

# Capacity Building in Marine Science—Added Value of the BBNJ?

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## Abstract

This chapter raises three questions regarding capacity building and technology transfer in marine science. First the main features of the existing global framework for capacity building and technology transfer is discussed before addressing lessons that can be drawn from on-going programs and experiences and then asking what the implications of the BBNJ process are in this respect. It is concluded that a comprehensive framework exists, based on UNCLOS, but that there appears to be scope for improvement when it comes to monitoring and evaluation of the functioning of this framework. Furthermore, a key issue is the Decade of Ocean Science for Sustainable Development which will provide a major opportunity for strengthening capacity building efforts in marine science and technology. Also, as regards the implications of the BBNJ for future developments in capacity building, a future agreement would certainly serve to complement and extend the global framework for oceans' governance.

## Keywords

capacity building – marine science – areas beyond national jurisdiction – technology transfer – marine genetic resources

## 1 Introduction

The need for capacity building in ocean science and education has never been greater than now. We face two major challenges: On the one hand, oceans are under stress from climate change, pollution, overfishing and more (IPCC 2019, UN 2015). On the other, the need for food, minerals, transportation and other services the oceans provide has never been greater and is set to increase in the coming decades (Bogard *et al.*, 2019, Barange *et al.*, 2018). In both cases capacity

building<sup>1</sup> in marine science and education are critical parts of the answer to how these challenges can be addressed.

As documented by the 2017 Global Ocean Science Report (GOSR) (Valdes 2017), the capacity to do ocean science is heavily concentrated in certain countries and regions in the world. In the UN Secretary-General's 2019 Report on Oceans and the Law of the Sea (A/74/70),<sup>2</sup> it is reported that “[g]aps in human and institutional capacity and a lack of resources still hamper developing countries from taking full advantage of ocean science. The importance of developing human and institutional capacity relating to ocean science cannot, therefore, be overstated” (para 50).

This state of affairs is nothing new, and early efforts at capacity building in marine science in developing countries dates back at least to the early post-World War II years.<sup>3</sup> A number of international instruments pertaining to the oceans, such as the 1982 Law of the Sea Convention (UNCLOS) and the 1995 UN Fish Stocks Agreement (UNFSA), addresses capacity building and transfer of technology. Also, a number of UN bodies with mandates in the marine realm, such as the International Oceanographic Commission (IOC), the International Maritime Organization (IMO), the International Seabed Authority (ISA), and the Food and Agriculture Organization (FAO) have major programs for capacity building, including in marine science and education. Importantly, preparations have now started for the UN Decade on Ocean Science for Sustainable Development (2021–30), which will be a global focal point in this respect for the coming years (IOC 2019, Claudet *et al.*, 2019).

This paper is an attempt at taking an outside look at capacity building in marine science and education in general, and to raise some questions to its application in the context of the Biodiversity Beyond National Jurisdiction (BBNJ) process currently taking place under UN auspices, intended to result in another implementation agreement under UNCLOS.<sup>4</sup> This is done by addressing three questions: 1) what are the main features of the existing global framework for capacity building and technology transfer? 2) What lessons can be drawn from on-going programs and experiences? and 3) What are the

1 I use the term “capacity building” as interchangeable with “capacity development”.

2 <https://undocs.org/en/A/RES/73/124>.

3 Norwegian development aid in fisheries, for example, started in the 1950s.

4 The two existing implementation agreements are the 1994 Agreement Relating to the Implementation of Part XI of the United Nations Convention on the Law of the Sea of 10 December 1982 [https://www.un.org/Depts/los/convention\\_agreements/convention\\_overview\\_part\\_xi.htm](https://www.un.org/Depts/los/convention_agreements/convention_overview_part_xi.htm) and the 1995 UN Fish Stocks Agreement [https://www.un.org/Depts/los/convention\\_agreements/convention\\_overview\\_fish\\_stocks.htm](https://www.un.org/Depts/los/convention_agreements/convention_overview_fish_stocks.htm).

implications of the BBNJ process in this respect? Regarding question 1, only a brief overview can be provided within the scope of a book chapter. The same goes for question 2, and the intent here is to review a few examples of fruitful efforts at capacity building from the IOC and others. When it comes to implications of the BBNJ process (this is written after the third round of negotiations and before their conclusion) for capacity building, the idea here is simply to raise some questions relating to its possible impact in this realm, not to provide fixed answers.

