Option I – States Parties shall assess the potential effects of planned activities under their jurisdiction or control in ABNJ in accordance with their obligation under articles 204 to 206 of UNCLOS

(a) and applicable customary international law

Option II - When States have reasonable grounds for believing that planned activities under their jurisdiction or control may cause substantial pollution of or significant and harmful changes to the marine environment, they shall, as far as practicable, assess the potential effects of such activities on the marine environment

Further options require States to take legal or administrative measures to implement these obligations or require proponents of activities to do so. This section of the President's Aid also covers the scope of activities to which the EIA obligation applies whether only to activities in ABNJ or to all activities with impacts in ABNJ.

Activities for which an EIA is required

This section of the President's Aid sets out a range of options on thresholds and criteria for determining which activities in ABNJ require an EIA. These include:

- When States Parties have reasonable grounds for believing that planned activities under their jurisdiction or control may cause substantial pollution of or significant and harmful changes to the marine environment'
- When States Parties have reasonable grounds for believing that planned activities under their jurisdiction or control are likely to have more than a minor or transitory effect on the marine environment; and
- An environmental impact assessment shall be required unless the proponent can demonstrate that the potential impacts of the proposed activity would be very minimal, by reference to the criteria, standards and threshold elaborated by the scientific/ technical body

There are also options in this section of the President's Aid relating to a list of activities that require or do not require an EIA, the inclusion of cumulative impacts and transboundary impacts in EIAs, and requirements for EIAs of proposed activities in ecologically and biologically significant areas (EBSAs) or areas that have been identified as vulnerable in ABNJ.

EIA Process

The three broad options in this section of the President's Aid on the EIA process, range from less to more prescriptive. The three broad options are:

Option I – Details to be developed at a later stage

Option II – General description of procedural steps in EIA process and roles, obligations and responsibilities of States

Option III- Set out the steps in EIA process
Option III contains four broad components:

- Steps in the EIA Process

- Proponent is responsible for the cost of EIA including consultation
- States Parties shall cooperate on EIA in ABNJ taking into account the special needs of developing countries including by providing necessary technical and financial assistance as well as development of institutional capacity and transfer of marine technology
- Further details regarding EIA process to be developed by a body set forth in this instrument in the form of guidelines or an annex to this instrument with the guidelines to be regularly reviewed or no text on this aspect.

There are multiple steps in the EIA Process set out under Option III highlighting significant capacity building needs for developing countries including technical and financial assistance, development of institutional capacity and transfer of marine technology. These steps include:

- Screening
- Scoping
- Mitigation and Impact Management and Reporting
- Identification of Alternatives for mitigation, prevention and compensation for potential adverse effects
- Public notification and consultation
- Publication of reports and public availability of reports
- Consideration and review of reports
- Decision making
- Publication of decision making documents
- Access to information
- Monitoring and review
- Compliance
- Enforcement
- Auditing
- Examination of residual effects
- Consideration of post monitoring measures

The options for who will conduct an EIA process also indicate the potential need to develop capacity within the scientific/technical body established under the new instrument to assist

developing countries in conducting EIAs. The options in this section of the President's Aid include:

- Where the proponent is responsible for conducting an EIA it may contract with a third party to conduct the EIA
- Where the State Party with jurisdiction and control over the planned activity is responsible for the conduct of an EIA it may require the proponent of the activity to conduct the EIA or contract with a third party to conduct the EIA which will be subject to review and decision making by the State
- The EIA shall be conducted by an independent consultant appointed by a panel of experts designated by the scientific/technical body
 - States Parties in particular SIDS are not precluded from submitting joint EIAs
 - A pool of experts shall be created under the scientific/technical body and States Parties with capacity constraints may commission these experts to conduct EIAs for planned activities

Content of EIA Reports

The options in this section of the President's Aid include:

Option I in which details regarding the required content of an EIA report would be developed at a later stage

Option II in which the content of an EIA report is specified and could include but would not be limited to:

- A description of the planned activities and/or their purpose
- A description of reasonable alternatives to the planned activities, including non-action alternatives
- A description of the results of the scoping exercise
- A description of the potential effects of the planned activities on the marine environment including cumulative impacts and any transboundary impacts

- A description of the environment likely to be affected
- A description of any socio-economic impacts
- A description of the worst-case scenario that could be expected to occur as a result of the planned activity
- A description of the measures for avoiding, preventing, mitigating and, where necessary and possible, redressing any substantial pollution of or significant and harmful changes to the marine environment
- A description of any follow-up actions, including any monitoring and management programmes
- Uncertainties and gaps in knowledge
- A non-technical summary
- Identification of the sources of the information contained in the report
- An explicit indication of predictive methods and underlying assumptions as well as the relevant environmental data used
- The methodology used to identify environmental impacts
- An environmental management plan, including a contingency plan for responding to incidents that impact the marine environment
- The environmental record of the proponent
- A review of the business plan for the activity

The multiple components required in an EIA report many of them requiring substantial scientific and technical input is a further indication of the need for capacity building for developing States in implementing the new instrument.

Monitoring Reporting and Review

Under this section of the President's Aid, the options provide that States either individually or in conjunction with proponents of authorized activities in ABNJ are to ensure that the impacts of authorized activities in ABNJ are monitored reported and reviewed. This section also contains

options relating to compliance with monitoring and reporting provisions in the in the new instrument. These options include:

Option I in which compliance is to be facilitated through a body set forth in the instrument using supervision mechanisms, such as periodic reports, periodic evaluation or review, and individual complaints.

Option II in which the compliance committee established in the instrument shall:

- review reports under this section to ensure implementation of relevant provisions
- report to the decision-making body/forum set forth in Part; and
- In the case of non-compliance, the decision-making body/forum shall take adequate measures

Option III in which non-compliance with the provisions of the EIA Part of the instrument is to be reported to the decision-making body/forum established in the instrument for its consideration

There are also notification and consultation requirements in this section which relate specifically to the involvement of adjacent coastal States and small island developing States (SIDS) in the monitoring, reporting and review of activities in ABNJ. These options are:

Option I – Adjacent coastal States shall be kept informed of the monitoring, reporting and review process in respect of an activity approved under this instrument

Option II – Adjacent coastal States shall be notified and consulted about monitoring reporting and review processes in respect of activities in ABNJ

Option III – Adjacent coastal States and SIDS shall be actively consulted in monitoring, reporting and review processes in respect of activities in ABNJ

These additional responsibilities will require quite extensive capacity building and technology transfer for States Parties, proponents of activities in ABNJ and global and regional bodies including

those established under the new instrument.

Strategic Environmental Assessment

The options in this section of the President's Aid are less detailed but nevertheless presage the fact that if provisions are included in the new instrument on SEA, there would need to be considerable capacity building and technical assistance particularly for developing States to implement the less familiar process of SEA for programmes and plans relating to ABNJ. The options are:

Option I – Each party shall ensure that a strategic environmental assessment (SEA) is carried out for plans and programmes under their jurisdiction or control, affecting ABNJ, which meet the threshold/criteria established in the instrument for SEA

Option II – The instrument would set out rules and conditions to carry out SEAs as one type of EIA

Relationship to EIA Processes under relevant instruments frameworks and bodies

This section of the President's Aid is particularly significant for enhancing cooperation and coordination with relevant global regional and sectoral bodies with a mandate to regulate activities in ABNJ or to protect the marine environment on EIAs. The implementation of these provisions in the new instrument will require the establishment and fostering of multiple cross sectoral and cross institutional links between global, regional and national bodies which do not currently exist.

The options set out in the President's Aid include:

- The conduct of EIAs under the instrument to be consistent with UNCLOS obligations and customary international law
- Options on EIA process under instrument not undermining existing legal instruments, frameworks, global regional and sectoral bodies
- Option relating to coordinating with relevant global regional and sectoral bodies with a

mandate to regulate activities in ABNJ or to protect the marine environment – establishment of an ad hoc interagency working or participation of representatives from these organizations in meetings of the scientific/technical body of the new instrument

- Options on inclusion in the instrument or development of minimum global standards and/or guidelines for the conduct of EIA by scientific/technical body or through consultation with global regional and sectoral bodies
- Options related to requirement for EIA under the instrument to apply or not to any activities already covered by the rules and guidelines established by global regional and sectoral bodies

The capacity building and technology transfer section of the President's Aid to Negotiations highlights a number of issues that are applicable to EIAs many of which are the same as those noted above in relation to ABMTs. These include:

- Increasing, disseminating and sharing knowledge on the conservation and sustainable use of marine biodiversity of areas beyond national jurisdiction;
- Developing the marine scientific and technological capacity of States Parties in accordance with Parts XIII and XIV of UNCLOS
- Strengthening cooperation and coordination and synergies between relevant organizations;
- Conducting and evaluating environmental impact assessments and strategic environmental assessments
- Undertaking and participating in measures to conserve and sustainably use marine biological diversity of areas beyond national jurisdiction, inter alia, through the conduct and evaluation of environmental impact assessments and strategic environmental assessments

As noted in the section of this paper on ABMTs, the President's Aid also provides proposals for modalities, including the need for capacity building and technology transfer to be based on and responsive to expressed needs. These

proposals include the following measures related to EIAs and SEAs:

- Technical support
- Infrastructure
- Institutional capacity, including governance, policy and legal frameworks and mechanisms
- Scientific and research capacity and its application, as well as scientific and technical cooperation
- Information and knowledge sharing concerning EIAs and SEAs
- Collection and exchange of data and the capacity to translate it into effective and efficient policies
- The acquisition of the equipment necessary to sustain and further develop research and development capabilities in the context of EIAs and SEAs
- The development of manuals, guidelines, criteria, standards, reference materials
- Training programmes on all required aspects of EIAs and SEAs
- The development of regional centres of excellence, skill development and national and regional centres for scientific research
- Increasing cooperative links between regional institutions for example North-South and South-South collaboration between regional seas organizations and regional fisheries management organizations
- The development of human resources and individual capacity building including in natural and social sciences, both basic and applied, through exchange of experts, short term, medium term and long term training and the establishment of a global scholarship fund
- The provision of scholarships or other grants for representatives of SIDS in workshops, programmes or other relevant training programmes in order to develop their specific capacities
- The establishment of a networking mechanism among trained human resources
- The exchange of experts

- Assistance in the development, implementation and enforcement of national legislative, administrative or policy measures, including associated regulatory, scientific and technical requirements on a national or regional level
- The raising of awareness of stressors on the oceans that affect marine biodiversity of areas beyond national jurisdiction
- Mechanisms for financing

As with ABMTs, the President's Aid to Negotiations provides an indication of the types of capacity building and technology that may be required in relation to EIAs and SEAs and modalities for their delivery. The next section will further elaborate specific proposals for capacity building and technology relating to EIAs and SEAs

3.2. Possible Modalities for Operationalizing Capacity Building and Technology Transfer for EIAs and SEAs

Consistent with the President's Aid for Negotiations, it is envisioned that capacity building and technology transfer will enable inclusive and effective participation of all States and other stakeholders in the process of implementing EIAs and SEAs which would include the screening stage to identify those activities, plans and programmes for which EIAs and SEAs are required, the scoping stage to identify impacts and alternatives for mitigation, prevention and compensation for potential adverse effects, review of EIA and SEA reports, decision making on whether activities, plans and programmes should proceed and monitoring, review and enforcement of EIA and SEA conditions.

