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Gap analysis

SYNTHESIS OF GAPS IDENTIFIED IN CO-CHAIRS' BBNJ WORKSHOP

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Executive Summary of Gaps

This is a brief summary of gaps identified in the two May BBNJ workshops.¹ The summary is intended to be brief and informative, and as such is not exhaustive. Please refer to the co-chairs' report for full information.

I. Marine Genetic Resources

There is a need for fair and equitable and physical access to ABNJ, access to samples and data² and the ability to use the resources,³ as well as capacity building and transfer of technology in scientific research, access to marine genetic resources (MGRs) and development of MGRs, including molecular biology and oceanographics skills.⁴

Also needed is geographical origin of MGRs in patent applications,⁵ funding mechanisms,⁶ improved collaboration between countries.⁷ Baseline information is missing,^{8 9} and monitoring of loss of MGRs is needed.¹⁰

Environmental impact assessments (EIAs) and strategic environmental assessments (SEAs) are rarely undertaken concerning MGRs. Cumulative impact assessment is difficult.¹¹ Funding of research projects¹² and access to samples is difficult.^{13 14}

It is difficult to trace where MGRs originated from. Impediments posed by patent law including patent trolls¹⁵ and thickets.¹⁶ Patenting needs to be practised responsibly by ensuring that patents do not exclude others from using the materials.¹⁷

The disclosure of the origin of genetic resources is often not required.¹⁸ Checkpoints are needed to determine geographical origin including (1) the stage at which a product is approved for commercialization or (2) in the context of a material transfer agreement.¹⁹

Improved conservation of marine biodiversity in ABNJ is needed.²⁰ There can be adverse impacts on the marine environment attributable to the lack of a coordinated management approach in ABNJ²¹ such as potential cumulative adverse impacts on seamounts resulting from cobalt-crust mining combined with fisheries bottom trawling.²²

II. Conservation and Management Tools

The impacts of overfishing, climate change and ocean acidification need to be addressed. Fishing is currently the main threat to marine biodiversity in ABNJ. There are particular concerns over the impacts of bottom fisheries.^{23 24}

Marine Science

There is no centralized data repository for the results of research in ABNJ.²⁵ We need to increase South-South cooperation, including in relation to MGR.²⁶ Further scientific research in ABNJ is needed to fill data gaps.²⁷

RFMOs

RFMOs need to be strengthened and need to expand mandates to apply ecosystem approaches, including biodiversity considerations,²⁸ and need to conduct performance reviews, share best practices, improve monitoring and surveillance, and improve transparency and accountability of RFMOs.²⁹ There is a need to consider the impacts of fishing on non-target species and other human activities on fisheries productivity when adopting management measures.³⁰ Increased political will of member States is needed.^{31 32} Subsidies and overcapacity need to be addressed.³³

Better implementation of bottom fishing commitments is needed, including through the protection of habitats and the establishment of area closures.^{34 35} It is necessary to prevent cumulative impacts and manage user conflicts,³⁶ and to develop cross-sectoral integrated management approaches.³⁷

Ecologically or biologically significant marine areas (EBSAs)

Systematic assessments, improvements in data quality and increased scientific research,³⁸ and the sharing data and expertise across sectors are needed.³⁹ Also necessary is collaboration between the process to identify EBSAs and the Regular Process,⁴⁰ capacity-building and increased political awareness.⁴¹

New and emerging uses of, and experimental activities in, ABNJ

Conflicting existing uses of ABNJ such as fishing, seabed mining and the laying of submarine cables need to be addressed.⁴² The impacts need to be addressed by conducting cross-sectoral environmental impact assessments.⁴³ There is also a need to share information and data,⁴⁴ to address the governance of climate-related geo-engineering,⁴⁵ and to establish the responsibility of States for activities in ABNJ, especially concerning rogue States.⁴⁶

Area-Based Management Tools

An implementing agreement to UNCLOS is needed so as to legally bind non-parties to regional organizations to respect the measures adopted by regional organizations.⁴⁷

The lack of regional agreement or action in a particular region should not prevent anyone from taking appropriate management measures. If a conclusion is reached at the global level that some protective measures are required but no action is taken at the regional level, such measures should be capable of being adopted at the global level.⁴⁸ Also necessary is a mechanism to report entry into, and exits from, protected areas.⁴⁹ It is important to be transparent and to take better account of the interests of, and the need for involvement by, developing countries.⁵⁰

Environmental and Strategic Impact Assessments (EIA & SEA)

