Benefitting from the Common Heritage of Humankind: From Expectation to Reality

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Abstract

The international seabed 'Area' and its mineral resources are the common heritage of mankind and must be administered for the benefit of humankind as a whole. Yet the vision of the benefits to be reaped from the Area has changed over the years. The common heritage concept encapsulates seemingly conflicting developmental, commercial, and ecological imperatives. With seabed mining edging closer to becoming a reality, there is a need to analyse these imperatives and the range of benefits that humankind can (and in some cases already does) derive from the Area. This article critically discusses six categories of benefits that are relevant to seabed mining and assesses them against historical expectations. These are wealth generation and redistribution, advancement of developing States, security of mineral supply, ecosystem services, scientific knowledge, and other uses of the Area.

Keywords

seabed mining – common heritage of mankind – International Seabed Authority – benefit sharing – developing States

Introduction

Mining¹ the deep ocean for minerals, such as copper and manganese, has seen a sharp rise in interest over recent years. This emerging industry has been in

1 I thank the participants and organisers of the workshop 'Historicizing the Regulation of Ocean Resources in International Law: From Common Heritage to Sovereignty and Back' for fruitful and enriching discussions and Jeff Ardron and Kristina Gjerde for valuable comments

the making since the late 1960s when Maltese Ambassador Arvid Pardo gave a passionate speech in which he alerted the United Nations to the 'vastness of [the] untapped wealth' on the seafloor.² Pardo's speech started negotiations to develop an international legal regime for mining the seabed beyond national jurisdiction, known as the 'Area'.

At the time, there was much excitement about the 'immeasurable wealth' that seabed mining was to generate and the significant development opportunities it was expected to offer to developing States.³ To ensure all States, especially developing States, stood to benefit, the Area and its mineral resources were declared the common heritage of mankind (CHM) through the 1982 United Nations Convention on the Law of the Sea (LOS)⁴ and benefits were to be shared with all. However, the vision of the benefits changed over time.

During the negotiations of the Area regime at the third United Nations Conference on the Law of the Sea (UNCLOS III), from 1973 to 1982, seabed mining was thought to 'yield a net balance of benefits to the international community as a whole'.⁵ The focus lay on wealth generation and redistribution, but also on active participation of developing States in an industry that was thought capable of supporting the New International Economic Order.⁶ Yet, the 1994 Implementing Agreement changed the expression of the CHM and significantly undermined the hopes of developing States.⁷

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- 2 United Nations General Assembly (UNGA), *Examination of the Question of the Reservation Exclusively for Peaceful Purposes of the Sea-Bed and the Ocean Floor, and the Subsoil Thereof, Underlying the High Seas beyond the Limits of Present National Jurisdiction and the Use of Their Resources in the Interests of Mankind*, UN Doc A/C.1/PV.1516 (1 November 1967), para 27.
- 3 UNGA, *Summary of Records for 1st to 9th Meetings (Ad Hoc Committee to Study the Peaceful Uses of the Sea-Bed and the Ocean Floor Beyond the Limits of National Jurisdiction)*, UN Doc A/AC.135/SR.1-9 (10 May 1968), para 69.
- 4 United Nations Convention on the Law of the Sea (Montego Bay, 10 December 1982, in force 16 November 1994) 1833 UNTS 3, Art 136 [LOS].
- 5 Third United Nations Conference on the Law of the Sea (UNCLOS III), *Economic Implications of Sea-Bed Mining in the International Area: Report of the Secretary-General*, UN Doc A/CONF.62/37* (18 February 1975), para 128.
- 6 The New International Economic Order was a proposal to improve the terms of international trade for developing States. For details see, e.g., FH Paolillo, 'The future legal regime of seabed resources and the NIEO: Some issues' in K Hossain (ed), *Legal Aspects of the New International Economic Order* (Frances Pinter, London, 1980) 165–170.
- 7 Agreement Relating to the Implementation of Part XI of the United Nations Convention on the Law of the Sea (New York, 28 July 1994, in force 28 July 1996) 1836 UNTS 3 [1994 Implementing Agreement].

As the predictions about economic profitability were revised and the reality of the technological and political challenges sunk in, interest in seabed mining waned. However, scientific knowledge about the deep ocean continued to advance and compelled scientists to raise serious concerns over the environmental consequences of seabed mining.⁸ Today, the benefits of seabed mining are often framed in terms of offering security of mineral supply for the green economy, thus pitting ecological risks against the aim of building a green economy.⁹

The rationale for mining the seafloor has changed over time, from wealth generation and redistribution, to the active participation of developing States, and supply security. The picture is further complicated by rising concerns about the environmental risks of seabed mining as well as enduring concerns about the negative economic effects for land-based mineral producing States. These changes in benefits and concerns affect our understanding of what actions should flow from the seabed and its resources being our common heritage. Indeed, the CHM concept encapsulates these seemingly conflicting developmental, commercial, and ecological imperatives.¹⁰

With seabed mining edging closer to becoming a reality, there is a need to critically analyse these imperatives and the range of benefits that humankind can (and in some cases already does) derive from the Area. As Ranganathan concludes, ‘we need more critical inquiry into the idea of the “benefit of mankind” and whether, why and how it may be advanced by seabed mining.’¹¹

As illustrated in Fig. 1, there are at least six categories of benefits that can be considered. In other words, the CHM concept can be interpreted through different lenses that focus on achieving different, albeit sometimes interrelated, benefits. Identifying these can help to explain divergent views on how to give effect to the CHM. This article critically examines each of these six benefits and assesses them against historical expectations. This reductionistic view of CHM does not take into account the intrinsic value of the Earth's environment, including the deep ocean, and it may not do justice to the grand vision behind the CHM concept. Nonetheless, it is a pragmatic attempt to contribute to a discussion about what the Area regime can achieve today.

8 O Heffernan, ‘Deep-Sea Dilemma’ (2019) 571 *Nature* 465–468.

9 JR Hein, K Mizell, A Koschinsky and TA Conrad, ‘Deep-Ocean Mineral Deposits as a Source of Critical Metals for High- and Green-Technology Applications: Comparison with Land-Based Resources’ (2013) 51 *Ore Geology Reviews* 1–14, doi: 10.1016/j.oregeorev.2012.12.001.

10 R Collins and D French, ‘A Guardian of Universal Interest or Increasingly Out of Its Depth?’ (29 July 2019) *International Organizations Law Review* 1–31, doi: 10.1163/15723747-2019011.

11 S Ranganathan, ‘Ocean Floor Grab: International Law and the Making of an Extractive Imaginary’ (2019) 30 *European Journal of International Law* 573–600, doi: 10.1093/ejil/chzo27.

