ADVANCE UNEDITED REPORTING MATERIAL

I. Introduction

1. The need for capacity-building and the transfer of marine technology, as well as cooperation, are recognised by States as essential for the realisation of the benefits of the Convention by all States especially to ensure that developing countries, in particular the Least Developed Countries (LDCs), Landlocked Developing Countries (LLDCs), Small Island Developing States (SIDS), as well as coastal African States are able both to implement the Convention and to benefit from the sustainable development of the oceans and seas[1] and also to the long-term health and well-being of our oceans.[2] This recognition is underlined by the General Assembly in its resolution 79/144, paragraph 347, deciding that the twenty-fifth meeting of the Informal Consultative Process would focus its discussions on the topic "Capacity-building and the transfer of marine technology: new developments, approaches and challenges".

2. The underpinning nature of capacity-building for developing countries to implement all the Sustainable Development Goals is recognized in Goal 17 of the 2030 Agenda for Sustainable Development, and technology is recognised therein as one of the major pillars to enable implementation of the Sustainable Development Goals.

3. To facilitate discussions of the twenty-fifth meeting of the Informal Consultative Process, this report provides an overview of capacity-building and the transfer of marine technology highlighting new developments, approaches and challenges in this regard as well as opportunities. The report draws upon the contributions submitted by States and relevant organizations and bodies,[3] as well as upon other reports and studies related to the topic of focus.

II. Capacity-building

4. The concept of capacity has evolved from focussing on the capabilities of individuals to those of organisations and, more recently, to the capabilities of communities, States or a society's institutions as a whole.[4] Capacity-building should mutually reinforce individual and institutional development and also create an enabling environment at the national level.[5] It is enabled through cooperation including inter-agency cooperation, targeting beneficiary States.[6] It includes both financial assistance and in-kind and other contributions or cooperation which impact a State's capability to further its sustainable development in line with national

[1] General Assembly resolution 79/144 of 12 December 2024, preamble.
[2] Contribution of Barbados.
[3] The full text of the contributions is available from the website of the Division for Ocean Affairs and the Law of the Sea: https://www.un.org/depts/los/consultative_process/consultative_process.htm.
[4] Kacou, K. P., Ika, L. A., & Munro, L. T. (2022). Fifty years of capacity building: Taking stock and moving research forward. Public Administration and Development, 42(4). https://doi.org/10.1002/pad.1993
[5] Contribution of ISA.
[6] Contribution of CITES.

priorities and international commitments.[7] It is important for capacity-building to ensure that all States are able to fully implement UNCLOS, benefit from the sustainable development of the oceans and sea, and fully participate in global and regional fora.[8]

5. Effective management of the ocean calls for a holistic, ecosystem-based and knowledge-based approach that prioritises sustainability and the resilience of marine ecosystems.[9] However, capacity-building to promote sustainable management must also be tailored to the specific needs and priorities of the beneficiary to ensure buy-in and follow-through to produce lasting benefits. Such an approach allows for customised solutions that consider diverse contexts, including local knowledge, environmental conditions, and the need for data sharing.[10] Co-developing initiatives which leverage a range of knowledge systems and take into account specific needs, as well as early development of transition plans, can contribute to successful and sustainable capacity-building programmes with both localized and wider ranging benefits.[11] A wide range of capacity-building initiatives, covered under section IV below, are being implemented.

6. *Law of the Sea instruments.* UNCLOS requires cooperation among countries to assist developing and geographically disadvantaged States in addressing marine environmental challenges.[12] The Convention also emphasises the importance of building developing States' capacities to enable the sustainable utilization and conservation of ocean resources,[13] and it also addresses the need for developing countries to obtain technical assistance to enhance their knowledge in the areas of marine science.[14]

7. In the context of the 1995 United Nations Fish Stocks Agreement (UNFSA), Regional Fisheries Management Organisations (RFMOs) play a key role in identifying and addressing capacity-building needs. Achieving sustainability requires a level playing field among all RFMOs' Contracting Parties, which can only occur through robust and well-coordinated cross-regional capacity-building initiatives, as well as effective, timely and appropriate transfers of technology.[15]

8. Other law of the sea instruments, for example the Agreement on Port State Measures to Prevent, Deter, and Eliminate Illegal, Unreported, and Unregulated Fishing which obligates its parties to assist developing States, build on this approach.[16]

9. The adoption of the 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 (BBNJ Agreement) presents an avenue to enhance the implementation of capacity-building provisions under

[7] Report of the Secretary General on Oceans and the law of the sea, A/65/69, paras. 16-17.
[8] Contribution of Australia.
[9] Winther, JG., Dai, M., Rist, T. et al. Integrated ocean management for a sustainable ocean economy. Nat Ecol Evol 4 (2020). https://doi.org/10.1038/s41559-020-1259-6.
[10] Winther, JG., Dai, M., Rist, T. et al. Integrated ocean management for a sustainable ocean economy. Nat Ecol Evol 4 (2020). https://doi.org/10.1038/s41559-020-1259-6.
[11] Contribution of the United States of America.
[12] Contribution of IIJS, p. 1; and IMO, p. 1.
[13] Contribution of the European Union, p. 1; see also A/65/69, p. 6-7.
[14] A/65/69, p. 6-7.
[15] Contribution of the European Union, p. 3.
[16] Food and Agriculture Organization of the United Nations. (2009). *Agreement on Port State Measures to prevent, deter and eliminate illegal, unreported and unregulated fishing.* Retrieved from https://openknowledge.fao.org/se.rver/api/core/bitstreams/515b81dc-ad65-41c9-ab02-6ff081103cc3/content, p. 16.

UNCLOS.[17] Cooperation in this regard should enable cross-sectoral capacity-building and help improve coordination within governments, amongst appropriate sectors and with stakeholders at the national, regional and global levels. This coordinated approach should improve ocean governance both within and beyond areas of national jurisdiction.[18]

10. *Funding institutions for development*. Funding institutions, of which the following are but three examples, play an important role in financing capacity-building in ocean affairs and law of the sea in accordance with institutional approaches.[19]

11. The UN Development Account, a mechanism established by the General Assembly to fund capacity-building initiatives implemented by the UN's economic and social entities,[20] focuses on enhancing capacity at three levels: individual, organisation, and enabling environment; supporting projects at the sub-regional, regional, and inter-regional levels, providing mechanisms to facilitate the transfer of skills and knowledge among target countries.[21]

12. To guide its capacity-building programmes, the World Bank has introduced a Capacity Development and Results Framework (CDRF).[22] This approach emphasises active participation by countries and prioritises learning, knowledge sharing, and innovation.[23] The CDRF outlines a systematic process for analysing institutional capacity and designing change management strategies that address institutional and policy-related constraints and opportunities.[24]

13. The Global Environment Facility's approach to capacity development focuses on helping countries assess and address gaps in meeting their commitments under Multilateral Environmental Agreements through national frameworks.[25]

III. Transfer of marine technology

[17] Contributions of Australia, Colombia, and the European Union.

[18] Contribution of the European Union, p. 1-2.

[19] World Bank. (n.d.). *Strengthening institutional capacity for sustainable development: Addressing challenges and seizing opportunities in a changing world*. World Bank Group. Retrieved January 24, 2025, from https://openknowledge.worldbank.org/server/api/core/bitstreams/cee24b6c-2e2f-5579-b1a4-457011419425/content, p. ix.

[20] United Nations Department of Economic and Social Affairs. (n.d.). About the development account. UN DESA. Retrieved January 24, 2025, from https://da.desa.un.org/about-the-development-account.

[21] United Nations Department of Economic and Social Affairs. (n.d.). About the development account. UN DESA. Retrieved January 24, 2025, from https://da.desa.un.org/about-the-development-account.

[22] World Bank. (n.d.). *Overview of capacity development and results framework*. World Bank. Retrieved January 24, 2025, from https://documents1.worldbank.org/curated/fr/106621467998824685/pdf/80635-WP-Overview-of-Capacity-Development-and-Results-Framework-0-Box-377295B-PUBLIC.pdf, p. 1.

[23] World Bank. (n.d.). *Overview of capacity development and results framework*. World Bank. Retrieved January 24, 2025, from https://documents1.worldbank.org/curated/fr/106621467998824685/pdf/80635-WP-Overview-of-Capacity-Development-and-Results-Framework-0-Box-377295B-PUBLIC.pdf, p. 1.

[24] World Bank. (n.d.). *Overview of capacity development and results framework*. World Bank. Retrieved January 24, 2025, from https://documents1.worldbank.org/curated/fr/106621467998824685/pdf/80635-WP-Overview-of-Capacity-Development-and-Results-Framework-0-Box-377295B-PUBLIC.pdf, p. 1.

[25] Global Environment Facility. (n.d.). *Capacity development*. Global Environment Facility. Retrieved February 5, 2025, from https://www.thegef.org/what-we-do/topics/capacity-development; see also contributions of UNEP, p. 4; and UNFCCC, p. 3; as well as UNEP (n.d.). UNEP-GEF. https://www.unep.org/gef/index.php/focal-areas/capacity-development/our-work.

