



Implications of existing capacity building efforts for the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction: A case study of Japan

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ABSTRACT

Capacity building and the transfer of marine technology (CB&TT) are key parts of negotiations at Intergovernmental Conferences on an international legally binding instrument regarding the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction (BBNJ). Throughout the negotiations, divergent views persisted among governments. One possible reason for such a situation is the lack of comprehensive understanding of existing CB&TT efforts. In this case study, we assessed how these existing efforts could contribute to capacity building for the effective implementation of a newly proposed BBNJ agreement. A review of CB&TT projects implemented by Japanese organizations showed that there was a significant amount of efforts relevant to BBNJ (157 cases between 2010 and 2020, which cost about USD 4.3 billion in total). We also found that many of them provided platforms that could be applied to CB&TT for BBNJ. However, projects specifically tailored for BBNJ were still limited. Furthermore, there were several lessons from existing efforts that could provide useful insights for future initiatives. Given a higher priority of many countries to coastal areas and the exclusive economic zone, new capacity building should focus on not only areas beyond national jurisdiction, but also the other areas to manage the ocean as a whole. Lastly, recommendations are advanced to the UN member states on discussing how to build future initiatives of CB&TT upon existing efforts.

1. Introduction

Effective management of marine biological diversity of areas beyond national jurisdiction (BBNJ) is key to ensuring the conservation and sustainable use of oceans [1]. However, a legal framework to manage BBNJ has long been absent, resulting in largely fragmented and uncoordinated governance in this area [2]. To address this issue, UN member states featured BBNJ as an emerging issue at the fifth meeting of the UN Open-Ended Informal Consultative Process on Oceans and the Law of the Sea (2004) [3]. After a series of discussions at an Ad Hoc Open-Ended Informal Working Group (2006–2015) and subsequent Preparatory Committees (2016–2017), the first session of the Intergovernmental Conference (IGC1) on “an international legally binding instrument under the United Nations Convention on the Law of the Sea (UNCLOS)

on the conservation and sustainable use of BBNJ” was held in Autumn 2018 [4].

Four substantive negotiations to establish a new international legally binding instrument on BBNJ were scheduled between 2018 and 2020 [5], three of which were already completed as scheduled. The negotiations on the new BBNJ agreement have been framed with four main elements: 1) marine genetic resources (MGRs), including questions on the sharing of benefits; 2) area-based management tools (ABMTs), including marine protected areas (MPAs); 3) environmental impact assessments (EIAs); and 4) capacity building and the transfer of marine technology (CB&TT). Completion of the new treaty text is expected by IGC4, which was postponed to March 2022 due to the spread of COVID-19 [6]. However, divergent views still persist among IGC-participating states, which have posed challenges throughout the

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negotiations. Despite concerns about the negotiation timeline and persisting dichotomies among the states, there is no discussion on whether additional negotiation is necessary beyond IGC4 [2].

One such conflict emerged from MGRs, particularly a discussion of which principle—the common heritage of mankind or the freedom of the high seas—is to apply in the management of MGRs (especially MGRs on the seabed) [7]. Most developing countries support the former in ensuring fair and equitable benefit sharing of these resources. In contrast, developed countries affirm the latter to secure their rights over yet-to-be-found resources in areas beyond national jurisdiction (ABNJ). Article 136 of UNCLOS declared the Area (i.e., seabed in areas beyond national jurisdiction) and its resources as common heritage of mankind; however, it limits the definition of “resources” only to mineral resources in situ in the area at or beneath the seabed [8]. On the other hand, the Nagoya Protocol (supplementary agreement to the Convention on Biological Diversity (CBD)) was adopted to ensure “the fair and equitable sharing of benefits arising from genetic resources”; nevertheless, it does not apply to ABNJ. The absence of a statement regarding MGRs in these frameworks resulted in a long-lasting debate on which principal should be applied to MGRs.