FIGURE 1 Categories of actual and potential benefits that can be derived from the Area (non-exhaustive)

The Area Regime: A Brief Overview

The CHM concept is central to the Area regime. Its expression in the LOSC was aimed at building a unique regime, focused on solidarity and trusteeship, for the management of some of the most remote natural resources on Earth. However, some of the communitarian features enshrined in the LOSC proved to be so controversial that many industrialised States refrained from ratifying the Convention in the 1980s. Thus, the divisive provisions were re-negotiated through the 1994 Implementing Agreement, which substantially altered the original Area regime and its expression of the common heritage principle, as discussed below.

Nonetheless, the CHM concept continues to be a cornerstone of the Area regime and affects every aspect of it. It is widely viewed as entailing five elements: (a) non-appropriation, (b) common management, (c) sharing of benefits, (d) use of the common heritage for peaceful purposes only, and (e) preservation for future generations.¹²

The common management is realised through the existence of the International Seabed Authority (ISA), which was set up to manage minerals in the

12 R Wolfrum, 'Common Heritage of Mankind' in *Max Planck Encyclopedia of Public International Law* (2009) available at <http://opil.ouplaw.com/view/10.1093/law:epil/9780199231690/law-9780199231690-e1149?rskey=1EmERR&result=1&prd=EPIL>; accessed 27 May 2020; E Van Doorn, 'Environmental Aspects of the Mining Code: Preserving Humankind's Common Heritage while Opening Pardo's Box?' (2016) 70 *Marine Policy* 192–197, doi: 10.1016/j.marpol.2016.02.022; PEW/RESOLVE, *Report of the Workshop 'The Common Heritage of Mankind: Definition and Implementation' at Ocho Rios, Jamaica on 21 July 2018* (PEW Charitable Trusts and RESOLVE, 2018).

Area on behalf of mankind as a whole. However, while the LOSC and its subsequent 1994 Implementing Agreement set the legal framework for the Area regime, they leave the detailed requirements for mining, as well as the benefit sharing arrangements, to be decided at a later stage. As a result, the ISA now has the unenviable task of deciding these details in the context of developing the world's first international regulations for exploiting deep seabed minerals. These exploitation regulations will enable mining to start legally while also determining whether and how the common heritage principle will be given effect in practice.

The ISA is mandated to 'organize and control' mineral activities in the Area while at the same time needing to 'ensure effective protection for the marine environment from harmful effects' of mining.¹³ This is a difficult balancing exercise, as was already acknowledged during the Preparatory Commission for the ISA in the early 1990s, when Satya Nandan, who later became Secretary-General of the ISA, noted that 'the most difficult aspect' of developing early draft regulations 'had been to ensure that there was a fair balance between the need to preserve and protect the marine environment, and the development of the resources of the international sea-bed area'.¹⁴

Already at that point, there were divergent views as to how to strike such a balance. While it is clear that any seabed mining will cause ecological harm, several delegations at the Preparatory Committee queried the use of the notion of acceptable harm to the marine environment and 'stated their unwillingness to accept it in the absence of knowledge of the criteria that would be used to determine it'.¹⁵

Similarly, some delegates noted that the concept of 'serious harm' could 'result in utilizing an economic rather than ecological basis in the formulation of regulations'.¹⁶ Despite disagreements on the permissibility of environmental harm, most delegations agreed with the need to base the regulations on scientific knowledge of the environmental effects of seabed mining.¹⁷ Problematically, though, advancements in science have led to growing concerns about the ecological impacts of seabed mining, as discussed below.

13 LOSC (n 4), Arts 145, 157(1).

14 Preparatory Commission for the International Seabed Authority (ISA) and for the International Tribunal for the Law of the Sea, *Statement to the Plenary by the Chairman of Special Commission 3 on the Progress of Work in that Commission*, UN Doc LOS/PCN/L.79 (28 March 1990), para 10.

15 *Ibid.*, para 18.

16 *Ibid.*, para 21.

17 *Ibid.*, para 18.

Possible Benefits to Be Derived from the Area

Wealth Generation and Redistribution

In the 1960s and 70s, deep seabed minerals were thought to promise 'immeasurable wealth'¹⁸ capable of generating substantial profits,¹⁹ a prediction that was later described as 'unbridled speculation based on limited data and undeveloped technological capability of the past'.²⁰ At present, 'there is little consensus on whether [seabed mining] is likely to yield net benefits or costs'.²¹ Some studies consider seabed mining to be 'sub-economic at present',²² although any prediction is complicated by significant uncertainties regarding the size, distribution, and composition of marine mineral deposits.²³ Moreover, it remains extremely difficult to capture the economic value of deep-sea ecosystem services, including carbon absorption, which would be necessary to estimate the overall economic costs and benefits of seabed mining, including any effect on climate change.²⁴

Economic profitability of seabed mining depends partially on its environmental footprint. As leading geologists concluded in 2016: 'Whether deep-sea mining will be a viable activity in the future depends largely on its environmental impacts, which have yet to be fully assessed'.²⁵ Mukhopadhyay *et al.*

18 UNGA (n 3), para 69.

19 UNGA (n 2); D Bindow, 'Developing the Mineral Resources of the Seabed' (1982) 2 *The Cato Journal* 793–821; JL Mero, *The Mineral Resources of the Sea* (Elsevier, Amsterdam, 1965); Ranganathan (n 11); UNGA, *Summary of Records for the 13th–26th Sessions (Ad Hoc Committee to Study the Peaceful Uses of the Sea-Bed and the Ocean Floor beyond the Limits of National Jurisdiction)* UN Doc A/AC.135/SR.13-16 (1 November 1968).

20 CL Antrim, 'Deep Seabed Mining the Second Time Around: Supply, Demand and Competitive Opportunities on the Underwater Frontier' (2006) 47 *Sea Technology* 17–22; see also GP Glasby, 'Lessons Learned from Deep-Sea Mining' (2000) 289 *Science* 551–553.

21 MV Folkersen, CM Fleming and S Hasan, 'Depths of Uncertainty for Deep-Sea Policy and Legislation' (2019) 54 *Global Environmental Change* 1–5, doi: 10.1016/j.gloenvcha.2018.11.002.

22 GP Glasby, J Li and Z Sun, 'Deep-Sea Nodules and Co-Rich Mn Crusts' (2015) 33 *Marine Georesources and Geotechnology* 72–78, doi: 10.1080/1064119X.2013.784838; ECORYS, *Study to Investigate the State of Knowledge of Deep-Sea Mining: Final Report to the European Commission under FWC MARE/2012/06 - SC E1/2013/04* (28 August 2014), https://webgate.ec.europa.eu/maritimeforum/system/files/Annex%203%20Supply%20and%20demand_rev_1.pdf; accessed 27 May 2020.

23 S Petersen, A Krätschell, N Augustin *et al.*, 'News from the Seabed: Geological Characteristics and Resource Potential of Deep-Sea Mineral Resources' (2016) 70 *Marine Policy* 175–187, doi: 10.1016/j.marpol.2016.03.012.