14. The importance of needs-based capacity-building and access to innovative marine technologies for achieving the objectives of the Convention, Sustainable Development Goal 14, the annual resolutions of the General Assembly on oceans and the law of the sea, and the BBNJ Agreement is paramount, as is the role of international cooperation.[26] Advanced technologies are fundamental tools in for monitoring the oceans, in particular artificial intelligence and machine learning.[27] In this context, traditional knowledge,[28] gender policies,[29] leveraging a range of knowledge systems,[30] and the equitable participation of youth[31] and people with disability[32] are underscored to ensure that the process is inclusive and sustainable. Other aspects needed to ensure sustainability and adaptability include increased funding,[33] technical trainings, detailed operating manuals, support networks, ongoing technical assistance, collaboration with academic and research institutions, and financial instruments such as trust funds and public-private partnerships.[34] It is noted that technical trainings need to ensure that users can not only use the technologies but also maintain and adapt them as necessary.[35]

15. Some States have supported the voluntary transfer of marine technology on mutually agreed terms[36] with due regard given to the needs and priorities of developing States, particularly LDCs and SIDS.[37] The importance of supporting innovation by protecting and enforcing intellectual property rights is also underscored.[38]

16. A wide range of projects, covered under section IV below, is being implemented entailing the transfer of marine technology in areas such as the conservation of biodiversity, ecosystem-based management, tackling pollution and SDG 14 implementation needs, ocean monitoring, marine spatial planning, maritime delimitation, ocean observation, marine scientific research, the implementation of the BBNJ Agreement, decarbonisation and emissions reduction. Initiatives include the sharing of relevant data, information, knowledge and research; the development and strengthening of relevant infrastructure, including the provision of technology; the strengthening of capacities, including institutional capacities, through exchanges such as workshops, conferences and symposia, research collaboration, partnerships and networks, technical support, education and training including virtual training platforms; and the development and sharing of guidelines and standards.

17. *Law of the Sea instruments.* The legal regime under UNCLOS for the development and transfer of marine technology is primarily set out in Part XIV. In addition to general provisions, the Convention comprises sections on international cooperation, national and regional marine scientific and technological centres and cooperation among international organizations.[39]

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[26] Contributions of Australia, Colombia and the European Union.
[27] Contributions of Australia, the European Union, the United States of America, IIJS, UNODC.
[28] Contributions of Australia and Portugal.
[29] Contributions of Australia, Colombia, the European Union, FAO, GFCM, and ISA.
[30] Contribution of the United States of America.
[31] Contribution by GFCM.
[32] Contributions of Australia, and GFCM.
[33] Contributions of Portugal, Tunisia, IHO, IRENA, UNFCCC, and UNIDO.
[34] Contributions of Colombia, the European Union, Portugal, Tunisia, the United States of America, FAO, IHO, IIJS, IOC-UNESCO, IRENA, UNEP, UNFCCC, and UNIDO.
[35] Contribution of Colombia.
[36] Contributions of Australia, Portugal, and the United States of America.
[37] Contributions of Australia and the European Union.
[38] Contribution of the United States of America.
[39] United Nations, *Treaty Series*, vol. 1833.

18. The Part XI Agreement includes particular provisions regarding responsibilities of the International Seabed Authority (ISA) regarding the acquisition of relevant technology and promoting and encouraging its transfer to developing States, as well as for the Enterprise and developing States to obtain deep seabed mining technology.[40] UNFSA elaborates a cooperation obligation concerning the transfer of technology.[41] The BBNJ Agreement sets out provisions on modalities, types, monitoring and review of the transfer of marine technology; the Agreement also defines marine technology.[42]

19. The Intergovernmental Oceanographic Commission of UNESCO (IOC/UNESCO) specifies marine technology in its Criteria and Guidelines on the Transfer of Marine Technology as "instruments, equipment, vessels, processes and methodologies required to produce and use knowledge to improve the study and understanding of the nature and resources of the ocean and coastal areas".[43] This includes, for example, certain information and data, or sampling and methodology equipment.[44] In contrast, the definition of "marine technology" under the BBNJ Agreement, includes the terms "inter alia" and "related biotechnology".

IV. Current implementation of capacity-building and the transfer of marine technology

20. Successful initiatives of capacity-building activities and projects implementing the transfer of marine technology which may be transferable and scalable to other settings include those highlighted below.[45]

A. United Nations system

21. The Secretariat, through the Division for Ocean Affairs and the Law of the Sea, undertakes a wide range of capacity-building activities to assist developing States, especially LDCs, LLDCs, SIDS, and coastal African States, to promote a better understanding of the Convention and its implementing agreements. This includes training, technical assistance, fellowships, financial assistance through voluntary trust funds, and participation in intergovernmental processes and training events.[46] Key activities include those under the Programmes of Assistance[47] and fellowship programmes, such as the Hamilton Shirley Amerasinghe Memorial Fellowship and those supported by the Nippon Foundation.[48] In collaboration with the Food and Agriculture Organization of the United Nations (FAO), the Division implements a Project of Assistance to promote wider participation in and the effective

[40] United Nations, *Treaty Series*, vol. 1836.
[41] United Nations, *Treaty Series*, vol. 2167.
[42] https://treaties.un.org/doc/Treaties/2023/06/20230620%2004-28%20PM/Ch_XXI_10.pdf.
[43] IOC-UNESCO, IOC Criteria and Guidelines on the Transfer of Marine Technology, 2003, available at https://unesdoc.unesco.org/ark:/48223/pf0000139193.locale=en.
[44] IOC-UNESCO, IOC Criteria and Guidelines on the Transfer of Marine Technology, 2003, available at https://unesdoc.unesco.org/ark:/48223/pf0000139193.locale=en.
[45] For a fuller range of reported capacity-building initiatives and projects implementing the transfer of marine technology see the contributions available from the website of the Division for Ocean Affairs and the Law of the Sea: https://www.un.org/depts/los/consultative_process/consultative_process.htm. The information included in this report reflects all of the contributions that were received from United Nations entities, other intergovernmental organizations, States and non-governmental organizations.
[46] Report of the Secretary General on Oceans and the law of the sea, A/79/340, paras. 81-91; see also https://www.un.org/oceancapacity/tf.
[47] See https://www.un.org/oceancapacity/norway.
[48] See https://www.un.org/oceancapacity/UNNF.

implementation of UNFSA.[49] To support the understanding of the BBNJ Agreement and prepare for its entry into force, the Division implements a programme of activities, including regional workshops, technical assistance at the national level, briefings, side events, tools and outreach materials.[50] Training and briefings are also conducted in collaboration with partners under the PROBLUE programme of the World Bank, and the United Nations Institute for Training and Research.[51] Capacity-building is also a core objective of the Regular Process for Global Reporting and Assessment of the State of the Marine Environment, including Socioeconomic Aspects, aimed at raising awareness of the importance of the science-policy interface for ocean governance through dialogue across multiple stakeholders.[52]

22. The FAO conducts capacity-building in areas such as safety at sea, marine plastic pollution, fishing technology, small-scale fisheries, and aquaculture.[53] FAO develops knowledge materials and provides training on fishing gear technology, and small-scale fisheries with a focus on local fishing communities and women.[54] FAO also contributes expertise to the Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection; develops training materials and e-learning courses with the International Maritime Organization (IMO) on marine plastic pollution; and engages in capacity-building activities to support the sustainable use of marine resources and biodiversity conservation in areas beyond national jurisdiction (ABNJ) under the Common Oceans Program.[55] FAO is also paving the way for the digital transformation of aquaculture through a wide range of initiatives, such as the global Smart Aquaculture Biosecurity project, which aims to assist countries to effectively implement biosecurity governance and best practices through smart and digital tools. Another example is AquaGRIS,[56] the global information system on aquatic genetic resources which collects, validates, monitors and reports below the species level.[57]

23. Capacity-building is also integral to the 2030 Strategy of the General Fisheries Commission for the Mediterranean (GFCM). Examples include tailored courses and knowledge exchange under the MedSea4Fish and BlackSea4Fish programmes to support stakeholders in adopting monitoring technologies for marine resource management; capacity-building under the GFCM-Lex project to help contracting parties amend their legal frameworks; and the Aquaculture Demonstration Centres, which benefit women and small-scale farmers.[58]

24. The International Atomic Energy Agency (IAEA) supports capacity-building in Member States through various initiatives addressing key environmental challenges such as marine plastic pollution, ocean acidification, marine radioactivity, and other pollutants in the marine environment. These include the NUTEC Plastics initiative to assist Member States monitor and characterize marine microplastics; the development of tools to assess the potential local impacts of Ocean Alkalinity Enhancements through its Ocean Acidification International Coordination Centre; the provision of