CB&TT is another element in which the positions of the IGC-participating states often conflict. There is unanimous agreement among them that CB&TT is essential to strengthen the capacity of developing countries to fulfill the obligations of BBNJ management [7]. CB&TT is also referred to as an enabler of the other three elements of BBNJ [9,10]. A variety of CB&TT are expressed as needed, including items associated with scientific research and governance [11]. In addition, support for delegates to fully participate in international negotiations is considered capacity building. However, the countries are still divided over their opinions about whether CB&TT should be mandatory or voluntary. Developing countries support mandatory CB&TT, whereas developed countries prefer voluntary commitments. This conflict can be attributed to differences in the perspectives of benefit sharing. The former considered CB&TT as tools to improve their capacity for research and development of BBNJ, especially MGRs [12]. In contrast, the latter mostly opposes inclusion of the scope of MGRs in CB&TT, citing the fact that their commercialization requires significant investment and lengthy processes [7]. Such a divergent view causes the countries to be trapped in long-lasting conflicts of opinion about CB&TT-related issues.

To bridge the gap between the state parties, comprehensive information on existing frameworks and efforts related to CB&TT would be useful. Many IGC-participating states agree that CB&TT should be built on available mechanisms (e.g., Intergovernmental Oceanographic Commission of UNESCO (IOC-UNESCO), International Seabed Authority (ISA)), and emphasize the value of drawing lessons from past and ongoing initiatives [13]. However, such information is fragmentary, and countries have merely addressed the extent to which commitment to CB&TT should be mandatory or voluntary. Furthermore, little effort has been devoted to considering how existing efforts can be utilized and built upon, and how lessons from them can be applied to the development of the modality of CB&TT for BBNJ.

To facilitate discussions on CB&TT, we assessed the potential contribution of existing efforts to future CB&TT initiatives in the field of BBNJ.¹ Indeed, CB&TT does not start from a vacuum [9]. As pointed out in IGCs, there are already important provisions in several international agreements [7]. Part XIV of UNCLOS, for example, clearly states the necessity for marine scientific and technology capacity building in

¹ According to the United Nations Development Programme (UNDP), capacity building refers to “process that supports only the initial stages of building or creating capacities and is based on an assumption that there are no existing capacities to start from” whereas capacity development refers to “the process of creating and building capacities and their (subsequent) use, management and retention”. Since term “capacity building” is used in the BBNJ negotiation process, we use this term throughout.

developing countries [14]. IOC-UNESCO has also developed criteria and guidelines for the transfer of marine technology [15,16]. Furthermore, CB&TT has long been offered by various donors worldwide (both public and private sectors) to those in need of assistance at different levels (individual, organizational, national, regional, and international) [9]. It includes a wide variety of forms, ranging from financial assistance to technical cooperation. In a review of capacity building projects implemented by international organizations and non-governmental organizations, Cicin-Sain et al. [9] revealed considerable growth in BBNJ-related initiatives [9]. However, how national efforts, both ongoing and recently completed, can potentially contribute to CB&TT for BBNJ has rarely been assessed. Therefore, we conducted a survey of such efforts to address this question using a case study of Japan.

We selected this country because of its major role in the long history of technical assistance to developing countries (e.g., Official Development Assistance (ODA) since 1954 [17], and its leading role in marine science and technology [18]). Japan’s ODA stood at USD 16.3 billion in 2020, making Japan the fourth largest Organisation for Economic Co-operation and Development (OECD) Development Assistance Committee (DAC) country [19]. The objectives of this study are twofold: (1) to examine the trend of existing efforts on CB&TT by Japan and (2) to draw useful lessons from them. We then discuss how they can be relevant to CB&TT for BBNJ, and how the lessons and their implications can contribute to the development of the modality of future initiatives. The Paris Declaration on Aid Effectiveness and Accra Agenda for Action provide useful guidance for extracting lessons. These international agreements show a roadmap to improve the quality of aid and its impact on development [20].

2. Methods

We surveyed organizations in Japan that engaged in CB&TT in ocean sectors. They were mainly government institutes. We also included public universities and private foundations with a long-term experience of capacity building in the field of the ocean. We first collected relevant information on CB&TT projects from documents or websites published by organizations. Our survey covered projects related to the ocean and environment (e.g., biodiversity and climate change) rather than exclusively focusing on MGRs, ABMTs, or EIA for ABNJ. This is because various topics are relevant to the management of BBNJ. Another point is that lessons in terms of the project management could be applicable for CB&TT relevant to ABNJ. In addition, we focused on projects that started and were completed between 2010 and 2020, or those that are currently ongoing. When deemed necessary, we conducted interviews with officers of the studied organizations. Through the interviews, we clarified the accuracy of the collected information and asked whether there were any updates that were not covered in our review.