At the global level, international organizations, including the secretariat and scientific/technical body for the new instrument will address global level capacity needs relevant to implementation of EIAs and SEAs in ABNJ.

Capacity building between and among regional and sectoral bodies will also be required to improve information sharing and training on the conduct and evaluation of EIAs and SEAs by

States and proponents of activities, plans and programmes in ABNJ.

At all levels UN and international organizations, NGOs, academic and research organizations and funding entities will have a role to play in facilitating capacity building and technology transfer related to the conduct and evaluation of EIAs and SEAs in ABNJ.

The modalities for capacity building and technology transfer relating to EIAs and SEAs comprise three sections: (a) global considerations; (b) regional considerations; (c) national considerations.

3.3. Global Considerations for Capacity Building and Technology Transfer Related to EIAs and SEAs

The new instrument is likely to include both overarching principles and criteria and standards relevant to EIAs and SEAs. It is important for all States, proponents of activities, plans and programmes in ABNJ, global and regional organizations and other stakeholders to have a common understanding of terms and concepts related to EIAs and SEAs such as thresholds and criteria for conducting EIAs/SEAs, the different stages in an EIA and SEA processes including screening, scoping, public notification and consultation, monitoring review and reporting.

Capacity building, in particular training, may be required to better understand the practical application of globally defined terms and concepts, such as:

- Principles related to EIAs/SEAs
- Application of global criteria and standards relating to EIAs/SEA

Global organizations including UNEP, the Convention on Biological Diversity and the International Association of Impact Assessment have developed principles and best practice guidelines for EIA and SEA which could inform the development of comparable principles and guidelines for EIAs/SEAs in ABNJ under the new instrument.

Capacity building relating to principles and guidelines held by global organizations may include the following:

- Accessing relevant principles and guidelines developed under the new instrument through the clearing house mechanism (CHM)
- Applying these principles and guidelines to the conduct and evaluation of EIAs/SEAs in ABNJ
- Providing training relating to incorporating cumulative and transboundary impacts into EIAs/SEAs
- Providing training relating to incorporating climate change impacts into EIAs/SEAs in ABNJ
- Providing training on monitoring, reviewing and enforcing EIA/SEA conditions in ABNJ
- Supporting regional and national universities and centres of excellence with information training and technology needs related to EIAs/SEAs

3.4. Regional Considerations for Capacity Building and Technology Transfer Related to EIAs and SEAs

Most EIAs and SEAs in marine areas are currently conducted in waters under national jurisdiction by States and/or proponents of such activities plans and programmes. There are a limited number of EIA processes conducted for deep seabed mining exploration, some high seas fisheries (in accordance with the FAO International Guidelines for the Management of Deep-sea Fisheries in the High Seas), and ocean fertilisation activities in ABNJ. Accordingly closer collaboration will be required to achieve a more comprehensive and cross sectoral approach to the conduct and evaluation of EIAs and SEAs in ABNJ as envisaged in the President's Aid to Negotiations. Regional organizations can play an important role in supporting States within their region and beyond through providing data, information, knowledge, training and assistance in conducting and evaluating EIAs/SEAs for activities, plans and programmes in ABNJ.

Providing for regional collaboration

Limited information sharing and coordination of actions is a key barrier to consistent application of best practices in the conduct and evaluation of EIAs/SEAs in marine areas. While many regional seas agreements provide for information sharing in relation to EIAs conducted in their areas of responsibility this is rarely carried out in practice. Enhanced information sharing in relation to EIA/SEA practice across regions is one of the greatest capacity building needs at the regional level.

Collaboration, coordination and improved information sharing between regional bodies and national authorities on EIA/SEA practice in marine areas within and beyond national jurisdiction be achieved through the following capacity enhancing mechanisms:

- Joint databases of information and data of relevance to EIAs/SEAs or separate databases that can be accessed through a common portal
- Joint training and capacity building in implementation of the new instrument including any principles, criteria and standards related to EIAs/SEAs
- Institutional capacity building targeted specifically at those bodies and organizations that require further assistance in relation to specific aspects of conducting and evaluating EIAs/SEAs

Regional organizations as providers of national capacity building, and as links between the global and national levels

Regional organizations have an important role to play as key connectors between global policies and national actions in relation to EIAs and SEAs and in assessing regional and capacity needs.

Some of the functions of regional organizations relating to capacity for EIAs/SEAs include the following:

- Coordinating national and regional capacity needs assessments relating to EIAs/SEAs
- Coordinating application of global EIA/SEA criteria and standards regionally and nationally
- Assisting States and/or proponents in conducting and evaluating EIAs/SEAs under the new instrument
- Coordinating monitoring, review, reporting and enforcement of EIA/SEA conditions
- Maintaining regional data and information repositories on EIAs/SEAs with linkages to the global CHM
- Training in the conduct and evaluation of EIAs/SEAs
- Facilitating networking and exchange of experts on EIAs/SEAs
- Strengthening regional centres of excellence on topics related to EIAs/SEAs
- Providing data, equipment and training to support enforcement of EIAs/SEAs
- Providing data and training related to incorporating cumulative and transboundary impacts into EIAs/SEAs
- Providing data and training related to incorporating climate change impacts into EIAs/SEAs

3.5. National Considerations for Capacity Building and Technology Transfer Related to EIAs and SEAs

At the national level States and/or proponents of activities, plans and programmes in ABNJ will have primary responsibility for conducting and evaluating EIAs/SEAs in ABNJ and for ongoing monitoring, review and enforcement of conditions related to EIAs/SEAs in ABNJ.

The following capacity building needs may relate to the national level and would be applied by States individually, collectively and/or together with regional and global organizations

- Conduct of EIAs/SEAs

- o Assessing which activities, plans and programmes under national jurisdiction or control in ABNJ require EIAs/SEAs
- o Application of global criteria and standards to the conduct of EIAs/SEAs
- o Strengthening local institutions, data and practice in relation to conduct of EIAs/SEAs
- o Applying traditional knowledge in the conduct of EIAs/SEAs
- Evaluation of EIAs/SEAs
 - o Application of global criteria and standards to the evaluation of EIAs/SEAs
 - o Strengthening local institutions, data and practice in relation to evaluation of EIAs/SEAs
- Implementation of EIAs/SEAs
 - o Assistance in the implementation of EIA/SEA conditions through the provision of necessary data, expertise and technology
- Monitoring and Review of EIAs/SEAs
 - o Assistance in the monitoring and review of EIA/SEA conditions through the provision of necessary data, expertise and technology
- Other general needs
 - o Strengthening national laws and policies related to EIAs/SEAs
 - o Understanding and monitoring the connections between EIA/SEA conditions applied in waters under national jurisdiction and those in ABNJ

3.6. Additional Considerations Relating to Climate Change and EIAs/SEAs

The impacts of climate change on the marine biodiversity of the oceans generally and more specifically ABNJ, have been discussed in the ABMT section of this paper. EIAs and SEAs related to activities, plans and programmes in ABNJ will need to incorporate climate change impacts in all stages of the process including the scoping, reporting, evaluating and monitoring phases.

It is important that capacity building measures related to EIAs/SEAs also take into account climate change.

These measures may include the following:

- Capacity building in the research, data and information needs required to forecast, identify and measure climate change impacts on marine biodiversity in ABNJ
- Capacity building in the research, data, information and modelling needs necessary develop and adapt climate change mitigation conditions in EIA/SEAs in ABNJ

3.7. Role of the Clearing House Mechanism

As with ABMTs, the potential clearing house mechanism under the new instrument can facilitate access to data and information relevant to EIAs/SEAs in ABNJ. It can also provide a central repository for relevant information on capacity building, including on line training courses, webinars and practice manuals as well as funding information.

The role of the clearing house mechanism in facilitating capacity building in EIAs/SEAs may include the following:

- Serving as a central portal for facilitating EIAs/SEAs capacity building including:
 - o Information related to EIA/SEA capacity building opportunities
 - o Access to webinars, on line training courses and other on line capacity resources
 - o Information about funding opportunities
 - o Panel of experts on EIA/SEA
 - o Access to peer networks and discussion boards
 - o Information about exchange programmes and other on the job opportunities related to EIAs/SEAs
 - o Access to data, information and practice related to EIAs/SEAs

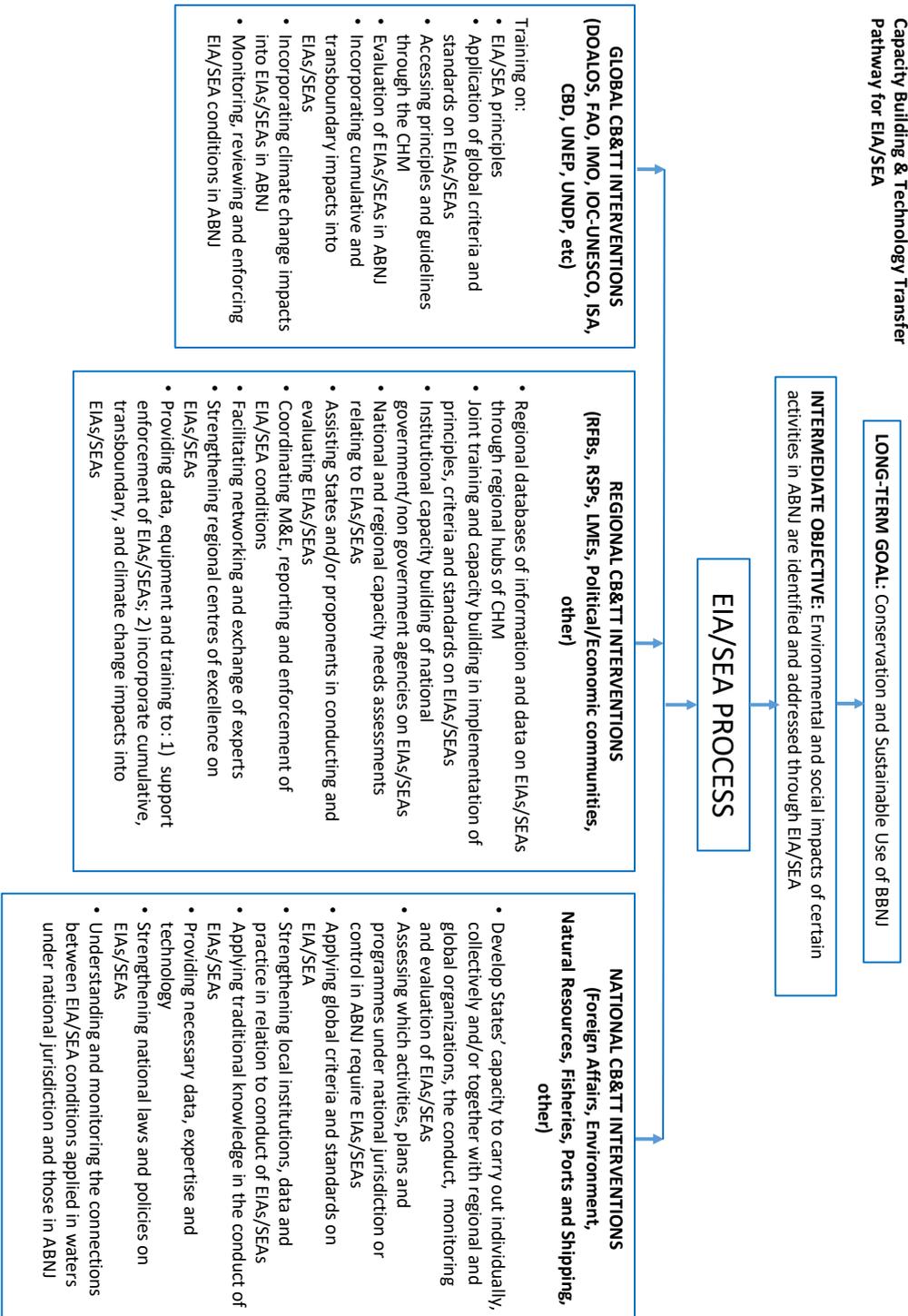
- o Access to legal, policy and socio-economic data and information related to EIAs/SEAs

3.8. Summary of Capacity Development for EIAs/SEAs

Figure 3 below summarizes the main capacity development activities that would need to be

carried out at global, regional, and national levels.

