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Marine science and technology transfer: Can the Intergovernmental Oceanographic Commission advance governance of biodiversity beyond national jurisdiction?

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ABSTRACT

Marine scientific research is crucial to forge solutions in the development of a new international legally binding instrument for the conservation and sustainable use of marine biological diversity in areas beyond national jurisdiction (ABNJ) under the *1982 United Nations Convention on the Law of the Sea* . The transfer of marine technology, capacity development and marine genetic resources are key issues. This paper examines how the Intergovernmental Oceanographic Commission (IOC), as a competent international organisation for marine scientific research and technology transfer, can inform the development of the instrument. Synergies between marine technology transfer and non-monetary benefit sharing of genetic resources are illustrated. Four key lessons from the IOC are examined: 1. Coordinating international cooperation in marine scientific research; 2. Enabling open access to data and knowledge; 3. Facilitating capacity development through scientific training and education; and 4. Governance of marine scientific research. Realising the potential of the IOC to advance governance solutions for ABNJ will depend on increased political will from Member States and strengthened partnerships to reduce resource constraints and enhance the IOC's capacity at global and regional scales.

1. Introduction

Marine scientific research, technology transfer and capacity development are vital lynchpins in the development of a new international legally-binding instrument (ILBI) on the conservation and sustainable use of marine biological diversity in areas beyond national jurisdiction (ABNJ) [1] under the *1982 United Nations Convention on the Law of the Sea* (LOSC).[1] These historic negotiations concern 65% of the global ocean surface, including the high seas (water column beyond national jurisdiction) and the Area (seabed, ocean floor and subsoil beyond national jurisdiction).[2] The Intergovernmental Oceanographic Commission (IOC) is the competent international organisation for marine scientific research[3] and marine technology transfer [2]. It is therefore timely to examine the potential role of the IOC in informing the development, and supporting the eventual implementation, of the ILBI.

The issue of marine genetic resources (MGR), including questions on the sharing of benefits, illustrates the important role of marine science and technology in enabling pragmatic solutions for the development of the ILBI, as highlighted at the first and second sessions of the Preparatory Committee (PrepComs 1 and 2)[4]. Marine scientific research is the first step in accessing MGR[5] from ABNJ and deriving "benefits" from their use [3,4,5]. Possible benefits include advancing scientific knowledge of marine biodiversity and enabling the exploitation of MGR for the development of biotechnology products [6,7]. The "non-monetary" benefits are increasingly recognised as more immediate and likely than monetary benefits from MGR in ABNJ [4,8,9]) on account of the cost, time, and barriers that could delay or prevent commercialisation [10,11]. However, disparities in scientific and technical capacity worldwide [12,13] and gaps in the international

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[1] A Preparatory Committee will meet four times during 2016 and 2017 and report to the United Nations General Assembly on its progress by the end of 2017. Four key elements will be considered in particular, together and as a whole: 1. Marine genetic resources, including questions on the sharing of benefits; 2. Area-based management tools, including marine protected areas; 3. Environmental impact assessments; and 4. Capacity building and the transfer of marine technology.

[2] LOSC, Article 1(1).

[3] LOSC Annex VIII, Article 2(2).

[4] The first PrepCom was held 28 March 2016 – 7 April 2016, the second PrepCom was held 26 August 2016 – 9 September 2016, at the United Nations, New York.

[5] MGR are not mentioned in the *1982* United Nations *Convention on the Law of the Sea* and there is no internationally agreed legal definition. MGR are considered to include biological material from animals, plants or microbes that is of actual or potential value [5]. This could include samples of entire organisms (animals, microbes or plants), individual genes, proteins or biologically produced chemicals as well associated data.

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legal framework have raised concerns of equitable access and benefit sharing of MGR in ABNJ [14,15,16]. Marine science, technology transfer and capacity development are inextricably linked to defining problems and developing solutions for MGR in ABNJ.

Although the relevance of the IOC for the ILBI has long been recognised [15,17,18,19,20,21,22,23] an analysis of the potential role of the IOC in supporting the development of the ILBI has not yet been undertaken. First, this paper introduces the role of IOC in marine scientific research governance and highlights the interlinkages between transferring marine technology and sharing non-monetary benefits of MGR. Second, lessons provided by IOC for the development of the ILBI are discussed: i) international cooperation; ii) open-access to data and knowledge; iii) capacity development and transfer of marine technology; and iv) governance of marine scientific research. Third, the paper argues that the IOC is uniquely positioned to take a lead role in informing the development of a robust ILBI that can adapt to, and benefit from, scientific and technological advances; the mandate, capacity and constraints influencing the role of IOC in the development and implementation of the ILBI are also discussed.