In what follows, the term “capacity building and technology transfer” is used loosely, taken to include marine science, technology transfer, and education, and not necessarily all at one time. The chapter is based on conversations with members of BBNJ delegations, IOC representatives, colleagues,<sup>5</sup> information from relevant websites (DOALOS and IOC in particular), and academic literature. Notably, the latter turned out to be surprisingly thin – while most aspects of the law of the sea has been subject to a vast literature (Nordquist 2012, Rothwell *et al.* 2015), relatively few academic publications appear to address capacity building explicitly.

## 2 The Global Framework for Capacity Building

Agenda 2030 and the Sustainable Development Goals (SDGs) comprise the current global political framework for addressing sustainable development concerns, including those relating to the oceans.<sup>6</sup> SDG 14 “Conserve and sustainably use the oceans, seas and marine resources for sustainable development”, has a specific target for capacity building (14A) where countries are to:

[I]ncrease scientific knowledge, develop research capacity and transfer marine technology, taking into account the Intergovernmental Oceanographic Commission Criteria and Guidelines on the Transfer of Marine Technology, in order to improve ocean health and to enhance the contribution of marine biodiversity to the development of developing countries, in particular small island developing States and least developed countries.<sup>7</sup>

<sup>5</sup> I am grateful for comments from Kristine Kraabel, Ove Hokstad, and Terje Lobach.

<sup>6</sup> <https://sustainabledevelopment.un.org>.

<sup>7</sup> <https://sustainabledevelopment.un.org/sdg14>.

UNCLOS<sup>8</sup> provides the general framework for the governance of marine scientific research (Churchill and Lowe 1988, Stephens and Rothwell 2015), with marine science being one of the freedoms of the high seas on the one hand and subject to a qualified consent regime in areas under national jurisdiction (UN DOALOS 2010). UNCLOS Part XIII addresses marine scientific research and Part XIV deals with development and transfer of marine technology, including the development of scientific capacity. Generally, states are to cooperate in promoting the development and transfer of marine technology, and to promote the development of capacity in developing States with a view to accelerate social and economic development (art 266). Measures to achieve this, for example by the establishment of technical cooperation, are listed. UNCLOS furthermore has provisions on international cooperation (arts 270–274), national and regional marine scientific research centers (arts 275–277), and cooperation among international organizations in this regard (UN DOALOS 2010, Roach 1996).

The objective of UNFSA,<sup>9</sup> an implementing agreement to UNCLOS, is to ensure the long-term conservation and sustainable use of straddling fish stocks and highly migratory fish stocks. It strengthens the global oceans regime and is therefore of great importance for ensuring good governance of fisheries (Balton 1996, Lodge *et al.*, 2007). The agreement provides an important impetus to marine scientific research (Hoel 2017), and Part VII of the agreement deals with requirements of developing States, as states shall “give full recognition to the special requirements of developing States in relation to conservation and management of straddling fish stocks and highly migratory fish stocks and development of fisheries for such stocks” (art 24.1). The agreement addresses forms of cooperation (art. 25), including regarding stock assessment and scientific research (25.3b). There is also a provision regarding assistance in implementation of the agreement establishing a special fund to this end and the establishment of new organizations for fisheries management (art. 26).

The implementation of this legal framework for the oceans is overseen by the UN General Assembly, which adopts annual resolutions on oceans and the law of the sea and sustainable fisheries respectively.<sup>10</sup> The oceans resolution in particular has a major segment on capacity building, and its 2018 iteration states in paragraph 9 that the UN General Assembly:

8 [https://www.un.org/Depts/los/convention\\_agreements/texts/unclos/closindx.htm](https://www.un.org/Depts/los/convention_agreements/texts/unclos/closindx.htm).

9 [https://www.un.org/Depts/los/convention\\_agreements/texts/fish\\_stocks\\_agreement/CONF164\\_37.htm](https://www.un.org/Depts/los/convention_agreements/texts/fish_stocks_agreement/CONF164_37.htm).

10 [https://www.un.org/Depts/los/general\\_assembly/general\\_assembly\\_resolutions.htm](https://www.un.org/Depts/los/general_assembly/general_assembly_resolutions.htm).