3. Trends of capacity building and their relevance to BBNJ

Analyzing trends of existing efforts on CB&TT can help us identify current gaps in CB&TT and potential areas of contribution to future initiatives [21]. We confirmed 157 projects (or programs) of CB&TT implemented by 11 organizations (2010–2020: Table 1), namely: (1) Ministry of Environment; (2) Ministry of Education, Culture, Sports, Science and Technology; (3) Fisheries Agency; (4) Japan International Cooperation Agency (JICA); (5) Japan Science and Technology Agency (JST); (6) Japan Agency for Marine-Earth Science and Technology (JAMSTEC); (7) Japan Oil, Gas and Metals National Corporation (JOGMEC); (8) Tokyo University of Marine Science and Technology (TUMSAT); (9) University of Tokyo; (10) Overseas Fishery Cooperation Foundation of Japan (OFCF); and (11) Nippon Foundation (NF). The estimated total budget spent on these projects was about USD 4.3 billion.

Our data showed that ocean-related CB&TT by Japan was fishery-oriented when assessed in terms of the number of projects (Fig. 1). However, Japan’s emphasis on the environment was evident when

Table 1
The number of capacity building and transfer of marine technology projects by the 11 organizations.

Name of the organization	No. of projects
Ministry of Environment	14
Ministry of Education, Culture, Sports, Science and Technology (MEXT)	3
Fisheries Agency	2
Japan International Cooperation Agency (JICA)	45
Japan Science and Technology Agency (JST)	6
Japan Agency for Marine-Earth Science and Technology (JAMSTEC)	23
Japan Oil, Gas and Metals National Corporation (JOGMEC)	1
Tokyo University of Marine Science and Technology (TUMSAT)	33
University of Tokyo	9
Overseas Fishery Cooperation Foundation of Japan (OFCF)	9
The Nippon Foundation (NF)	12
TOTAL	157

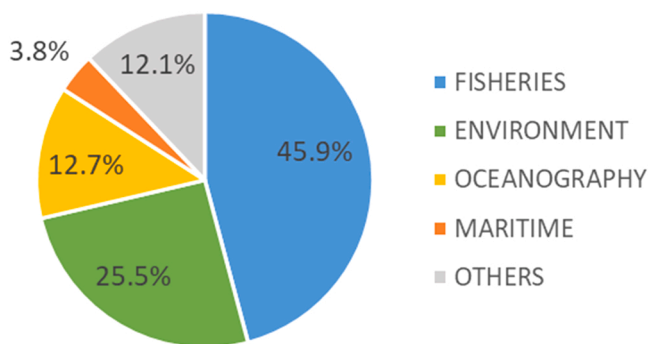


Fig. 1. Percent of the number of capacity building projects ($n = 157$) by field.

CB&TT was assessed in terms of budget (Fig. 2). These results reflect the fact that many fishery-related projects were conducted as non-monetary technology transfers in bilateral initiatives (through ODA). In contrast, environment-related projects focused more on financial contributions to multilateral initiatives (through international platforms such as the CBD). Environment-related projects can be applicable to CB&TT in ABMTs and EIAs (e.g., East and Southeast Asia Biodiversity Information Initiative (ESABII)), although fishery-related projects that involve technology transfer can also be relevant to ABMTs and EIAs (e.g., Promotion of Grace of the Sea for Coastal Villages) [22]. Furthermore, several projects of oceanography offered MGR-related training (e.g., Innovative Technologies for Exploration of Deep-Sea Resources, Japan At Sea Training Programme) (see Section 4 and Supplementary Material

