Sharing benefits of the common heritage of mankind – is the deep seabed mining regime ready?

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Abstract:

The 1982 United Nations Convention on the Law of the Sea declares the seabed beyond national jurisdiction and its mineral resources as the "common heritage of mankind" (CHM). This article examines the operationalisation of the CHM principle in the international seabed mining regime, with focus placed on the sharing of benefits derived from mining. The article begins by providing an overview of the CHM principle, before examining four modalities provided for in the Convention, both institutional and substantial, and their role in giving effect to the CHM principle: (1) financial benefits; (2) the "Enterprise"; (3) the parallel system of reserved areas; and, (4) marine scientific research. Finally, overarching issues are discussed and some suggestions on ways forward are presented. The article considers that the deep seabed mining regime is not yet ready to effectively share the benefits derived from the common heritage of mankind. In particular, the future of the Enterprise is uncertain and changes to the so-called parallel system that affects the CHM have received minimal discussion. Moreover, a lack of publicly available research data related to seabed mining is hindering current benefits for humankind. However, work is underway at the International Seabed Authority to establish rules and policies with respect to the sharing of financial benefits. While the CHM principle remains largely untested, approaches that are transparent, inclusive, accountable, and equitable are more likely to be successful.

Keywords: common heritage of mankind; deep seabed mining; International Seabed Authority; benefit-sharing

1. Introduction

Over the past 50 years, the deep sea has been intermittently considered as a source for minerals and metals. However, deep sea mining (DSM) has proven elusive, with many engineering, financial, and regulatory issues still unresolved. Spurred by historically high metal prices in 2010 and 2011 (which have since declined), DSM once again captured political, scientific, public, and critically, investor interest.[1] Although outside the particular focus of this paper on areas beyond national jurisdiction, DSM laws and regulations are being developed in several national jurisdictions, particularly Pacific Island States [2][3][4][5], and in one case mining could conceivably begin in the near future [6].

The foundation of the legal regime for mineral mining on the seabed in areas beyond national jurisdiction, legally known as the Area, is set out in Part XI of the 1982 United Nations Convention on the Law of the Sea (LOSC).[1] Central to the negotiations of the international seabed mining regime were the questions of ownership and reaping the benefits from seabed mineral resources (whether solid, liquid or gaseous). In 1970, UN General Assembly Resolution 2749 declared the Area and its resources to be the "common heritage of mankind" (CHM)[7], a principle that was later enshrined in the LOSC.[2] This characterisation informs every aspect of the international seabed mining regime and establishes a legal distinction between the Area and the water column, which is still governed by the principle of the freedom of the high seas.

The historical development of the LOSC, and in particular the provisions to operationalise the CHM principle, is discussed in detail elsewhere [8][9][10][11][12][13]. By way of a very brief summary, a central aim, in particular for developing States,[3] was to ensure that the benefits of deep seabed mining would not be solely reaped by the handful of industrialised States that possessed the capacity to make substantial investments to develop seabed mining technology. The concern was that developing States might effectively be excluded from enjoying the economic potential of seabed minerals and further, that land-based mineral-exporting developing States could be disadvantaged by a rise in global metal supply [14]. The CHM principle encapsulated the need to share the benefits of this mineral wealth and to establish an international organisation to manage the common heritage on behalf of 'mankind as a whole.'[4] As such, the International Seabed Authority (ISA), established by the LOSC, is the institutional manifestation of the CHM principle.

[1] United Nations Convention on the Law of the Sea (adopted 10 December 1982, entered into force 16 November 1994) 1833 UNTS 3.
[2] LOSC, Article 136.
[3] In the context of seabed mining, the term "developing State" is not defined. Singapore and China have successfully applied for exploration contracts for minerals in areas reserved for developing States.
[4] LOSC, Articles 137(2), 153(1).