Emphasizes that capacity-building is essential to ensure that States, especially developing countries, in particular the least developed countries, ... are able to implement the Convention, benefit from the sustainable development of the oceans and seas and participate fully in the global and regional forums on ocean affairs and the law of the sea.<sup>11</sup>

The statements in the 2018 resolution on oceans and the law of the sea regarding capacity building go on for another 50 or so paragraphs, addressing among other things marine scientific research generally (para 16), as well as a number of concrete initiatives such as the World Maritime University (para 26) and efforts under the Convention on Biological Diversity (para 28).

Also, the environmental summits in 1992, 2002 and 2012 produced strong statements regarding capacity building. The Joint Plan of Implementation from the 2002 World Summit of Sustainable Development addresses capacity building in marine scientific research regarding protection of the marine environment (para. 32a), as well as in the context of the need to improve the scientific understanding and assessment of marine and coastal ecosystems as a fundamental basis for sound decision-making (para. 34). There is also a specific reference to the need to strengthen the ability of the Intergovernmental Oceanographic Commission of the United Nations Educational, Scientific and Cultural Organization, FAO, and other relevant international, regional and subregional organizations to build national and local capacity in marine science and the sustainable management of oceans and their resources (34d).<sup>12</sup>

The main outcome of the 2012 Earth Summit in Rio de Janeiro was the “The Future We Want” document. In the section on oceans and seas it provided:

We recognize the importance of building the capacity of developing countries to be able to benefit from the conservation and sustainable use of the oceans and seas and their resources and, in this regard, we emphasize the need for cooperation in marine scientific research to implement the provisions of the United Nations Convention on the Law of the Sea and the outcomes of the major summits on sustainable development, as well as for the transfer of technology, taking into account the Intergovernmental Oceanographic Commission Criteria and Guidelines on the Transfer of Marine Technology (para 160).<sup>13</sup>

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11 <https://undocs.org/en/A/RES/73/124>.

12 <http://enb.iisd.org/2002/wssd/PlanFinal.pdf>.

13 <https://sustainabledevelopment.un.org/futurewewant.html>.

In sum, a substantial body of legal instruments as well as soft law addressing capacity building and technology transfer in the marine realm exists. At the international level, this is implemented in a number of organizations and programs.

### 3 On-going Programs and Experiences

In addition to the general paucity of academic literature on capacity building in the marine realm, few global overviews exist of on-going efforts in capacity building in marine science. The UN Regular Process for Global Reporting and Assessment of the State of the Marine Environment has an inventory of capacity building activities on its website. While not complete, it nevertheless provides information on activities under a number of global organizations and regional bodies, as well as activities led by agencies at the country level.<sup>14</sup>

A significant contribution in respect of providing overview of the field was the 2010 meeting of the UN Informal Consultation Process on Oceans and the Law of the Sea (UNICPOLOS or ICP) which addressed “Capacity-building in oceans affairs and the law of the sea, including marine science”. The report of the Secretary-General to that meeting contains a comprehensive review of needs as well as on-going efforts in capacity building.<sup>15</sup> In marine science, identified capacity building needs include development of skills, infrastructures, technology transfer, and access to data. A particular need exists in relation to the introduction of new principles for management, such as the precautionary approach and ecosystem-based management. Capacity-building initiatives in marine science are addressed in about 30 paragraphs in the report, including references to UNESCO/IOC (see below), the UN Industrial Development Organization (UNIDO), the Department of Oceans and the Law of the Sea (DOALOS) under the UN Secretary-General, the International Seabed Authority (ISA), the Regular Process for Global Reporting and Assessment of the Marine Environment,<sup>16</sup> the Food and Agriculture Organization (FAO), and the UN Environment Program (UNEP), as well as regional activities.

The report of the 2010 UNICPOLOS meeting contains additional material reflecting upon capacity building for marine science.<sup>17</sup> A main conclusion was

14 <https://www.un.org/regularprocess/capacity-building-reports>.

15 <https://documents-dds-ny.un.org/doc/UNDOC/GEN/N10/296/54/PDF/N1029654.pdf?OpenElement>.

16 <https://www.un.org/regularprocess/>.