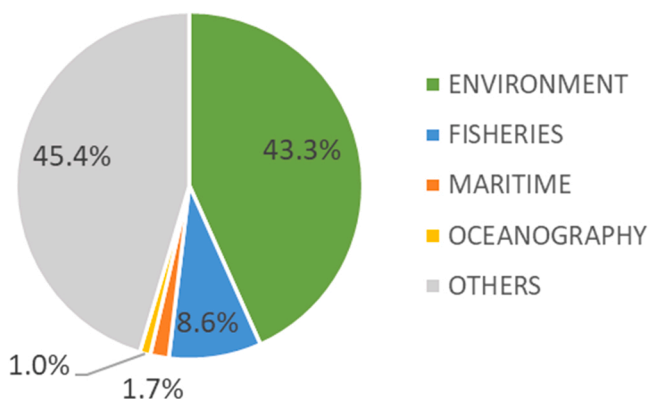


Fig. 2. Percent of the budget of capacity building projects (total = USD 4.3 billion) by field.²¹

1 and 2 for details of each project/program). The 157 cases mostly focused on coastal areas or the EEZ and were not directly aimed at CB&TT for BBNJ except the “BBNJ Training Programme” by NF [23]. However, given the connectivity among different areas of the ocean, existing efforts would have greater potential to contribute to BBNJ management if their geographical scope embraces ABNJ.

Our research also showed that existing efforts covered various types of CB&TT, many of which would serve as useful platforms for future initiatives. Many of them offered types of capacity building listed as needed in the draft text of the BBNJ agreement, such as financial assistance, technical cooperation, training/seminar, data and information sharing, and joint research (Fig. 3). Examples include “Japanese Funds-in-Trust for the IOC/WESTPAC Programme” (financial assistance), “Promotion of Grace of the Sea for Coastal Villages” (technical cooperation), “Innovative Technologies for Exploration of Deep-Sea Resources” (training), “ESABII” (data sharing), and “Science and Technology Research Partnership for Sustainable Development (SATREPS)” (joint research). (see Section 4 and Supplementary Materials 1 and 2 for details of each project/program). Financial assistance accounted for about 3/4 of the estimated total budget, while the proportion for other types of projects was much lower in that their primary purposes were not financial support (Fig. 4). However, different types of CB&TT have been offered relatively evenly in terms of the number of projects (Fig. 3), exhibiting a balanced coverage of capacity building items. Diverse types of CB&TT can have greater potential to accommodate the various needs of recipients. In addition, our results show that the majority of projects offered are non-monetary (e.g., technical cooperation). This result indicates that many non-monetary initiatives can contribute to CB&TT for BBNJ.

4. Lessons and useful modalities from existing capacity building efforts

For the effective implementation of CB&TT, a continuous cycle from a needs assessment to planning, implementation, evaluation, and follow-up is key [24]. Although limited information made an assessment of capacity building effectiveness challenging, available information indicated that Japan contributed well to capacity building overall, but with various lessons. Here, we showcase lessons and useful modalities of capacity building from existing efforts that can be applied to future initiatives by each of the different phases: 1) the preparation phase (Lesson 1); 2) the implementation phase (Lessons 2, 3, and 4); and 3) the post-project phase (Lesson 6). Taking into consideration these lessons can offer clues for the modality of CB&TT while allowing us to build on the experience of past initiatives [9]. Lastly, we mention the importance of capacity building at higher levels (institutional and social) (Lesson 7). Details of the evaluation for case study projects are available as Supplementary Material 1.

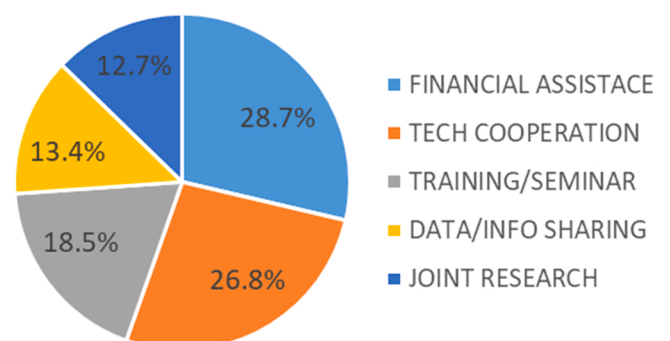


Fig. 3. Percent of the number of capacity building projects ($n = 157$) by type.