However, the CHM principle, and in particular the measures through which it would be operationalised, was not uncontroversial. Indeed, during the negotiations of the LOSC, "nothing tested so sorely the ability of diplomats from various corners of the world to reach common ground than the goal of conserving that common heritage and profiting from it at the same time" [15]. After the adoption of the LOSC, some of its provisions, in particular those concerning DSM benefit-sharing, continued to be divisive. Several industrialised States interested in DSM refrained from signing the Convention. Thus, a second set of negotiations began on what would become the Part XI Implementing Agreement (IA).[5] Although in its preamble, the IA reaffirms the Area as the common heritage of mankind, it weakens several of the provisions of the LOSC that dealt with the distribution of benefits. The IA ensured almost universal support for the LOSC. However, it left the details regarding the sharing of benefits to be developed in the future, under the auspices of the ISA.

The ISA now faces the difficult task of determining the precise parameters of the benefit-sharing arrangements. Over the course of the past two decades, the ISA has been developing its Mining Code, a collective term for the regulations and recommendations that set out the detailed rules, regulations, and procedures for seabed mining in the Area [16]. Having agreed upon the regulations concerning the exploration of seabed minerals, the ISA is now developing exploitation regulations. However, significant questions still remain regarding the operationalisation of the CHM principle, and in particular the sharing of benefits.

2. The common heritage of mankind and the International Seabed Authority

The principle of the common heritage of mankind is as fundamental to the international seabed mining regime as it is controversial. Article 136 of the LOSC, declaring the Area and its resources to be the CHM, is "one of the most contentious yet also one of the most symbolic provisions of the Convention" [17]. The CHM principle guides the interpretation and application of Part XI [18] and its fundamental importance is reflected in Article 311(6) of the LOSC, which specifically prohibits any amendment to the basic CHM principle. Although no definition of the CHM principle is provided in either the LOSC or the IA (or indeed the ISA's Mining Code), the broad scope of the principle is captured in several key provisions of Part XI of the LOSC:

1) Article 137 confirms that "[a]ll rights in the resources of the Area are vested in mankind as a whole" and prohibits any claims of sovereignty or sovereign rights over the Area and its resources.

[5] Agreement Relating to the Implementation of Part XI of the United Nations Convention on the Law of the Sea, (adopted 28 July 1994, entered into force 28 July 1996) 1836 UNTS 3.

2) Articles 156 to 185 set out the common management of the Area through the ISA.

3) Article 141 requires any use of the Area to be exclusively for peaceful purposes.

4) Article 145 requires the ISA to protect the marine environment from harmful effects of seabed mining.

5) Pursuant to Article 143, marine scientific research in the Area is to be carried out exclusively for the benefit mankind as a whole. In order to support developing States, the ISA and its member States must support the research capacity of developing States (Article 143(3)(b)), support the transfer of technology and scientific information relating to seabed mining (Article 144; section 5 of the Annex to the IA), and provide for the effective participation of developing States in the seabed mining regime (Article 148).

6) Article 139 sets out the responsibility of States parties to ensure that mining activities in the Area are carried out in conformity with the international regulatory framework.

7) For the purposes of this article the most important provisions relate to the benefit-sharing requirements. Article 140(1) requires that seabed mining activities in the Area must be carried out for the benefit of mankind as a whole, taking into particular consideration the interests and needs of developing States. Pursuant to Article 140(2), the ISA shall provide for the "equitable sharing of financial and other economic benefits" derived from activities in the Area.

In sum, the CHM principle requires the ISA to act as a custodian or, as Ambassador Pardo dubbed it, the "trustee" [19], of the Area and to ensure the equitable sharing of any benefits (as well as the preservation of the marine environment) for present and future generations [20][21][22]. To that end, the ISA is required to further elaborate the parameters of the benefit sharing system. In the next section, this paper explores four modalities, in various stages of development, which could assist in meeting this critical, but challenging, part of the ISA's mandate.

