



Marine Genetic Resources in the BBNJ Process – Building Bridges

Workshop Report

27 – 28 June 2018

University of Aberdeen, Deep-Ocean Stewardship Initiative
(DOSI)¹

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Overview

This workshop considered marine genetic resources in the context of the progress made, and goals of, the United Nations Inter-Governmental Conference on an International Legally Binding Instrument under the United Nations Convention on the Law of the Sea on Conservation and Sustainable Use of Marine Biological Diversity of Areas Beyond National Jurisdiction. This proceeds pursuant to General Assembly resolution 69/292 and A/72/L.7. The workshop built on a paper, *Mare Geneticum* developed and written by some of participants and circulated before the workshop to all participants. The overarching aim was to build bridges between experts, academics and country representatives to move towards the pragmatic solution.

The workshop opened with a presentation on Marine Genetic Resources (MGR) in the biodiversity beyond national jurisdiction (BBNJ) process and the movement towards the International Legally Binding Instrument (ILBI). The *Mare Geneticum* approach was then summarised and considered in detail. The afternoon session began with a presentation proposing that knowledge and opportunities can be enhanced and derived from the utilization of MGR through open access, capacity building, and inclusive innovation. There followed a presentation on capacity building and data sharing through the NEKTON initiative and OCTOPUS (Ocean Tool for Public Understanding and Science) platform. A wide ranging series of questions and discussion concluded Day 1.

The second day commenced with a presentation on the EU approach to MGR in the BBNJ process. Proposals followed regarding the consistency of the *Mare Geneticum* proposal with international law. The event closed with analysis of next steps. It was suggested that a short workshop report (the present document) be prepared, following the Chatham House Rule. References are made to some documents which were provided in advance of the workshop and these are listed at the end of this report.

Introduction

This Aberdeen workshop considered marine genetic resources in the context of the United Nations process on Conservation and Sustainable Use of Biodiversity of Areas Beyond National Jurisdiction. The workshop built on a paper, *Mare Geneticum*, developed and written by some of the participants of the present workshop.

The overarching aim was to build bridges between experts, academics and country representatives to commence working towards a pragmatic solution, through *Mare Geneticum*, to meet the goals of the BBNJ process.

The workshop went deep into the subject and discussed three main elements:

1. How the *Mare Geneticum* building blocks could be used to develop a regime built on good scientific practice and how a prior notification system could work.
2. How inclusive innovation could allow all parties to benefit from BBNJ. This includes aspects of open access linked to capacity building, technology transfer and benefit sharing.
3. To illustrate how these potential approaches are consistent with established principles of international law, and provisions of the United Nations Convention on the Law of the Sea, applicable to the Area Beyond National Jurisdiction (ABNJ) and the High Seas.

The workshop consisted of six main sessions held over one and a half days: 27-28 June 2018.

DAY 1: 27.06.2018

Session 1

Opening Remarks

Based on the existing status of negotiations, the aims of the present workshop were:

- to work towards a pragmatic solution
- to promote inclusive innovation
- to stimulate thought across different disciplines
- to explore the challenges within the current Law of the Sea
- to create a possible basis to move forward
- to create a document for those involved in negotiations plus others interested in the utilization of MGR in ABNJ

Presentation – Marine Genetic Resources in the Biodiversity Beyond National Jurisdiction process.

The presentation identified the main issues which lead to divergence in approaches taken as a result of:

1. lack of definition of MGR and unclear legal status
2. lack of definition of marine scientific research (MSR)
3. lack of an applicable access and benefit sharing (ABS) regime
4. different capacities across countries
5. lack of scientific knowledge on MGR

Other issues leading to divergence included:

- Common Heritage of Humankind vs. Freedom of the High Seas principles
- Geographic scope
- Material scope (*in situ*, *ex situ*, *in silico*, fish)
- Regulated access
- MSR vs. bioprospecting
- Non-monetary vs monetary benefits, or both
- Traceability
- Intellectual property rights (IPR)

The provisions of the United Nations Convention on the Law of the Sea (UNCLOS) regulating access to MGR were identified as Part XIII (MSR) and Part XIV (Marine Technology Development and Transfer). It was suggested that these provisions together could form the basis of an ABS regime. Monetary benefits could be derived from utilization of MGR from ABNJ. Consideration, however, should be given to questions such as ‘who is required to share?’, ‘what is required to be shared?’, ‘when will benefits be shared?’ and ‘who are the beneficiaries?’