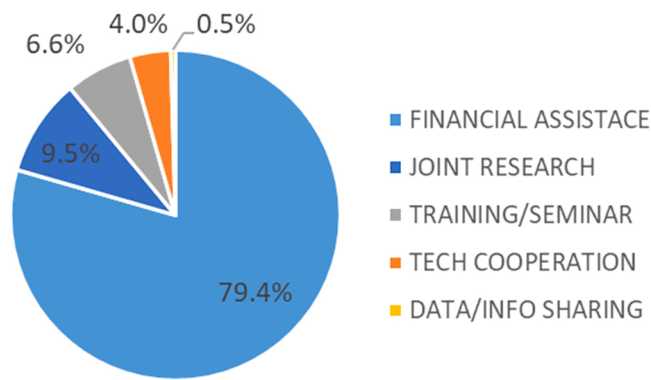


Fig. 4. Percent of the budget of capacity building projects (total = USD 4.3 billion) by type.

Lesson 1: A needs assessment for capacity building is critical, but not fully implemented

The first lesson to highlight is the importance of careful needs and capacity assessments [9,25]. It is repeatedly pointed out during the BBNJ negotiation that CB&TT should be needs-driven; however, in practice, meeting countries' various needs can be challenging. In fact, a needs assessment was conducted for approximately 35% of the projects assessed in this study (and hence needs-driven), and these projects were all given through ODA schemes (JICA or OFCF). As for the other projects, it was unclear whether a needs-assessment took place, or whether they were needs-driven or rather supply-driven, except in some cases. For instance, a few projects indicated their alignment to recipients' needs (e.g., Japan at Sea Training Programme; interview). In contrast, MEXT's scholarship for international students can be categorized as supply-driven. While needs-driven capacity building can reflect the needs of recipients more than supply-driven capacity building whereas the latter may be swifter in decision-making and implementation, a careful assessment is essential to accurately understand the country's needs.

One relevant example is the project "Eco-technical Management of Tuvalu against Sea Level Rise" (SATREPS project: 2009–2014), which was successful in developing the beach nourishment method for Tuvalu [26]. However, the limited need for beach nourishment in the country led to the failure of Tuvaluan counterparts to actively participate in monitoring the beach nourished in the project. In addition, limited resources in the country and high running costs of installed facilities (aquaculture farms of Foraminifera for beach nourishment) resulted in the suspended operation of the facilities after the project. Experience from the project indicates the necessity of a careful needs assessment to meet national needs and the sustainability of the project's effectiveness. It also implies that a needs assessment should examine existing capacity, the sense of ownership, national policies, and willingness of counterparts' to continue the efforts initiated by the transfer of technologies. In other words, a needs assessment is important to contextualize CB&TT in each of different countries because they have unique environmental, institutional, political, and capacity contexts [9]. Furthermore, although there was little information available about who carried out needs assessments, they should be conducted by third persons to ensure their transparency and objectivity. These evaluations can also help promote a sense of ownership among recipients in achieving capacity building goals, while project implementers can ensure the long-term effectiveness of the project [27].

² The largest proportion of the category "Others" is as a result of categorizing large-scale financial and technical cooperation programs as this category (e.g., Science and Technology Research Partnership for Sustainable Development). Multiple projects are conducted under various themes in these programs.

Lesson 2: Long-term relations, regular communication, and mutual learning are essential

The second lesson we drew from existing efforts is the importance of long-term engagement and relations [28]. We would like to introduce two projects successfully delivered thanks to well established long-term relations between the project implementers and their counterparts. First, the project "Development of Aquaculture Technology for Food Security and Food Safety in the Next Generation" in Thailand (SATREPS project: 2012–2016) was launched to develop a high food production system for aquatic species in Thailand [29]. This culminated in the development of a diagnostic method for EMS/AHPND (infectious disease found in farmed shrimp). It was adopted as a standardized method by the Thai government and the World Organization for Animal Health and is now used across the country. Second, the project "Sustainable Management of Coral Reef and Island Ecosystems: Responding to the Threat of Climate Change" in Palau (SATREPS project: 2013–2018) was conducted with the objective of strengthening Palau's capacity for scientific research (e.g., coral reef monitoring) and reef conservation [30]. Its outcomes not only enhanced the capacity of local researchers but also successfully proposed policy recommendations on reef management by the Palauan government based on joint research.