Figure 3. Summary of Capacity Development Needs and Processes for EIAs/SEAs at Global, Regional, and National Levels



4. CAPACITY NEEDS FOR MARINE GENETIC RESOURCES

4.1. Needs Expressed in the President's Aid to Negotiations for IGC 2

The President's Aid for Negotiations puts forward a number of options relevant to capacity building and technology transfer of marine genetic resources (MGRs), including sharing of benefits. Overall, it envisions a range of potential activities that include scientific collaboration, access to MGRs, access to relevant technology, and development of research capabilities relating to marine genetic resources and products, processes and other tools.

General options for MGRs, including the sharing of benefits, that are of relevance to capacity building

The President's Aid for Negotiations put forward options related to potential inclusion of marine genetic resources obtained

- **In situ**
- **Ex situ**
- **In silico**
- **In silico and digital sequence data**
- **Derivatives**

While it is not yet known whether all of these options will be included, it is important that capacity building relating to MGRs considers both the meaning of the terminology, and how MGRs obtained through these pathways might be utilized.

In regards to access and benefit-sharing, the President's Aid includes options for cooperation of States parties in regards to the conservation and sustainable use of marine genetic resources of areas beyond national jurisdiction, including questions on the sharing of benefits, taking into account the special requirements of developing countries for capacity-building and the transfer of marine technology; and the special circumstances and needs of small island developing States. An additional option states that, having regard to Part

XIV, section 2, of the Convention, States parties shall cooperate with respect to marine genetic resources of areas beyond national jurisdiction, including questions on the sharing of benefits.

In addition, the President's Aid contains options for additional requirements for accessing MGRs in ecologically and biologically significant areas, vulnerable marine ecosystems and other specially protected areas in order to ensure conservation and sustainable use of the resources therein; as well as potential environmental impact assessment (EIAs). Thus, activities related to MGRs and the sharing of benefits are also tied to area-based management and EIAs.

The options in the section related to access also put forward options that relate to capacity building and technology transfer as a condition for access; propose the deposit of samples, data and related information in open source platforms, such as databases, biorepositories and/or biobanks; and/or contribution to an access and benefit-sharing fund.

Additional options for open *ex situ* access to MGRs, as well facilitated access to *in silico* resources are also included.

It is also envisioned that benefit-sharing under the instrument shall build the capacity of developing countries to access and use marine genetic resources of areas beyond national jurisdiction; facilitate the transfer of technology; and address the special case of small island developing States and aim to support their empowerment to effectively conserve as well as benefit from the sustainable use of biological diversity of areas beyond national jurisdiction. While benefit-sharing may include both monetary and non-monetary benefits depending on the outcome of negotiations, it is envisioned that non-monetary benefits include but are not limited to:

- **capacity-building,**
- **the exchange and public availability of information and scientific knowledge,**
- **access to samples and sample collections**
- **access to technology and technical knowledge and transfer of technology.**

Clearinghouse mechanism and MGRs

The President's Aid also puts forward options related to the role that the clearing-house mechanism could perform in regards to MGRs and benefit-sharing. These include the following:

- Promote transparency in the use of marine genetic resources, disseminate data and scientific information, disseminate information concerning capacity-building and transfer of technology and improve cooperation and coordination
- Promote and facilitate technical and scientific cooperation, knowledge and data sharing;
- Serve as a platform to access, evaluate, publish and disseminate information;
- Disseminate information related to: marine genetic resources-related activities...
- Disseminate information regarding: capacity-building and the transfer of marine technology opportunities; the proceedings of capacity-building trainings; the advertisement of trainings, best practices or other tools to facilitate access to relevant expertise; and training on the use of the clearing-house mechanism

Capacity building and technology transfer relating to MGRs and the sharing of benefits

The section of the President's Aid for Negotiations related to capacity building and technology transfer also highlights several topics that are applicable to MGRs, including (but not limited to):

- Capacity building and transfer of marine technology shall promote and encourage access to technology by and transfer of marine technology to developing countries for the attainment of the objectives of this instrument.
- States parties, recognizing that marine technology includes biotechnology and that both access to and transfer of marine technology among States parties are essential elements for the attainment of the objectives of this instrument, undertake to provide and/or facilitate access for and transfer to other States

parties of marine technologies that are relevant to the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction and do not cause significant damage to the environment.

Additional objectives of capacity-building and the transfer of marine technology under this instrument include:

- (1) **The development of the marine scientific and technological capacity** of States parties with regard to the exploration, exploitation, conservation and sustainable use of marine biological resources of areas beyond national jurisdiction, the protection and preservation of the marine environment, marine scientific research, and other activities in areas beyond national jurisdiction compatible with this instrument, with a view to accelerating the social and economic development of developing countries;
- (2) **The development of technical, scientific, and research and development programmes, including biotechnological research activities;**
- (3) Ensuring that developing countries have:
 - (a) **Access to and benefit from the scientific information** resulting from access to resources in areas beyond national jurisdiction, in particular marine genetic resources;
 - (b) **Access to and benefit-sharing from marine genetic resources and marine scientific research;**
 - (c) **Access to marine genetic resources in situ, ex situ and in silico;**
 - (d) **Endogenous research capabilities relating to marine genetic resources and products, processes and other tools.**

Finally, the document also provides proposals on modalities, including the need for capacity building and technology transfer to be based on/responsive to expressed needs, and which include (but are not limited to) the following measures related to MGRs:

- Technical support for the implementation of provisions, including for data monitoring and reporting;
 - Infrastructure
 - Institutional capacity, including governance, policy and legal frameworks and mechanisms
 - Scientific and research capacity
 - Knowledge-sharing and technical cooperation
 - The sharing of information and technologies
 - Information dissemination
 - Data collection and exchange
 - Capacity to translate into effective and efficient policies
 - Programmes of research, education and training taking into account the Intergovernmental Oceanographic Commission (IOC) Criteria and Guidelines on the Transfer of Marine Technology and the practices of the International Seabed Authority;
 - Education and training in science and technologies, policy and governance;
 - The development of regional centres of excellence;
 - Increasing cooperative links between regional institutions, for example North-South and South-South collaboration and collaboration between regional seas organizations and regional fisheries management organizations;
 - The designation/creation of a financial mechanism to support implementation of activities
 - Technical exchange and cooperation on marine science
 - Open access and wide dissemination of environmental and biological information collected through research conducted in areas beyond national jurisdiction as well as in the Area
 - The establishment or strengthening of the institutional capacities of relevant national and regional organizations and institutions
- The acquisition of the equipment necessary to sustain and further develop research and development capabilities, including data management, in the context of access to and use of marine genetic resources, area-based management tools, including marine protected areas, and conduct of environmental impact assessments
 - The development of human resources and individual capacity-building, including in natural and social sciences, both basic and applied, through exchange of experts, short-term, medium-term and long-term training and the establishment of a global scholarship fund
 - The provision of scholarships or other grants for representatives of small island developing States in workshops, programmes or other relevant training programmes in order to develop their specific capacities;
 - The establishment of a networking mechanism among trained human resources;
 - The exchange of experts
 - Assistance in the development, implementation and enforcement of national legislative, administrative or policy measures, including associated regulatory, scientific and technical requirements on a national or regional level;
 - The facilitation of access to and acquisition of necessary knowledge, information and data in order to inform decision-makers of developing countries;
 - Assistance with marine science and technology research and application;
 - The development of regional centres for skill development
 - Knowledge-sharing through the sharing of research and development results
- While the options included in the President's Aid may or may not find their way into the International Agreement, they provide an indication of the types of activities that States, and international and regional bodies may be required to undertake, and thus areas where capacity building and technology transfer may be required.

4.2. Possible Modalities for Operationalizing Capacity Building and Technology Transfer for MGRs

There currently exists a vast capacity gap in the ability of countries to benefit from the utilization of marine genetic resources. This gap has to do with the specialized nature of MGR-related research, which in the deep sea entails expensive ships and equipment. Perhaps more importantly, the capacity gap reflects the lack of ability of many developing countries to participate in the biodiscovery process, from screening MGRs for biological activity to developing them into a commercial product. Access to latest published information about MGRs may also be limited due to the expense of scientific journals. The uneven distribution of capacity for marine biotechnological research is also reflected in patents related to marine genes, more than 90% of which are registered with ten developed countries (Arnaud-Haond et al, 2011). As a result, scientific discoveries and the benefits of exploitation of the ocean are unevenly shared amongst nations.

In accordance with the President's Aid for discussions, it is envisioned that capacity building and technology transfer will enable inclusive and equitable participation of all States in accessing and developing MGRs. Resulting marine biotechnology capacities and infrastructure also have the potential to further contribute to national blue economies in accordance with Sustainable Development Goal 14.

There are current efforts underway by individual scientists and research organizations to provide capacity building and technology transfer to partner organizations and scientists in developing countries. These efforts, while having achieved many tangible benefits, are still add hoc and uncoordinated. A more coordinated approach to capacity building and technology transfer relating to MGRs and their utilization is needed for the capacity gap to be fully addressed.

Researchers, international organizations, governments, donor organizations and industry have a role to play in undertaking capacity building and technology transfer relating to

MGRs, including the sharing of benefits. Recent research demonstrates that the majority of patents relating to marine genetic resources (84%) belong to companies, while 12% are held by universities (Blasiak et al, 2018). Thus, the private sector, in addition to research organizations, should also be viewed as a partner in capacity building and technology transfer. Overall, concerted and coordinated efforts towards capacity building and technology transfer by all actors are required to address the capacity gap. One approach may be through large, multi-country and multi-actor projects, such as the EU-funded PharmaSea project discussed in more detail in Box 4 below.

Capacity building and technology transfer relating to marine genetic resources, including the sharing of benefits, will be required on multiple levels. On the national level, where the focus of capacity building should be directed by expressed needs, strengthening of both institutions and individual scientists and policymakers will likely be required. On the regional level, capacity building and technology transfer may involve strengthening regional institutions, including centres of excellence, in undertaking marine biotechnology research, and in providing training, both basic and advanced, to scientists and policymakers in the region. Globally, access to data and information related to MGRs, and information related to capacity building opportunities can be shared through a clearinghouse mechanism. Standards, codes of conduct and best practices related to MGRs and access and benefit-sharing are also best developed on the global level.

The following text provides suggestions for the types of capacity building and technology transfer that may occur on the global, regional and national levels.