It was recognised that the forthcoming BBNJ negotiations also provide opportunities for convergence on topics such as:

- knowledge generation: sharing knowledge as a common benefit of humankind

- international cooperation: support mechanisms to promote MSR
- capacity building and transfer of marine technology: to enable developing countries to access and utilize MGR
- appropriate means to share monetary and non-monetary benefits

Presentation – Building blocks of a solution: the *Mare Geneticum* approach

The *Mare Geneticum* paper represents the input and contribution from a combination of scientists and lawyers. Suggestions within this article (particularly the flow diagram) could be considered as potential ‘building blocks for a solution’ in terms of the BBNJ process.

The aim of the *Mare Geneticum* paper is to bridge gaps between positions taken by different states, and to begin to identify ways that benefits from MGR (and research in respect of it) could be shared in an equitable way. Observations were made in terms of scientific and technical baselines and areas where disparities currently lie. Premises for benefit sharing were also outlined.

Mare Geneticum introduces a particular approach to open access. At the heart of this is the use of an Obligatory Prior Electronic Notification (OPEN) regarding access to MGR in ABNJ. OPEN would be managed by an international institution and would be the start of a track and trace system. OPEN would include conditions for access to samples and data and require the provision of information about activities. Access may not necessarily be free of charge, but could still count as being open access by only charging reasonable handling charges. Once benefit sharing begins, the OPEN must be updated. Benefit sharing may be linked to an ‘exclusivity period’ and may be in the form of samples or raw data. The exclusivity period could potentially be extended for a fee and require updating of the OPEN.

It was noted that Blasiak, *et al*'s (2018) publication indicates that a large proportion of patents linked to MGR from ABNJ are owned by BASF, a single German chemical company. It was also suggested that all of these patents were obtained through use of publicly available data (digital sequence information). There was general recognition that such open access to information is an important change in science in recent years. It was argued by some that the patenting example further highlights the challenge of open access initiatives, that it could perhaps end up giving corporations a competitive advantage. It was noted that low novelty and inventive step thresholds make such appropriation from public repositories possible; this reflects the pattern of acquisition of the last few years in biotechnology and synthetic biology.

Session 2

Discussion

This built on the questions and points made in response to the *Mare Geneticum* paper. These ranged from compliance, to fee structures that could discourage unnecessarily long exclusivity periods, and whether lessons could be learnt from legal frameworks currently in existence. In terms of how often/when the OPEN should be updated, regular reporting periods (possibly yearly) were suggested as also being a good way to make the exclusivity period more workable.

Possible problems relating to when cruise reports should be deposited were discussed. It was noted that MSR is sometimes conducted in collaboration with private vessel owners, significantly reducing costs to scientists. However, such research activity cannot be planned years in advance since yacht owners do not always plan their travels in this way. It may therefore be important to embrace some level of flexibility in terms of the OPEN and MSR linked to MGR from ABNJ. There was a discussion of the place of citizen science and noting that there is the need to comply with the existing legal regimes regarding the location of research and meeting the requirements of any relevant jurisdiction. The rapid development of technology was also noted, and addressing technological advancement consideration during BBNJ negotiations was recognised as essential, to ensure that any agreement does not become obsolete as technology evolves.

Questions were raised regarding IPR and other ownership issues that would directly impact on the access to and circulation of MGR, with reference to points now in an LSE Law Policy Brief (2018). These included the legal basis under which any governance regime such as OPEN would function; the relevance of the Common Heritage of Humankind Principle for freedom of scientific exploration and utilization of MGR; the potential link between track and trace and legal rights such as those arising through the international patent system; the relationship between IPR and the implication for an open access approach and equity implications of an exclusivity fee. It was argued that the relationship between scientific research and IPR has evolved considerably through the evolution of biotechnology and synthetic biology, and concern was expressed that ignoring IPR in the BBNJ process could lead to the entrenching of first mover advantages and control of important raw data and materials. The issue of IPR was also discussed in the context of the technical gap that rewards only a select number of countries and entities that have the capacity to prospect on the High Seas. While the Nagoya Protocol to the Convention on Biological Diversity is not directly relevant to ABNJ, existing due diligence requirements, specifically in Europe and also elsewhere can require provenance of MGR from ABNJ to be recorded. The contentious discussions on Digital Sequence Information under the Nagoya Protocol are also of direct relevance here.