Regarding the former project, TUMSAT (project implementer) had frequent communication with its Thai counterparts (e.g., workshops, training sessions), which promoted knowledge sharing between them, and also allowed adaptive management of the project. This contributed to the adoption of emerging local needs, resulting in the development of the aforementioned diagnostic method. Their relationship was built upon the academic partnership TUMSAT and its counterparts had been maintaining since the 1990s. Similarly, Japan has long been committed to capacity building for the Palau International Coral Reef Center (counterpart in the latter project and now a hub of international collaborative research) since 2000. The experiences accumulated through previous projects were also effectively used. The project evaluation reports also recognize that the successful implementation of the two projects can be largely attributed to years-long relations between partners, stressing their value to ensure effective capacity building [29, 30].

Another relevant factor that may affect the success of capacity building is mutuality. The power imbalance between "builders (those with the power)" and "beneficiaries (those assumed to be powerless)" is often pointed out in development assistance [31]. This issue may have resulted from the underlying concept that capacity building is a one-way knowledge or technology transfer. However, one expert argues that strengthening not only the capacity of recipients but also that of donors can lead to effective aid [31]. Mutual learning and accountability can be key to enhancing donor capacity [25,32]. In these processes, a donor and a recipient are expected to share each other's knowledge, skills, experience, and responsibilities for achieving the common goals. To do so, building trust and interdependent relations are required through long-term dialog with the idea that both a donor and a recipient are equal partners. The success of the two projects discussed above can also be attributed to researchers from countries who shared their expertise to "co-produce" new knowledge through long-term relations among them.

Lesson 3: Make use of existing resources and institutional mechanisms, and expand

The third lesson we identified is the benefit of utilizing existing resources and institutional mechanisms [33]. Among the capacity building cases we studied, we would like to highlight the project "Promotion of Grace of the Sea for Coastal Villages". It is a technical cooperation project by JICA launched to strengthen an ability of the Fisheries Department (FD) in fisheries resource management and promote community-based coastal resource management (CB-CRM) in Vanuatu (Phase 1–3: 2006–2021) [34]. Through the three-term project, coastal

residents' awareness of coastal resource management improved, and the expansion of CB-CRM continued in Phase 3, indicating the autonomy of project participants. Furthermore, increases in coastal resources and income of people in coastal communities have been reported as some of the perceived benefits of CB-CRM [34]. The success of this project can be attributed to the adaptation of local systems. It fully utilized existing institutional mechanisms and resources (incorporating local MPA committees into CB-CRM schemes and designating local leaders to extend CB-CRM). Strategies of the project increased the involvement of coastal communities in CB-CRM and promoted their sense of ownership. It was also useful to support villages in a condition of limited resources, which otherwise could not have been supported. The Paris Declaration on Aid Effectiveness and Accra Agenda for Action encompass the concept of the use of local systems [20].

Lesson 4: Build a strong network of capacity building partners

The fourth lesson to underscore is the potential effectiveness of organizing a network of capacity building partners [35]. The project "Pacific Islands Capacity Enhancement for Achieving SDG14" is another project by JICA in collaboration with the University of the South Pacific (2020–2024). The purpose of this project is to strengthen the capacity of fishery officers in the Pacific Island countries and regions to promote actions to achieve the Sustainable Development Goal 14 (SDG14). This project is unique in that it has formed a network of other capacity building partners as the "SDG14 Training Committee" where JICA plans to collaborate with them by sharing information, receiving technical advice, and participating in joint training. Although this project is still under progress and its evaluation results are yet to come, the network of partners would allow them to share knowledge and find areas where they can collaborate to produce project synergies. It would also help avoid duplication of existing capacity building efforts, and hence, maximize their efficiency and efficacy. Furthermore, such collaboration can contribute to multi-way knowledge sharing, where not only can recipients gain benefits of capacity building, but also donors from co-created knowledge and skills.