24 MV Folkersen, CM Fleming and S Hasan, 'The Economic Value of the Deep Sea: A Systematic Review and Meta-Analysis' (2018) 94 *Marine Policy* 71–80, doi: 10.1016/j.marpol.2018.05.003; Folkersen *et al.* (n 21).

25 Petersen *et al.* (n 23).

find nodule mining in the Indian Ocean to be 'economically feasible assuming that ... an appropriate mining technology is developed and can be used in order to lift the nodules without causing much damage to the ecosystem'.²⁶ This precondition could prove a major stumbling block as current data suggests that seabed mining 'will have devastating, and potentially irreversible impacts on marine life',²⁷ as discussed below in the section on ecosystem services.

Ranganathan argues that the promise of economic profit, though it already came into question during the early development of the Area regime,²⁸ was key to keeping developing States engaged in the seabed negotiations.²⁹ The expectation at the time was for seabed mining to become a funding source for international development efforts³⁰ and, more generally, a way to promote the economic and social advancement of developing States.³¹

Meeting those expectations seems improbable at present, not least because of the uncertain economic potential of seabed mining. Indeed, current discussions about the future payment regime for the Area have generated concern among developing State members of the ISA. Criticising the currently proposed low rate of payments from future mining operations to the ISA, the African Group notes: 'The African Group does not wish to see an exploitation regime that facilitates the loss of common heritage resources in return for minimal or no benefit to the populations of African countries, and other developing States'.³²

Central to the criticism is the focus on making sure the post-tax profits for contractors are attractive for investors. As the African Group argues, this approach 'implies that the overarching goal of the payment regime is to not

26 R Mukhopadhyay, S Naik, S De Souza *et al.*, 'The Economics of Mining Seabed Manganese Nodules: A Case Study of the Indian Ocean Nodule Field' (2019) 37 *Marine Georesources & Geotechnology* 845–851, doi: 10.1080/1064119X.2018.1504149.

27 Heffernan (n 8).

28 PE Sorensen and WJ Mead, 'A Cost-Benefit Analysis of Ocean Mineral Resource Development: The Case of Manganese Nodules' (1968) 50 *American Journal of Agricultural Economics* 1611–1620, doi: 10.2307/1237364.

29 Ranganathan (n 11).

30 UNGA (n 3).

31 UNGA (n 19), paras 114–115; UNCLOS III, *Statements on the International Regime and Machinery (Continued)*, 5th meeting of the First Committee, 16 July 1974, UN Doc A/CONF.62/C.1/SR.5, para 18.

32 African Group, *Request for Consideration by the Council of the African Group's Proposal on the Economic Model/Payment Regime and Other Financial Matters in the Draft Exploitation Regulations under Review* (9 July 2018), para 10, available at <https://www.isa.org.jm/document/statement-algeria-obo-african-group-2>; accessed 27 May 2020.

inhibit deep-sea mining. We do not agree with that goal or that approach'.³³ Instead, the African Group stressed that it will only support seabed mining 'if it is demonstrably beneficial to mankind'.³⁴

Similar concerns were already voiced during the ISA's Preparatory Commission in the 1990s in relation to the ISA's power to determine the threshold for environmental degradation caused by seabed mining.

[I]t was suggested that this could lead to a conflict of interest because the Authority, which would be dependent on revenue from economic activities in the Area, could be biased on [*sic*] favour of a permissive regulatory regime. Several delegations requested that some provisions be reformulated so that the obligations of the Authority correspond to those of a Sponsoring State.³⁵

Determining the economic costs or benefits of seabed mining would require not only an assessment of potential profits but also any costs it generates from impacts to ecosystem services, such as climate regulation.³⁶ In other words, the natural capital of the seabed would need to be considered.³⁷ This is particularly important as any profits from seabed mining might be reaped predominantly by private actors while the costs are borne by humankind.³⁸ In its assessment of a seabed mining application, which led to an ongoing court battle, the New Zealand Environmental Protection Authority used the concept of 'total economic value', which includes 'the direct and indirect values of [natural] resources as used by others or for their intrinsic and ecosystem services

33 M Remaoun, *Statement on Behalf of the African Group on the Financial Model at the 25th Session of the Council of the ISA* (25 January 2019) available at https://ran-s3.s3.amazonaws.com/isa.org.jm/s3fs-public/files/documents/1-algeriaoboag_finmodel.pdf; accessed 27 May 2020.

34 African Group, *African Group Submission of Two Payment Regimes for Consideration by the Council of the International Seabed Authority* (15 July 2019) available at <https://ran-s3.s3.amazonaws.com/isa.org.jm/s3fs-public/files/documents/agpaymentregimes.pdf>; accessed 27 May 2020.

35 Preparatory Commission for the ISA and for the ITLOS (n 14), para 19.

36 See e.g., Tonga, *Tonga Interventions to Part 1 of the 25th Session of the Council of the ISA* (2019) available at https://ran-s3.s3.amazonaws.com/isa.org.jm/s3fs-public/files/documents/7-tg_financial_model.pdf; accessed 27 May 2020.

37 SE Beaulieu, TE Graedel and MD Hannington, 'Should We Mine the Deep Seafloor?' (2017) 5 *Earth's Future* 655–658, doi: 10.1002/ef2.227.

38 Folkersen *et al.* (n 21).

values'.³⁹ Such an approach is supported by scholars arguing for a net-positive benefit to humankind from seabed mining, which is to include 'an assessment of the likely impacts of mining activities on the natural capital of the Area and on other potential uses of the deep sea'.⁴⁰ The challenge lies in quantifying the value of ecosystem services provided by the Area, as we currently lack robust evidence.⁴¹ This gap in knowledge would need to be filled before we can estimate the economic costs and benefits of seabed mining in the Area.

The question of wealth generation is further complicated by the fact that any economic profit generated by mining the Area would need to be balanced against potential losses for land-based mineral producing States, many of which are developing States. This key consideration was acknowledged early on,⁴² with Algeria noting in 1974 that 'all the documents available suggested that the benefits to be acquired from seabed production would not serve to compensate the land-based producers'.⁴³ To address these concerns, the legal framework provides for an economic assistance fund for developing States, which, however, is to be financed only from contractors or voluntary contributions and only once the ISA has covered its own administrative costs.⁴⁴ Given these constraints, it remains unclear whether this fund can compensate developing States for lost income. In any event, the provision of this fund serves to demonstrate that economic losses to land-based producing developing States are to be expected and rather than seeking to prevent such loss, this

39 New Zealand Environmental Protection Authority, *Trans-Tasman Resources Ltd Marine Consent Decision* (June 2014), para 86, available at <https://www.epa.govt.nz/assets/File/API/proposal/EEZ000004/Boards-Decision/ff4e630f5d/EEZ000004-Trans-Tasman-Resources-decision-17June2014.pdf>; accessed 27 May 2020; RE Kim and DK Anton, 'The Application of the Precautionary and Adaptive Management Approaches in the Seabed Mining Context: Trans-Tasman Resources Ltd Marine Consent Decision under New Zealand's Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act 2012' (2015) 30 *International Journal of Marine and Coastal Law* 175–188, doi: 10.1163/15718085-12341343.