4.3. Global Considerations for Capacity Building and Technology Transfer

Some types of capacity and technology are best provided at, or through, the global level, including coordinating information about capacity building and technology transfer requirements and opportunities as they relate to MGRs, and to non-

monetary benefit-sharing. These types of capacity include facilitating open access to information, data and samples related to MGRs, and opportunities for participation in research collaborations. As issues related to MGRs are complex and constantly evolving, with science progressing rapidly, there is also a need to provide continuously updated capacity development opportunities and information to ensure that scientists and policy makers in developing countries stay current on both the implications of new developments and their applications.

In addition, capacity building is needed to help scientists and policy makers in both developed and developing countries to better understand and comply with the requirements of the new international agreement.

Better understanding and complying with the new international agreement

Capacity building to better understand and comply with requirements of the new international agreement as they relate to MGRs and benefit-sharing may include:

- Clarifying legal terminology relating to marine genetic resources, as well as the real-world implications of this terminology
- Capacity building (training, how-to brochures, etc) to those seeking to access MGRs in ABNJ to ensure that they comply with the requirements of the new international agreement relating to access, benefit-sharing and traceability. This would particularly target both scientists and the private sector.

Facilitating open access to data and samples and capacity building opportunities

There currently exist many sources of data and information that are relevant to marine genetic resources, but they are not necessarily coordinated or easily accessible. The clearinghouse mechanism will likely provide an important avenue for coordination and collaboration, but considerable effort is required to ensure that databases, information about sample access, and opportunities for capacity building and technology

transfer are accessible through a common entry point.

Capacity building relating to accessing information relevant to MGRs may include the following:

- Making data and information related to MGRs in publicly accessible databases (e.g. OBIS, WoRMS, GenBank, BGIF, etc) available through a common access point or portal
- Improving the availability of, and access to, accurate taxonomic and geographic data to aid natural products research, particularly of microbes and other relatively unknown taxa
- Providing access to information, including published research, related to MGRs
- Providing facilitated access to ex situ and in silico data, including training in the use of these data
- Providing a global access point to capacity building and technology transfer opportunities; as well as a way to countries to express their needs in this regard
- Providing information about research cruises that aim to sample MGRs, and opportunities for participation in research collaborations

Promoting good practice in MGR research

There is need for scientists to adhere to best practices as they undertake research to access MGRs in ABNJ, with these best practices covering both environmentally sustainable research practices, and compliance with benefit-sharing requirements (see examples of codes of conduct in the box below). Similarly ex situ collections may require best practices to facilitate access to samples and associated metadata.

Capacity building relating to best practices accessing MGRs in situ and ex situ may include:

- International standards, best practices, and/or codes of conduct relating to marine scientific

research to access MGRs in ABNJ, including both environmental sustainability and benefit-sharing requirements

- Ability of *ex situ* collections to keep records and apply standardized procedures for exchanging samples of genetic resources and related information with other collections, and for supplying samples of genetic resources and related information to third persons for their utilization in accordance with the new international agreement

4.4. Regional Modalities for MGRs, Including the Sharing of Benefits

The discovery of MGRs depends on good science and the ability to use technology related to biodiscovery. Thus, capacity building and technology transfer will also need to have a strong focus on building science and technology capacities of both institutions undertaking research, and of individual researchers. Skills in applied biotechnology research are vital for the process of preparation, isolation, analysis and screening of samples, as well as the production of commercial products from promising candidates.

On the regional level, concentrating capacities in regional universities, or centers of excellence, will allow these centers to pursue multiple research objectives and broad applications related to marine genetic resources, the marine environment, and its physical, chemical, biological and socio-economic context. Scientific collaborations involving such centers can help build their capacities, as was the case with the Pacific Natural Products Research Centre at the University of South Pacific (see box below).

Finally, regional organizations may have a coordinating role in assessing national needs related to MGRs, and conveying those needs to the global level. However, the process is likely to work differently in different regions, and national needs may also be reported directly by governments to the global level.

Building institutional capacity through regional centres of excellence may involve:

- Technology transfer to regional centres of excellence, of facilities, equipment, data and information, to allow them to participate in research related to MGRs
- Continuous enhancement of regional centres of excellence as science and technologies advance, to enable them to train researchers from various countries of the region, and to undertake the development of MGRs into commercial products.

4.5. National Modalities for MGRs, Including the Sharing of Benefits

National level needs drive the capacity building and technology transfer process. Assessing national needs is often the first step to developing a program or course of action for capacity building and technology transfer. In regards to MGRs and benefit sharing, these needs are likely to relate to building both individual and institutional capacity at the national level, as well as addressing the enabling environment. These needs are likely to relate to accessing and developing genetic resources, as well as ensuring that new developments in biotechnology are understood and applied.

Capacity building on the national level in regards to MGRs and benefit-sharing may involve:

Creating an enabling environment

- Training of policymakers at the national level in the relevance of MGRs to national blue economies, and the legal and policy requirements for supporting scientific research, biodiscovery and development of marine biotechnology
- Training of policymakers at the national level in the legal requirements of the new international agreement as they relate to access to MGRs and the sharing of benefits

Accessing marine genetic resources

- Accessing MGRs in situ, including through shared scientific cruises

- Sampling and sample processing techniques at sea
- Accessing MGRs ex situ
- Accessing MGRs in silico
- Accessing knowledge related to marine genetic resources

Developing marine genetic resources

- Training in the use of in silico data
- Technology transfer to national universities of facilities, equipment, data and information to allow them to participate in research related to MGRs
- Training in the biodiscovery process, as well as commercialization of products
- Training in the use of ex situ data
- Training in the use of in silico data
- Collaborative research projects between developing and developed country scientists, including joint publications
- South-South cooperation in development of MGRs
- Scientific exchanges
- Collaboration with the private sector in commercial development of MGRs

Staying current with new developments

- Access to new research related to MGRs
- Access to, and training in, new scientific and biotechnology developments, including synthetic biology
- Understanding new tools created through genetic research to understand ocean health (eDNA), which can help also with conservation

4.6. Additional Considerations Relating to Climate Change and MGRs

Climate change has profound impacts on biological diversity (Lourenco et al, 2016), and may lead to loss or erosion of genetic diversity (Assis et al, 2015). Climate refugia are characterized by the occurrence of relatively stable local climatic conditions that persist over

time, despite change at regional and global scales. They may become important for the conservation of not only species, but also genetic diversity (Assis et al, 2015; Lourenco et al, 2016).

Identification and protection of such refugia may become important for conserving species and genetic diversity in the face of climate change.

Marine microorganisms are particularly important for biotechnology, and are also impacted by climate change in various ways. Some functional groups such as nitrogen-fixing cyanobacteria and denitrifiers may be net beneficiaries of these changes, while others such as calcifiers and nitrifiers may be negatively impacted. Other groups, such as heterotrophic bacteria, may be relatively resilient to changing conditions. The challenge for research will be to forecast how such changes impact not only the microorganisms, but the ocean ecosystem as a whole, as well as ocean's carbon and nutrient cycles (Hutchins, 2017).

Finally, climate change is likely to have considerable impacts on the deep sea and the mid-water column, including reduced oxygen concentrations in the water column, and reduced flux of particulate organic matter to the deep seafloor, impacting ecosystems and species (Sweetman et al, 2017). Warming of the deep ocean by 1 degree C or less may exert stress or cause shifts in depth or latitudinal distributions and alter species interactions. The combined impacts of ocean warming, deoxygenation, reduced transport of surface nutrient supplies to the deep ocean, and ocean acidification may threaten biodiversity and compromise key ocean services that maintain a healthy planet and human livelihoods (Levin and Bris, 2015). Impacts on marine genetic resources are unknown, but likely detrimental.

Capacity building needs related to MGRs in the context of climate change

- Understanding the role of climate refugia in safeguarding genetic diversity
- Using the latest scientific research to protect areas that are likely to be climate refugia, or

that contain species that are important to the development of marine genetic resources

- Developing a better understanding of how climate change impacts genetic diversity, including in microorganisms
- Developing a better understanding of climate change impacts on the deep sea and the water column, and the adaptive potential of species

4.7. Role of the Clearinghouse Mechanism

The clearinghouse mechanism can become a central location to access all data relevant to MGRs and the sharing of benefits, as well as capacity building opportunities.

The role of the clearinghouse mechanism in facilitating capacity building in MGRs, including benefit-sharing, may include the following:

- Serving as a central portal for information about MGRs, and capacity building opportunities, including:
 - Access to scientific information, data and samples related to MGRs
 - Access to legal, policy and socio-economic information of relevance to MGRs and benefit-sharing
 - Information related to MGR capacity building opportunities, including scientific collaborations and shared cruises
 - Access to webinars, online training courses and other online capacity resources
 - Information about funding opportunities
 - Access to peer networks and discussion boards
 - Roster of experts
 - Information about exchange programmes and other hands-on opportunities

4.8. Financing

Financing for capacity building and technology transfer related to MGRs is likely to come from several sources, which might include the following:

- Financing mechanism, such as the GEF or other, for the new international agreement, which may include a specific trust fund for MGR-related capacity building
- Public research funding from national governments or other donors for international research collaborations in the area of marine biodiscovery
- As part of non-monetary benefit-sharing, which is financed by those undertaking research of relevance to MGRs in ABNJ
- From royalties resulting from monetary benefit-sharing
- Private sector collaboration in, and funding of, capacity building and technology transfer

4.9. Summary of Capacity Development Related to Marine Genetic Resources

Figure 4 provides a summary of capacity needs and processes related to marine genetic resources.

Box 3. PharmaSea Project--International Cooperation in Marine Genetic Resources Research

PharmaSea brings together a broad international, interdisciplinary consortium of 24 partners from 13 countries from industry, academia and non-profit organizations with world-leading researchers in the areas of marine genomics, biosynthesis and chemical structure analysis as well as legal experts. World-leading experts from Belgium, UK, Norway, Spain, Ireland, Germany, Italy and Denmark as well as partners from China, South Africa, Chile, Costa Rica and New Zealand are taking part in the PharmaSea project.

The PharmaSea project focuses on biodiscovery research and the development and commercialisation of new substances from marine organisms. Its primary goal is to collect samples from some of the hottest, deepest and coldest places on the planet. These samples will be screened to uncover marine microbes and new bioactive compounds to evaluate their potential as novel drug leads, antibiotics or ingredients for nutrition or cosmetic applications. PharmaSea is funded by the European Union under its FP7 programme

From the PharmaSea website at <http://www.pharma-sea.eu/news/pharmasea-project-started/>

Box 4. Examples of Scientific Codes of Conduct Relating to MGRs and Access and Benefit-sharing

The CIESM Charter on Access and Benefit-Sharing

The Mediterranean Science Commission (CIESM) developed a charter on Access and Benefit-Sharing for access to knowledge for all and for the prevention of misuse of the global ocean commons. The CIESM Charter favours the sharing of scientific knowledge with collaborative handling of data, traceability, nature conservation and environmental stewardship. The Charter, which was developed after extensive consultation with scientists and legal experts, lists nine ethical guidelines for providers, applicants and end-users regarding the use of marine resources. It emphasizes essential core values, such as fair and equitable sharing of benefits, transparency and reciprocal relations. The CIESM Charter goes beyond biological approaches and extends beyond the strict perimeter of the Mediterranean/Black Sea region. It is applicable to large scientific initiatives such as oceanographic cruises in the world oceans. (<http://ciesm.org/marine/charter/index.php>)

InterRidge statement of commitment to responsible research practices at deep-sea hydrothermal vents

InterRidge statement of commitment to responsible research practices at deep-sea hydrothermal vents (2006):

<https://www.interridge.org/irstatement>

From Boyen et al (2017) Scoping industrial needs for sustainable development. Online at <http://www.marinebiotech.eu/sites/marinebiotech.eu/files/public/D3.9%20D3.10%20D3.11%20Scoping%20industrial%20needs%20for%20sustainable%20development.pdf>

Box 5. Pacific Natural Products Research Centre, University of South Pacific

The Centre was established in 2001 under the guidance and leadership of Professor William Aalbersberg as a research branch for the Institute of Applied Sciences (IAS) involved in bioprospecting work on marine and terrestrial organisms and plants. The Centre has developed in strength and independence, establishing several partnerships over the years. In 2005, the Centre secured an ICBG grant through a consortium of Georgia Institute of Technology, Scripps Institute of Oceanography and IAS. This competitive grant has been successfully renewed twice and Centre is currently on a 5-year term (2014-2019) of collaborative research. Success of the ICBG collaboration has brought new grants. The Centre was awarded a GEF (Global Environment Facility) grant through the Government of Fiji to work on nature-based products and building capacities for the application of the Nagoya Protocol on Access to Genetic Resources and Benefit Sharing (ABS) in Fiji.