17 <https://undocs.org/A/65/164>. Panel discussions at that meeting addressed: (a) assessing the need for capacity-building in ocean affairs and the law of the sea, including marine

that “... capacity-building was essential to ensure that all States, especially developing countries, were able to implement the Convention, benefit from the sustainable development of the oceans and participate fully in global and regional forums dealing with ocean affairs and the law of the sea.”

The 2019 UNICPOLOS addressed “Ocean Science and the United Nations Decade of Ocean Science for Sustainable Development”.<sup>18</sup> The Secretary-General’s report in preparation for the meeting addresses status and gaps in marine science, and measures in advancing ocean science and closing the gaps. Among the issues raised at the meeting were an underlining of the importance of the coming UN Decade on Ocean Science for Sustainable Development (see below), the role of science in achieving the targets under SDG 14, the need for a more comprehensive understanding of the oceans to ensure sustainable management of their resources, the importance of reliable and accessible ocean data, and the limited capacity of developing countries to conduct and benefit from ocean science.<sup>19</sup>

The 2021–2030 UN Decade on Ocean Science for Sustainable Development was proclaimed by the UN General Assembly in 2017.<sup>20</sup> The IOC is tasked with organizing the planning of the Decade, a process which is now underway, developing a framework meant to apply across the UN system in the work on the 2030 Agenda. The overarching goals of the Decade are to foster scientific knowledge and infrastructure for sustainable development and to provide science in support of the Sustainable Development Goals.<sup>21</sup> The decade sets the stage for a substantial effort in a number of areas of marine science, including a comprehensive ocean observing system, improved understandings of ecosystems and their functioning, and capacity building for marine science (Clauudet *et al.*, 2019).<sup>22</sup> There are altogether seven priority areas, including capacity

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science; (b) overview of capacity-building activities/initiatives in ocean affairs and the law of the sea, including marine science and transfer of technology; (c) challenges for achieving effective capacity-building in ocean affairs and the law of the sea, including marine science and transfer of technology; and (d) new approaches, best practices and opportunities for improved capacity-building in ocean affairs and the law of the sea.

18 The Secretary-General’s report in preparation for the meeting can be found at: <https://undocs.org/a/74/70>.

19 [https://www.un.org/Depts/los/consultative\\_process/CoChair\\_summary.pdf](https://www.un.org/Depts/los/consultative_process/CoChair_summary.pdf).

20 Para 292–295 in the 2017 resolution on oceans and the law of the sea, A/RES/72/73 <https://undocs.org/en/a/res/72/73> “Decides to proclaim the United Nations Decade on Ocean Science for Sustainable Development for the 10-year period beginning on 1 January 2021 ...”.

21 [http://www.unesco.org/new/en/member-states/single-view/news/roadmap\\_for\\_the\\_un\\_decade\\_of\\_ocean\\_science\\_for\\_sustainable\\_d/](http://www.unesco.org/new/en/member-states/single-view/news/roadmap_for_the_un_decade_of_ocean_science_for_sustainable_d/).

22 <https://oceanandecade.org>.

development and accelerated technology transfer, training and education, and ocean literacy.<sup>23</sup>

The International Oceanographic Commission (IOC, established 1960) of UNESCO is the competent international organization regarding marine scientific research. Its purpose is to promote international cooperation to enhance our scientific knowledge of the oceans and the resources there.<sup>24</sup> It plays a critical role in establishing and coordinating international ocean observation and monitoring programs and data management initiatives such as the Global Ocean Observing System (GOOS)<sup>25</sup> and the International Oceanographic Information and Data Exchange (IODE).<sup>26</sup> The IOC also has regional commissions for Africa, the Caribbean and the Western Pacific for the implementation of IOC programs there.<sup>27</sup>

The IOC also plays a critical role in the international work on capacity building in marine science. In 2003 IOC adopted the Criteria and Guidelines for the Transfer of Marine Technology, implementing the provisions of Part XIV of UNCLOS on development and transfer of marine technology.<sup>28</sup>

An IOC capacity building strategy was adopted in 2015, with a mission to “... undertake relevant actions to assist Member States with developing and sustaining the necessary capacity to undertake activities necessary to achieve the IOC vision at the national level as well as at the international cooperation level.”<sup>29</sup> The strategy lists six outputs with associated activities, including development of human resources and infrastructure, as well as mechanisms for cooperation. A first meeting of a Group of Experts on Capacity Development was held in 2018 and included regional subgroups.<sup>30</sup>

Also, an Ocean Teacher Global Academy (OTGA) was started in 2015, building on earlier activities relating to training of ocean data managers and marine information managers. The OTGA aims to develop an international network of regionally based training centers.<sup>31</sup> The IOC has also engaged in partnerships

23 <https://unesdoc.unesco.org/ark:/48223/pf0000265198>.