40 S Christiansen, H Ginzky, P Singh and T Thiele, *The International Seabed Authority and the Common Heritage of Mankind* (IASS Policy Brief 2/2018) (Institute for Advanced Sustainability Studies, 2018); Folkersen, Fleming and Hasan (n 24).

41 Folkersen *et al.* (n 21).

42 Chile, *Working Paper on the Economic Implications for the Developing Countries of the Exploration of the Sea-Bed Beyond the Limits of National Jurisdiction*, UNCLOS III, 26 August 1974, UN Doc A/CONF.62/C.1/L.11, para 179.

43 UNCLOS III (n 31).

44 1994 Implementing Agreement (n 7), Annex, section 7; LOSC (n 4), Arts 151(10), 164(2)(d).

fund merely applies 'after an adverse effect has materialized'.⁴⁵ In other words, wealth generation on the international level, if it was to occur, may still negatively affect some developing States as well as other States involved in land-based mining.

Realising the economic dimension of the CHM principle would presuppose not only wealth generation through seabed mining but also redistribution of that wealth. In fact, the LOSC specifically provides for the 'equitable sharing of financial and other economic benefits' derived from seabed mining.⁴⁶ In the 1970s, developing States expected to receive substantial direct payments from the ISA in the future,⁴⁷ an expectation that looks increasingly unlikely given the current discussions around the payment regime.

In any event, it remains unclear how any income of the ISA would be used, after administrative costs of the ISA are covered and some funds are used for the economic assistance fund.⁴⁸ The use of funds paid to the ISA as a proxy for humankind might indeed serve to illustrate one of this article's arguments, namely that the vision of the benefits to be derived from the CHM has changed over time. In addition to direct payments to (developing) States, current discussions consider funding the Enterprise, as discussed below, or a global sovereign wealth fund that can be used for activities that benefit developing States and/or humankind as a whole, including future generations.⁴⁹

Advancement of Developing States

In addition to generating wealth, seabed mining was to enable developing States to become *active* participants in collective natural resource management and supporting them in determining their own economic future. As Ranganathan argues:

45 J Siegfried, 'Article 151' in A Proelss (ed), *United Nations Convention on the Law of the Sea: A Commentary* (C.H. Beck/Hart/Nomos, Munich/Oxford/Baden-Baden, 2017), at p. 1074.

46 LOSC (n 4), Art 140(2); 1994 Implementing Agreement (n 7), Annex, section 8.

47 I Feichtner, 'Sharing the Riches of the Sea: The Redistributive and Fiscal Dimension of Deep Seabed Exploitation' (2019) 30 *European Journal of International Law* 601–633, doi: 10.1093/ejil/chz022, at p. 611; RS Katz, 'Financial Arrangements for Seabed Mining Companies: An NIEO Case Study' (1979) 13 *Journal of World Trade* 209–222.

48 LOSC (n 4), Art 173(2); 1994 Implementing Agreement (n 7), Annex, section 1(14).

49 PEW/RESOLVE (n 12); A Jaeckel, JA Ardron and KM Gjerde, 'Sharing Benefits of the Common Heritage of Mankind: Is the Deep Seabed Mining Regime Ready?' (2016) 70 *Marine Policy* 198–204, doi:10.1016/j.marpol.2016.03.009.

[T]hese aspects were perhaps even more meaningful than developed states' commitment to share the profits derived from the exploitation of seabed minerals. For that commitment, although important in itself, could be assimilated within the existing order in which developing states remained passive recipients of aid and consumers of products manufactured elsewhere.⁵⁰

This aim of collective management and solidarity was to be achieved, *inter alia*, through four key measures: the Enterprise, technology transfer, capacity building, and reserved areas. As is well-known, the 1994 Implementing Agreement undermined these measures and, by extension, the advancement of developing States.⁵¹ However, more recent changes introduced by the ISA have also contributed to shifting away from the notion of collective benefit enshrined in the CHM concept, in favour of supporting individual developing States.

The LOSC foresaw the Enterprise as a public body that would itself conduct deep-seabed mining on behalf of humankind.⁵² To allow the Enterprise to keep pace with States and private mining companies, the LOSC provided for funding from States parties, technology transfer to the Enterprise, and capacity-building programmes to ensure the Enterprise has qualified staff.⁵³ The Implementing Agreement significantly undermined the idea of the Enterprise, not least by eliminating obligatory technology transfers and removing any obligation of States parties to provide funding, leaving the idea of the Enterprise to potentially fail on the basis of insufficient funds.⁵⁴ Discussions about setting up the Enterprise have been slow, and its initial functions that were supposed to be performed by the ISA Secretariat have been neglected for some time,⁵⁵

50 S Ranganathan, 'The law of the sea and natural resources' in Eyal Benvenisti and Georg Nolte (eds), *Community Interests across International Law* (Oxford University Press, Oxford, 2018) 121–135, doi: 10.1093/oso/9780198825210.001.0001.

51 AG Kirton and SC Vasciannie, 'Deep Seabed Mining under the Law of the Sea Convention and the Implementing Agreement: Developing Country Perspectives' (2002) 51 *Social and Economic Studies* 63–115, at p. 90.

52 LOSC (n 4), Arts 153, 170.

53 Final Act of UNCLOS III, *Resolution II 'Governing Preparatory Investment in Pioneer Activities Relating to Polymetallic Nodules'*, UN Doc A/CONF.62/121* (27 October 1982), para 12(a)(ii).

54 1994 Implementing Agreement (n 7), Annex, sections 2(3), 5(1)(b).

55 ISA, *Final Report on the Periodic Review of the International Seabed Authority Pursuant to Article 154 of the United Nations Convention on the Law of the Sea*, ISBA/23/A/3 (8 February 2017), para 21; 1994 Implementing Agreement (n 7), Annex, section 2(1).

causing developing States to repeatedly express dismay at the lack of progress in setting up the Enterprise.⁵⁶

In the absence of the Enterprise, capacity building foreseen in the LOSC⁵⁷ has been focused on providing individual citizens of developing States with educational opportunities through the ISA's training programmes. These are arguably the most tangible benefits the Area regime currently offers. Between 2013 and 2018, a total of 98 training places were provided, which range from multi-year fellowships and scholarships to at-sea training, internships, and attendance at workshops.⁵⁸ Additionally, the ISA's Endowment Fund for Marine Scientific Research in the Area has provided financial support to individuals from developing States to participate in marine scientific research programmes and activities. While scientific research is undeniably important and training programmes are a valuable measure to support developing States, the Convention's provisions on capacity building can only be realised partially by a focus on individuals rather than the collective longer-term benefit envisioned to arise from upskilled personnel for the Enterprise.