[49] See https://www.un.org/oceancapacity/UNFSAproject.
[50] A/79/340, para. 83. See also https://www.un.org/bbnjagreement/en.
[51] See https://www.un.org/oceancapacity/WorldBank.
[52] See https://www.un.org/regularprocess/content/capacity-building.
[53] Contribution of FAO; see also FAO, Action Plan for Safety, Social Protection and Decent Work in Fisheries and Aquaculture in the Western Central Atlantic Fishery Commission (WECAFC) Region (Rome, 2024).
[54] Contribution of FAO; see also https://www.fao.org/voluntary-guidelines-small-scale-fisheries/news/news-detail/fao--in-collaboration-with-the-ministry-of-fishing-and-the-blue-economy-and-the-national-network-of-women-in-fisheries--distribute-post-harvest-materials-and-equipment-and-provide-training-to-women-s-associations-in-madagascar/en.
[55] Contribution of FAO.
[56] See https://www.fao.org/aquatic-genetic-resources/activities/aquagris/en/.
[57] Contribution of FAO.
[58] Contribution of GFCM.

training and materials through its Marine Radioactivity Information System; and training courses for experts in laboratories from the Programme for the Assessment and Control of Marine Pollution in the Mediterranean in cooperation with the United Nations Environment Programme (UNEP).[59]

25. The IMO has been instrumental in promoting capacity-building efforts to enable the global maritime workforce to handle alternative fuels and new technologies, including through technical training programmes, collaborative research projects, public-private partnerships, and the development of guidelines.[60] The IMO also supports the implementation needs of Member States through a global portfolio of projects that include GloLitter,[61] RegLitter,[62] and ProSeas,[63] which focus on sea-based marine litter; GloNoise,[64] addressing underwater noise; GloFouling[65] and TEST Biofouling projects[66] targeting biofouling; and the SENSREC project[67] on ship recycling.[68]

26. IOC/UNESCO carries out a range of activities to enhance scientific knowledge and strengthen research capacities among its Member States. Building on its Capacity Development Strategy, the IOC/UNESCO has revised its operational framework through updated terms of reference and targeted needs assessment.[69] Notable examples include the Ocean Training Internships, and training through e-learning platforms like the OceanTeacher Global Academy, offering courses on topics related to sustainable ocean planning and the blue economy.[70] IOC/UNESCO also supports Regional Training and Research Centers to strengthen marine science capabilities, especially for young scientists in developing countries.[71] Capacity development is also a priority in the Updated Joint Roadmap to accelerate Marine/Maritime Spatial Planning processes worldwide (MSProadmap 2022-2027).[72] A new IOC-wide strategy on Sustainable Ocean Planning and Management is under development, with capacity development as a key pillar to strengthen the IOC value chain from ocean observation and data to knowledge-based marine policies. IOC/UNESCO also engages in capacity-building through the outputs of the Group of Experts on Capacity Development, including the implementation of the Ocean Decade Capacity Development Facility, which provides on-demand training, and the Ocean Capacity Development Hub, a global repository of capacity development opportunities. Additionally, IOC supports capacity-building through data access, the development of guides and best practices for marine scientific research, and the monitoring of ocean science capacity.[73]

27. IOC/UNESCO also furthers the transfer of marine technology through online data sharing platforms, coordination of global monitoring and observation networks,

[59] Contribution of IAEA.
[60] Contribution of the European Union.
[61] See https://glolitter.imo.org/.
[62] See https://glolitter.imo.org/news/reglitter-imo-and-the-republic-of-korea-signed-the-agreement.
[63] See https://www.thegef.org/projects-operations/database?project_search=PRO-SEAS.
[64] See https://glonoise.imo.org/.
[65] See https://www.glofouling.imo.org/.
[66] See https://testbiofouling.imo.org/.
[67] See https://www.imo.org/en/OurWork/PartnershipsProjects/Pages/SENSREC-Phase-2.aspx.
[68] Contribution of IMO.
[69] Contribution of IOC-UNESCO; see IOC Capacity Development Strategy 2023-2030, available at https://unesdoc.unesco.org/ark:/48223/pf0000390082.
[70] Contribution of IOC-UNESCO.
[71] Contribution of IOC-UNESCO; see also https://www.ioc.unesco.org/en/ocean-teacher-global-academy.
[72] Contribution of IOC-UNESCO; see also https://www.mspglobal2030.org/wp-content/uploads/2022/11/MSProadmap2022-2027.pdf.
[73] Contribution of IOC-UNESCO.

development of guides, manuals, codes of conduct and best practices in Marine Scientific Research and data standards and management and monitoring of ocean science capacity.[74] The Ocean Data and Information System (ODIS) includes continental-scale data systems as well as those of small organisations.[75] ODIS partners use web architectural approaches to share metadata describing their holdings, services, and other capacities.[76] An Ocean InfoHub Global Search portal[77] was developed as a demonstration of ODIS to improve and refine services offered,[78] containing over 130,000 content items, as of October 2024, in eight content categories.[79]

28. The ISA implements a range of programmes including the Contractors' Training Programme, providing operational expertise through various trainings; Deep Dive,[80] an eLearning programme on the legal framework of UNCLOS, the 1994 Agreement, and ISA regulations; national capacity workshops; and post-doctoral fellowships. The ISA has also collaboratively established Joint Training and Research Centres.[81] A key focus of ISA's capacity-building activities is fostering opportunities for women, including through the Women in Deep-Sea Research project;[82] as well as through the "See Her Exceed" career mentoring programme.[83]

29. UNEP supports capacity-building through various initiatives. Examples include the launch of the online Marine Protected Area Tool Hub (MPAth), which provides guidance and problem-solving support tools for MPA planners; a Blue Carbon capacity-building workshop focusing on mangrove restoration and community inclusion; a Monitoring and Evaluation Toolkit for the Global Fund for Coral Reefs; and development of a tailored, low-cost technology for sanitation provision and wastewater treatment for coastal water villages. UNEP collaboratively organized a global training on the BBNJ Agreement and developed an introductory course on the BBNJ Agreement through InforMEA. UNEP supports capacity-development to tackle plastic pollution; and, through the Regional Seas Conventions and Action Plan, supports member States in ratifying and implementing the BBNJ Agreement.[84]

30. The United Nations High Commissioner for Refugees (UNHCR) addresses protection at sea, including access to asylum and non-refoulement, through capacity-building activities aimed at enhancing understanding of key issues at the intersection of international refugee law, human rights law, and the law of the sea. Key efforts in 2024 included the first global course on Protection in Mixed Movements; and the e-learning course on the Protection of Migrants and Refugees Moving by Sea. UNHCR also facilitated regional training on search and rescue and key responsibilities under the law of the sea and international law, in collaboration with local authorities, humanitarian organizations, and other partners.[85]

31. The United Nations Industrial Development Organization (UNIDO) has collaboratively provided a platform to connect SIDS and coastal developing countries

[74] Contribution of IOC-UNESCO.
[75] Contribution of IOC-UNESCO.
[76] Contribution of IOC-UNESCO.
[77] See https://oceaninfohub.org/.
[78] Contribution of IOC-UNESCO.
[79] Contribution of IOC-UNESCO.
[80] https://www.isa.org.jm/deep-dive/.
[81] https://www.isa.org.jm/capacity-development-training-and-technical-assistance/isa-china-joint-training-and-research-centre-2/ and https://www.isa.org.jm/capacity-development-training-and-technical-assistance/isa-egypt-joint-training-and-research-centre/.
[82] https://www.isa.org.jm/capacity-development-training-and-technical-assistance/widsr-project/.
[83] Contribution of ISA.
[84] Contribution of UNEP.
[85] Contribution of UNHCR.

with emerging ocean renewable industries, scaling up its work with innovative blue finance actors, and is using technology to support emerging blue industries such as seaweed.[86] UNIDO has also helped equip industries with tools and knowledge to mitigate land-based sources of marine pollution.

32. The United Nations Office on Drugs and Crime (UNODC), through its Global Maritime Crime Programme (GMCP), undertakes capacity-building initiatives to enhance maritime law enforcement capabilities and improve ocean governance. These efforts include the establishment of training centres with respect to uncrewed vessels. UNODC also entered a partnership to provide regional training on using artificial intelligence and satellite imagery to detect illegal activities, such as pollutant dumping and marine resource exploitation in marine protected areas and other area-based management tools.[87]

33. The World Meteorological Organization continues delivery of its Marine Services Courses focussing on enhancing technical forecasting skills and practical applications such as using visualisation tools for generating marine forecasts.[88]

34. The Secretariat of the Convention on Biological Diversity (CBD) advances capacity-building to achieve global marine and coastal biodiversity goals under the Sustainable Ocean Initiative. Key activities include holding workshops aimed at enhancing understanding of the Kunming-Montreal Global Biodiversity Framework; establishing a network of subregional support centres for technical and scientific cooperation;[89] and organizing the first Biodiversity Capacity-Building and Development Forum[90] to support the implementation of National Biodiversity Strategies and Action Plans.[91]

35. The Secretariat of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) has supported a pilot phase of a project to assess genetic variation of queen conch across the Caribbean with the aim of identifying the illegal, unreported and unregulated fishing of queen conch.[92]