3. Modalities of benefit-sharing

As noted above, the sharing of benefits is an integral element of the common heritage of mankind principle. However, it is yet to be determined which specific measures will be taken by the ISA and its States parties to operationalise this obligation. The following sections provide a brief discussion of four potential, non-exclusive and non-exhaustive, approaches.

3.1. Sharing of financial benefits

The mining of deep sea mineral resources can be seen as the conversion of natural capital into financial capital. Therefore, a fiscal mechanism is arguably the most direct approach for sharing the benefits of this conversion. The ISA is specifically required to "provide for the equitable sharing of financial and other economic benefits derived from activities in the Area […]"[6] and to develop rules, regulations, and procedures to this end, through its Finance Committee.[7]

In developing these rules, the ISA must be guided by six principles set out in Section 8 of the Annex to the IA. These require *inter alia* a payment system to be fair, non-discriminatory, simple, and within the range of payments prevailing for land-based mining. In addition, the payment system must ensure a process for monitoring compliance.

Interestingly, Section 8 of the Annex to the IA does not require consideration of the Enterprise, the commercial arm of the ISA discussed below, when developing financial regulations. In contrast, the original objectives, set out in Article 13 of Annex III to the LOSC, to guide the ISA in developing such regulations mandate the effective engagement of the Enterprise in seabed mining. Moreover, they require incentives for joint arrangements with the Enterprise and developing States "to stimulate the transfer of technology thereto, and to train the personnel of the Authority and of developing States."[8] Although the IA does not repeal these provisions, the six objectives set out in the IA nevertheless take precedent [18].

While a detailed analysis of these principles is beyond the scope of this paper, a number of observations can be made in relation to the obligation to share the benefits of the CHM.

Fairness and oversight

Developing the financial terms of contracts will involve balancing the interests of contractors and humankind as a whole, "on whose behalf the Authority shall act."[9] To arrive at a formulation that guarantees a fair outcome to all interests, transparent discussions will be crucial. However, the Finance Committee, which is responsible for drafting the "[r]ules, regulations, and procedures on the equitable sharing of financial and other economic benefits […]",[10] meets in private and there is limited reporting of these deliberations. This lack of transparency also complicates the prevention of conflicts of interests. The IA requires that "members of the Finance Committee shall have no financial interest in any activity relating to matters upon which the Committee has the responsibility

[6] LOSC, Article 140(2).
[7] LOSC, Article 160(2)(f), (g), 162(2)(o); IA, Annex Section 9(7).
[8] LOSC, Annex III Article 13(1)(d).
[9] LOSC, Article 137(2).
[10] IA, Annex Section 9(7)(f).

to make recommendations."[11] However, unlike the Legal and Technical Commission (LTC),[12] the Finance Committee does not yet have procedures to address potential conflicts of interest.

Lastly, a system of payment must generate sufficient revenue to finance monitoring schemes by the ISA.[13] Again, it will be important for these schemes to provide transparent information to allow for a clear assessment of whether the CHM principle, including obligations towards benefit-sharing, is being fully implemented.

Nature of the payment system

When selecting a payment system, the risks to humankind and the ISA's ability to share the financial benefits of seabed mining must be taken into account. Whilst outside the scope of this paper, it is worth noting that different systems bring with them varying amounts of potential income as well as risk. For example, the risks associated with a royalty system can be low, as income is collected regardless of whether or not the mining operation is profitable. So long as the resource is being extracted, some income is being generated. Other forms of payment schemes, such as progressive taxation and joint-ventures, are linked to profitability. As such, they could generate little or no revenue when markets are in decline but high revenues when the markets are buoyant. These latter systems carry the risk of mining operations being conducted at a loss during difficult times, accompanied with the ensuing environmental harm, but without any financial benefits for humankind.