The absence of a functioning Enterprise also affects other measures, such as reserved areas. These are sites with economically valuable mineral deposits that have been studied by contractors from developed States as a condition of them obtaining exploration rights over another site.⁵⁹ Reserved areas can be explored and exploited by the Enterprise or a developing State,⁶⁰ though the Enterprise has a preferential right of access to reserved areas, which it has not been able to exercise because it does not yet function independently.⁶¹ Instead, reserved areas have only been claimed by individual developing States, most of whom sponsor private companies from developed States, including the ones that originally contributed the reserved area.⁶²

56 African Group, *Request for Consideration by the Council of the African Group's Proposal for the Operationalization of the 'Enterprise'* (6 July 2018), para 12, available at <https://www.isa.org.jm/document/statement-algeria-obo-african-group-1>; accessed 27 May 2020; IISD, 'ISA-24 Part 2 Highlights: Friday 20 July 2018' (2018) 25 *Earth Negotiation Bulletin* 164, available at <http://enb.iisd.org/vol25/enb25164e.html>; accessed 27 May 2020.

57 LOSC (n 4), Arts 143(3), 144; Annex III, Art 15; 1994 Implementing Agreement (n 7), Annex, section 1(10), 2(2), 2(5).

58 ISA, *Assembly Report of the Secretary-General of the International Seabed*, ISBA/25/A/2 (3 May 2019), para 68, available at <https://www.isa.org.jm/document/isba25a2>; accessed 27 May 2020.

59 LOSC (n 4), Annex III, Arts 8, 9.

60 *Ibid.*, Annex III, Art 9.

61 *Ibid.*, Annex III, Art 9(4).

62 Jaeckel *et al.* (n 49); G Barron, *Address to ISA Council* (27 February 2019) available at <https://www.isa.org.jm/document/nauru-1>; accessed 27 May 2020.

Some view this as a pragmatic and successful way for developing States to be actively involved in the Area regime. However, accessing reserved areas as a sponsoring State rather than collectively through the Enterprise increases the risk for developing States as they can be held liable for environmental harm caused by their sponsored entity.⁶³ In contrast, engaging in mining through the Enterprise alleviates that substantial risk for developing States, although questions remain about the extent of liability of the Enterprise.⁶⁴ In addition, it remains unclear whether States accrue significant benefits from sponsoring foreign private mining companies.⁶⁵ Moreover, one commentator has speculated about the potential for sponsoring States to also incur financial risks of investment arbitration under international investment law.⁶⁶ The role of sponsoring States, as well as the benefits and risks incurred by them, requires further investigation.

Reserved areas being claimed by sponsoring States also affects the future prospects of the Enterprise, which must conduct its initial operation by joint venture.⁶⁷ The incentive for a State or company to propose a joint venture is to gain access to reserved areas. Dwindling numbers of reserved areas arguably make future proposals for joint ventures less likely. Put bluntly, fewer reserved areas equal less incentive to build a joint venture, which in turn reduces the chance of the Enterprise becoming fully operational.

This trend has been exacerbated by a regulatory change introduced in 2010, through which the ISA offers contractors exploring certain types of mineral deposits a choice between contributing a reserved area or offering an

63 LOSC (n 4), Arts 139, 153(4); Annex III, Art 4(4); Seabed Disputes Chamber of the ITLOS, *Responsibilities and Obligations of States Sponsoring Persons and Entities with Respect to Activities in the Area*, Advisory Opinion, 1 February 2011, *ITLOS Reports 2011*.

64 T Davenport, *Responsibility and Liability for Damage Arising Out of Activities in the Area: Attribution of Liability (Liability Issues for Deep Seabed Mining Series, Paper No. 4)* (Centre for International Governance Innovation, 2019) available at https://www.cigionline.org/sites/default/files/documents/Deep%20Seabed%20Paper%20No.5_o.pdf; accessed 27 May 2020; E Egede, M Pal and E Charles, *A Study on Issues Related to the Operationalization of the Enterprise in Particular on the Legal, Technical and Financial Implications for the International Seabed Authority and for States Parties to the United Nations Convention on the Law of the Sea* (ISA, Kingston, 2019), paras 27–30, available at https://ran-s3.s3.amazonaws.com/isa.org/jm/s3fs-public/files/documents/study-enterprise-unedited_advance_text-11jul2019.pdf; accessed 27 May 2020.

65 Feichtner (n 47), at p. 631.

66 A Pecoraro, 'Deep Seabed Mining in the Area: Is International Investment Law Relevant?' (2019) *EJIL: Talk!*, available at <https://www.ejiltalk.org/deep-seabed-mining-in-the-area-is-international-investment-law-relevant/>; accessed 27 May 2020.

67 1994 Implementing Agreement (n 7), Annex, section 2(2).

equity interest in a joint venture arrangement.⁶⁸ Under an equity interest, the Enterprise will receive a share of any profits (at least 20 per cent, and up to 50 per cent if so negotiated), from the contractor's future exploitation of minerals, though the specific terms have yet to be developed. In other words, instead of supporting developing States to directly participate in mining the common heritage, the equity interest option instead rests on financial benefits, the sharing of which is delayed until commercial mining is underway.⁶⁹ The equity interest option was introduced because the mineral deposits in question would require substantial upfront exploration work to identify a potential reserved area.⁷⁰ However, the decision had follow-on effects for the overall number of reserved areas and thus the future of the Enterprise.

At the same time, the equity interest option offers a potential funding source for the Enterprise. Yet with few reserved areas, and the mineral and environmental data associated with such areas, it becomes less likely that the Enterprise will assume an active role in mining. Indeed it is unclear what role the Enterprise could assume beyond financial redistribution or reinvestment.⁷¹

As the discussion demonstrates, the original vision of collective benefit and active participation of developing States has largely given way to a focus on privileging individual developing States through access to training programmes and reserved areas. While this shift was initiated by the 1994 Implementing Agreement, it was furthered by the ISA's hesitation to prepare for an independent Enterprise as well as its introduction of an alternative to reserved areas. As Feichtner argues: 'the transformations that the regime is undergoing are promoting a further integration of developing states into an economic order that is characterized by competition and has all but lost its redistributive ambitions'.⁷²

68 ISA, *Regulations on Prospecting and Exploration for Polymetallic Sulphides in the Area*, ISBA/16/A/12/Rev.1 (7 May 2010), regulations 16–19, available at <https://www.isa.org.jm/documents/isba16a12-rev-1>; accessed 27 May 2020; ISA, *Regulations on Prospecting and Exploration for Cobalt-Rich Ferromanganese Crusts in the Area*, ISBA/18/A/11 (22 October 2012), regulations 16–19, available at <https://www.isa.org.jm/documents/isba18a11>; accessed 27 May 2020.

69 Jaeckel *et al.* (n 49).

70 ISA, *Considerations Relating to the Regulations for Prospecting and Exploration for Hydrothermal Polymetallic Sulphides and Cobalt-Rich Ferromanganese Crusts in the Area*, ISBA/7/C/2 (29 May 2001), para 12.