24 <http://www.unesco.org/new/en/natural-sciences/ioc-oceans/>.

25 <http://www.goosocean.org>.

26 <https://www.iode.org>.

27 <http://www.unesco.org/new/en/natural-sciences/ioc-oceans/about-us/ioc-worldwide/>.

28 <https://unesdoc.unesco.org/ark:/48223/pf0000139193>.

29 [http://www.ioc-cd.org/index.php?option=com\\_content&view=article&id=8&Itemid=104](http://www.ioc-cd.org/index.php?option=com_content&view=article&id=8&Itemid=104).

30 [http://www.ioc-cd.org/index.php?option=com\\_content&view=article&id=152:summary-report-of-first-session-ioc-group-of-experts-on-capacity-development-now-available&catid=14&Itemid=188](http://www.ioc-cd.org/index.php?option=com_content&view=article&id=152:summary-report-of-first-session-ioc-group-of-experts-on-capacity-development-now-available&catid=14&Itemid=188).

31 [http://www.ioc-cd.org/index.php?option=com\\_content&view=article&id=4&Itemid=108](http://www.ioc-cd.org/index.php?option=com_content&view=article&id=4&Itemid=108).

with other international bodies such as the Global Environment Facility (GEF) to promote marine science in Large Marine Ecosystems (LME) off the coasts of developing countries.<sup>32</sup>

Another important UN agency providing capacity building initiatives in science is the UN Food and Agriculture Organization (FAO), the central global body for fisheries policy and development.<sup>33</sup> The FAO has played a leading role in capacity development for fisheries for decades, through among other means regional programs for the implementation of various aspects of its Code of Conduct for Responsible Fisheries,<sup>34</sup> as well as the 2009 Agreement on Port State Measures.<sup>35</sup> For the latter, the FAO is now running a global capacity development program to assist developing countries in implementing the agreement.<sup>36</sup>

Article 12 of the Code deals with fisheries research, laying down a set of global norms for how fisheries science is to be developed and implemented. A specific provision on fisheries science states that:

States and relevant international organizations should promote and enhance the research capacities of developing countries, *inter alia*, in the areas of data collection and analysis, information, science and technology, human resource development, and provision of research facilities, in order for them to participate effectively in the conservation, management and sustainable use of living aquatic resources (art 12.18).

The FAO also runs the Aquatic Sciences and Fisheries Abstract database, a premier reference source for marine scientists worldwide.<sup>37</sup>

Among the FAO activities in support of this, the EAF Nansen program<sup>38</sup> is perhaps the most significant. Now aiming to strengthen the knowledge base

32 The GEF hosts an International Waters Learning Exchange & Resource Network which aims to provide a global forum for ecosystem-based management. <https://iwlearn.net/marine/consultative-meetings> There are on-going LME projects in a number of regions. <https://iwlearn.net/marine>.

33 <http://www.fao.org/fisheries/en/>.

34 <http://www.fao.org/3/v9878e/v9878e00.htm>.

35 <http://www.fao.org/port-state-measures/en>.

36 <http://www.fao.org/port-state-measures/en> This is part of a wider effort, the FAO Global Capacity Development Umbrella Programme, set up in 2016 to strengthen efforts in ensuring sustainable food systems. <http://www.fao.org/port-state-measures/capacity-development/ongoing-capacity-building-efforts/en/>.

37 <http://www.fao.org/fishery/asfa/en>.

38 <http://www.fao.org/in-action/eaf-nansen/en/>.

for and implementing an ecosystem approach to marine fisheries in developing countries, the project is a continuation of a long-standing effort (it started in 1975), now funded by the Norwegian “Fish for Development Program”.<sup>39</sup> A key part of the Nansen program is the research cruises by the research vessel R/V *Fridtjof Nansen*, which collects data that are the basis for management plans and has provided training for hundreds of scientists in countries in Africa and Asia. Over the years the Nansen cruises has taken place in the waters of more than 60 countries, providing data to these countries as well as to regional initiatives.