A discussion was held regarding whether or not IPR should be considered at all in the context of BBNJ. Would this lead to better understanding of the potential implications and risks of approaches for BBNJ, or should all IPR issues be left to the World Intellectual Property Organization (WIPO) and /or the World Trade Organization (WTO), on the basis of the TRIPS Agreement? It was noted that WIPO has already planned meetings to review the status of MGR from ABNJ, and associated IPR issues. It was argued that the decision whether or not to engage with IPR in some shape or form with respect to ABNJ (even accepting that substantive points will be dealt with in WIPO and the WTO) could send a powerful signal and impact the way the issue is taken up by other bodies.

It was noted that the WTO plays an important role in discussions surrounding the declaration of origin of sample material. Issues of 'mandatory disclosure of origin' (primarily pertaining to whether research is conducted within or beyond national jurisdiction) and 'track and trace' were considered in more depth. The legal distinction and analogy between an exclusivity period (as proposed in *Mare Geneticum*) and a patent was discussed. Some participants noted that many open access termed initiatives require prior ownership (through patents, copyright or otherwise), and there can then be non-exclusive licensing - if the IP owner chooses to take this approach. Patenting should therefore not be considered as just an avenue to commercialisation, but also as an avenue towards enhancing open access, subject to the licensing terms. The level at which the proposed exclusivity period fees should

be set: high, low, flat, or increasing was discussed. Other issues which should be considered during negotiations for the new legal agreement include:

- obligations of states and/or private companies involved
- sanctions in case of breach of those obligations
- a dispute settlement mechanism

The 'clearing house mechanism' was debated. Does a new mechanism need to be established or could an existing one (8 clearing house mechanisms were said to already exist) be adapted and used? It was suggested that this could have important implications for capacity building activities. The OPEN access/notification approach could be a way to link with existing clearing mechanisms.

The BBNJ package objective is ocean governance, to encourage conservation and sustainable use of BBNJ. It was agreed that clear efforts should be made to ensure that MSR addressed in UNCLOS is not hampered by the new ILBI.

Some participants indicated that it could be useful to consider 'access' and 'utilization' differently. Multiple different stages exist between access and utilization, and that a variety of different benefits and sharing obligations could be associated with these. For example, commercialization (and associated considerations) should be more associated with utilization than with access to MGR. Queries were voiced regarding whether it might be possible and/or useful to have benefit sharing without the 'access' component of a traditional ABS regime (as opposed to the ABS approach resulting from implementation of the Nagoya Protocol). This approach could limit burdens faced by scientists. Other participants highlighted the importance of thinking about the BBNJ package of elements 'together and as a whole', and suggested that a neat separation between 'access' and 'benefit sharing', or between 'access' and 'utilization' may not be desirable. A 'light' Nagoya Protocol/ABS approach was suggested as suitable alternative.

The two types of access relevant to MGR from ABNJ include: 1) physical access (to sample material); and 2) intellectual access. Both of these require specific capacity and capabilities which are currently lacking in a number of states around the world. To reach an equitable solution and to promote sustainable use of MGR, some states may therefore need to receive some form of 'means' (both non-monetary and monetary benefits). Some participants felt it was unlikely that 'developing' states will advance significantly over the short-term, indicating the importance of non-monetary forms of benefit-sharing. It was also suggested that some form of 'needs assessment' could potentially be useful in determining the most suitable forms of benefit sharing. In addition, many states may not ever have the opportunity to conduct *in-situ* access. As such, in order to promote scientific research around the world, it was proposed that emphasis could be placed on *ex-situ* and *in-silico* access.