71 PEW/RESOLVE (n 12).

72 Feichtner (n 47).

Security of Mineral Supply

The availability of metals may be regarded as a benefit in its own right. An increase in living standards across the world's middle class equates to an increased demand for metals. As one participant at a July 2018 workshop noted:

The most significant benefit to bestow on current and future generations is providing them with the minerals that they will need for their economic development. A mature deep-sea mining industry will increase the supply of those minerals and thereby hold down prices.⁷³

There is certainly truth in that, although the extent to which future generations can benefit from an increase in metal supply now depends on metal recycling rates and efforts to move towards a circular economy. Moreover, developing States that engage in land-based mining might in fact be adversely affected by reductions in metal prices, as discussed above. Indeed, the African Group of ISA member States recently noted that they will only support a payment regime that 'results in substantial and fair compensation to mankind' and that either 'constrains production from deep-sea mining to a level that does not result in lower metal prices and a loss of government revenue from land-based mining' or 'results in high enough revenue from deep-sea mining for governments with revenues from land-based mining to be fully compensated'.⁷⁴

In recent years, the benefit of mineral supply has also been framed as necessary for shifting to the green economy and scaling up renewable energy technologies that rely on minerals.⁷⁵ In other words, the environmental risks of seabed mining are framed as a necessary cost for achieving another environmental goal, namely reducing carbon emissions. This presents a very recent argument in favour of seabed mining and certainly a significant shift from the originally anticipated benefits. While the jury is still out, some regard seabed mining as a necessary compromise,⁷⁶ whereas others consider this choice to

⁷³ PEW/RESOLVE (n 12).

⁷⁴ African Group, *African Group Submission on the ISA Payment Regime for Deep-Sea Mining in the Area* (5 July 2019) available at <https://ran-s3.s3.amazonaws.com/isa.org/jm/s3fs-public/files/documents/agssmitmodelfinal.pdf>; accessed 27 May 2020.

⁷⁵ D Shukman, 'Renewables' deep-sea mining conundrum' (11 April 2017) *BBC*, available at <https://www.bbc.com/news/science-environment-39347620>; accessed 27 May 2020.

⁷⁶ J Major, 'Deep sea mining could help develop mass solar energy: Is it worth the risk?' (24 April 2017) *The Conversation*.

be a false one, arguing that minerals from the seafloor are not required even to achieve a shift to 100 percent renewable energy supply.⁷⁷

Ecosystem Services

Key benefits which all of humankind derive from the deep oceans are ecosystem services and functions, including oxygen production, carbon dioxide absorption, and climate regulation.⁷⁸ These are current rather than future benefits, and the challenge is to ensure that disturbances to the seafloor from mining would not significantly affect these fundamental ecosystem services. Problematically, it remains unclear which ecosystem services are likely to be impacted by seabed mining,⁷⁹ though scientists are now predicting potentially 'irreversible loss of some ecosystem functions' from nodule mining⁸⁰ and overall biodiversity loss from seabed mining.⁸¹

This is a significant shift from earlier assumptions. In the 1970s, nodule mining was believed to have far fewer environmental consequences than we know today, with some having argued that 'there are virtually no living organisms' around potential mine sites,⁸² which turned out to be entirely incorrect.⁸³ In the 1990s, as scientific understanding of the deep ocean improved, significant environmental impacts of seabed mining were highlighted, although considerable uncertainties remained.⁸⁴ A 1992 study concluded that disturbance from

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- 77 S Teske, N Florin, E Dominish and D Giurco, *Renewable Energy and Deep-Sea Mining: Supply, Demand and Scenarios* (Report prepared by ISF for JM Kaplan Fund, Oceans 5 and Synchronicity Earth, 2016) available at <https://opus.lib.uts.edu.au/handle/10453/67336>; accessed 27 May 2020.
- 78 Folkersen *et al.* (n 24); JT Le, LA Levin and RT Carson, 'Incorporating Ecosystem Services into Environmental Management of Deep-Seabed Mining' (2017) 137 *Deep-Sea Research Part II: Topical Studies in Oceanography* 486–503, doi: 10.1016/j.dsr2.2016.08.007.
- 79 Le *et al.* (n 78).
- 80 E Simon-Lledó, BJ Bett, VAI Huvenne *et al.*, 'Biological Effects 26 Years after Simulated Deep-Sea Mining' (2019) 9 *Scientific Reports* 8040, doi: 10.1038/s41598-019-44492-w.
- 81 CL Van Dover, JA Ardron, E Escobar *et al.*, 'Biodiversity Loss from Deep-Sea Mining' (2017) 10 *Nature Geoscience* 464–465, doi: 10.1038/ngeo2983; HJ Niner, JA Ardron, EG Escobar *et al.*, 'Deep-Sea Mining with No Net Loss of Biodiversity—An Impossible Aim' (2018) 5 *Frontiers in Marine Science* 53, doi: 10.3389/fmars.2018.00053.
- 82 DB Johnson and DE Logue, 'US economic interests in law of the sea issues' in Ryan C Amacher (ed), *The Law of the Sea: US Interests and Alternatives* (AEI Press, Washington, DC, 1975), at p. 47.
- 83 DOB Jones, DJ Amon and ASA Chapman, 'Mining Deep-Ocean Mineral Deposits: What Are the Ecological Risks?' (2018) 14 *Elements* 325–330, doi:10.2138/gselements.14.5.325.
- 84 JM Markussen, 'Deep Seabed Mining and the Environment: Consequences, Perceptions, and Regulations' (1994) *Green Globe Yearbook of International Co-operation on Environment and Development* 31–39, at p. 34; CL Morgan, N Allotey Odunton and AT Jones, 'Synthesis of Environmental Impacts of Deep Seabed Mining' (1999) 17(4) *Marine Georesources*

manganese nodule mining would likely have 'a large scale severe and disastrous impact on the seabed and the benthic community'.⁸⁵ However, the effects of sedimentation at far distances from the mining site were considered to have been overestimated.⁸⁶ As scientific knowledge has advanced in the period since the 1990s, these predictions have increased in respect of severity of potential impact,⁸⁷ with a 2011 study concluding that due to the environmental conditions of abyssal nodule habitats, 'the mechanical and burial disturbances resulting from commercial-scale nodule mining are likely to be devastating'.⁸⁸ In addition, concerns are being raised about the potential of mining plumes to affect the mid-water column, including through introduction of metal pollution to commercially-fished species such as tuna.⁸⁹

A 2019 study concluded that the ecological footprint of nodule mining 'may be greater than expected'.⁹⁰ The DISCOL site, a scientific experiment involving seafloor disturbances on a small scale carried out in 1989 remains heavily impacted today. As Thiel, the lead scientist on the original experiment concludes: 'The disturbance is much stronger and lasting much longer than we ever would have thought'.⁹¹ In short, the more scientists learn about deep-

and *Geotechnology* 307–356, doi: 10.1080/106411999273666, at p. 329; H Thiel, 'Deep-Sea Environmental Disturbance and Recovery Potential' (1992) 77 *Internationale Revue der gesamten Hydrobiologie und Hydrographie* 331–339, at p. 335; DD Trueblood, E Ozturgut, M Pilipczuk and IF Gloumov, 'The Ecological Impacts of the Joint U.S.-Russian Benthic Impact Experiment' (1997) *Proceedings of the ISOPE Ocean Mining Symposium* 139–145, at p. 139.