The International Seabed Authority (ISA) was established by the Convention to manage the exploration and exploitation of minerals on the deep seabed in the area beyond national jurisdiction.<sup>40</sup> ISA has substantial engagement in capacity building in scientific and technical matters relating to deep seabed mining, providing seminars, training and other activities in this respect.

At the UN in New York, the Department of Oceans and the Law of the Sea (DOALOS) provides assistance to developing states on the implementation of various aspects of UNCLOS, including scientific and technical aspects.<sup>41</sup>

The regional level of cooperation is important to a number of capacity development initiatives, as many of the phenomena requiring greater scientific understanding and monitoring are regional in their nature. In fisheries, for example, this is reflected in the role of regional fisheries management organizations (RFMOs) (Lodge *et al.*, 2007, Haas *et al.*, 2019). In the North Atlantic, the International Council for the Exploration of the Sea (ICES) is both an institution for scientific cooperation (since 1902), as well as a mechanism for the development and provision of scientific advice to governments as well as to regional oceans bodies in that region.<sup>42</sup> Viewed in a global context, a particularly important aspect of ICES is that it is independent of those countries and organizations to whom it provides scientific advice, shielding scientific deliberations from political pressures.

In some developing country regions, a number of Large Marine Ecosystem projects address challenges relating to marine science with funding from the GEF. This includes the Benguela Current, the Canary Current, and the Caribbean and North Brazilian Shelf.<sup>43</sup>

39 <https://norad.no/en/front/thematic-areas/climate-change-and-environment/fish-for-development/>.

40 <https://www.isa.org.jm>.

41 <https://www.un.org/Depts/los/TechAsst.htm>.

42 <http://www.ices.dk/Pages/default.aspx>.

43 <https://iwlearn.net/marine>.

#### 4 The BBNJ Process and Capacity Building

What to make of this in the context of the BBNJ negotiations? The BBNJ process, starting around 2004, was born out of two desires: that of the developing countries and the G7 being able to capture a share of the potential wealth that marine genetic resources are believed represent on the one hand, and that of some developed countries and the NGO community on the other for stronger protections of the marine environment – in particular biodiversity. While very different in terms of their objectives, these groups found common ground in wanting the negotiation of a third implementing agreement under UNCLOS. The interested groups eventually succeeding a decade later in the launching of the PrepCom<sup>44</sup> for what has become the Intergovernmental Conference on an internationally binding legal instrument under the Convention on the Law of the Sea on the conservation and sustainable use of marine biodiversity of areas beyond national jurisdiction.<sup>45</sup>

The concept of biodiversity has become increasingly important in the global oceans discourse, in particular in relation to fisheries (Garcia *et al.*, 2014). A critical juncture was the 2011 meeting in the informal, *ad hoc* working group that was debating the issue, where agreement was reached on the scope of the eventual negotiation: marine genetic resources, area-based management tools, environmental impact assessment, and capacity building and technology transfer (DOALOS).<sup>46</sup> The formal negotiations were initiated in 2018, with a view to arriving at an agreement in 2020 addressing these four themes.<sup>47</sup> As of November 2019, three of four mandated negotiation sessions have been conducted, consisting of discussions of these themes based on a president’s “aid to negotiations” rather than formal negotiating texts.

A “Revised draft text on an agreement under the United Nations Convention on the Law of the Sea on the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction” was issued in November 2019 as basis for the negotiation meeting to be held in March-April 2020, which was postponed due to Covid-19.<sup>48</sup> Compared to the president’s “aid to negotiations” for the second round of negotiations in April 2019, the revised draft

44 <https://www.un.org/Depts/los/biodiversity/prepcom.htm>.

45 <https://www.un.org/bbnj/>.

46 [https://www.un.org/Depts/los/biodiversityworkinggroup/webpage\\_legal\\_and\\_policy.pdf](https://www.un.org/Depts/los/biodiversityworkinggroup/webpage_legal_and_policy.pdf) and <https://documents-dds-ny.un.org/doc/UNDOC/GEN/N11/397/64/PDF/N1139764.pdf?OpenElement>.