The Centre continues to focus its research on the search for antibacterial, antifungal as well as anticancer activity from marine and terrestrial samples. New bioassays and in particular, an anti-dengue test facility is in the process of being set up. The Centre houses a library of actinomycete bacteria isolated from marine sediments and organisms including more than 1900 strains of marine bacteria and more than 3350 marine invertebrate/algae extracts that have been analyzed for general toxicity and against our in-house drug resistant pathogenic bacteria and fungi. They are also in the process of establishing libraries of pure compounds extracts from marine macro and microorganisms. There is also a DNA laboratory used in plant and animal/bacterial

identification. They also supervise research students at the postgraduate level on topics relating to natural products chemistry and microbiology.

From <https://www.usp.ac.fj/index.php?id=18023>

Box 6. University of Papua New Guinea and University of Utah Collaboration in Drug Discovery

The University of Papua New Guinea Molecular Bio-discovery and Biomedicines Laboratory was established through collaboration with the University of Utah, USA, for the screening of PNG natural products for new therapeutic lead compounds and the validation of traditional medicine. The University of Utah College of Pharmacy participate in the international effort in order to seek to identify drugs for use as anti-cancer, antitubercular and anti-HIV agents.

From <http://www.upng.ac.pg/site/our-research-establishments.html> and <https://pharmacy.utah.edu/pharmtox/research/drug-discovery.php>

Box 7. GEF Capacity Building Project in Natural Product Discovery in Support of the Nagoya Protocol

The Global Environment Facility has provided funding for an Access Benefit Sharing project for Fiji entitled “*Discovering Nature-Based Products and Building Capacities for the Application of the Nagoya Protocol on Access to Genetic Resources and Benefit Sharing in Fiji.*” A major outcome of the project is to build capacity of Fijian institutions to perform natural product drug discovery and development activities in the country. In particular, the programme hopes to discover and develop new pharmaceuticals from natural sources and to conserve the resources from which these pharmaceuticals are derived. The GEF-ABS project builds on activities implemented by a bio-discovery initiative known as the International Cooperative Biodiversity Group (ICBG) in Fiji. The project also addresses gaps in working with the local and national governments in securing access to marine samples and establishing benefit-sharing protocols and mechanisms that support in-country research activities.

From

[https://www.usp.ac.fj/index.php?id=6380&tx_ttnews\[tt_news\]=4351&cHash=1e3bf7e28c72f0bd70c1b3fa2523920c](https://www.usp.ac.fj/index.php?id=6380&tx_ttnews[tt_news]=4351&cHash=1e3bf7e28c72f0bd70c1b3fa2523920c)

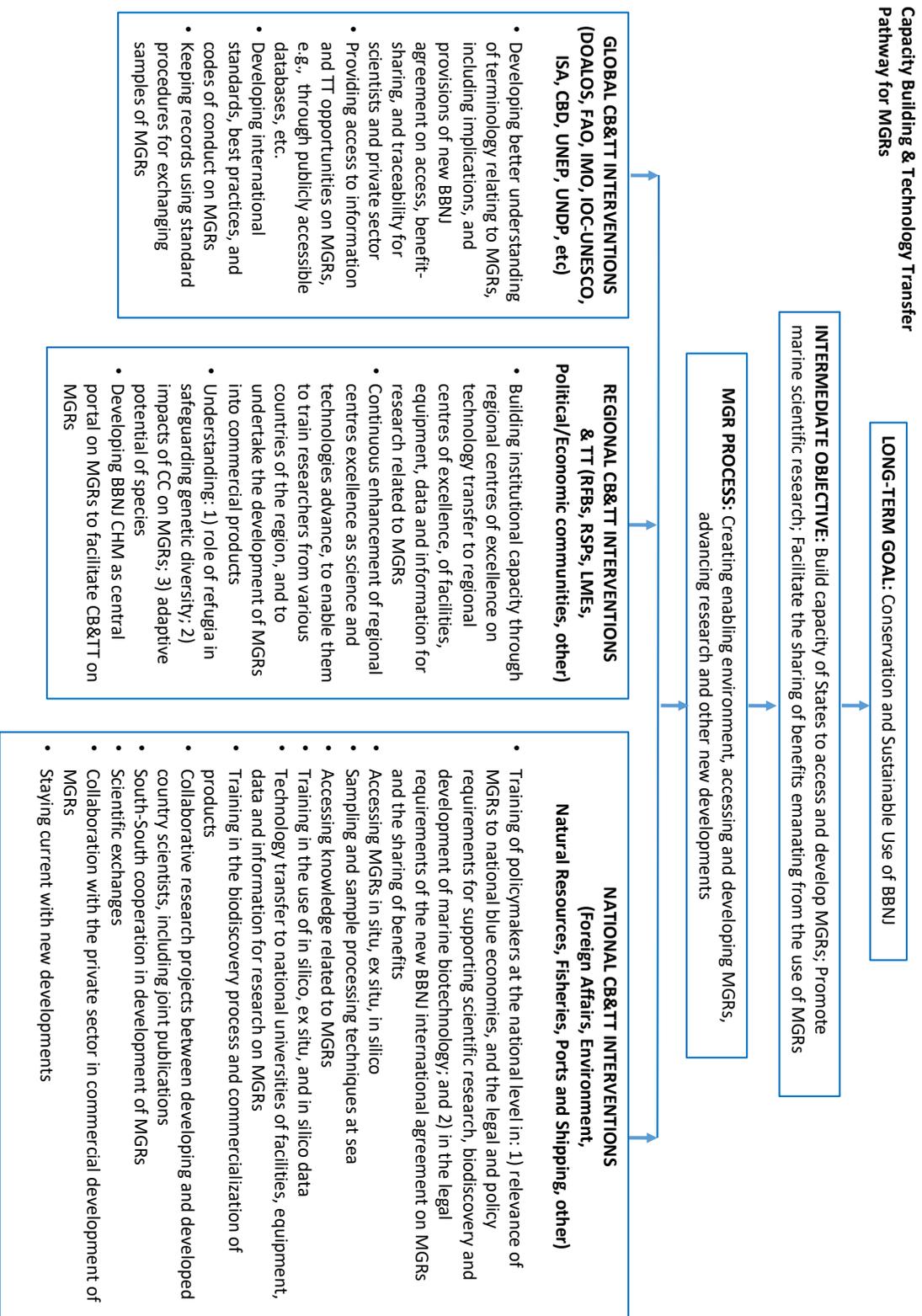


Figure 4. Summary of Capacity Needs and Processes Related to Marine Genetic Resources at Global, National, and Regional Levels

5. CLIMATE CHANGE AND BBNJ

5.1 The Ocean and Climate Nexus

The ocean plays a key role in regulating the climate, producing 50% of the oxygen on Earth, storing 50% of all carbon naturally sequestered from the atmosphere, absorbing 30% of the anthropogenic heat added since 1750, and absorbing 93% of all additional heat since the 1970s (IPCC 2013). In turn, changes in the climate have significant impacts on the ocean, including but not limited to warming, changes in ocean chemistry, deoxygenation, sea level rise, and altering currents and oceanographic conditions, all of which have accelerated significantly in recent years. Greater ocean warming due to climate change could lead to the disruption of coastal marine ecosystems in a way that creates large scale biological loss. At the current rate of CO₂ emissions, the mean surface pH is predicted to decrease by another 0.3 to 0.4 units, the equivalent to a 100-150% increase in acidity, by the end of the century (IPCC 2005). Sea level rise threatens coastal communities globally, with SIDS facing the threat of sea level rise at four times the global average, and some facing submergence and trillions of dollars in losses.

The wide range of impacts arising from climate change on the oceans and on peoples in 183 coastal and island nations must be urgently addressed. The overall picture reveals a need for more urgent action and investment in mitigation and adaptation to protect marine environments and the human populations which depend on them, and should be considered both within the UNFCCC and at all levels of policymaking related to climate change and ocean management, both for the survival of planetary health and for human well-being (Cicin-Sain, 2019).

We frame our discussions on the Oceans and Climate Nexus in the context of new relevant scientific evidence, in particular, to the IPCC report on 1.5°C (IPCC 2018). The request to IPCC to carry out this report was a key outcome of UNFCCC COP 21 in Paris, following the SIDS

nations long-standing push for “1.5 to stay alive.” The 1.5° report is a landmark report with far reaching implications for all climate change action and with special relevance to oceans and coasts. It:

- *Demonstrates that the predicted impacts of climate change are coming much earlier than expected—we will most likely reach a warming of 1.5°C as early as 2030 and no later than 2052, posing immediate threats to peoples and ecosystems around the world, especially in 183 coastal countries and SIDS. Global emissions of greenhouse gases have to approach zero already in 2050 to avoid the most harmful consequences.*
- *Demonstrates that there is a marked difference between keeping to a 1.5° scenario versus a 2° scenario—under a 1.5°C scenario, very adverse impacts may be avoided—e.g., displacement of millions of people due to sea level rise, increased frequency and intensity of storms, and other seriously adverse effects. Limiting warming to 1.5°C instead of 2°C would reduce the impacts of rising sea levels, lower the likelihood of an ice-free Arctic in summer, and limit coral-reef decline alongside many other negative consequences of increased temperatures.*
- *Finds that limiting global warming to 1.5°C would require “rapid and far-reaching” transitions in land, energy, industry, buildings, transport, and cities. Global net human-caused emissions of carbon dioxide (CO₂) would need to fall by about 45 percent from 2010 levels by 2030, reaching ‘net zero’ around 2050. This means that any remaining emissions would need to be balanced by removing CO₂ from the air.*

The implications of the IPCC Report 1.5° are profound for ecosystems and peoples in the oceans and in the coastal zones of 183 coastal and island nations. As Amjad Abdulla, Alliance of Small Island States and IPCC Board member noted: “...I have no doubt that historians will look back at these findings as one of the defining moments in the course of human affairs. I urge all civilized

nations to take responsibility for it by dramatically increasing our efforts to cut the emissions responsible for the crisis and to do what is necessary to help vulnerable people respond to some of the devastating consequences we now know can no longer be avoided” (AOSIS).