It was noted that the Intergovernmental Oceanographic Commission of UNESCO (IOC-UNESCO) has a working group related to MSR, capacity building and technology transfer, which has developed guidelines. It would be useful for this to be explored and considered during the BBNJ process. The IOC recognises the need to consider a variety of stakeholders, including land-locked states plus other types of disadvantaged states referred to in UNCLOS. A question was raised regarding whether states actually know how to ask for help and whether there was a need for some form of active facilitation or 'match-making' service. Other suggestions were made in terms of avoiding additional burdens associated with MSR. It was generally accepted that any new regulations and processes should be as similar as possible in all states (and in ABNJ) for ease of implementation and compliance.

Issues surrounding ‘track and trace’ were raised. It was noted that scientists already record all positional and environmental information associated with sampling and include this in their cruise report. This type of information may be useful for other elements of the BBNJ package. Sample related information could play an important role in the conservation and sustainable use of BBNJ. This information could be used to identify the location of the samples (areas within/beyond national jurisdiction) and which legal regime should apply. A ‘united tracing body’ was suggested (so that nothing ‘falls into the cracks’), but others expressed uncertainty in terms of its feasibility. Caution was urged with regard to drawing lessons from the Nagoya Protocol due to the significant differences experienced in areas within and beyond national jurisdiction. For example, compliance will likely represent a very different, potentially more difficult issue in ABNJ. However, it was also noted that due diligence requirements under measures implementing the Nagoya Protocol may in fact require provenance to be recorded for MGR acquired from ABNJ.

It was noted that incentives already exist to promote practices in line with potential BBNJ considerations (e.g. disclosure of origin and open access). For example, some journals only accept papers if scientists can prove that they have information pertaining to sample location, and all EU funded research must be made publicly available.

Some participants questioned whether the distinction between scientific and commercial use is important as scientific research has the potential to lead to commercial use in the (distant) future. Other participants indicated that it may potentially be challenging to pool commercial interests with those of scientists, particularly with regards to the way that samples are stored.

In conclusion, it was agreed that *Mare Geneticum* represents a good first step in establishing what a possible BBNJ model could look like and will be useful to build upon as steps are taken to reach a solution. It was also agreed that the basics in terms of BBNJ should be addressed by embracing the ‘together and as a whole’ concept before attempting to tackle the specifics.

Session 3

Presentation – Inclusive innovation: introductory concepts

The afternoon session began with a presentation which proposed that knowledge and opportunities can be enhanced and derived from the utilization of MGR through open access, capacity building, and inclusive innovation.

Open access provides enhanced opportunities to access data and samples. Capacity building provides fairer opportunities and capability to work with data. Together, open access and capacity building could pave the way for inclusive innovation, thereby encouraging greater participation of all stakeholders in the utilization of MGR from ABNJ.

A series of steps to maximize global opportunities and knowledge derived from MGR from ABNJ were set out, as MGR represent as yet unexplored resources of untapped potential. It was recommended that the BBNJ ILBI could bear provisions which promote benefit sharing, conservation and sustainable use, open access, and capacity building. The presentation also highlighted the importance of removing barriers associated with utilization of MGR.

Three potential approaches were described for utilization of MGR:

- restricted utilization: this would lead to limited growth in knowledge and opportunities

- preservation of the *status quo* without BBNJ: this would result in some growth in knowledge and opportunities, but not significant
- open access, capacity building, and inclusive innovation: this would bring maximum potential in terms of knowledge and opportunities.

In conclusion, the third approach was considered the most comprehensive which would generate maximum potential and benefits for all where “the whole is greater than the sum of its parts”.

Presentation 2 – Capacity building and data sharing

This presentation analysed future opportunities for capacity development through the NEKTON initiative and the OCTOPUS (Ocean Tool for Public Understanding and Science) platform.

NEKTON is a foundation concerned with the governance and management of marine ecosystems. It carries out bathyal (deep sea) surveys to generate data that facilitates ocean governance by decreasing exposure to direct and indirect human impacts. NEKTON missions have produced standardized protocols, accelerated discovery and big data regardless of geographic location and time. It has produced new technologies, capacity building, and a direct pool of information. These have an impact on education and public outreach and its purpose is to increase the public understanding of science. The standardized protocols, such as the GOSSIP (the General Ocean Survey and Sampling Iterative Protocol), provide a framework to guide conduct on research cruises and the treatment of samples and data. This brings together biology, geology, physical oceanography, water chemistry, and socio-cultural studies. NEKTON Mission II has identified 6 areas of high biodiversity. This helps in understanding the bathyal zone and may contribute to the publication of hundreds of scientific papers.