B. Other intergovernmental organizations

36. Capacity-building initiatives within the Commission for the Conservation of Antarctic Marine Living Resources have strengthened capacity in ecosystem monitoring programmes, stock assessments, and the use of new technologies for taxonomic identification.[93]

37. The International Hydrographic Organization engages in capacity-building focusing on readiness for the S-100 standards framework, which enhances safe navigation, marine spatial planning, and coastal management. Key efforts include workshops, practical training, and the establishment of the Fund Generation Project Team to explore alternative funding sources for further S-100 capacity-building.[94]

38. The Pacific Community (SPC) conducts a variety of capacity-building activities to support sustainable resource management in its member countries. SPC has programmes to enhance tuna fishery data management and stock assessments; plays

[86] Contribution of UNIDO.
[87] Contribution of UNODC.
[88] Contribution of WMO.
[89] https://www.cbd.int/tsc/tscm/subregionalcentres.
[90] https://www.cbd.int/cb/forum.
[91] Contribution of CBD.
[92] Contribution of CITES.
[93] Contribution of CCAMLR.
[94] Contribution of IHO.

a key role in fisheries observer training; and organizes workshops and training on harvest strategies, climate change impacts on tuna fisheries, marine spatial planning and maritime boundary delimitation. It also fosters leadership through the Pacific Early Career Ocean Professionals.[95]

C. States

39. Australia works to build capacity for advancing marine conservation and the sustainable use of marine resources. Key activities include workshops with neighbours to share traditional knowledge on coral reef management including the development of the ReefCloud[96] Community Dashboard, which presents reef data in an accessible format for local decision-makers and the development of Ikasavea, an artificial intelligence-assisted mobile phone application used to identify and record information about species catch, used within the Pacific Community.[97] Australia also provides tailored assistance in marine spatial mapping; contributes to regional efforts in establishing maritime zones and resolving maritime boundaries; and supports institutional capacity-building in Southeast Asia to characterize living and non-living marine resources in their maritime domains.[98] Australia has also provided multi-parameter water quality sampling equipment used to monitor the health of aquatic and marine ecosystems; and is developing new "biogeographic regionalisation" for the Indian Ocean to support future proposals for marine protected areas, once the BBNJ Agreement enters into force, including by leveraging regional expertise.[99]

40. Barbados highlighted an example where strategic backing has enabled a local renewable energy startup to showcase the potential for a decentralized clean energy system.[100]

41. Singapore focuses its capacity-building efforts on coastal and marine management, and decarbonization and emissions reductions.[101] Key activities include the Marine Monitoring for Action workshop exploring how marine monitoring can inform marine management policies; a virtual East Asia Summit workshop on marine plastic debris; and a symposium on the BBNJ Agreement to support knowledge-sharing and expedite ratification and entry into force.[102] Singapore also supports aquaculture capacity-building through the Singapore Aquaculture Plan; fosters research on responsible ocean-based carbon dioxide removal; and supports training of the global maritime workforce in operating vessels with clean marine fuels through the Maritime Energy Training Facility. Further, Singapore is leveraging international partnerships to accelerate maritime decarbonisation by establishing green shipping corridors to develop alternative fuel supply chains.[103] Singapore also supports the Marine Environmental Sensing Network, a national multi-institution effort with the goal of encouraging collaboration with regional and global networks and improving global ocean monitoring.[104]

42. The United States of America reported on its global capacity-building initiatives in collaboration with various partners.[105] Examples include NOAA's support for

[95] Contribution of SPC.
[96] See Report of the Secretary General on Oceans and the law of the sea, A/78/67, para. 16.
[97] Contribution of Australia.
[98] Contribution of Australia.
[99] Contribution of Australia.
[100] Contribution of Barbados.
[101] Contribution of Singapore.
[102] Contribution of Singapore.
[103] Contribution of Singapore.
[104] Contribution of Singapore.
[105] Contribution of the United States of America.

ocean acidification research and the collaborative development and distribution of low-cost comprehensive kits for collecting local ocean acidification measurements along with training and resources to effectively use the kits to monitor and assess ocean acidification, as well as workshops on collecting carbon data in mangrove ecosystems and coastal and marine management under the Blue Carbon Inventory Project.[106] The Project also advances the development of tools, approaches, and capacity for integrating coastal blue carbon in National Greenhouse Gas Inventories and managing these ecosystems to achieve co-benefits for adaptation and mitigation. Other activities include those to support the implementation of the S-100 Universal Hydrographic Data Model; to advance science-driven ocean policy and governance via the All-Atlantic Ocean Research and Innovation Alliance and the Atlantic Partnership; as well as fostering Communities of Practice, peer-to-peer learning, and the integration of climate data into sustainable development planning through the Local2030 Islands Network.[107]

43. The European Union (EU) supports capacity-building as essential for the conservation and sustainable use of marine biodiversity, particularly in ABNJ. For example, the EU has assisted the CITES Secretariat in helping Parties develop non-detriment findings for specimens of Appendix II species taken from ABNJ, and advocates for capacity-building to address transboundary plastic pollution. Through its EU Global Ocean Programme, the EU enhances the capacity of developing countries, particularly SIDS and LDCs, to engage with global biodiversity processes in ABNJ, which includes establishing a Technical Assistance Facility to provide targeted support for implementing the BBNJ Agreement; conducting research on MGRs, and developing proposals for area-based management tools (ABMTs,) including MPAs. The EU also mainstreams the objectives of the BBNJ Agreement and the broader ocean dimension in its regional development cooperation programmes. Additionally, the EU supports training through RFMOs, particularly in surveillance, control, and regulatory participation, and strengthens institutional capacities for MSP through MSP global 2.0.[108] It further supports and develops initiatives in the context of the energy transition in maritime transport that enable the use of new types of fuels and technologies and promote the creation of green shipping corridors.[109]

44. In the area of data sharing and digitalisation to further marine technology transfer the Copernicus Marine Service and the European Marine Observation and Data Network offer marine environmental and human activities data serving a diverse, multi-sectorial user base, through the open and free delivery of harmonized, standardized, and interoperable data and products.[110] The EU Galileo and European Geostationary Navigation Overlay Service (EGNOS) satellite navigation systems services are free for use worldwide and enhance marine safety and security, particularly in the areas of navigation, search and rescue, and emergency response.[111]

D. Non-governmental organizations

[106] Contribution of the United States of America.
[107] Contribution of the United States of America.
[108] Contribution of the European Union.
[109] Contribution of the European Union.
[110] Contribution of the European Union.
[111] Contribution of the European Union.

45. OceanCare supports capacity-building for technological innovations aimed at conserving marine ecosystems. For instance, the SAvE Whales project[112] led to the establishment of the first ever integrated acoustic observatory with a view to enabling operational measures to avoid potential collisions.[113] The use of environmental DNA (eDNA) is also being promoted, which has become a powerful non-invasive tool for identifying and monitoring species in their natural habitats and, consequently, deterring poaching.[114] The transfer of marine technology in the field of collection and analysis of eDNA is being advanced by the preparation of training materials to be posted online, including in close cooperation with select partners and scientific institutions.[115]

V. Challenges in implementing capacity-building activities

46. To deliver effective and targeted capacity-building for developing countries, several challenges will need to be addressed in respect of capacity-building activities, including ensuring proper needs and stakeholder identification, selecting suitable levels and modes of delivery, monitoring and evaluating capacity-building activities, securing sufficient funding, and avoiding duplication and fragmentation through coordination and collaboration.

A. Needs identification

47. It is important that capacity-building initiatives address regional contexts, and take into account the specific needs of States and relevant stakeholders.[116] Indeed, capacity-building activities are most effective if they are inclusive and adapted to the specific needs of the beneficiaries.[117] However, capacity-building activities are often not sufficiently tailored to meet the evolving needs of beneficiaries, as they are often designed more in line with the vision of donors.[118] In this regard, the lack of a participatory process to define priorities has long been noted, as has the need for the consensual establishment of priorities.[119]

48. Carefully performed and inclusive needs assessments are critical to priority setting and programme design and are essential if capacity-building activities are to address the specific priorities, conditions and needs of beneficiaries.[120] However, identifying capacity-building needs extends beyond establishing priorities and identifying technical gaps, it also involves assessing broader structural and financial challenges that may hinder the long-term impacts of capacity-building.[121] Capacity-building activities may also face obstacles due to insufficient political support and

[112] See https://www.oceancare.org/en/stories_and_news/high-tech-save-whales/.
[113] Contribution of OceanCare.
[114] Contribution of OceanCare.
[115] Contribution of OceanCare.
[116] General Assembly resolution 79/144 of 12 December 2024, para. 14; contribution of SEAFDEC.
[117] Contribution of Colombia.
[118] Kacou, K. P., Ika, L. A., & Munro, L. T. (2022). Fifty years of capacity building: Taking stock and moving research forward. Public Administration and Development, 42(4), 215–232.
[119] Report on the work of the United Nations Open-ended Informal Consultative Process on Oceans and the Law of the Sea at its eleventh meeting, A/65/164, para. 53.
[120] Contribution of Colombia; see also Report of the Secretary General on Oceans and the law of the sea, A/65/69, para. 295.
[121] Contribution of UNIDO.

limited engagement from multiple stakeholders, which constrain their ability to deliver meaningful results and outcomes.[122]

49. Needs assessment initiatives that seek to align with the priorities of beneficiaries in oceans affairs and the law of the sea include IOC/UNESCO's biennial capacity development needs survey to identify existing capacities and gaps in specific national and regional entities, as part of its Capacity Development Strategy 2023-2030,[123] and the Capacity-building needs and priorities Assessment Toolkit being developed by the United Nations to determine the capacity-building needs of States for becoming parties to, and implementing, the BBNJ Agreement in the context of their specific priorities.