47 In A/Res/72/249 the UN General Assembly decided that an agreement is to be developed “as soon as possible” (op1), during four meetings (op3) 2018, 2019 and 2020.

48 <https://www.un.org/bbnj/content/fourth-substantive-session>.

text of November 2019 is considerably more concise, although much language remains in brackets.

Part I of the revised text contains general provisions, including definitions, objectives and relationship to other instruments. Then the four themes of the agreement follow – marine genetic resources (part II), area-based management tools (part III), environmental impact assessments (part IV) and capacity building and transfer of marine technology (part V). The revised draft text also contains provisions on *inter alia* institutional arrangements (part VI) including a Conference of the Parties, a scientific and technical body (or network), a secretariat and a clearinghouse mechanism to provide access to information, implementation (part VIII), and settlement of disputes (part IX).

Part V of the revised draft text on capacity building and transfer of marine technology contains six articles running over six pages, in addition to an annex. The objective (article 42) of this part of the agreement is to assist developing State parties in implementing the agreement, enable participation in activities, promote access to technology, increase and share knowledge, and develop marine science and technological capacity of states with regard to conservation and sustainable use of biodiversity in these areas.

A provision on cooperation in capacity-building and transfer of marine technology (article 43) establishes a duty to cooperate and addresses the level and form of cooperation and special requirements of developing states. Modalities for capacity-building and transfer of marine technology are addressed in the following paragraphs (articles 44 and 45), as well as in greater detail in Annex II of the draft revised text.

Types of capacity-building and transfer of marine technology (article 46) refer to *inter alia* sharing data and information, development of relevant infrastructure, development and strengthening of regulatory frameworks, development and strengthening of human resources, and development of research programs, including biotech activities.

A final provision (article 47) reads that capacity-building and technology transfer under the agreement should be subject to monitoring and periodic review, aiming among other things to address needs and priorities, measure performance, and recommend ways forward in implementing the agreement.

The November 2019 revised draft text part VI on institutional arrangements also includes an article 49 on a Scientific and Technical Body “to be composed of experts”. The body may also draw on “appropriate advice” from other institutions and expertise, and its main function will be to provide scientific and technical advice to the Conference of the Parties. The revised draft text lists functions for the Scientific and Technical Body relating to marine genetic resources, area-based management tools, and environmental impact

assessments, as well as the transfer of marine technology and implementation of capacity-building measures.

## 5 Discussion

Capacity building in scientific and technical aspects in the context of the BBNJ process is about the knowledge needed to address the distinct themes of marine genetic resources, area-based management tools, environmental impact assessments, and capacity building itself. These themes represent very different areas of marine science with limited overlap, as demonstrated *inter alia* by the workshops held at the United Nations in 2013 to improve the understanding of the issues at hand.<sup>49</sup> The themes are very different in a number of ways, including scientific constituencies, infrastructure requirements, costs of doing science, and commercial potential.

Marine genetic resources are seen as holding considerable commercial potential, although future benefits are decades and billions of dollars away in terms of investments required in the scientific and technical work required to explore and exploit these resources.<sup>50</sup> Aspects of benefit sharing, such as the sharing of results of marine scientific research (Yu 2019) or intellectual property rights over marine genetic resources, are important issues (Blasiak *et al.*, 2018). Science relating to area-based management tools is dominated by conservation biology (e.g., Stevenson *et al.*, 2019) and also contains a number of debates, for example on the effectiveness of such measures (Pendleton *et al.*, 2017). As regards environmental impact assessments, this is as well a distinct area of inquiry (e.g., Wright 2014).

In addition to the scientific dimensions of the themes explicitly stated in the negotiation mandate, there are also other concerns calling for additional scientific constituencies to contribute to capacity building in marine science related to BBNJ. This includes concerns such as integrated oceans management (Underdal 1980, Hoel and Olsen 2011), cumulative impacts (Hodgson and Halpern 2018), connectivity between ecosystems inside and outside areas beyond national jurisdiction (Popova *et al.*, 2019), and climate change and its impacts on marine ecosystems (Hollowed *et al.*, 2019).