OCTOPUS is a tool which dynamically investigates, harmonizes, and manages ocean data from global sources. To date, it has captured 98 billion data points of biodiversity, oceanography, human impacts, and policy. It has assisted with the discovery of 40+ new species of mesophotic algae, and dozens of new living organisms in sponges. The next phase of OCTOPUS is to demonstrate its use in specific science projects and to develop tools for specific user groups. It can provide academic licences to other bodies such as global fishing watch for the acquisition of further data sets, while a collaboration with Greenpeace is being used to design a global network of marine information.

The policy impact of this initiative included the launching of the UNESCO World Heritage in the High Seas report, re-initiation of marine protected area (MPA) discussions for the Bermuda exclusive economic zone (EEZ), education and outreach through connection to schools and universities (STEM educational programme, arts and writers programme). The next ambition is to go to countries surrounding the Indian Ocean and promote the development of the Blue Economy.

It was concluded that that the NEKTON initiative aims to explore the deep ocean, specifically the bathyal and mesophotic zones. This requires standardized approaches, accelerated science, publicly available data, and the turning of science into policy.

Session 4

Discussion

There followed a detailed discussion on the content of the two presentations.

One general concern was how to identify local stakeholders and how they were or can be engaged in the process. There was a discussion of working with stakeholders on the ground, with face-to-face meetings (e.g. with local agencies in villages) at an early stage of projects. Such face to face collaboration and discussion was invaluable. Non-governmental organisations (NGOs) were recognised as knowledgeable about local matters, for example Greenpeace. It was recommended that specific tools be developed for locals and indigenous people. Other questions regarding local stakeholders included:

- who is 'local' in the High Sea and what impact would that have on benefit sharing?
- which state should receive credit - the flag state?
- can local people provide a different form of citizen science, including regarding traditional knowledge associated with genetic resources?

To address how to make NEKTON more functional under BBNJ, the GOSSIP Protocol was suggested regarding best practice for methods, especially in terms of environmental impact assessment (EIA).

Links between IPR and OCTOPUS were discussed. The data in GOSSIP is openly available, however the IPR for the software which developed, and can improve or enhance OCTOPUS, is currently held by the University of Oxford. There are ongoing negotiations relating to future use by others. This is important as OCTOPUS is the first of its kind, and in order not to become obsolete it needs to be updated frequently. In order for this to happen, ideally the software should be made freely available. Restrictions on this is consistent with the policy of the university which while not unusual, further blurs the distinction between academic research and commercial intent. It was noted that if successfully negotiated, this example of open access would be consistent with article 266 UNCLOS (promotion of the development and transfer of marine technology). Confidentiality is also an issue regarding data availability. Regarding the data in OCTOPUS, it was proposed that there could be a licence for non-commercial use attached to each dataset. There was also the possibility of a compulsory licence, either formally based on state legislation or through a requirement of access through contract. State action may be resisted, and could lead to arguments that this went beyond the flexibilities in TRIPS, which could lead ultimately to trade sanctions. There is considerable ambiguity in this area of law and it will ultimately come down to the terms (such as public health or other emergencies, national need) under which such a licence is granted.

Debate moved on to how to incorporate these issues into the BBNJ ILBI. It was thought that the standardized protocols developed under NEKTON for OCTOPUS (including GOSSIP) could provide provisions for inclusion. Suggestions for the development of OCTOPUS included making it interactive, available and accessible for policy makers. OCTOPUS was acknowledged as a very successful initiative and could be a template from which others can learn. It was also suggested that the creation of an associated agency or institution could also assist in enhancing its use.

More generally, it was recognised that any restriction on information sharing is problematic. A good example is fisheries data which is now making progress in terms of transparency. If the BBNJ ILBI were to promote the use and the funding of platforms such as OCTOPUS, this might encourage states to provide open access to samples and data. It was pointed out that if a BBNJ body is created as a result of forthcoming negotiations, it remains uncertain whether such a body would be responsible for all of these issues. For example, the body could provide the certificate of compliance for cruises or alternatively, an existing UN body could do this.