5.2 Climate Change and ABNJ

While at the national level, 70% of national reports to the UNFCCC (Nationally Determined Contributions NDCs) laying out governmental goals and policies for curbing greenhouse gas emissions and for mitigation and adaptation, address oceans and climate issues, there is no such assessment and reporting for the over 60% of the ocean that lies beyond national jurisdiction. As well, the ocean and climate nexus has not yet been treated systematically in the BBNJ process.

For the Capacity Development aspects of the BBNJ International Agreement that will ultimately be adopted, it will be very important to factor into these sections consideration of the impacts of climate change on areas beyond national jurisdiction and deployment of strategies for mitigating the negative impacts of ocean warming, deoxygenation, ocean acidification, and changes in ocean chemistry in areas beyond national jurisdiction and incorporate these considerations in capacity development programs.

As the oceans warm, gases like oxygen become less soluble and ultimately release back into the atmosphere. In addition to this deoxygenation process, the ocean becomes more stratified, thereby reducing the introduction of oxygen from the mixed layer to the ocean interior, ultimately affecting organisms that depend on the local oxygen supply. Ocean acidification is expected to lower the “availability of carbonate ions important to the production of carbonate shells, tests and other biological structures including deep-water coral reefs” (DOSI 2015). Together, ocean warming and acidification will endanger or restructure many sensitive environments across the vast expanse of ABNJ, including the fisheries networks that humans currently depend on (Barange et al, 2018). For example, under a

Business As Usual scenario, the maximum body size of fish communities is expected to decrease by 14-24% by 2050 relative to 2015 due to exposure to environments beyond their tolerance level (DOSI 2015).

Climate change is also predicted to have a significant impact on life in the deep sea, particularly through disruptions in the transfer of heat, oxygen, and carbon (Levin & Le Bris 2015). The deep sea environment is characterized by “very stable thermal regimes” wherein “warming of 1°C or less may exert stress or cause shifts in depth or latitudinal distributions and alter species interactions” (Levin and Le Bris 2015). The conclusion that “deep-sea biodiversity is...significantly affected by very small temperature changes” (Danovaro et al. 2004) becomes even more critical when considering the fact that “more than 90% of [Earth’s] livable volume is in the deep ocean, below water depths of 200 m” (Levin & Le Bris 2015). Thus, as the warming Earth destabilizes the deep-sea environment, potentially invaluable Marine Genetic Resources such as bacteria, viruses, fish and other marine organisms may disappear.

As shown in Figure 6, the continental margins and bathyal zone will experience the most extreme temperature change, although even small temperature fluxes in the deep ocean can have deleterious effects on biodiversity. A study of the Mediterranean Sea found that in addition to climate change, biodiversity is greatly affected by “habitat loss and degradation, fishing impacts, pollution, eutrophication, and the establishment of alien species,” and that “all these impacts are expected to grow in importance in the future, especially climate change and habitat degradation” (Coll et al. 2010). As illustrated in Figure 6, anthropogenic impacts from fishing, mining, oil and gas extraction, and marine litter need to be considered in the context of maintaining biodiversity in ABNJ.

The uncertainty surrounding how responsive the seafloor environment can be to anthropogenic effects like sea bed mining, military activity, and

seafloor cables has led many researchers to advocate for the precautionary principle. While abundant research exists on how shallow water organisms react to the introduction of particulate matter, lights, and sounds, there remain large gaps in familiarity with the relationship between deep-sea life and anthropogenic activity (Hauton et al. 2017).

5.3 Climate Change and Area Based Management Tools

Area Based Management Tools, including Marine Protected Areas and sectoral tools such as areas closed to protect Vulnerable Marine Ecosystems (VMEs), are utilized globally as mechanisms for conserving particularly important, vulnerable or representative regions across the ocean, as well as areas covering all life history stages of migratory species, including both within and beyond national jurisdiction. Policy makers agree that in the face of climate change, significantly more research will be required in order to better understand where ABMTs will have the greatest effect. As the changing ocean temperature results in a more dynamic ocean current system, designated areas may require flexibility in order to accommodate shifting marine organism population centers.

Designating Marine Protected Areas requires a scientific basis that generally relies on spatial data from remote sensing, tracking, models, observations and other sources to determine which areas would benefit the most from conservation and/or management. Selig et al. (2014) applied modeled spatial data to both EEZs and ABNJ, identifying priority areas in particular portions of the Arctic, Antarctic, Mediterranean, Baltic, Western Pacific, Southwest Indian Ocean, and the Coral Triangle. Within the highest priority areas, the researchers noted that climate change and fishing habits are the most significant impacts on the health and sustainability of each region. Large amounts of spatial data relating both to ABNJ and EEZs have also been compiled as part of the CBD process to identify Ecologically or Biologically Significant Areas (EBSAs). These data provide a

considerable resource for the future application of area-based management tools.

Area-based management tools, in particular marine protected areas, can also be used locally to help marine ecosystems adapt and to buy time until emissions are reduced, e.g. by relieving the pressure of other stressors, such as pollution and unsustainable fishing (Billé et al. 2013). There is some evidence from recent studies that priority areas for protection should include areas that may be most resilient to the impacts of climate change, and thus act as refuges of important biodiversity. This would imply that climate change be taken into account in decisions related to design and management of marine protected areas, and in broader applications of an ecosystem approach, such as in marine spatial planning. For example, Jackson et al. (2014) argue that unmanaged pressures such as ocean acidification and global warming should be incorporated into marine management decisions. In a study of acidification, trawling activity, and marine protected areas (MPAs) in the Northeast Atlantic, they suggested that management efforts be focused on removing trawling pressure from areas which may be either important reef strongholds (reef areas likely to be less impacted by acidification by being located at depths above the aragonite saturation horizon), or important for maintaining reef connectivity and gene flow, which may be crucial for coral species to adapt to the changing conditions.

Another study tested in the Northeast Atlantic proposes a novel approach, based on spatial meta-analysis of climate impact models, to improve the positioning of MPAs to limit climate change and ocean acidification (CCOA) impacts. The study estimates the vulnerability of ocean ecosystems to CCOA in a spatially explicit manner and then co-maps human activities such as the placement of renewable energy developments and the distribution of MPAs. The study found that, in this case, current regional conservation plans protect areas with low ecosystem-level vulnerability to CCOA, but disregard how species may redistribute to new, suitable and productive habitats. Thus, ocean conservation strategies under

CCOA must recognize the long-term importance of these habitat refuges, and undertake studies to identify them. Protecting these areas creates adaptive, climate-ready and ecosystem-level policy options for conservation, suitable for changing oceans (Queirós et al. 2016).

In another example, Australian scientists undertaking work to protect benthic communities found that coral-based seamount systems have a low ecological resilience compared to most other marine systems subject to disturbance by bottom trawling, with little ecological recovery of damaged seamounts even after decades or more of repair (Althaus et al. 2015, Williams et al. 2010) but their fragility makes them susceptible to damage by bottom trawling. Here we examine changes to stony corals and associated megabenthic assemblages on seamounts off Tasmania (Australia). However, research by Williams and colleagues (2010) indicates that appropriate approaches to benthic spatial planning can result in recovery outcomes, despite the slow rate of coral growth. Spatial closures post-trawling can be beneficial, if they include areas of connected, intact habitat over a range of depths. In order to maximize survival of corals in these areas, the scientists proposed prioritising communities at depths above the aragonite saturation horizon for protection. Thus, it has been observed that even delicate ecosystems like coral reefs can be protected with appropriate knowledge of specific spatial and temporal growth characteristics.

There is also evidence that the protection of **representative habitats** is important, as is replication to prevent biodiversity from being lost as a result of isolated disturbances (Freiwald et al. 2004). Furthermore, a management system that provides sufficient protection of representative benthic habitats that are adjacent or connected to trawled areas can also act as important refuges and source habitat for benthic species (DoE et al. 2014).

A stakeholder workshop to assess and prioritise options for conserving legislatively protected deep-sea coral reefs off southeast Australia

prioritised the following actions as being both high benefit and low risk (Thresher et al. 2015). These actions seek to increase the system's adaptive capacity by changing regulatory/policy frameworks.

1. Minimise impacts of other anthropogenic stressors on the system;
2. Maximise the likelihood of survival of the species and its associated biota at other sites globally, and
3. Identify and protect possible future refugia regionally.

In studying migratory marine species, Lascelles et al. (2014) notes that “existing management frameworks do not yet contribute sufficiently to [Migratory Marine Species] conservation,” citing the fact that “MPA networks need to be expanded to capture key areas, in many cases through the application of new dynamic management techniques such as time area closures.” Johnson et al (2018b) expands on this idea, noting the drastic effects of climate change: “In a 20–50 year timeframe, virtually all North Atlantic deep-water and open ocean ABMTs will likely be affected.” The researchers call for a more precautionary approach to ABMTs, and advise that larger areas be protected until more scientific evidence is able to narrow down the highest priority regions. Bruno et al. (2018) warns, however, that “rearranging MPAs to minimize exposure to one stressor could well increase exposure to another” since “continued business-as-usual emissions will likely disrupt many marine ecosystems.” This will ultimately “[reduce] the benefits of MPAs.”

Other issues surrounding ABMTs are linked to capacity shortfalls and implementation issues. Gill et al. (2017) concluded that “continued global expansion of MPAs without adequate investment in human and financial capacity is likely to lead to sub-optimal conservation outcomes.” The study indicated that “MPAs with adequate staff capacity had ecological effects 2.9 times greater than MPAs with inadequate capacity.” Capacity limitations also affected the ability to use scientific monitoring methods as the primary means of informing management. Climate change

is expected to exacerbate this issue as human-ocean-atmosphere interactions become less predictable and more resources will need to be allocated to studying the biological repercussions. Data management and sharing is also considered a principle task in capacity building, since countries should be relying on the most recently available scientific findings when developing policy.

5.4 Climate Change and Environmental Impact Assessment

In a 2018 policy brief, the Deep Ocean Stewardship Initiative noted the importance of “[evaluating] potential synergistic effects of climate change stressors with direct human disturbances and how their cumulative impacts can alter the functionality and resilience capacity of deep-ocean ecosystems.” For this reason, the precautionary principle is strongly recommended when it comes to the effects of climate change on deep-sea organisms, as long as the policies remain flexible in light of the most recent scientific findings. The policy brief also calls for sharing of technologies between countries so that the “mechanistic understanding of the vulnerability of species and ecosystem” can be used as a basis for best practice in conservation. In other words, each nation should be able to adequately determine their conservation policies based on the health and stability of their local ecosystems using the latest available technology and scientific findings of the global community.

The global community has made great strides in standardizing the legal framework around Environmental Impact Assessments within national boundaries, but has unfortunately done little in assessing impacts in ABNJ. Warner (2018) concludes that the current framework of EIA can be applied to the creation of an International Legally Binding Instrument (ILBI) that can govern activities that may hinder ABNJ marine biodiversity. Warner (2018) also stresses the importance of identifying a baseline environmental state to which changes can be compared to, as well as a regular monitoring program that can track environmental changes accurately.