B. Stakeholder identification

50. When capacity-building projects are developed without careful identification of all relevant stakeholders, and delivered without participation of, and buy-in from such stakeholders, they are unlikely to build sustained capacity.[124] The limited participation from vulnerable communities, as well as cultural and religious barriers to awareness and participation have been identified as additional challenges,[125] and a stronger alignment with policy goals and societal needs is also needed.[126] In addition, capacity-building activities that specifically target policymakers, legislators or other high-level government officials should be increased since those groups can generate significant change across and between levels and sectors.[127]

51. Another challenge is that organizers of capacity-building activities often have insufficient control over selecting participants and may not reach those best suited to effectively deploy new capacities at the desired level.[128] Close cooperation between the organizers and beneficiaries in this regard is crucial.

52. The participation of women has a positive impact on sustainable development and innovation, however, women still face structural barriers that limit their participation in capacity-building activities, especially in the marine domain, including unequal access to resources, specialized training and leadership opportunities.[129] Particular attention should therefore be given to gender

[122] Kacou, K. P., Ika, L. A., & Munro, L. T. (2022). Fifty years of capacity building: Taking stock and moving research forward. Public Administration and Development, 42(4); see also Report of the Secretary General on Oceans and the law of the sea, A/65/69, para. 294.

[123] IOC Capacity Development Strategy, 2023–2030. IOC-UNESCO, Paris, 2024, IOC Information document, 1433 (IOC/INF-1433) (English/French; Spanish/Russian), p. 33.

[124] Report of the Secretary General on Oceans and the law of the sea, A/65/69, para. 292.

[125] Contribution of UNFCCC.

[126] Marjo K. Vierros, Harriet Harden-Davies, Capacity building and technology transfer for improving governance of marine areas both beyond and within national jurisdiction, Marine Policy, Volume 122, 2020.

[127] Report of the Secretary General on Oceans and the law of the sea, A/65/69, para. 306; As part of the project: "Promotion of a better understanding of the 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 (BBNJ Agreement), in particular to strengthen capacities of developing States toward becoming parties to the BBNJ Agreement and implementing it", implemented by the Division and funded by the European Union, the Division is implementing a series of workshops targeted to those who are playing or expected to play a leading role in the national process towards becoming a party to the BBNJ Agreement, which may include governmental officials and/or parliamentarians. For more information see: https://www.un.org/bbnjagreement/en/capacity-building-and-technical-assistance/regional-workshops.

[128] Report of the Secretary General on Oceans and the law of the sea, A/65/69, para. 305.

[129] Contribution of Colombia.

mainstreaming in the design of capacity-building projects.[130] Exemplars of capacity-building initiatives that work towards equality between women and men include a project in Colombia which focuses on enhancing digital skills and fostering leadership in the marine science and the technological sector,[131] FAO initiatives supporting the capacity development of local small-scale fisheries organizations and local fishing communities,[132] and a career mentoring programme for experts in deep-sea research by the ISA.[133]

C. Levels and modes of delivery

53. Capacity-building should encompass the human, scientific, technological, organizational, and institutional capacities of a country,[134] and take place at multiple levels, including the individual, institutional, national, regional, or even global.[135] It also spans science, law, policy, and regulation to address complex and multifaceted issues related to the conservation and sustainable use of the oceans.[136] However, most capacity-building projects, including those focused on the public sector, fail to produce their intended benefits and/or meet stakeholder and beneficiary expectations.[137] At the same time, it has been put forward that the provisions in UNCLOS related to capacity-building and the transfer of marine technology have not been implemented effectively.[138] This is in part because most capacity-building activities take a short-term approach, for example through trainings and workshops, which do not build lasting capacity.[139] Therefore, activities should be designed to ensure long-term impact, including by promoting networks among participants and creating an enabling environment for ongoing research.[140]

54. While capacity-building initiatives that take a medium- and long-term approach are more effective, they are also more difficult to implement because they typically require greater financial resources and a significant time commitment from both the

[130] Global Ocean Science Report 2020, IOC-UNESCO 2020, pp. 105, 189, 192, 221; Report of the Secretary General on Oceans and the law of the sea, A/65/69, para. 295; contribution of Colombia.

[131] Contribution of Colombia; Ángeles Jiménez García-Carriazo, Building Capacity in the Law of the Sea: The IMO International Maritime Law Institute's Experience, 100 International Law Studies, 266 (2023).

[132] Contribution of FAO.

[133] Contribution of ISA.

[134] Contribution of Colombia.

[135] Marjo K. Vierros, Harriet Harden-Davies, Capacity building and technology transfer for improving governance of marine areas both beyond and within national jurisdiction, Marine Policy, Volume 122, 2020.

[136] Marjo K. Vierros, Harriet Harden-Davies, Capacity building and technology transfer for improving governance of marine areas both beyond and within national jurisdiction, Marine Policy, Volume 122, 2020.

[137] Kacou, K. P., Ika, L. A., & Munro, L. T. (2022). Fifty years of capacity building: Taking stock and moving research forward. Public Administration and Development, 42(4), 215–232.

[138] Harden-Davies, H., Amon, D.J., Chung, T.-R., Gobin, J., Hanich, Q., Hassanali, K. et al. (2022). How can a new UN ocean treaty change the course of capacity building? Aquatic Conservation: Marine and Freshwater Ecosystems, 32(5), 907–912; Blasiak, Yagi (2016). Shaping an international agreement on marine biodiversity beyond areas of national jurisdiction: Lessons from high seas fisheries, Marine Policy 71 (2016) 210-216.

[139] Harden-Davies, H., Amon, D.J., Chung, T.-R., Gobin, J., Hanich, Q., Hassanali, K. et al. (2022). How can a new UN ocean treaty change the course of capacity building? Aquatic Conservation: Marine and Freshwater Ecosystems, 32(5), 907–912; Report of the Secretary General on Oceans and the law of the sea, A/65/69, para. 301.

[140] Ángeles Jiménez García-Carriazo, Building Capacity in the Law of the Sea: The IMO International Maritime Law Institute's Experience, 100 International Law Studies, 266 (2023).

donor and provider as well as the beneficiary.[141] However, there is enormous potential in building long-term capacity-building partnerships involving multiple stakeholders with an expectation that all partners contribute to, and benefit from, the arrangement through mutually agreed approaches.[142] Overall, capacity-building strategies are most effective if they involve multi-level interventions and link outputs and outcomes at one level with activities and goals at other levels.[143] A prominent example for such an initiative is the United Nations Nippon Foundation Fellowship, which has produced deep and sustained research-led initiatives and influential alumni networks.[144]

D. Monitoring and evaluation

55. Monitoring and evaluation are important components of effective capacity-building activities. However, they pose challenges such as the difficulty in quantifying their long-term impacts, including assessing the deployment or utilization by beneficiaries of newly acquired capacities.[145] The lack of clear methodologies to measure impacts and identify areas for improvement complicates the process.[146]

56. Limited access to accurate information and specialized expertise poses further challenges to the effective monitoring and evaluation of capacity-building activities, particularly in developing States.[147] This is exacerbated by the absence of assessments at the monitoring and evaluation stage, making it difficult to track progress and ensure long-term impact.[148]

57. Despite these challenges, it is important to develop holistic approaches for implementing monitoring and evaluation of capacity-building activities to ensure that such activities achieve their targeted objectives.[149] Strengthening longitudinal data collection to analyse changes, embedding monitoring from the outset, and developing efficient monitoring and evaluation systems that align with national contexts can support informed decision-making and improve project design.[150] Establishing robust monitoring and evaluation frameworks, which include baseline assessments, performance indicators, and feedback mechanisms can enhance accountability, facilitate adaptive learning, and provide lessons for improving future activities.[151] Ensuring access to accurate and reliable data[152] and promoting standardized