In relation to recognition of the fluidity of MGR between national and international waters, it was stated that OCTOPUS is an ocean-wide tool and draws no distinction between boundaries. Most vessels sail from a port which provides logistic convenience, not necessarily the flag state. In relation to these points a recommendation was made about the use of regional stewardship, where specific countries would be identified to receive benefits and further training. It was also suggested that a technical university located in multiple regional steward countries could further the task of capacity building including reciprocal arrangements to address problems with coastal states (e.g. customs).

The discussion moved on to identifying which lessons could be drawn from other legal instruments associated with genetic resources, such as the Nagoya Protocol, the Convention on Biological Diversity (CBD), the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA), and applied to BBNJ. The EU implementing regulation for the Nagoya Protocol (Regulation (EU) No 511/2014) contains some criteria or standards of good practice together with a registry of compliant collections for infrastructure. It was recommended that the same could be done for ABNJ.

It was noted again that there are other issues in addition to access to samples/ data and benefit sharing. A potential solution could be to create a 'university of the deep ocean' to address all of the BBNJ package issues. The EU has established the European Marine Observation and Data Network (EMODNet), an organisation to protect and share marine scientific data. This facility, as all European marine research infrastructures, is used for capacity building amongst EU countries, and to transfer of marine scientific data and resources. It was generally agreed that such solutions should be considered in the BBNJ process. They are key to building training programmes, promoting exchange of scientists, and accessing the largest European research facilities and services for non-European countries. They act, thus, as non-monetary benefit sharing providers. Some of these research infrastructures have the apparatus of international organisations, notably the European Research Infrastructure Consortium.

28/06/2018 – Morning

Session 5

Presentation – The EU approach to MGR in the BBNJ process

The presentation highlighted the importance to the BBNJ ILBI of the conservation and sustainable use of marine biological diversity in ABNJ. To achieve that, it has been proposed that a 'pragmatic approach' should be followed; through this, progress in negotiations will not depend on the determination of the legal status in international law of MGR in ABNJ.

It was suggested that the ILBI should cover fish and biological resources for the research of their genetic properties, but not the management of fish stocks or fisheries as these are already covered in other instruments. Definitions were identified as important and should be linked to those in other instruments, such as the CBD, with any adaptation limited to technical and necessary changes. The new ILBI should focus only on the most crucial and new definitions.

The presentation set out the principles for *in situ* access. It was highlighted that access to MGR should remain free and in line with UNCLOS and the provisions associated for MSR. The conservation of biological diversity should be compliant with the rights and obligations of states under UNCLOS in maritime zones.

In relation to the sharing of benefits, it was stressed that living resources are very different to non-living resources and have a different cost and market value. Lengthy and costly research and

development is required for MGR and may not always generate commercial benefits. In terms of the types of benefits, it was noted that monetary forms (such as a share of royalties or sales of products) do not always materialize, whereas the non-monetary benefits (such as education and training opportunities) are more practical and more readily available, but bear an up-front cost.

It was argued that the UNCLOS obligations under articles 242, 244(1) and 244(2) to promote cooperation, to disseminate knowledge, and to provide data and information, need to be respected by the new ILBI. The new framework should provide coordination and collaborations, reflecting UNCLOS articles 266 and 269.

Overall, it was concluded that the purpose of the new ILBI should be to make benefit sharing activities practical, effective, and efficient.

Discussion

The presentation resulted in a number of questions and initiated a detailed discussion.

It was suggested that the potential contradiction between the proposal and UNCLOS articles 137 and 241 prohibiting ownership of resources could be addressed through the proposed new arrangements which would still enable access to them. It was argued that appropriation does not normally take place during the stage of scientific research, but may follow afterwards. It was argued by some, reflecting recent discussion in the CBD context, that the utilization of MGR can entail private appropriation through patents and exclusive databases that make use of openly available data.