3.2. The Enterprise

Perhaps the boldest measure envisaged by the LOSC to institutionalise benefit-sharing is the creation of the Enterprise, the commercial arm of the ISA.[14] The Enterprise was designed to directly carry out exploration for and exploitation of seabed minerals as well as transporting, processing, and marketing of minerals.[15] It was to be a communitarian feature of Part XI that would enable joint seabed mining operations with some of the profits being distributed amongst States parties, particularly developing States.[16] The LOSC envisages the Enterprise as an organ of the ISA[17] albeit

[11] IA, Annex Section 9(6).
[12] ISA, Rules of Procedures of the Legal and Technical Commission, Rules 11, 13.
[13] IA, Annex Section 8(1)(a).
[14] LOSC, Article 158(2), Annex IV.
[15] LOSC, Article 170(1), Annex IV Article 1.
[16] LOSC, Article 173. See also LOSC, articles 140(2), 160(2)(g) and Annex IV, Article 10.
[17] LOSC, Article 170(1).

enjoying "autonomy in the conduct of its operations."[18] However, in accordance with the evolutionary approach to setting up the organs of the ISA,[19] and with the revisions contained in the IA,[20] the Enterprise is not yet operational.

In the meantime, an interim Director-General has been appointed from within the Secretariat staff to oversee the would-be Enterprise's rather modest initial functions, including assessing relevant technological developments and results of marine scientific research.[21] Whether the Enterprise will ever become operational is debateable. The IA makes the transition for the Enterprise to an independently functioning organ contingent upon approval by the Council and adherence to commercial principles.[22] Specifically, the Council must "take up the issue of the [independent] functioning of the Enterprise" once the first exploitation plan is approved or an application for a joint-venture operation is received.[23] In order to minimise costs for States parties, the Enterprise's initial deep seabed mining operations must be conducted by means of joint-ventures [23].[24] However, the Council will only establish an independently functioning Enterprise, "if joint-venture operations with the Enterprise accord with sound commercial principles."[25] Moreover, the IA removes any obligation for States parties to finance the Enterprise,[26] which calls into serious question the feasibility of an independently operating Enterprise.

It must be noted that the IA was adopted in the context of encouraging private sector involvement in deep seabed mining and bringing the regime in line with a market-driven economy. As such, the IA also strengthened the role of contractors in relation to the Enterprise. For example, the IA repealed the obligation to reserve specific amounts of minerals for production by the Enterprise.[27] Moreover, in the case of a joint-venture involving the Enterprise, the contractor who originally contributed the reserved area has a right of first refusal to enter into a joint-venture.[28] If no application has been submitted for the reserved area within 15 years, the contractor who originally contributed the area is entitled to submit an application "provided it offers in good faith to include the Enterprise as a joint-venture partner."[29] As such, whilst a contractor has an initialobligation to research a second

[18] LOSC, Annex IV Article 2.
[19] IA, Annex Section 1(3).
[20] IA, Annex Section 2(2).
[21] IA, Annex Section 2(1).
[22] IA, Annex Section 2(2).
[23] IA, Annex Section 2(2).
[24] IA, Annex Section 2.
[25] IA, Annex Section 2(2) .
[26] IA, Annex Section 2(3). Compare LOSC, Article 144, Annex IV Article 11(3).
[27] IA, Annex Section 6(7).
[28] IA, Annex Section 2(5).
[29] IA, Annex Section 2(5).

site to be reserved, the amendments made by in the IA enable that contractor to potentially receive full exploitation rights over that site.

In sum, the changes introduced by the IA make the existence of the Enterprise as a mining entity tentative, and reliant on joint-ventures with States or the private sector. As discussed in the next section, the introduction of a profit-sharing option as an alternative to reserved areas, could further alter the potential role of the Enterprise.

3.3. Changes to the parallel system: reserving mining areas for developing States?

One measure provided for in the LOSC to support developing States to participate in and share the benefits of seabed mining is the so-called parallel system.[30] The parallel system requires an application for an exploration contract to include information for two sites of estimated equal economic value, capable of permitting two mining operations.[31] If successful, the applicant receives a contract covering one of the sites, whilst the second site becomes a reserved area held by the ISA. The minerals of a reserved area can then be explored and exploited by the Enterprise or a developing State[32] without the costs and efforts associated with locating a potential mine site.