2. The IOC and the importance of marine science and technology

2.1. IOC and the LOSC

The IOC was established in 1960 as a body within the United Nations Educational, Scientific and Cultural Organisation (UNESCO)[6] and received functional autonomy in 1987. It has 148 member states and runs a large portfolio of marine scientific research projects.[7] The purpose and objectives of the IOC [24,25], include:

- promoting international cooperation;
- coordinating research and capacity development;
- sharing knowledge and research results;
- developing standards and guidelines;
- providing technical guidance advancing scientific knowledge of deep-sea ecosystems;
- international and regional coordination;
- responding to emerging scientific and policy issues raised by expanding use of marine resources; and
- applying knowledge for societal benefit.

The IOC's mandate to assist States in the implementation of LOSC Parts XIII (marine scientific research) and XIV (development and transfer of marine technology) position it as a key actor in the development of the ILBI. The LOSC Parts XIII and XIV provide the foundation for sharing non-monetary benefits from MGR and transferring marine technology. It sets a framework for marine technology transfer[8] and capacity development[9] that promotes international cooperation, exchange of experts and establishment of centres of excellence. The LOSC also establishes responsibilities for marine scientific research to:

- protect the marine environment[10];
- cooperate internationally[11];
- publish and share knowledge and data[12];
- conduct research with appropriate scientific methods and means[13]; and
- conduct scientific research in the Area for the benefit of all mankind.[14]

The question of access and benefit sharing of MGR in ABNJ highlights both synergies and tensions between the LOSC Parts XIII and XIV. For example, ambiguity created by the lack of a definition of marine scientific research and the absence of any mention of genetic resources in the LOSC, combined with questions over the sharing of research outcomes and transfer of technology, draws scrutiny to the balance of freedom and responsibility in marine scientific research in ABNJ.[15] Statements made at PrepComs 1 and 2 revealed concerns that the ILBI could potentially hinder research in ABNJ. A discussion of these issues, the interpretation of which will likely be a defining feature of the development of the ILBI, is not within the scope of this paper. Instead, this paper illustrates how the IOC can help the ILBI to achieve two objectives - marine technology transfer and non-monetary benefit sharing - through marine scientific research and cooperation.

2.2. Common themes link technology transfer and non-monetary benefit sharing

Synergies between sharing non-monetary benefits from MGR and marine technology transfer enable these elements to be considered "together and as a whole" in accordance with UN resolution 69/292 [1]. The definition of marine technology provided by the IOC's Criteria and Guidelines on Transfer of Marine Technology (CGTMT)[16] [26] and the examples of non-monetary benefits provided by the *2010 Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization* (Nagoya Protocol) provide a framework that enables the identification of five common themes that are underpinned by marine scientific research and technology (Fig. 1). Recognising these similar themes enables the development of synergistic governance solutions based on marine science and technology that could enable an ILBI to simultaneously achieve non-monetary benefit sharing of MGR and transfer of marine technology through:

1. Access to data, samples and information (e.g. open-access to biodiversity data, biological samples, publication of knowledge);
2. Capacity development (e.g. marine scientific training, research equipment, regional marine science and tecnology centres);
3. International cooperation (e.g. biodiversity research in ABNJ, training);
4. Scientific and socioeconomic benefits (e.g. advanced knowledge of ABNJ, research directed to priority needs, enhanced reputation of scientific institutions); and
5. Standards, guidelines and methodologies (e.g.for standardised collection, storage and sharing of biological samples and data).

Given the importance of marine scientific research to investigating and sustainably using biodiversity in ABNJ, the ILBI should arguably provide a framework that facilitates, not hinders, scientific research [3,27].[17] This will require developing an innovative and effective access and benefit sharing regime that supports research and fosters capacity development and transfer of marine technology. The development of the ILBI is an opportunity to enhance implementation of LOSC Part

[6] IOC was established by Resolution 2.31 adopted by the General Conference of UNESCO at its 11th session (Nov-Dec 1960) and in conformity with the recommendation of the Intergovernmental Conference on Oceanic Research (Copenhagen 11–16 July 1960). Statutes of the Intergovernmental Oceanographic Commission [24], Article 1(1).

[7] http://ioc-unesco.org/(accessed 14/03/2016).

[8] LOSC, Articles 266, 270, 271, 272, 273.

[9] LOSC, Articles 269, 275, 276.

[10] LOSC, Article 240(d).

[11] LOSC, Articles 239, 242, 243.

[12] LOSC, Article 244.

[13] LOSC, Article 240(b).

[14] LOSC, Article 143.

[15] Marine scientific research is a "freedom of the high seas", LOSC, Article 87(1)(f).

[16] The CGTMT were drafted in response to LOSC article 271 and adopted by the IOC Assembly (Resolution XXII-12) in 2003.

[17] This was highlighted by Australia, Canada, New Zealand and US at PrepCom 1 (International Institute for Sustainable Development, 2016).