It was argued that a pragmatic approach provided the opportunity to move forward to agreement regarding the BBNJ ILBI. The issue of the pragmatic approach's engagement with IPR was discussed. It was argued by some that there is potentially a risk if the discussions regarding utilization of MGR do not include patent experts they may not focus on both the advantages and also disadvantages of patents. A follow-up point asked what actually happens to the companies which are currently privately appropriating MGR through patents. It was argued that while a narrow pragmatic approach might move the political conversation forward, it risks ignoring the consequences of the current international patent system, and on-going private appropriation of genetic resources via patents. It was argued that if there are ambitions for benefit for all humankind, not just for wealthier and technologically capable nations, then the BBNJ process must reference and engage/challenge as necessary with the IP dynamic.

There followed a discussion regarding whether MGR should be considered as products or as services. MGR *sensu lato* are the basis of any adaptation to change in future oceans, hence for continued ecosystem functioning and ecosystem service delivery. It was suggested that both approaches could be supported, but the service approach is difficult to apply in the pharmaceutical and high value materials context. Discussions then focused on how ecosystem services could be used directly. The general agreement was that ecosystem services are already used in many countries to assign monetary value to ecosystems including in the deep-sea, and impacts on ecosystem service delivery should be included as part of EIAs.

With respect to benefit-sharing, building on the points above, it was suggested that some experience via the Nagoya Protocol has shown that non-monetary benefits in the form of public goods like progress of science and knowledge dissemination do not always materialise and cannot be easily

monitored. On the other hand, it was observed that monetary benefits may require a tie-in via the patent system.

Session 6

Presentation – Discussion of approaches that are consistent with established principles of international law, and provisions of UNCLOS

The presentation began with definitions and distinctions as follows:

- Minerals: extractive activity is required to obtain the resources, the resource is finite and depleting, extraction may have high environmental impacts, exclusive licences are required, high investments are needed, high technology is required, the value is created at sea, and these resources have a limited market.
- Fish: extractive activity is also required, depletion of the resource depends largely on management, environmental impact depends on methods used, few/no restrictions apply (in terms of licence requirements), requires low to medium investment, low to medium technology, value is created in principle at sea, and has a global local market.
- MGR: non-extractive activity is required so utilization does not cause depletion of the resource, there are no/low environmental impacts associated with extraction, it is as yet uncertain whether exclusive licences will be required, requires medium to high investment, high technology, the value is created exclusively on land, and has a limited market.

Then, a comparison was made between the following principles:

- Common Heritage of Humankind: argued to relate to *resources*, being linked to the management of resources. Components include benefit-sharing, future generations, non-appropriation, joint and sustainable management.
- Freedom of the High Seas: argued to relate to *activities*, and is not an unrestricted freedom.

Building on this, it was suggested that in terms of BBNJ, application of the Common Heritage of Humankind principle may be associated with management of MGR, benefit-sharing and capacity building. The Freedom of the High Seas Principle may be more relevant for management of (M)SR on MGR as well as for track and trace. It was suggested that open access to MGR complies with both the Common Heritage of Humankind and the Freedom of the High seas Principles.

With regards to access to resources, the following distinction was made:

1. *in situ*: organism
2. *ex situ*: organism/genetic material
3. *in silico*: genetic resource.

It was argued that there is not necessarily a consistent, logical flow from *in situ* to *in silico* access in terms of MGR. There is a potential gap between points 2 and 3. For example, genetic sequencing research may only be conducted on MGR 5 years after sample collection, with a further 10-50 years until data is analysed or utilized. This is not the case with mineral utilization, where material is processed swiftly from sampling to commercialisation. The possible 'break in the flow' associated with MGR may have implications for an ABS regime and how the early steps should be managed. Additionally, a recent scientific advance is the ability to carry out *in situ* sequencing which removes the distinctions between the three categories above.

The presentation concluded with proposed principles for mandatory benefit sharing. This was to be:

- meaningful;
- of high impact for developing communities and for the scientific community;
- of low cost to the users; and
- aiming for a bundling of resources.

To achieve this requires:

- sharing metadata;
- sharing genetic sequencing data (possibility for extended exclusivity period for a fee);
- sharing biochemical data voluntarily; and
- engaging in capacity building and technology transfer (possibly through research funding organizations).

Discussion

An important distinction was highlighted in the difference between *in situ* (resource), *ex situ* and *in silico* (value) access. If the focus is on benefit sharing and the proposed open access to samples/ data, there should be no issues with appropriation. The concept of open access does not have to be too detailed on this point in the ILBI. There is, however, the question of the link between this and patents and appropriation.