However, the legal framework has been adjusted in recent years, which has significantly altered the nature and functioning of the parallel system. Whilst the current Nodules Exploration Regulations require all applications to contribute a reserved area (unless the application is in respect to a reserved area),[33] the Sulphides and Crusts Exploration Regulations offer applicants a choice between (a) contributing a reserved area or (b) offering an equity interest in a joint-venture arrangement.[34] If an applicant opts for the latter, the Enterprise will receive a share of any profits (at least 20%, and up to 50% if so negotiated), from the contractor's future exploitation of minerals.[35] The rationale behind this change was that sulphides and crusts are qualitatively different from nodules as they are three-dimensional deposits, rendering it difficult to determine their size. In order to identify two sites of equal estimated commercial value, the applicant has to undertake substantial exploration work, including drilling, at the pre-application stage [24].

The equity interest / joint-venture option provides an alternative to the parallel system, which has implications for the operationalisation of the common heritage principle. The potential follow-on

[30] LOSC, Article 153, Annex III Articles 8, 9.
[31] LOSC, Annex III Article 8; IA, Annex Section 1(10).
[32] LOSC, Annex III Articles 8, 9.
[33] Nodules Exploration Regulations, Regulations 15-18.
[34] Sulphides and Crusts Exploration Regulations, Regulations 16-19.
[35] Sulphides and Crusts Exploration Regulations, Regulation 19(2). The specific terms with respect to equity interests have yet to be developed.

effects of this change has to date been subject to little discussion. Specifically, reserved areas lower the threshold for an interested developing State to actively participate in mining the common heritage by assisting it in locating commercially viable mining sites. A joint-venture, on the other hand, does not directly assist any particular State but instead provides for the sharing of monetary benefits more broadly to all eligible States through the Enterprise (though the nature of this distribution has not yet been specified). The development of scientific, technical, and operational expertise for developing States (as envisioned under, *inter alia*, Articles 143, 144, and 148 of the LOSC) will therefore not be a direct outcome of the joint-venture option, which only considers an equity interest as a tangible outcome. Moreover, under the Sulphides and Crusts Exploration Regulations it would appear that every applicant must offer either a joint-venture arrangement or contribute a reserved area.[36] In other words, even developing states seeking exploration rights over a reserved area may have to grant the Enterprise an equity interest, although this has not yet been tested in practice.

At present, nine out of the ten contractors that have undertaken exploration work for sulphides or crusts selected the equity interest / joint-venture option [25]. Moreover, in 2013, the Council requested the LTC to review the Nodules Exploration Regulations with a view to potentially incorporating the joint-venture option [26]. If such an amendment will be agreed and the current rate of uptake for the equity interest / joint-venture option continues, there might not be many additional reserved areas. Thus, by making reserved areas optional, the Mining Code erodes what was envisioned in the LOSC as an important mechanism to build seabed mining capacities of developing States under the CHM principle.

Nevertheless, it is also possible that in the long-term the equity interest / joint-venture option could offer a more secure revenue stream to the Enterprise, and hence presumably developing States, than reserved areas, which still need to be explored, and technology developed, prior to exploitation. Because the Mining Code specifies that 10% of the equity interest must be treated *pari passu* (on the same footing) with the equity participation of the applicant, the Enterprise should receive an income as soon as commercial exploitation were to begin.[37] (The remaining equity interest, however, would only be paid out after the applicant has recouped its costs, which may take some time.[38])

[36] See the difference between the Sulphides and Crusts Exploration Regulations (Regulation 16) and the Nodules Exploration Regulations (Regulation 15).
[37] Sulphides and Crusts Exploration Regulations, Regulation 19(2)(a)(i).
[38] Sulphides and Crusts Exploration Regulations, Regulation 19(2)(a)(ii).