[141] Report of the Secretary General on Oceans and the law of the sea, A/65/69, paras. 303-304.
[142] Harden-Davies, H., Amon, D.J., Chung, T.-R., Gobin, J., Hanich, Q., Hassanali, K. et al. (2022). How can a new UN ocean treaty change the course of capacity building? Aquatic Conservation: Marine and Freshwater Ecosystems, 32(5), 907–912.
[143] Report of the Secretary General on Oceans and the law of the sea, A/65/69, paras. 308 and 311.
[144] Margaret A Young, Strengthening capacity in ocean governance, Asia-Pacific Journal of Ocean Law and Policy, 8 (2023) 5 - 24.
[145] Report of the Secretary General on Oceans and the law of the sea, A/65/69, para, 312.
[146] Harden-Davies, H., Amon, D.J., Chung, T.-R., Gobin, J., Hanich, Q., Hassanali, K. et al. (2022). How can a new Un ocean treaty change the course of capacity building? Aquatic Conservation: Marine and Freshwater Ecosystems, 32(5).
[147] United Nations contributions to national evaluation capacity development and the evaluation of national evaluation systems, 2022, pp. 19.
[148] UNFCCC, 6th Capacity-building Hub Summary Report, pp. 18-19.
[149] Kacou, K. P., Ika, L. A., & Munro, L. T. (2022). Fifty years of capacity building: Taking stock and moving research forward. Public Administration and Development, 42(4).
[150] UNFCCC, 6th Capacity-building Hub Summary Report, pp. 19 and 38.
[151] Report of the Secretary General on Oceans and the law of the sea, A/65/69, para. 313; United Nations contributions to national evaluation capacity development and the evaluation of national evaluation systems, 2022, p. 30; UNITAR, Independent Baseline Evaluation: Strengthening capacities in the use of geospatial information for improved resilience in Asia-Pacific and Africa, 2022.
[152] Contribution of CITES.

methodologies for evaluation are critical to making these activities more effective and sustainable.[153]

E. Coordination, cooperation and funding

58. One of the overarching challenges to the effective implementation of capacity-building initiatives is the lack of coordination among donors.[154] This can lead to missed opportunities to leverage synergies between initiatives and build on the outcomes of previous achievements.[155] In ocean affairs and the law of the sea, increased coordination within the United Nations system, including though UN-Oceans, can uncover such opportunities as well as prevent fragmentation or duplication of efforts.[156]

59. Innovative approaches, such as regional mapping campaigns, regional coordination bodies, and virtual training platforms, can enhance coordination and expand cooperation opportunities while reshaping traditional models of capacity-building, and enable dissemination of best practices, ensuring all regions benefit from global advancements.[157] The establishment of an inventory of ocean-related capacity-building efforts would also be useful.[158]

60. Weak institutions and lack of coordination at the national and regional levels, both within and among relevant authorities, hamper capacity-building efforts, particularly efforts to address transboundary and multidisciplinary issues such as marine pollution.[159] Supporting broader international development of assets and capacities, including innovative and lower-cost technologies, serves as a means to promote synergistic collaboration across disciplines, institutions, and States.[160] This approach enables efforts to address critical data[161] and knowledge gaps,[162] and mitigating disparity in financial resources necessary for development of advanced technology.[163]

61. The limited availability of financial resources and the lack of continuity in funding are among the main challenges for the long-term success of capacity-building initiatives.[164] Many initiatives rely on a short-term, project-based approach, often leading to the cessation of promising efforts once external funding ends. Building lasting capacity requires long-term partnerships, including sustainable financial

[153] Contributions of CITES and UNIDO.
[154] Kacou, K. P., Ika, L. A., & Munro, L. T. (2022). Fifty years of capacity building: Taking stock and moving research forward. Public Administration and Development, 42(4).
[155] UN DESA, World Public Sector Report 2021, National Institutional Arrangements for Implementation of the Sustainable Development Goals: A Five-Year Stocktaking.
[156] Contribution of CITES; see also Report on the work of the United Nations Open-ended Informal Consultative Process on Oceans and the Law of the Sea at its eleventh meeting, A/65/164, para. 52.
[157] Contribution of the United States of America.
[158] Marjo K. Vierros, Harriet Harden-Davies, Capacity building and technology transfer for improving governance of marine areas both beyond and within national jurisdiction, Marine Policy, Volume 122, 2020.
[159] Contribution of FAO; see also contribution by UNFCCC, Report on the work of the United Nations Open-ended Informal Consultative Process on Oceans and the Law of the Sea at its eleventh meeting, A/65/164, para. 49.
[160] Contribution of the United States of America.
[161] Contribution of the United States of America.
[162] Contribution of IIJS.
[163] Contribution of IIJS.
[164] Contribution of UNIDO; see also contribution of UNFCCC.

support, which may not be easily possible through temporary funding models.[165] Innovative financing mechanisms can be a valuable tool to bridge funding gaps. For instance, UNIDO has addressed this through a targeted capacity-building programme which integrated innovative financing mechanisms and partnerships to achieve long-term economic and environmental successes.[166]

62. The BBNJ Agreement, once it enters into force, has the potential to make a meaningful difference to level the playing field with respect to capacities and available technologies between States since the promotion of capacity-building and the transfer of marine technology for the benefit of developing countries is one of the Agreement's main areas of focus.[167] However, key challenges for its implementation remain, including ensuring the promotion of capacity-building and the transfer of marine technology[168] as well as country-driven needs assessments and action plans; measures to monitor and review the quality of capacity-building; information sharing and cooperation; and funding.[169]

F. Other challenges

63. Capacity-building initiatives often face challenges in delivering the resources needed to undertake the multidisciplinary and interdisciplinary research and implement the governance measures required to solve complex ocean problems.[170] Moreover, regulatory and institutional barriers may complicate the implementation of innovative solutions,[171] and beneficiaries often lack the facilities and equipment needed for effective use of built capacities.[172] Parties to the United Nations Framework Convention for Climate Change (UNFCCC) identified technical barriers, knowledge gaps, and coordination as key capacity-building challenges in their National Adaption Plans.[173]

64. The shortage of qualified human resources, particularly in developing countries, makes it difficult for them to adapt to the fast-paced technological evolution and digital transition of the ocean sector.[174] Women continue to be underrepresented in ocean science[175] and early-career ocean scientists, in particular, face precarious employment, limited funding and unclear career paths.[176] Building a skilled workforce requires a long-term investment in education, training, and the creation of

[165] Marjo K. Vierros, Harriet Harden-Davies, Capacity building and technology transfer for improving governance of marine areas both beyond and within national jurisdiction, Marine Policy, Volume 122, 2020.
[166] Contribution of UNIDO.
[167] Contributions of Australia, Colombia, and the European Union; see also Ángeles Jiménez García-Carriazo, Building Capacity in the Law of the Sea: The IMO International Maritime Law Institute's Experience, 100 International Law Studies, 266 (2023).
[168] Contribution of OceanCare.
[169] Harden-Davies, H., Lopes, V.F., Coelho, L.F. et al. First to finish, what comes next? Putting Capacity Building and the Transfer of Marine Technology under the BBNJ Agreement into practice. npj Ocean Sustain 3, 3 (2024).
[170] Marjo K. Vierros, Harriet Harden-Davies, Capacity building and technology transfer for improving governance of marine areas both beyond and within national jurisdiction, Marine Policy, Volume 122, 2020.
[171] Contribution of UNODC.
[172] Marjo K. Vierros, Harriet Harden-Davies, Capacity building and technology transfer for improving governance of marine areas both beyond and within national jurisdiction, Marine Policy, Volume 122, 2020.
[173] Contribution of UNFCCC, p. 5.
[174] Contribution of Portugal.
[175] Global Ocean Science Report 2020, IOC-UNESCO 2020, p. 25.
[176] Contribution of Portugal; Global Ocean Science Report 2020, IOC-UNESCO 2020, p. 25.

institutional frameworks to support research and development,[177] including by developing university programmes in marine science.[178] In addition, post-capacity-building opportunities are important, including the development of career pathways of those who have been trained.[179]

VI. Challenges with respect to the transfer of marine technology

65. Part XIV of the Convention[180] stresses the need to strengthen developing States' scientific, technological, and institutional capacities, which includes sharing marine technology and expertise to enhance their ability to manage and conserve marine resources, conduct research, and protect and conserve the marine environment.[181] Capacity-building and technology transfer have traditionally been central mechanisms for boosting States' economic, scientific and social development, such as the introduction of advanced farming technologies in developing countries during the Green Revolution.[182] However, the Green Revolution also revealed challenges inherent in technology transfer, such as a reliance on external inputs and the necessity of adapting technologies to local contexts.[183]

66. The need for transferring or sharing technology under mutually agreed and voluntary terms, with due regard to the needs and priorities of developing States, has been put forward;[184] however, more focus has to ensure that the transferred or shared technology is adapted to the local context, including strengthening local institutions, skills and governance structures to ensure long-term sustainability has been advocated.[185] Challenges in technology transfer, include several key issues: increasing knowledge uptake in advanced stages of development and unlocking market opportunities, navigating regulatory approvals, large-scale deployment, market readiness and ensuring industry adoption, and the inherent complexity of ocean-related technologies, resulting in lengthy development timelines.[186] These challenges slow down progress and make it difficult for emerging technologies to reach their full potential.[187]

67. Based on the principle of equity, international cooperation and financial support to developing countries are necessary to address the knowledge gap between different States, as well as the unequal distribution of financial resources needed to build advanced technologies.[188] Initiatives that aim to enhance capacity-building and technology transfer should be inclusive and tailored to the specific needs of States, as determined by the recipient States.[189] Technology translation from research programmes to its application within industries is further enabled through access to