Does a patent involve appropriation, given the fact that a patent is not actually about ownership of resources? It was explained that there is exclusive use of the subject matter of patents for a certain period of time. Also (with exception for microorganisms) some jurisdictions will require further innovative work in order to be eligible for a patent, and only then would questions of ownership and some kinds of benefit arise. Given the prospect of potential patenting very early in the MGR development pipeline, it was argued to be important to ensure that there are indeed no issues with appropriation and that the BBNJ ILBI does not lead to fragmentation of rights and over propertization (even if for a limited term) of information and knowledge. This was a problem which played out in the early years of biotechnology patents.

Discussions moved to the *Mare Geneticum* OPEN system.

1. How straightforward would it be to constantly update the OPEN and how would this be done?
This would need to be considered from a practical perspective
2. How to describe the expected nature of what will be collected?
3. How to describe the target?
4. Would the research be random or targeted?
5. When should OPEN updates be submitted?

It was noted that this type of activity and description is conducted for environmental impact purposes and can be fulfilled by describing the type of sampling/research equipment that will be used and included in the OPEN before the cruise start.

The discussion moved on to methods of securing funding for the operation of the new system, and trust funds were suggested. A funding programme with strong obligations in the BBNJ ILBI, including obligations to publish findings, was also proposed. There was concern that extensive or strong obligations might discourage funders from being involved, and another possibility was that

commitments from funders be dealt with external to the BBNJ ILBI and/or be part of implementation at state level. The third option would be a system of fees, although this may raise issues of inclusivity. It was noted that approximately 20 research funding bodies already exist for MSR in ABNJ and that private sector funding could also be pursued. The discussion recognised that many states currently acknowledge the value of benefit sharing and capacity building in the way that they fund biodiversity related research.

A final question was posed about obtaining a sample or collecting derivatives of MGR (e.g enzymes, hormones, DNA) directly from the ocean (*in situ*), without having to collect the actual MGR (e.g. specimens of a species of sponge). The basic response was positive, however, scientific advances are required to implement this in practice.

Looking forward, it was agreed that a report would be prepared of the workshop. Developing the report into a publication, co-authored by all participants of the present workshop, for a scientific or law journal was also discussed. Its purpose would be to develop the discussions and act as a central starting point and reference for other initiatives in the future.

Glossary:

ABNJ: Areas Beyond National Jurisdiction

ABS: access and benefit sharing

BBNJ: biodiversity beyond national jurisdiction

Blue Economy: a term which can cover sustainable use and better stewardship of ocean resources for economic growth, improved livelihoods and jobs, human well being and social equity and ocean ecosystem health

Chatham House rule: principle by which points made in a discussion may be reported but the source may not be identified.

CBD: Convention on Biological Diversity

DOSI: Deep-Ocean Stewardship Initiative

EIA: Environmental Impact Assessment

EMODNet: European Marine Observation and Data Network

EEZ: Exclusive Economic Zone

GOSSIP: General Ocean Survey and Sampling Iterative Protocol

EU Funded research: e.g. Horizon 2020

IOC-UNESCO Intergovernmental Oceanographic Commission of UNESCO

ILBI: International Legally Binding Instrument under the United Nations Convention on the Law of the Sea on Conservation and Sustainable Use of Marine Biological Diversity of Areas Beyond National Jurisdiction

ITPGRFA: International Treaty on Plant Genetic Resources for Food and Agriculture

IPR: Intellectual property rights

MGR: Marine Genetic Resources

MPA: Marine Protected Areas

MSR: Marine Scientific Research

Nagoya Protocol to the Convention on Biological Diversity

NGO: Non Governmental Organisations

OCTOPUS: Ocean Tool for Public Understanding and Science

OPEN: Obligatory Prior Electronic Notification

STEM Science, Technology, Engineering and Mathematics

TRIPS: Agreement on Trade Related Aspects of Intellectual Property Rights

UN: United Nations

UNCLOS: United Nations Convention on the Law of the Sea

UNESCO: United Nations Educational, Scientific and Cultural Organization

WIPO: World Intellectual Property Organization (WIPO)

WTO: World Trade Organization

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