At present, in line with the LOSC,[39] six reserved areas have been allocated to applicants sponsored by developing States. However, some of these exploration operations involve companies from developed States, including the ones that originally contributed the reserved area (see table 1). Whether the sponsoring States, at least some of which are developing States, benefit from the arrangement depends on the terms of the confidential agreement they have entered into with the companies in question. Currently, there are no minimum standards for these agreements with respect to the sharing of benefits – monetary or otherwise.

Table 1: Information on the exploration contracts covering reserved areas

Sponsoring state	Information on the contract
Nauru	When the application for an exploration contract was submitted in 2008, it involved a local subsidiary of Nautilus Minerals Inc., a Canadian company. By the time the application was approved in 2011, the affiliation between Nauru and Nautilus Minerals had ceased. Instead, the exploration contract now involves DeepGreen Resources Inc., the Deputy Chairman of which was the former CEO of Nautilus Minerals [27][28]. *ISA. ISBA/17/C/9 (11 July 2011), paragraph 17*
Tonga	The exploration contract involves a local subsidiary of Nautilus Minerals Inc. *ISA. ISBA/17/C/10* (8 July 2011), paragraph 15*
Kiribati	The exploration contract is held by a State enterprise owned and controlled by the Republic of Kiribati. The reserved area was originally contributed by the Korean Government. *ISA. ISBA/18/C/18 (18 July 2012), paragraphs 1, 11.*
Singapore	The exploration contract is held by Ocean Mineral Singapore Pte Ltd. (OMS), a subsidiary of the Singaporean corporation Keppel Corporation Limited. The reserved area was originally contributed by UK Seabed Resources Ltd. (UKSRL), a subsidiary of Lockheed Martin UK Holdings Ltd., which in turn is part of the US defence company, Lockheed Martin Corporation. OMS invited UKSRL to be a minority, non-controlling shareholder. *ISA. ISBA/20/C/7 (25 February 2014), paragraph 10*
Cook Islands	Once signed, the exploration contract will be held by a State enterprise but involves G-TEC Sea Mineral Resources NV, a Belgian corporation. The reserved area was originally contributed by G-TEC. *ISA. ISBA/20/C/18 (9 July 2014), paragraph 19*
China	The exploration contract is held by a Chinese company, China Minmetals Corporation. The reserved area was contributed by China Ocean Mineral Resources Research and Development Association (COMRA), a Chinese State enterprise; Yuzhmorgeologyia, a Russian State enterprise; and Interoceanmetal Joint Organization, a consortium formed by Bulgaria, Cuba, Czech Republic, Poland, Russia, and Slovakia. China Minmetals Corporation noted that it is not affiliated with COMRA. *ISA. ISBA/21/C/2 (5 March 2015), paragraphs 14, 20*

In contrast, the equity interest system will likely provide for the sharing of benefits, albeit only monetary benefits, under the auspices of the ISA. Whether this system can enable developing States to acquire the skills and technologies necessary to fully participate in seabed mining, as foreseen in

[39] LOSC, Annex III Article 9(4).

the LOSC,[40] is, however, doubtful. In any event, a shift away from reserved areas would also affect the future functioning of the Enterprise from that of an independent mining entity to one of a silent partner.

3.4. Benefits derived from marine scientific research

Sharing the benefits of the common heritage of mankind also extends to benefits regarding knowledge and expertise [29]. For DSM, these include non-monetary benefits, such as expanding human knowledge of the deep ocean and seafloor.[41] Indeed, given the long lead time of commercial seabed mining, perhaps the most likely benefit arising from DSM, at present, is the knowledge and expertise developed through scientific research, prospecting, and exploration activities[14][30][31]. The ISA is charged with promoting as well as coordinating and disseminating the results of such research and analysis where available.[42] However, to date, very little scientific and environmental data have been made available[32], despite the fact that it has been highlighted on numerous occasions that environmental data should not be confidential but instead freely available [33][34].[43] As a result, this potentially significant ancillary benefit arising from the development of the CHM has been hindered.