Also, the scientific aspect of capacity building and technology transfer itself is one of the four areas of the negotiation mandate and is listed among the

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49 [https://www.un.org/depts/los/biodiversityworkinggroup/intersessional\\_workshop\\_2013.htm](https://www.un.org/depts/los/biodiversityworkinggroup/intersessional_workshop_2013.htm).

50 A. Doyle, "Who is in charge of the high seas?" *Financial Times* 11 November 2019.

functions that the Scientific and Technical body is to address. As pointed out at the outset, the academic literature in this field appears limited, although some works exist (e.g., Long 2007, Harden-Davies 2017 and 2018, Minas 2017). A limited literature on various impacts of a future BBNJ agreement is emerging, addressing for example specific areas such as the Arctic high seas (Balton 2019, De Lucia 2017) or specific themes such as diplomacy (Harden-Davies 2018).

The different scientific traditions and disciplines needed to address the different functions envisioned for the Scientific and Technical body raise a number of questions. Is it really possible to have one body addressing such a diverse and complex set of questions in a meaningful way, let alone provide scientific advice on them? The revised draft text provides for the establishment of subsidiary bodies as well as cooperation with scientific and technical bodies, and this could perhaps go some way to address this concern, but there are also questions relating to the size of such a body as well as the no doubt substantial costs such an enterprise would incur. It could also be argued that one would be better served by regional solutions that are more tailored to the needs in different regions of the world, such as the LME programs. The model represented by the International Council for the Exploration of the Sea (ICES) in the North Atlantic also has a lot going for it with its independence from political entities (governments and regional governmental bodies). This model nevertheless provides them with scientific advice and a carefully constructed science-policy interface.<sup>51</sup>

## 6 Conclusions

The BBNJ negotiations are about amending the governance framework for the two thirds of the global oceans that are beyond national jurisdiction. At the time of writing, three rounds of negotiations have concluded, and several more await. It is therefore premature to draw conclusions about how this is going to affect efforts at capacity building and technology transfer, but a few observations can nevertheless be made.

When it comes to devising effective mechanisms for the governance of the environment and natural resources, there are no silver bullets or quick fixes (Ostrom *et al.*, 2007). Considerable attention has to be devoted to contexts, available technologies, and synergies with existing institutions at global and regional levels of governance. Also, considering the two major challenges

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51 <http://ices.dk/Pages/default.aspx>.

referenced at the outset—the urgency of conservation on the one hand (UN 2015) and the need to enhance our utilization of the oceans on the other—it can be asked what additional benefits an eventual BBNJ outcome will bring. In terms of food provision, for example, only about 5% of the world's fisheries are in the ABNJ (Sala *et al.*, 2019). An agreement could become important for the development of products derived from marine genetic resources, but most likely not in a near future. Areas inside national jurisdiction are easily accessible, less remote and hence less costly to engage.

As to the three questions raised at the outset of this chapter, the first related to the main features of the current global framework for capacity building and technology transfer. A comprehensive framework exists, based on UNCLOS, as well as much recent political attention through Agenda 2030 and the Sustainable Development Goals. There appears however to be scope for improvement when it comes to monitoring and evaluation of the functioning of this framework.

The second question concerned what on-going programs and experiences there are in capacity building for science that provide relevant lessons for the BBNJ process. A substantial number of programs and initiatives exist, most prominently in the IOC, but also in a number of other UN bodies. A key issue in this respect is the Decade of Ocean Science for Sustainable Development, proclaimed by the UN General Assembly in 2017. This will provide a major opportunity for strengthening capacity building efforts in marine science and technology (Ryabinin *et al.*, 2019). The IOC is currently leading a comprehensive global effort in planning the decade.

As regards the third question, the implications of the BBNJ for future developments in capacity building, a future agreement would serve to complement and extend the global framework for oceans governance. This is in itself valuable, demonstrating the importance of this framework and the ability of states to improve upon the existing framework in light of new and emerging issues. Also, efforts at capacity building in science and technology for the areas beyond national jurisdiction are likely to be beneficial also for the areas inside national jurisdiction, where the challenges relating to governance of oceans and seas are on a different order of magnitude than those outside.

A final thought. The focus of most capacity building efforts in science is on building infrastructure and developing the capacity for producing and utilizing scientific knowledge. However, education and human resource development should be an important part of any capacity development program.

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