Lesson 5: Evaluation of capacity building should be fully in place

The fifth lesson we emphasize is related to project evaluation [36]. Nearly 35% of the projects assessed in this study were evaluated after their implementation or subject to mandatory post-project evaluation. These projects were conducted by either JICA or OFCF. Out of 12 JICA projects, of which full evaluation results were available, seven projects fully achieved their declared goals with high impacts on the recipient countries. The remaining five accomplished their goals to some extent, but with moderate or limited impacts. JICA has a well-established project rating system. It conducts outcome-based assessments for mid- and large-scale projects (JPY 200 million ~ JPY 1 billion) on or up to three years after the completion of projects [37]. They are evaluated in terms of the achievement of capacity building goals using the criteria of relevance, effectiveness, efficiency, sustainability, and impacts. In addition, JICA evaluates the mid-scale projects by itself, whereas large-scale projects (JPY 1 billion <) are assessed by both JICA and third persons to ensure transparency and objectivity of the evaluation process. OFCF employs similar evaluation criteria. As for the projects conducted by the other donors, the evaluation of how their project results met the varying demands of CB&TT recipients and how they were effective in enhancing recipients' capacity were not sufficiently evaluated; thus, it is difficult to draw any definitive conclusions.

One example that exhibits the importance of project evaluation is the Japan At Sea Training Programme (Phase 1–2: 2015–2024) [38]. It is a technical training program for deep-sea mining conducted as part of the ISA's contractor program. JOGMEC (contractor and training implementer) continues to improve the quality of the training through the "PDCA (Plan, Do, Check, and Action) Cycle" [39], and due to its quality

and high demands for the training, the Programme is highly competitive to participate. However, the long-term benefits and overall impact of the contractor training program as a whole were assessed as unclear [40]. One reason for this was the lack of training records to assess the effectiveness of the program. This example implies the need for project evaluation schemes, including document management, to fully assess the outcomes of capacity building efforts. Since it is beneficial to determine whether further follow-up or the next phase of the project is necessary to ensure the autonomy of trainees, future capacity building should emphasize the value of the post-project evaluation.

Lesson 6: Long-term follow-up and a network of trainees enhance post-project results

The sixth lesson is the necessity of long-term follow-up after capacity building [41,42]. It is widely recognized that follow-up is essential to ensure the autonomy of training participants as well as the long-term effectiveness of capacity building [43]. For example, JICA offers "follow-up cooperation" when necessary. Follow-up cooperation consists of the provision of facilities or equipment (e.g., when provided facilities are destroyed due to natural disasters) and further enhancement of trainees' abilities (e.g., networking of trained individuals). A follow-up program for capacity building should be continuous rather than ad hoc to maximize its effectiveness. As exemplified in the SATREPS projects in Palau and Thailand, long-term relations can serve as capacity building follow-up. However, limited resource both in donor and recipient countries can often make sufficient follow-up challenging.

In this regard, it is useful to learn from the experience of "Innovative Technologies for Exploration of Deep-Sea Resources". It is one of the themes in the Cross-Ministerial Strategic Innovation Promotion Program (SIP) by the government of Japan [44]. It offered technical training to the Pacific Island countries in the field of deep-sea research (training led by JAMSTEC in 2019). The training was successfully implemented, leading to its second round in the same year. However, there was no evidence of further follow-up after training. It is highly likely that most Pacific Island countries do not own the research vessels and facilities necessary to explore the deep sea. Hence, providing researchers from developing countries with continuous access to necessary equipment can further strengthen their research capacity. Nevertheless, in practice, resources that donors can offer for follow-up are also limited.

One potential breakthrough would be to build alumni networks. The following two projects provide good examples. The NF/GEBCO Training Program has offered a scholarship program since 2004 to train experts in bathymetric charts [45]. What is remarkable about this program is the strong network of alumni members. The network served as a platform of the "self-sustaining follow-up" where the alumni team further improved their skills through knowledge exchange among them. This led them to win a first prize in an international competition for deep-sea exploration technologies in 2019 (Shell Ocean Discovery XPRIZE). This achievement also indicates the full autonomy of trainees in implementing their skills. Another example is ESABII by the Ministry of Environment (2009–present). The main components of this initiative are capacity building in taxonomy and the development of biodiversity information [46]. A recent study reported that the initiative was successful in bridging a gap in regional capacity (e.g., the lack of knowledge and information about taxonomy) [47]. ESABII also formed a network of participating countries, which helped enhance the overall capacity for biodiversity conservation activities in Asia.