A further non-financial benefit relates to capacity building for developing States.[44] To support the participation of scientists and technical personnel from developing States in deep seabed mining, contractors are required to offer training programmes within the framework of their exploration work [35]. Moreover, the ISA established an Endowment Fund for Marine Scientific Research in the Area, which aims to support scientists and technical personnel from developing States to be able to participate in scientific research programmes and cooperation [36][37]. The Fund was initially financed through the remaining balance from the application fees paid by the pioneer investors and now continues to be financed by voluntary contributions [37]. Whether these training programmes and the Endowment Fund are sufficient to enable developing States to participate in the seabed mining regime (without the assistance of the Enterprise) remains to be seen.

4. Discussion

[40] LOSC, Articles 140(2), 143(3), 144.
[41] LOSC, Article 143.
[42] LOSC, Article 143(2).
[43] LOSC, Annex III Article 14(2).
[44] LOSC, Articles 140, 143, 144, 148.

Whilst the benefits derived from deep sea mining as part of the common heritage of mankind could be significant, there are several difficult issues that remain to be resolved before it can be assured that these benefits will be distributed equitably, particularly amongst developing States.

Transparency

It is difficult to imagine how the CHM principle can be well served without the basic tenets of transparency being incorporated into the operations of its governance bodies. Since the inception of the ISA, there have been concerns regarding the transparency of the LTC [38]. As interest in seabed mining increases further, so too does the interest in transparency of the work of the ISA. At its 2014 annual session, '[s]trong interest was expressed in increasing transparency and dialogue on the development of the [LTC's] work' [39]. Similarly, in 2015, the ISA Secretariat was requested to draft a stakeholder consultation and participation strategy [40]. In the context of developing the regulations on financial benefits, it is particularly important to include the Finance Committee in the discussion regarding transparency, because it shares responsibility for the development of the regulations and will be the ISA organ charged with overseeing them.[45] If the Finance Committee is not transparent in its auditing and reporting, it is hard to conceive of how the international community, particularly developing States scheduled to receive particular DSM financial benefits, will be assured of State and contractor compliance.

Financial benefits

The details of a DSM fiscal regime, which proved to be a difficult element of the LOSC negotiations three decades ago, remain contentious. Establishing rules, regulations, and procedures concerning resource payments will undoubtedly remain a priority for the ISA. With respect to the CHM principle, it will be important to take into account any financial risks for humankind as well as the need for the ISA to share in the financial benefits of seabed mining. Questions as to what is fair and equitable in the fiscal regime may also need to take into consideration the loss of natural capital and the related ecosystem services that provide benefits to humankind. Whether financial compensation to present and future generations will need to account for these ecosystem losses has to date not been discussed.

The Enterprise

[45] IA, Annex Section 9(7)(e)-(f).

The Enterprise was visionary in the eyes of its supporters, and unrealistic in those of its detractors. At present, the future of the Enterprise is uncertain. However, the implications of a potential failure to establish a functioning Enterprise have not yet been properly discussed – either within the ISA or the UN General Assembly.

In facilitating the participation of less technologically endowed States, the Enterprise was designed to provide an important mechanism to give effect to the common heritage of mankind principle. However, its current legal framework is the product of highly divergent views. On the one hand it was envisioned as a global, public mining operator, on the other its statute requires that the Enterprise will "operate in accordance with sound commercial principles."[46] Given that State parties no longer need to directly fund the Enterprise and its initial operation must proceed by joint-venture, it is uncertain whether the Enterprise will ever meet the expectations of developing States and provide for substantial engagement and benefit sharing from the CHM. Indeed, without the Enterprise, the Area's mineral resources could be effectively reserved for those private corporations and government entities with sufficient capital and operational knowledge to extract them, to the effective exclusion of others.