5.5 Climate Change and Marine Genetic Resources

Ever since researchers discovered that “diversity in the deep-sea is much greater than in equivalent shallow marine environments from temperate latitudes and is of the same magnitude as in the shallow marine tropics” (Hessler & Sanders 1967), global leaders have become increasingly interested in what lies beyond their national ocean territories. Recently, scientists have concluded that this untapped biodiversity could lead to significant developments in chemical-based industries like pharmaceuticals, energy, and cosmetics due to the extensive inventory of Marine Genetic Resources (MGRs) that accompany areas with high biodiversity, or the novel adaptations that can be found in extreme environments (e.g. high pressure, toxicity, or high/low temperature). The benefits of Marine Genetic Resources are estimated to be around 100 billion USD, and while the portion attributable to ABNJ is marginal, it is expected to increase in the future (Brogiato 2013). However, this expected future increase is contingent upon maintaining the current level of biodiversity throughout the ocean. Factoring in the negative effects of climate change on biodiversity, this prediction becomes highly doubtful.

The 2018 DOSI policy brief “Climate and Biodiversity Beyond the Limits of National Jurisdiction” recommends three major steps regarding Marine Genetic Resources:

1. Address knowledge and information gaps on the mutual relationships between climate change and deep-ocean ecosystems, together with marine biodiversity, beyond national jurisdiction;
2. Support and fund adaptive and integrated use and conservation of deep-ocean genetic resources in the context of climate and environmental changes through benefit arrangements; and
3. Develop best practices for accessing genetic resources in compliance with climate regulations, with specific attention to open data and carbon footprint

5.6 Conclusion

As researchers and global leaders learn more about the role of oceans in climate change, it is imperative that the discussion is not limited to national EEZ, but includes all areas beyond national jurisdiction. and as climate change continues to impact the environments that help sustain human life, scientists and policymakers will need to be able to assess the health and sustainability of the oceans at every depth and surface position. In particular, the biodiversity found in Earth's marine environments is directly linked to the health and wellbeing of the human population, thereby necessitating action on maintaining the stability of both shallow and deep organisms using tools that are science-based, flexible, accessible, equitable, and well-financed.

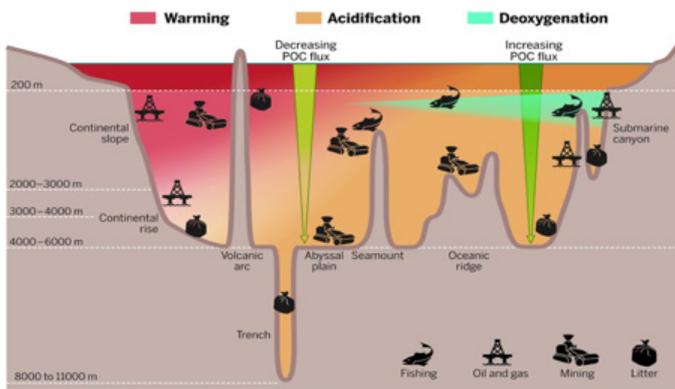


Figure 5. Schematic Showing Areas under Greatest Threat from Temperature Change and Human Activity. (Levin and Le Bris 2015)

6. WAY FORWARD ON CAPACITY BUILDING ON BBNJ AREA-BASED MANAGEMENT VIA THEORY OF CHANGE ANALYSIS

In this section, using the Theory of Change (ToC) methodology, the interventions discussed so far related to BBNJ area-based management are assessed as to whether these could bring about the achievement of the proposed objectives. In case of gaps, options on possible additional interventions could be proposed/recommended as appropriate, along with the requisite capacity building and transfer of marine technology (CB&TT) interventions. In this section, the ToC analysis is applied to BBNJ Area-Based Management; in future iterations of this Policy Brief, ToC analysis will be applied, as well, to EIA/SEA and to Marine Genetic Resources. Annex 2 provides a brief outline of the ToC methodology.

6.1. Initial Analysis Using Theory of Change Approach Related to Capacity Building Regarding Area-Based Management

The diagram summarizing capacity development modalities on ABMTs at global, regional and national levels (Fig. 4) shows how various interventions at the global, regional, and national level would be needed to support the ABMT process. However, it does not show the intervening activities and outcomes that must occur before the ABMT objectives could be achieved. The ToC approach is useful in that it identifies the interventions that can lead to particular outcomes and objectives in a logical step-wise manner and in distinct pathways.

The following diagrams of Theory of Change analysis for ABMTs and the requisite capacity building and transfer of technology are based on relevant text found in the President's Aid to the Negotiations for IGC2, which reflects the main issues discussed and the general trends of discussion observed during the IGC1 and BBNJ PrepCom meetings. A number of the intermediate outcomes and interventions are supplied.

Figure 6 shows an initial outcomes framework that indicates the logical connection among the long-term goal of a BBNJ agreement (*Conservation and sustainable use of BBNJ*), a particular intermediate ABMT objective (e.g., *Establishing connected networks of representative MPAs*), the goal of a specific CB&TT intervention (e.g., *Development of human resources and individual capacity on ABMTs*), and various step-wise outcomes in between. This framework maps the linear relationship, or pathway to change, linking the set of short, intermediate and long-term outcomes over time. The outcomes framework also depicts relationships between long-, intermediate-and short-term outcomes and the proposed ABMT interventions to be applied under the BBNJ agreement, e.g., as listed in Fig. 4.

The initial draft ToC on ABMTs (see Fig. 8 below) shows the logical connection among the long-term goal (conservation and sustainable use of BBNJ) and several intermediate goals and interventions, including capacity building and transfer of marine technology. Based on the previous section of the CB&TT needed at the global, regional, and national level (Fig. 4), a proposed ToC was developed following the framework of the ABMT ToC, showing global, regional, and national pathways for capacity building (see Fig. 9). Further analysis should show gaps in the outcomes and interventions discussed so far in the BBNJ process. Additional layers of information in terms of organizations involved in the different pathways as well as different levels of capacity building (individual vs. organizational) could be added to the ToC. An analysis of experiences on ABMTs in ABNJ, e.g., OSPAR high seas MPAs, could improve the logic and feasibility of the ToC. The clearinghouse mechanism could help organize the implementation of CB&TT along the different pathways, especially with the prospect of regional hubs of CHM.

The next steps for these ToCs are: 1) check for gaps in the outcomes; 2) articulate the assumptions and rationales for the outcomes; 3)

check for gaps in interventions and assign the most strategic interventions to achieve a particular desired outcome; 3) develop indicators for measuring progress on the desired outcomes and assessing performance of initiatives; 4) do a quality review using the plausibility, feasibility, testability criteria; and 5) write a narrative to explain the summary logic of the initiative.

This exercise is showing the importance of identifying intermediate outcomes, all of which are critical in achieving the long-term outcome of the BBNJ agreement, facilitated by asking the question at each point: “What are the preconditions required for the outcomes at this stage?” ToCs for the BBNJ agreement should show clear and distinct pathways for conservation as well as for sustainable use goals on BBNJ. Without each outcome in its logical place, it could be assumed that the goal/s cannot be reached. Expanding the national pathway of interventions on ABMTs as part of a ToC analysis could be done as a step in the process of defining national interests in BBNJ. As suggested in the first Policy Brief, this could be done by developing Nationally Determined Goals (NDGs) on BBNJ, which involves setting national goals, assessing national needs and developing national capacity and means for achieving national goals on BBNJ in line with the goals of the new International Agreement.

CH&TT for ABMTs	Conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction						
Ecosystems in ABNU are protected/ rehabilitated/restored/ Loss of biodiversity in ABNU is reduced/halted/ Ecosystem productivity, health, and resilience in ABNU are enhanced/ Socio-economic benefits from ABMTs are realized and sustained, e.g., support to food security, safeguarding aesthetic, natural or wilderness values	ABMTs are sustainably managed and functioning						
Global Capacity building relating to data and information held on the global level may include the following: Accessing relevant data and information through the clearinghouse mechanism (CHM). Accessing and using individual databases; Applying these data to the management and monitoring of ABMTs, including MPAs; Providing data and training relating to assessing and responding to climate impacts on MPAs and other ABMTs, and deploying MPAs for climate resilience; Providing data and training to support enforcement of ABMTs; Providing data and training to support assessing ecological connectivity and representativeness of global and regional networks of MPAs; Supporting regional universities and centres of excellence with their data, information, training and technology needs	Regional Implementation: Maintaining regional data and information repositories, with linkages to the global CHM; Providing data and training to support enforcement of ABMTs; Providing data and training to support assessing ecological connectivity and representativeness of regional networks of MPAs; Providing data and training relating to assessing and responding to climate impacts on MPAs and other ABMTs, and deploying MPAs for climate resilience Collaboration, coordination and improved information sharing between regional bodies be achieved through the following capacity-enhancing mechanisms: Joint meetings to coordinate activities relating to ABMTs; Joint collaborative bodies or structures relating to coordinating activities on ABMTs; Joint databases of information and data of relevance to ABMTs, or separate databases that can be accessed through a common portal Joint training and capacity building in implementation of the new International Agreement, including any standards and criteria related to ABMTs; Institutional capacity building targeted specifically at those bodies and organizations that require further assistance on specific ABMT aspects						
Capacity is developed and marine technology transferred to carry out implementation of management plan, monitoring and review of ABMTs, and address issues emerging from ABMT implementation	ABMTs are designated within framework of new ILBI						
Global Capacity building relating to data and information held on the global level may include the following: Accessing relevant data and information through the clearinghouse mechanism (CHM); Applying these data to the identification, establishment of ABMTs, including MPAs; Providing data and training to support assessing ecological connectivity and representativeness of global and regional networks of MPAs; Supporting regional universities and centres of excellence with their data, information, training and technology needs	Regional Coordinating national & regional capacity needs assessments relating to ABMTs Coordinating application of global ABMT criteria and standards regionally and nationally Coordinating development of regional proposals for application of ABMTs, including MPAs, in ABNU Assisting countries in evaluating proposals for ABMTs in ABNU that may have implications to them Training in use of ABMTs, including MPAs Facilitating networking and exchange of experts Strengthening regional centres of excellence on topics related to ABMTs						
Capacity is developed for the design and designation of ABMTs	National Identification of areas: Assessing which nationally and locally important species and areas would benefit from additional ABMTs in ABNU; Application of global criteria and standards to select important areas; Strengthening local institutions, data and research capacity, particularly in relation to transboundary species and habitats; Applying traditional knowledge in identification of areas for ABMTs Designation process: Capacity in collaborating with other countries and regional organizations in developing proposals; Capacity in assessing proposals, including building up necessary data and knowledge; Capacity building in the use of ABM approaches specific to open ocean environments, including mobile MPAs; Capacity building in the use of ABM approaches specific to migratory species; Application of principles related to ABMTs, including MPAs; Application of possible global criteria and standards relating to identification of areas for management						
Global preconditions/enabling environment	Regional preconditions/enabling environment						

Figure 7. Initial Theory of Change, Capacity Building and Technology Transfers for ABMTs

7. CONCLUSIONS

General

It is envisioned that capacity building and technology transfer will enable inclusive and effective participation of all States and other stakeholders in the process of implementing the new International Agreement. Countries will be required to participate in the global process relating to establishment of ABMTs, ensuring that actions taken within their national jurisdictions are consistent with those in ABNJ. They will also need to participate in the process of implementing and evaluating EIAs and SEAs. Finally it is envisioned that all States will be able to inclusively and equitably participate in accessing and developing MGRs, with the resulting marine biotechnology capacities and infrastructure also having the potential to further contribute to national blue economies in accordance with Sustainable Development Goal 14.