85 Thiel (n 84), at p. 333.

86 Trueblood *et al.* (n 84), at p. 139; H Amann and H Beiersdorf, 'The Environmental Impact of Deep Sea Mining' (1993) *Proceedings of the 25th Annual Offshore Technology Conference* 213–231, at p. 218.

87 CL Van Dover, 'Impacts of Anthropogenic Disturbances at Deep-Sea Hydrothermal Vent Ecosystems: A Review' (2014) 102 *Marine Environmental Research* 59–72, doi: 10.1016/j.marenvres.2014.03.008; E Ramirez-Llodra, PA Tyler, MC Baker *et al.*, 'Man and the Last Great Wilderness: Human Impact on the Deep Sea' (2011) 6 *PLoS ONE* 1–25, doi: 10.1371/journal.pone.0022588; Beaulieu *et al.* (n 37); DOB Jones, S Kaiser, AK Sweetman *et al.*, 'Biological Responses to Disturbance from Simulated Deep-Sea Polymetallic Nodule Mining' (2017) 12 *PLoS ONE*, doi: 10.1371/journal.pone.0171750; Midas Consortium, 'Managing Impacts of Deep Sea Resource Exploitation: Research Highlights' (2016) available at https://www.eu-midas.net/sites/default/files/downloads/MIDAS_research_highlights_low_res.pdf; accessed 27 May 2020.

88 Ramirez-Llodra *et al.* (n 87).

89 J Drazen, C Smith, K Gjerde *et al.*, 'Report of the Workshop Evaluating the Nature of Midwater Mining Plumes and Their Potential Effects on Midwater Ecosystems' (2019) *Research Ideas and Outcomes*, e33527, doi: 10.3897/rio.5.e33527.

90 Simon-Lledó *et al.* (n 80).

91 Heffernan (n 8), at p. 468.

ocean ecosystems, the more concerned they become about the magnitude of the environmental impacts of seabed mining.

Environmental considerations have been part of the Area regime from the start and were already reflected in the UN's 1970 Declaration of Principles.⁹² Similarly, the CHM captures the conservation and preservation of natural and biological resources for both present and future generations.⁹³ The LOSC imposes on the ISA an obligation to protect the marine environment from harm caused by seabed mining.⁹⁴ As noted above, the ISA must strike a balance between mineral exploitation and its environmental obligations.

The importance of environmental protection was universally accepted and did not form part of renegotiating the controversial aspects of CHM in the early 1990s.⁹⁵ Indeed, if anything, the environmental obligations of the ISA have increased in importance over the years, with the 1994 Implementing Agreement specifically acknowledging 'the growing concern for the global environment'.⁹⁶ Since then, in line with growing concern in the scientific community about the potential ecological consequences of seabed mining, the ISA has gradually strengthened its environmental standards.⁹⁷

Peter Thompson, Special Envoy of the UN Secretary-General for the Ocean, recently called for a precautionary pause on seabed mining to await the outcome of the UN Decade for Ocean Science from 2021 to 2030 'before we start even thinking about disturbing the seabed of the high seas'.⁹⁸ While current discussions at the ISA are a long way off a temporary moratorium, ISA member

92 K Mickelson, 'Common Heritage of Mankind as a Limit to Exploitation of the Global Commons' (2019) 30 *European Journal Of International Law* 635–663, doi: 10.1093/ejil/chz037; A Jaeckel, KM Gjerde and JA Ardron, 'Conserving the Common Heritage of Humankind: Options for the Deep-Seabed Mining Regime' (2017) 78 *Marine Policy* 150–157, doi:10.1016/j.marpol.2017.01.019; UNGA, *Declaration of Principles Governing the Seabed and the Ocean Floor, and the Subsoil Thereof, beyond the Limits of National Jurisdiction*, UN Doc A/RES/2749(XXV) (17 December 1970).

93 Jaeckel, Gjerde, and Ardron (n 91).

94 LOSC (n 4), Art 145.

95 ISA, *Secretary-General's Informal Consultations on Outstanding Issues Relating to the Deep Seabed Mining Provisions of the United Nations Convention on the Law of the Sea: Collected Documents* (ISA, 2002), at p. 77, para 46, available at <http://www.isa.org.jm/files/documents/EN/Pubs/SG-InformConsultations-ae.pdf>; accessed 27 May 2020; AL Jaeckel, *The International Seabed Authority and the Precautionary Principle* (Brill Nijhoff, Leiden, 2017), at p. 119–120.

96 1994 Implementing Agreement (n 7), preamble, para 3; Annex, section 1(5)(g).

97 Jaeckel (n 95), chapter 5.

98 Remaoun (n 33).

States have argued for strong environmental standards and a 'precautionary approach to all aspects of the mining code'.⁹⁹

Giving effect to its environmental mandate, and thereby securing environmental benefits for humankind, is one of the ISA's most difficult tasks. The CHM concept, as well as the ISA's far-reaching environmental mandate, offers an opportunity to reassess which benefits can be derived from the Area and which ones are in the interest of humankind as a whole, taking into account that some benefits will be primarily reaped by corporate mining entities rather than humankind. Mickelson speculates about a willingness of States in the years to come 'to again readjust and reduce the emphasis on exploitation based on an enhanced global awareness and appreciation of environmental and ethical concerns' and argues that 'such a shift would in fact be easier to reconcile with CHM's underlying values'.¹⁰⁰

Scientific Knowledge

Scientific knowledge about the deep ocean is widely considered to be of benefit to humankind as a whole.¹⁰¹ Marine scientific research has helped to discover the existence of valuable marine genetic resources and brings us closer to searching for life on other planets.¹⁰² As the ISA Secretary-General highlighted: 'The benefits to mankind of deep seabed exploration extend far beyond simply knowledge of the mineral resources but include scientific knowledge of the marine environment that will be critical to realizing all aspects of the Blue Economy'.¹⁰³

The LOSC requires States to promote cooperative research programmes that benefit developing States and technologically less developed States.¹⁰⁴ Scientific knowledge of the deep ocean is advanced through pure academic research as well as commercial research in the context of exploring for minerals

99 Canada, *Statement of Canada, Australia and New Zealand to the 25th Assembly Session of the ISA* (23 July 2019) available at https://ran-s3.s3.amazonaws.com/isa.org/jm/s3fs-public/files/documents/canz_0.pdf; accessed 27 May 2020.