[177] Contribution of Portugal; Concept paper for the 2022 United Nations Ocean Conference: Interactive dialogue 6: Increasing scientific knowledge and developing research capacity and transfer of marine technology, A/CONF.230/2022/6, para. 34.
[178] Report on the work of the United Nations Open-ended Informal Consultative Process on Oceans and the Law of the Sea at its eleventh meeting, A/65/164, para. 59.
[179] Marjo K. Vierros, Harriet Harden-Davies, Capacity building and technology transfer for improving governance of marine areas both beyond and within national jurisdiction, Marine Policy, Volume 122, 2020.
[180] United Nations, *Treaty Series*, vol. 1833.
[181] Contribution of the European Union, p. 1.
[182] Contribution of Colombia.
[183] Contribution of Colombia, p. 3.
[184] Contributions of Australia pp. 1-2, and Portugal, p. 8.
[185] Contributions of Colombia, and Portugal.
[186] Contribution of Portugal, p. 8.
[187] Contributions of the European Union and Portugal.
[188] Contribution of IIJS, p. 2.
[189] Contribution of Colombia, p. 2.

intellectual property.[190] The transfer of marine technology should be more than the simple provision of equipment or tools; it must be a comprehensive process that includes technical training and know how, ongoing support, and mechanisms that ensure the sustainability of its use over time.[191]

68. The development and transfer of appropriate technologies are fundamental to ensuring the sustainable utilization of marine resources, particularly in support of science-based management practices.[192] Technology development and capacity-building must address emerging regional contexts and the specific needs of States and relevant stakeholders,[193] with a continued need for tailored technologies and capacity-building programs to enhance livelihoods, this includes providing low-cost, user-friendly technologies for small-scale operators and improving access to training, financial and market opportunities.[194]

69. Finance and capacity-building have been identified as critical enablers needed to accelerate ocean-based climate action, especially for developing countries.[195] In this context, LDCs and SIDS lack access to finance and have significant capacity-building needs for the uptake of technologies required for ocean climate action.[196] Scaling financial flows would require government support to align public finance, and the development of innovative financial instruments to lower market barriers and costs, and related risks.[197] Access to adaptation technologies and technology transfer remains one of the key challenges and needs of developing countries.[198] Financial constraints for research and technological innovation were also identified as major barriers, which include limited access to affordable, low-maintenance technology, insufficient research facilities, lack of State-driven initiatives, and limited knowledge of local circumstances.[199] Additionally, limited coordination and collaboration across ministries and sectors, outdated legal frameworks to attract the private sector, and limited emergency response capacities further hinder marine technology transfer.[200]

70. From the perspective of industries, important financial obstacles are also in the way of scaling up investments in ocean energy technologies to accelerate their deployment.[201] Companies are encountering difficulties accessing investments to develop ocean energy prototypes and ensure financial security throughout their product development cycle.[202] Solving this problem requires developing financial instruments such as public grants, public-guaranteed loans, or revenue support systems.[203] It has also been underscored that licensing authorities should adopt adaptative management practices involving the acceptance of short-term risks in order to learn more about the environmental impacts of these technologies and thus gain valuable insights to guide decision making in the long term.[204]

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[190] Contribution of Singapore, para 5.
[191] Contribution of Colombia, p. 4.
[192] Contribution of SEAFDEC, p. 1.
[193] Contribution of SEAFDEC, p. 1.
[194] Contribution of SEAFDEC, p. 1.
[195] Contribution of UNFCCC, p. 3.
[196] Contribution of UNFCCC, p. 3.
[197] Contribution of UNFCCC, p. 3; see also Report of the Secretary General on Oceans and the law of the sea, A/78/67, para. 20.
[198] Contribution of UNFCCC, p. 5.
[199] Contribution of UNFCCC, p. 5.
[200] Contribution of UNFCCC, p. 5.
[201] Contribution of IRENA, pp. 2-4.
[202] Contribution of IRENA, pp. 2-3.
[203] Contribution of IRENA, pp. 3-4
[204] Contribution of IRENA, p. 4.

71. Resource constraints, particularly in developing countries, restrict the ability to adopt and sustain advanced technologies for maritime enforcement.[205] Technological gaps and interoperability issues also impede seamless data sharing and coordination, highlighting the importance of specialized training.[206] Furthermore, regulatory and institutional barriers, along with the impacts of climate change on maritime security, complicate the implementation of innovative solutions.[207] These challenges are addressed by the UNODC through tailored assistance, improved coordination, and sustainable strategies.[208]

72. In Europe, there are challenges associated with the potential use of the Galileo and EGNOS satellite navigation systems to improve maritime safety and security, for developing and/or coastal States, including the need for training and capacity-building.[209]

73. The main obstacle to the dissemination of the S-100 universal hydrographic data model is that it requires a concerted effort from all government data providers and commercial players to make this geoinformation operational and accessible to data consumers.[210] To address this barrier, various workshops are designed to raise awareness and promote the use of the S-100 model.[211]

74. Considering the impacts of new developments in marine technology on people and the environment, and potential unintended consequences, it would be useful to integrate nature-based solutions and implement appropriate independent monitoring and reporting mechanisms to ensure social and environmental safeguards.[212] Application of the precautionary principle with respect to emerging technologies and processes is also needed.[213]

75. There are also limited financial and technical capacities in integrating innovative approaches such as the Transfer of Environmentally Sound Technology approach, and nature-based infrastructure solutions, and harmonizing regulatory frameworks across transboundary waters aiming to enhance marine conservation and resilience.[214] These challenges are addressed through UNIDO's capacity-building programs, innovative financing mechanisms, and partnerships and other adaptive strategies to ensure the systematic removal of barriers, enabling scalable, impactful solutions for sustainable marine ecosystem management.[215]

76. Women face structural barriers that restrict their involvement in capacity-building and technology transfer in the marine sector, such as unequal access to resources, specialized training, and leadership opportunities.[216] It is crucial to strengthen efforts for inclusive public policies and to ensure the sustainability of such initiatives,[217] as well as the removal of barriers to equitable participation of people with disabilities and their representative organizations in consultation and decision-making processes.[218]

[205] Contribution of UNODC, p. 2.
[206] Contribution of UNODC, p. 2.
[207] Contribution of UNODC, p. 2.
[208] Contribution of UNODC, p. 2.
[209] Contribution of the European Union, p. 7.
[210] Contribution of IHO, para. 14.
[211] Contribution of IHO, para. 14.
[212] Contribution of IIJS, p. 5.
[213] Contribution of OceanCare.
[214] Contribution of UNIDO, p. 3.
[215] Contribution of UNIDO, p. 3.
[216] Contribution of Colombia, p. 4.
[217] Contributions of Australia, p. 2; and Colombia, p. 4.
[218] Contribution of Australia, p. 2.

77. Strategic collaborations, such as public-private partnerships, also play a pivotal role in developing and facilitating the transfer of marine technology.[219] Approaches such as regional mapping campaigns, regional coordination bodies, virtual training platforms, and data systems that are discoverable, accessible, equitable, and usable, are possible ways to reshape traditional models of capacity-building and enable rapid dissemination of protocols and best practices to ensure all regions benefit from global advancements.[220]

VII. Opportunities

78. Significant opportunities are foreseen following the entry into force of the BBNJ Agreement, as capacity-building and the transfer of marine technology represent one of the four key issues covered by the new agreement.[221] The BBNJ Agreement will provide opportunities to: enable inclusive, equitable and effective cooperation and participation in the activities undertaken under the BBNJ Agreement; develop the marine scientific and technological capacity of parties, including with respect to research; increase, disseminate and share knowledge on the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction; and support developing States Parties in achieving the objectives of the BBNJ Agreement relating to marine genetic resources, including the fair and equitable sharing of benefits, measures such as area-based management tools, including marine protected areas, and environmental impact assessments; as well as create synergies with existing instruments, frameworks and bodies.[222] The BBNJ Agreement also establishes a capacity-building and transfer of marine technology committee to, among other tasks, carry out monitoring and review of these activities under the Agreement.[223]

79. The World Trade Organization Agreement on Fisheries Subsidies will offer new opportunities when it enters into force in terms of targeted technical and capacity-building assistance to developing countries, including LDCs.[224] The outcome of the ongoing work of the Intergovernmental Negotiating Committee to develop an international legally binding instrument on plastic pollution, including in the marine environment, may also present opportunities for capacity-building, technical assistance and technology transfer, including international cooperation.[225]

80. Ongoing global and regional opportunities in connection with new international instruments and frameworks include the long-term strategic framework for capacity-building and development to support nationally determined priorities for the implementation of the Kunming-Montreal Global Biodiversity Framework and the adoption of a technical and scientific cooperation mechanism under the CBD,[226] the Common Oceans Programme, implemented by FAO, UNEP and the United Nations Development Programme,[227] the Capacity Development Strategy of ISA,[228] the

[219] Contribution of the United States of America, p. 1.
[220] Contribution of the United States of America, p. 1.
[221] Contributions of Australia, Colombia, the European Union, IIJS, OceanCare and UNEP.
[222] Contribution of CITES, p. 2.
[223] Article 46, 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.
[224] Article 7, Agreement on Fisheries Subsidies.
[225] Article 12, Chair's text, 1 December 2024, https://wedocs.unep.org/bitstream/handle/20.500.11822/46710/Chairs_Text.pdf.
[226] Contribution of CBD, Annex, p. 4.
[227] Contribution of FAO, p. 4.
[228] Contribution of ISA, p. 1.