While the capacity building needs and requirements for each of these areas of focus differ, there are also similarities. Each area includes topics related to science, policy, law, as well as social and economic aspects of ocean. In addition to the specific areas of capacity building outlined below, capacity building will also be required in regards to globally-defined principles, terms, and criteria, standards, best practices and codes of conduct as they relate to the new International Agreement.

Building capacity on marine scientific research will have a central role in implementing the new international agreement, and may build on the knowledge gathered from existing efforts both within and beyond national jurisdiction. Capacity building may be required in conducting scientific research and in all aspects of data analysis, management and interpretation. Capacity building may further be required for accessing and using

data and information held on the global level, including in global databases.

Ultimately, the needs and unique circumstance of countries will drive the capacity development effort, and national needs assessments could be seen as a first step in the process. At the same time, many countries already have considerable experience in applying area-based management tools and EIAs/SEAs, and in developing MGRs, and these experiences can inform both global and regional levels.

Regional organizations have an important function to play as capacity providers, including in regards to data and information, training and coordination. They also provide a link between global policies and national actions, and will play a key role in the assessment of regional and national capacity needs.

United Nations and international organizations, NGOs, academic and research organizations, private sector, and funding entities will have a role to play in facilitating capacity building and technology transfer.

Capacity building will also need to consider the socio-economic context of the ocean, and bring together ocean sectors and stakeholders at both global and regional levels to address any knowledge gaps and to undertake an integrated and holistic approach to ocean management.

Area-based management tools

For ABMTs, specific topics for capacity building include the identification of areas, designation of measures, implementation of measures, and monitoring and review. All measures would be applied in the broader context of an ecosystem approach, and may include tools and approaches such as marine spatial planning (MSP) and marine protected areas (MPAs), as well as measures restricting sectoral activities. Global and regional organizations have role to play in facilitating transboundary to ABNJ-collaboration in marine spatial planning. Some lessons on applying ABMTs on an ocean-basin

scale can be learned from regional organizations, such as CCAMLR, and ongoing scientific projects such as the ATLAS project.

Most area-based management measures currently undertaken in ABNJ only restrict specific sectoral activities. Thus, close collaboration and cooperation is required to achieve a holistic and cross-sectoral approach to ocean management. One of the greatest capacity needs may be in developing structures for collaboration and coordination between sectoral regional organizations, including the sharing of data and the coordinated application of management measures. Lessons can be learned from existing examples of regional cross-sectoral collaboration, for example, collaboration between NEAFC and OSPAR in the North Atlantic and the Sustainable Ocean Initiative Global Dialogue with Regional Seas Organizations and Regional Fishery Bodies, coordinated by the CBD Secretariat, FAO and UN Environment.

ABMTs, including MPAs will need to be adapted to the realities of climate change, including leaving open the possibility to amend MPA boundaries as the geographic distribution of species shifts. At the same time, it has been proposed that MPAs be applied as tools to increase climate resilience in certain areas, where they act to provide habitat refuges. This approach has already been applied in regards to coral bleaching, and is now tested for ocean acidification in cold water coral reef areas

EIAs/SEAs

For EIAs/SEAs, specific topics for capacity building include all stages in EIA process: (i) the screening stage to identify those activities, plans and programmes for which EIAs and SEAs are required, (ii) the scoping stage to identify impacts and alternatives for mitigation, prevention and compensation for potential adverse effects, (iii) review of EIA and SEA reports, (iv) decision making on whether activities, plans and

programmes should proceed, and (v) monitoring, review and enforcement of EIA and SEA conditions.

Enhanced information sharing in relation to EIA/SEA practice across regions is one of the greatest capacity building needs at the regional level. Limited information sharing and coordination of actions is a key barrier to consistent application of best practices in the conduct and evaluation of EIAs/SEAs in marine areas. While many regional seas agreements provide for information sharing in relation to EIAs conducted in their areas of responsibility this is rarely carried out in practice. Capacity building between and among regional and sectoral bodies will be required to improve information sharing and training on the conduct and evaluation of EIAs and SEAs by States and proponents of activities, plans and programmes in ABNJ.

EIAs and SEAs related to activities, plans and programmes in ABNJ will need to incorporate climate change impacts in all stages of the process including the scoping, reporting, evaluating and monitoring phases. It is important that capacity building measures related to EIAs/SEAs also take into account climate change. This may include capacity building in the research, data and information needs required to forecast, identify and measure climate change impacts on marine biodiversity in ABNJ; and capacity needs in developing and adapting climate change mitigation conditions in EIA/SEAs in ABNJ.

Marine genetic resources

For MGRs, specific topics for capacity building include creating an enabling environment for MGR application; accessing MGRs in situ, ex situ and in silico; developing marine genetic resources, including training in the biodiscovery process; and staying current with new developments and scientific findings related to MGRs. National and regional universities and scientific institutions, as well as the private sector are important partners in capacity building.

Discovery of MGRs depends on good science and the ability to use technology related to biodiscovery. Thus, capacity building and technology transfer will also need to have a strong focus on building science and technology capacities of both institutions undertaking research, and of individual researchers. Skills in applied biotechnology research are vital for the process of preparation, isolation, analysis and screening of samples, as well as the production of commercial products from promising candidates. Lessons can be learned from multi-country and multi-actor projects focusing on marine genetic resources, such as the EU-funded PharmaSea project. Facilitating open access to data, information and samples are also important for building capacity.

On the regional level, concentrating capacities in regional universities, or centers of excellence, will allow these centers to pursue multiple research objectives and broad applications related to marine genetic resources, the marine environment, and its physical, chemical, biological and socio-economic context.

Scientific collaborations involving such centers can help build their capacities, as was the case with the Pacific Natural Products Research Centre at the University of South Pacific.

Climate change may lead to loss or erosion of genetic diversity and may impact marine micro-organisms, which are particularly important for biotechnology, in various ways. Likely impacts on the deep sea and the mid-water column may threaten biodiversity and compromise key ocean services. The impacts on MGRs are unknown but likely detrimental. The challenge for research will be to forecast how such changes impact not only the microorganisms but the ocean ecosystem as a whole.

Climate change

Researchers strongly recommend a precautionary approach when it comes to the

effects of climate change on deep-sea organisms. Precautionary approach is also called for in regards to ABMTs, and scientific advice recommends that larger areas be protected until more scientific evidence is able to narrow down the highest priority regions. The 2018 DOSI policy brief “Climate and Biodiversity Beyond the Limits of National Jurisdiction” recommends three major steps regarding Marine Genetic Resources:

1. Address knowledge and information gaps on the mutual relationships between climate change and deep-ocean ecosystems, together with marine biodiversity, beyond national jurisdiction;
2. Support and fund adaptive and integrated use and conservation of deep-ocean genetic resources in the context of climate and environmental changes through benefit arrangements; and
3. Develop best practices for accessing genetic resources in compliance with climate regulations, with specific attention to open data and carbon footprint

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Annex 2. Notes on Theory of Change Analysis

Theory of Change (excerpts from a basic guide on ToC (<https://www.alnap.org/help-library/theory-of-change-basics-a-primer-on-theory-of-change>)).

Theory of change is a rigorous yet participatory process whereby groups and stakeholders in a planning process articulate their long-term goals and identify the conditions they believe have to unfold for those goals to be met. These conditions are modeled as desired outcomes, arranged graphically in a causal framework.

A theory of change describes the types of interventions (a single program or coordinated initiative) that bring about the outcomes depicted in the outcomes framework map. Each intervention is tied to an outcome in the causal framework, revealing the often complex web of activity required to bring about change. The framework provides a working model against which to test hypotheses and assumptions about what actions will best produce the outcomes in the model. Adherence to the theory of change method keeps the processes of implementation and evaluation transparent so that everyone involved knows what is happening and why.

A ToC provides a roadmap of an initiative through the following stages:

- Identifying long-term goals and the assumptions behind them.
- Backwards mapping from the long-term goal by working out the preconditions or requirements necessary to achieve that goal--and explaining why.
- Voicing assumptions about what exists in the system without which theories won't work, and articulating rationales for why outcomes are necessary preconditions to other outcomes.
- Weighing and choosing the most strategic interventions to bring about desired change.

- Developing indicators to measure progress on desired outcomes and assess the performance of initiatives.
- Quality review should answer three basic questions: Is the theory 1) plausible, 2) “doable” (or feasible), and 3) testable?
- Writing a narrative to explain the summary logic of the initiative.

Long-term Outcome

An outcome is a state or condition that does not currently exist but must be in place for the initiative to work. An outcome may represent a change in a group of people, organizations, or places. Outcomes are the building blocks of a Theory of Change. The Long-term Outcome (LTO) is the desired goal, which is the purpose of the initiative.

Causal Pathways and Backwards Mapping

A pathway is the sequence in which outcomes must occur to reach your long-term goal. Pathways are depicted by vertical chains of outcomes connected to one another by arrows, proceeding from early outcomes at the bottom to longer-term outcomes at the top. Pathways represent a causal logic; each level along the pathway depicts the chain of outcomes that must come into being for the next outcome up the chain to be achieved. A key component of the ToC experience is the process of “backwards mapping,” beginning with your long-term outcome and working back toward the earliest changes that need to occur. Most initiatives have multiple pathways that lead to the long-term outcome

Assumptions and Rationales

In ToC, assumptions are conditions or resources that are needed for the success of a program, and which proponents believe already exist and will not be problematic to maintain. Rationales explain the logic behind each causal relationship on the precondition pathway. Often, rationales and assumptions are supported by research, strengthening the plausibility of the theory and the likelihood that its stated goals can be achieved.

Interventions

Interventions are the things that will be undertaken to bring about outcomes, sometimes called “strategy” or “activity.” Strategy means a coordinated sequence of interventions, using a variety of tools and calculated for optimal leverage, to bring about the desired outcomes. Activity means all the specific actions that make up an intervention.

Indicators

Indicators are the measurable evidence of meeting a goal, usually visible signs that demonstrate that the outcome has been fulfilled. Indicators can involve quantitative measures or qualitative information. Each indicator needs to have four targets: How many of who or what will reach what level by when? Ideally each outcome in the theory will have multiple indicators and the initiative will have the capacity to collect data on them all.

Quality Review

Quality review should answer three basic questions: Is your theory 1) plausible, 2) doable/feasible, and 3) testable?

Plausibility refers to the logic of your pathways. Does it make sense? Are the outcomes in the right order? Are preconditions actually preconditions to the outcomes you’ve indicated? Are there big gaps in the logic?

Feasibility refers to how realistic it is that your program and/or initiative can achieve your long-term outcome. Do you have the resources to implement all the interventions you’ve specified? Do you need to bring in additional partners? Do you need to adjust the scope, expectations or timeline of your theory?

Testability refers to how well you have crafted your indicators. Have you identified solid, measurable indicators that can be evaluated in a timely manner? Quality review should be an ongoing process during the construction of your theory.

Strengths and Weaknesses of the Theory of Change Methodology

A ToC approach can be useful for the planning, management and monitoring of complex conservation and development initiatives. The process of developing a theory of change also facilitates sharing of knowledge, developing a common vision of project goals and building a clear road map for how goals will be achieved, that is agreed upon by the whole team. However, the approach also has its weaknesses, including its reductionist view of complex problems and the amount of dedicated time required to develop a theory of change. (CI 2013)