100 Mickelson (n 92), at p. 646.

101 PEW/RESOLVE (n 12); MW Lodge, 'The Common Heritage of Mankind' (2012) 27 *International Journal of Marine and Coastal Law* 733–742, doi: 10.1163/15718085-12341248.

102 CL Van Dover, S Arnaud-Haond, M Gianni *et al.*, 'Scientific Rationale and International Obligations for Protection of Active Hydrothermal Vent Ecosystems from Deep-Sea Mining' (2018) 90 *Marine Policy* 20–28, doi: 10.1016/j.marpol.2018.01.020.

103 M Lodge, *Statement at a Side Event on Deep Sea Mining Hosted by H. E. Baron Divavesi Waqa, President of Nauru, during the Forty-Ninth Pacific Island Forum Leaders Meeting, Nauru Island, 3 September 2018*, available at <https://ran-s3.s3.amazonaws.com/isa.org/jm/s3fs-public/documents/EN/SG-Stats/pif-nauru.pdf>; accessed 27 May 2020.

104 LOSC (n 4), Art 143(3).

or marine genetic resources. Scientific knowledge holds intrinsic value and enables environmental management of ocean industries. But again, we need to question whether all of humankind has equal access to and benefit from that knowledge.

Other Uses of the Area and Deep Oceans

Lastly, uses of the Area *not* related to mining can be of great benefit to humankind. For example, submarine cables crossing the Area deliver crucial telecommunication services. Studying ecosystems around hydrothermal vents as well as other marine genetic resources can, and in some cases already does, yield significant benefits for humankind,¹⁰⁵ although the benefits are currently not equitably distributed.¹⁰⁶ Examples of such benefits include improved preservation of organs for transplants using knowledge about oxygen transport gained from vent tubeworms.¹⁰⁷

Studying marine genetic resources for medical and biotechnological applications can be in direct competition with seabed mining because genetic resources may occur exclusively in some of the habitats that also house high-grade mineral deposits. Researchers have called for a moratorium on mining around *active* hydrothermal vents, to realise the opportunity of studying vent ecosystems for their scientific, cultural, and commercial value.¹⁰⁸

When the original legal framework for seabed mining was negotiated, the potential of marine genetic resources was not yet envisioned. It would seem imprudent to ignore such crucial new information about the existence of promising biological resources when evaluating what benefits humankind can derive from the international seabed. As Beaulieu *et al.* note: '[r]egulations need to be flexible enough to accommodate new knowledge from scientific research that may dramatically change our view of the global ocean resource potential'.¹⁰⁹ Folkersen *et al.* invite us to adopt a long-term perspective when estimating economic value of the deep ocean. Mineral mining generates one-off revenue as seabed minerals are non-renewable resources, while other uses of the space may generate more long-term, sustainable profit.¹¹⁰

¹⁰⁵ Van Dover *et al.* (n 102).

¹⁰⁶ R Blasiak, JB Jouffray, CCC Wabnitz *et al.*, 'Corporate Control and Global Governance of Marine Genetic Resources' (2018) 4 *Science Advances*, doi: 10.1126/sciadv.aar5237.

¹⁰⁷ J Simoni, 'New Approaches in Commercial Development of Artificial Oxygen Carriers' (2014) 38 *Artificial Organs* 621–624.

¹⁰⁸ Van Dover *et al.* (n 102).

¹⁰⁹ Beaulieu *et al.* (n 37).

¹¹⁰ Folkersen *et al.* (n 21).

Conclusion

The vision of the benefits that can be derived from our common heritage of mankind has significantly changed over time. The promise of future benefits has ranged from wealth generation and redistribution to active involvement of developing States and reduction of inequality. These promises have gradually given way to a narrative of needing to increase mineral supply for a growing population as well as the shift to a green economy, with the latter utilising an environmental narrative to justify a new extractive industry. As Collins and French note, 'the utopian aspects of the underlying principles infused within CHM, conceived on the floor of the UN General Assembly many decades ago, now seem a distant past'.¹¹¹

The change in vision was accompanied by an increase in knowledge about the deep ocean over the past four decades. The LOSC was negotiated without knowledge of marine genetic resources around hydrothermal vents and the seriousness of the environmental impacts that seabed mining would cause. Moreover, the negotiations occurred at a time of false promises regarding the economic potential of seabed mining.¹¹² Indeed, it remains unclear today whether seabed mining can be economically viable, which would be a prerequisite for realising the anticipated benefits of wealth generation and redistribution. In order to determine the full cost and benefits of seabed mining, it will be necessary to include the natural capital and ecosystem services in economic modelling, which remains a challenging task at present.

Knowing what we know today, it is timely to ask what benefits we could, and in some cases already do, reap from our common heritage of humankind. Current benefits include ecosystem services, submarine cables, marine scientific research, training programmes, and early benefits derived from marine genetic resources. Two of these, ecosystem services and increased knowledge from scientific research, are particularly important in the context of climate change, not least because of the deep oceans' natural carbon sequestration mechanisms. The industry building around marine genetic resources serves as a reminder that the Area's resource potential may be broader than originally anticipated, though questions around equitable benefit sharing may be just as applicable as they are in the Area regime.

The aim of advancement of developing States, a key ambition of the Area regime, has been significantly altered, both through the 1994 Implementing Agreement and subsequent actions by the ISA. The original vision of collective

¹¹¹ Collins and French (n 10).

¹¹² Johnson and Logue (n 82).

benefit and agency gave way to the current expression of the CHM, which focuses on benefiting individual developing States through the sponsorship system. This focus on individual sponsoring States, rather than collectively engaging in seabed mining through the Enterprise, greatly increases financial and legal risks for developing States and reduces the likelihood of the Enterprise becoming operational.

The more recently articulated benefits of increased mineral supply and lower mineral prices could be reaped by some consumers but would negatively affect developing State land-based mineral producers whose interests are recognised by the LOSC. Similarly, it remains unclear whether minerals from the seafloor are indeed required for a transition to a green economy.

In the context of developing the first exploitation regulations, the ISA has the opportunity to re-evaluate which benefits we can draw from the Area. Indeed, the ISA's 2019 draft exploitation regulations include the CHM as a criterion to assess whether an application for an exploitation contract should be approved. They require the ISA to have regard to 'the manner in which the proposed Plan of Work contributes to realizing benefits for mankind as a whole'.¹¹³ In other words, the ISA will need to consider the value of an individual mining operation to all of humankind. That requires clarity on what the relevant benefits are, and how they might be measured. This article seeks to contribute to answering these questions by critically analysing some of the current and future benefits we can derive from our common heritage.

¹¹³ ISA, *Draft Regulations on Exploitation of Mineral Resources in the Area* (ISBA/C/25/WP.1, 22 March 2019), <https://www.isa.org.jm/document/isba25cwp1-o>, regulation 12(3).