GFCM 2030 Strategy for sustainable fisheries and aquaculture in the Mediterranean and the Black Sea, [229] the IMOs technical cooperation programme, [230] the IOC/UNESCO Capacity Development Strategy 2023-2030,[231] the rolling workplan of the Technology Executive Committee for 2023-2027 under the UNFCCC,[232] the Blue Industry Programmatic Framework under UNIDO,[233] the GMCP under UNODC,[234] and the efforts of the Ocean Acidification International Coordination Centre under the IAEA.[235]

81. The United Nations Decade of Ocean Science for Sustainable Development (2021-2030) will continue to stimulate ocean science and knowledge through partnerships and convening frameworks,[236] with actions being taken to build upon the outcome of the 2024 Ocean Decade Conference and prepare for 2025 United Nations Ocean Conference to be held in Nice, France from 9-13 June 2025.[237] The overarching theme of the 2025 United Nations Ocean Conference will be "Accelerating action and mobilizing all actors to conserve and sustainably use the ocean" with the aim of supporting implementation of Sustainable Development Goal 14 on conserving and sustainably using the oceans, seas and marine resources for sustainable development, including through increased finance.[238]

82. The fourth cycle of the Regular Process for Global Reporting and Assessment of the State of the Marine Environment, including Socioeconomic Aspects (Regular Process) will include an enhanced element on capacity-building for strengthening the science-policy interface. [239] The fourth World Ocean Assessment will build on previous cycles and fill gaps and needs identified by Member States and the ocean community.[240]

83. Based on its updated work programme, [241] UN-Oceans will continue to accelerate collective ocean action by strengthening cooperation and coordination on ocean and coastal issues.[242] Continued coordination and cooperation through UN-Oceans can provide multidimensional support to Member States in addressing technical capacities.[243]

84. In terms of bridging financing gaps for capacity-building and the transfer of marine technology, opportunities lie in enhancing international cooperation and leveraging innovative funding mechanisms and blended approaches. [244] Official

[229] Contribution of GFCM, p. 1.
[230] Contribution of IMO, p. 2.
[231] Contribution of IOC-UNESCO, pp. 1-2.
[232] Contribution of UNFCCC, p. 4.
[233] Contribution of UNIDO, p. 1.
[234] Contribution of UNODC, pp. 1-2.
[235] Contribution of IAEA, p. 1.
[236] See Report of the Secretary General on Oceans and the law of the sea, A/79/340, pp. 54-55, 58-59; see also contribution of IOC-UNESCO.
[237] https://oceandecade.org/decade-events/category/ocean-decade-events.
[238] https://sdgs.un.org/conferences/ocean2025; see also Report of the Secretary General on Oceans and the law of the sea, A/79/340, pp. 80 and SDG 14 target 14.a.
[239] See Report on the work of the Ad Hoc Working Group of the Whole on the Regular Process for Global Reporting and Assessment of the State of the Marine Environment, including Socioeconomic Aspects, A/79/238; see also https://www.un.org/regularprocess/sites/www.un.org.regularprocess/files/7._possible_building_blocks_4th_cycle_to_21_ahwgw.pdf.
[240] https://www.un.org/regularprocess.
[241] https://www.un.org/Depts/los/coop_coor/documents/2025UNOceansWorkProgramme.pdf; see also Report of the Secretary General on Oceans and the law of the sea, A/79/340, pp. 73-75.
[242] https://www.un.org/depts/los/coop_coor/home_en.htm.
[243] Contribution of CITES.
[244] Contribution of UNFCCC, p. 3.

development assistance for the ocean, while still relatively small, is increasing,[245] and is complemented by South-South cooperation.[246] International financial institutions, such as the World Bank, regional development banks and the Global Environment Facility, continue to play a vital role in financing ocean actions,[247] both by channelling official development assistance and mobilizing additional financial resources, including through the Global Biodiversity Framework Fund.[248] These financial flows continue to offer crucial opportunities to scale up funding support for capacity-building and the transfer of marine technology. Moreover, innovative financing instruments, such as "blue bonds" and "blue loans",[249] as well as blended funding approaches, such as public-private partnerships, public-supported equity, public-guaranteed loans, revenue support mechanisms and philanthropic contributions, offer additional opportunities for mobilizing resources and fostering cross-sectoral collaboration, including in relation to capacity-building and the transfer of marine technology.[250]

85. The BBNJ Agreement will also create opportunities to mobilize resources to support capacity-building and the development and transfer of marine technology, including through the establishment of a financial mechanism for the provision of adequate, accessible, new and additional and predictable financial resources. This mechanism will comprise a voluntary trust fund, a special fund and a Global Environment Facility trust fund and will assist developing States in the implementation of the BBNJ Agreement, including through funding in support of capacity-building and the transfer of marine technology.[251] The upcoming ninth replenishment cycle of the Global Environment Facility trust fund is a vital opportunity to ensure that it can effectively serve as part of this mechanism, building on its decades of experience funding ocean-related capacity-building projects,[252] and its ongoing work in funding support for ratification and early action activities related to the BBNJ Agreement.[253]

86. The new programmes of action for LDCs,[254] SIDS,[255] and LLDCs[256] all reaffirm commitments to address funding challenges, which can help generate momentum for capacity-building and the transfer of marine technology. Upcoming major conferences, such as the 2025 United Nations Ocean Conference,[257] and the Fourth International Conference on Financing for Development[258] also provide opportunities

[245] A/78/880, para. 51.
[246] Contribution of Singapore, paras. 4 and 8.
[247] See, for example, A/78/880, para. 52; see also contributions of FAO and UNEP.
[248] https://www.thegef.org/sites/default/files/documents/2023-07/EN_GEF.C.64.05.REV01_Global%20Biodiversity_Framework_Fund_Establishment%20final%20checked.pdf.
[249] Report of the Secretary General on Oceans and the law of the sea, A/79/340, para. 53.
[250] Contributions of Colombia, sect. 4; the United States of America, p. 1; IIJS, p. 5; and IRENA p. 3.
[251] Part VII, 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.
[252] Contributions of FAO, para 17; and UNIDO, p. 3; see also General Assembly resolution 79/144 of 12 December 2024, para. 51.
[253] See https://www.thegef.org/what-we-do/topics/biodiversity-beyond-national-jurisdiction.
[254] Doha Programme of Action for the Least Developed Countries for the Decade 2022-2031, see General Assembly resolution 76/258 of 1 April 2022.
[255] Antigua and Barbuda Agenda for Small Island Developing States: A Renewed Declaration for Resilient Prosperity, see General Assembly resolution 78/317 of 16 July 2024.
[256] Programme of Action for Landlocked Developing Countries for the Decade 2024-2034, see General Assembly resolution 79/233 of 24 December 2024.
[257] https://sdgs.un.org/conferences/ocean2025.
[258] https://financing.desa.un.org/ffd4.

to advance concrete solutions for increasing investment in capacity-building and the transfer of marine technology.

VIII. Conclusions

87. Full implementation of the Convention, its implementing agreements and other related legal instruments can provide all States with the opportunity to maximize the benefits derived from the ocean. This report covers a wide range of bilateral and multilateral endeavours, including South-South cooperation, helping to build capacity and realise the transfer of marine technology across a broad array of ocean fields equitably within and amongst populations. Collaborative development of initiatives taking into account the needs and circumstances of the beneficiaries as equitable partners will ensure that the benefits of those initiatives are realised more broadly.

88. However, despite progress challenges remain, gaps exist and capacities are still lacking. Access to innovative technologies is also lacking. Moreover, developing countries, in particular Least Developed Countries, Landlocked Developing Countries, Small Island Developing States, as well as coastal African States have faced barriers preventing the full realisation of their environmental, social and economic development aspirations through sustainable use of the oceans and seas. The importance of the coordinated identification of sources of funding, either through established official development assistance mechanisms, or from other potential donors, to ensure that beneficiary-identified needs are satisfied by available sources of support cannot be overemphasised.

89. Nevertheless, significant opportunities exist and it is foreseen that the entry into force and consistent implementation of recently adopted instruments will allow for the tangible realisation of capacity-building and transferred technologies. Continuing efforts of the United Nations Decade of Ocean Science, mechanisms such as UN-Oceans and the Regular Process, and focus afforded by the 2025 United Nations Ocean Conference will help to strengthen cooperation and coordination and promote ocean affairs and the law of the sea.