Technology transfer and capacity building

As discussed above, the parallel system of reserved areas is undergoing changes and the future of the Enterprise remains uncertain. The private sector has already partnered with developing States to gain access to reserved areas. Whether this will translate into technology transfer and capacity-building, however, remains unclear. As is the case with exploration contracts with the ISA, the arrangements between sponsoring States and mining operators remain confidential, and could vary widely.

Inter-generational equity

The CHM principle implies not only the equitable sharing of benefits with current interests but also with future generations. While it follows that some, indeed much, of the Area's resources should be left for the future, no such requirement is expressly incorporated in the LOSC, the IA, or the Mining Code. To date, the first-come-first serve approach has meant that those areas estimated to be most valuable have already been allocated in exploration contracts. While other mineral-rich areas

[46] LOSC, Annex IV Article 1(3).

undoubtedly remain to be discovered, no sections have explicitly been set aside for future generations.

As noted above, DSM can be seen as the conversion of natural capital into financial capital. However, there has been little discussion as to whether enjoyment of this financial capital is to be the exclusive preserve of current generations, or whether a portion of it should be set aside for future generations. The ISA equivalent of a sovereign wealth fund, for example, could be one way to extend the benefits of the CHM over time. Moreover, as noted above, the sharing of natural capital between present and future generations must be balanced with financial capital.

Marine genetic resources

Finally, there is an unresolved question with respect to rights over any commercially relevant genetic material obtained during mineral exploration and exploitation work in the Area. As part of their exploration work, contractors are required to catalogue the organisms present at the site of the potential mine.[47] If the contractor's research yields genetically interesting organisms or information, it is unclear whether the operator has the right to potentially commercialise this information and whether any benefit-sharing is required. At present the Mining Code is silent on such considerations, not least because the use of marine genetic material falls outside of the ISA's competence, which covers only mineral resources.[48] Furthermore, it should be noted that an exploration contract with the ISA does not affect the rights of the contractor, or indeed others, to conduct marine scientific research in the lease area.[49] Nonetheless, given that such genetic information may be discovered in the context of developing and extracting resources that are recognised to be CHM, the possible linkage to existing benefit-sharing requirements cannot be immediately ruled out. The future legally binding international instrument to the LOSC on the conservation and sustainable use of marine biodiversity in areas beyond national jurisdiction could establish a system of access to and benefit sharing of marine genetic resources, and define the role (if any) of the ISA [41][42][43]. However, if such a regime solely focused on the deep seabed, it could leave uncovered marine genetic resources of the water column above, where many deep sea species spend key portions of their life cycle. The outcome of preparatory negotiations in 2016 and 2017 will shed further light on this topic.

5. Conclusion

[47] Sulphides Exploration Regulations, Regulation 34; ISA. ISBA/19/LTC/8 (1 March 2013).
[48] LOSC, Article 133.
[49] LOSC, Article 256; Exploration Regulations, Regulation 1(4).

There are several indications that current management of seabed mining is not yet consistent with the CHM principle. On the positive side, the ISA has begun tackling some of the issues discussed in this paper, and has, in 2014 and again in 2015, invited stakeholder input through written submissions [44]. On the other hand, the future of the Enterprise is uncertain, and it remains unclear as to whether developing States will gain meaningful access to deep sea mineral resources of the Area. Moreover, a lack of transparency in the work of the ISA remains a concern and is hindering the implementation of the CHM principle. A fiscal benefit-sharing system is not yet in place, but is under development. It will need to provide transparent and "adequate means of determining compliance by the contractor"[50] and allow for the sharing of financial benefits. The loss of natural capital and ecosystem services due to the mining of deep seabed minerals, and mechanisms to reserve options for mining, revenues and/or ecosystem services for future generations, have yet to be discussed.

The policy road ahead will not be smooth. Old disagreements will likely be unearthed again. However, if DSM is to truly benefit humanity, any benefit-sharing process established should be fair, transparent and accountable. As a starting point, ISA discussions on this topic will need to reflect the inclusive nature of the CHM principle, engaging States, the private sector, academia, NGOs, and civil society.

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