Lesson 7: Capacity building at institutional and societal level is essential

The development of institutional and societal capacity is fundamental to guarantee the sustainability of CB&TT [9]. The former in particular is an important type of capacity to guarantee that capacities in countries are realized in the long-term [9]. However, ensuring the effectiveness of CB&TT at these levels is challenging. Training

individuals is often effective in improving the capacity and skills of individual trainees, but a single, ad hoc training course alone does not provide the type of long-term effort required to raise capacity. Furthermore, enhanced individual capacities are not necessarily translated into improvements in capacity at the institutional and societal levels [9]. One reason pointed out was the lack of incentive for trainees to share their new knowledge and skills with others. Knowledge and skill sharing should therefore be promoted to maximize the benefit of capacity building for the entire organization to which trainees belong. Another reason is the lack of resources available in recipient countries, including long-term financing. In addition, in many cases, individuals trained overseas do not have the necessary equipment or employment opportunities available in their home countries. These challenges underscore the importance of follow-up measures for capacity building at broader institutional and societal levels.

5. Conclusion

Building on existing projects and programs of CB&TT is key to tangible capacity building [22,48]. The first step is to analyze and understand current trends of existing efforts. This study revealed a significant volume of CB&TT projects and programs in place. Existing efforts spanned various fields including, but not limited to, fisheries, environment, oceanography, and maritime issues. They also covered various types of CB&TT, such as financial assistance, technical cooperation, training and seminar, data and information sharing, and joint research. We also found that the number of CB&TT activities directly relevant to BBNJ remains limited. This may be a reason for many developing countries demanding additional CB&TT in IGCs [7]. However, building on existing efforts, rather than pursuing new CB&TT for BBNJ, is essential given the high priority of developing countries to coastal areas and the EEZ [49]. It is important to note clear linkages between these areas and the ABNJ [50]. It is also essential to develop a better understanding of how CB&TT for BBNJ contributes to the well-being of societies, economies, and cultures so that new initiatives under the BBNJ Agreement are designed to benefit not only the public and industrial sectors involved in the development of ABNJ, but also coastal residents who are vulnerable to such development. It is not adequate to detract existing efforts to ABNJ as it may reduce opportunities of capacity building for coastal residents. Efforts on CB&TT within areas of national jurisdiction should, therefore, benefit the management of BBNJ and vice versa. In other words, synergies between efforts for different ocean areas would be essential for the successful management of BBNJ [22].

Our review of existing efforts also drew several lessons from them, which gave us implications for future initiatives. The lessons identified here cover each phase of the capacity building implementation. In the process of preparation, careful needs assessments are essential to tailor the project to local and national contexts. The assessments should also be carried out at regional levels as there are multiple stakeholders involved in the high seas. These assessments can be beneficial in promoting the ownership of trainees and project participants. During the implementation phase, good communication and long-term relations between partners are key to successfully achieving capacity building goals. Taking full advantage of existing resources or institutional mechanisms, rather than introducing a new system, is also effective in implementing the project efficiently, especially under the conditions of limited resources. Furthermore, building a network among capacity building partners has the potential to generate synergies between them. After the conclusion of the project, the evaluation of its effectiveness is vital to ensure that the capacity of trainees has been built or developed successfully. In addition, follow-up measures are necessary for the sustainable effectiveness of capacity building. These lessons go beyond the scope of the case study in that they can be universally applicable to future CB&TT initiatives in the field of BBNJ.

Based on our findings, we recommend, as a step forward in their discussion of CB&TT, that the UN member states undertake an

assessment of how to fully utilize and build on existing efforts, and to identify what new efforts are required for managing BBNJ. Such an assessment, together with identified countries' needs, will help develop a roadmap for future action on effective CB&TT toward the implementation of the BBNJ Agreement and achievement of the conservation and sustainable use of BBNJ.

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CRedit authorship contribution statement

Iwao Fujii: Conceptualization, Investigation, Writing – original draft. **Miko Maekawa:** Supervision, Conceptualization, Methodology, Investigation, Writing – review & editing. **Nozomi Shimizu:** Investigation, Writing – review & editing. **Naohisa Kanda:** Investigation, Writing – review & editing. **Nariaki Mikuni:** Writing – review & editing. **Kazunobu Suzuki:** Writing – review & editing. **Izumi Tsurita:** Writing – review & editing. **Miriam C. Balgos:** Writing – review & editing.

Declaration of Competing Interest

The authors declare no competing interests.

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Appendix A. Supporting information

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