The assessment of cumulative impacts is needed because of the interplay between different impacts,⁵¹ and address the aggregate impacts of human activities.⁵² Independent verification of EIAs conducted in ABNJ is needed and verification capacity needs to improve.⁵³ Trigger points for requiring EIAs need to be found.⁵⁴ Better implementation of soft-law and existing instruments is needed⁵⁵ and it is good practice to identify relevant stakeholders^{56 57} to help monitoring and to create an incentive for compliance.⁵⁸

BBNJ Workshops
Executive Summary of Gaps Analysis

We need to establish representative networks of MPAs by 2020, linking this goal with other efforts to address impacts on the marine environment and the provision of ecosystem services.⁵⁹ Important are large areas to support ecosystem processes in the open oceans, bioregionalization,⁶⁰ and mobile MPAs for pelagic species.⁶¹ It is necessary to build regional capacity, including for monitoring and the conduct of impact assessments.⁶² Ecosystem considerations need to be taken into account,⁶³ and we need better collaboration between EBSA and VME assessments through the input of science across sectors, including a bottom-up contribution.⁶⁴

Overall Gaps

It is necessary to address potential conflicting uses of ABNJ, such as bottom fishing activities and seabed mining, and coordination among competent bodies,⁶⁵ cross-sectoral co-ordination among sectoral bodies, and we need to address all activities impacting marine biodiversity in ABNJ, as well as issues of competing jurisdictions and uses, and cumulative effects of, current and future activities.⁶⁶ There needs to be co-ordination of the implementation of measures at the sectoral and regional levels.⁶⁷

There is a need for an overarching legally-binding mandate and framework setting out goals and purposes,⁶⁸ and for an instrument that would provide for integrated MPAs in ABNJ,⁶⁹ and which would provide international support for areas in need of protection, complemented by measures adopted at the regional level.⁷⁰ Also needed is improved compatibility of measures in ABNJ.⁷¹

Synthesis and Summary of Gaps Identified in Co-Chairs' BBNJ Workshop Report

Introduction

This report highlights gaps and issues identified in the Co-Chairs' Report of the two BBNJ Workshops held from 2-3 May and 6-7 May 2013.¹ It is intended to help those delegates who could not attend the workshops to gain an understanding of the workshop proceedings, and as an *aide memoire* for all those who did attend. The emphasis is on making the issues discussed in the workshops accessible, clear and understandable, and reference should be made to the full report for more complete details.²

I. Workshop on Marine Genetic Resources

1. Meaning and scope; Extent and types of research, uses and applications

Capacity Building and Transfer of Marine Technology:

- There is a need for **capacity-building** and **transfer of marine technology** to level the playing field with regard to scientific research related to marine genetic resources (MGRs).³
- **Collaboration** between developed and developing countries is mostly carried out on a small-scale, and often consists of *ad hoc* activities on a bilateral basis.⁴

Geographic Origin of Marine Genetic Resources (MGR):

- Patent documents lack available information on the exact **geographical origin** of marine genetic resources used in the development of an invention.⁵
- It is often **impossible to establish which patents** related to inventions based on MGR from areas beyond national jurisdiction (ABNJ).⁶

2. Impacts and challenges to marine biodiversity beyond areas of national jurisdiction

Impacts

Fishing: Fishing, in particular overfishing, is a **primary source of negative impacts** on marine genetic resources, including through reduction of fish populations, removal of top predators and over extraction of biomass. Seamounts, which are habitats for species, as well as coral and the sediments of the ocean floor are affected by destructive fishing practices, including trawling, as well as by drilling.⁷

Mining: Microbes play an important role in ecosystem functioning, including by **regulating the climate**, the **absorption of methane** before it is released into the atmosphere, as well as in **bioremediation**.⁸ **Mining** would have **negative impacts on the unique bacteria and microbes** found in ocean floor sediments as well as on various vent species which occur in narrow corridors in the oceans.⁹

Ocean Acidification and Climate Change: Ocean acidification and water temperature rise are **affecting genetic diversity**. However, these are difficult to address as they are not localized but take place on a global scale.¹⁰

Challenges

- Genetic loss could often take place **unnoticed**.¹¹
- **Research** is needed for **measurements that would allow assessing how much of the catch should be preserved in order to preserve marine genetic diversity**. This is not currently being carried out. Baseline information to prevent collapse of stocks and to promote recovery is needed.¹²
- **Temporary catch limits** could be used to preserve marine genetic diversity.¹³
- **Baseline information would also help to assess the impacts of seabed mining** before mining licenses are granted. The International Seabed Authority (ISA) has a possible role with respect to marine genetic resources.¹⁴

3. Technological, environmental, social and economic aspects

- There are **limitations in oceanographic skills and molecular biology**, and **high costs** of research and development related to marine genetic resources.¹⁵
- It is **difficult to identify the geographic areas of origin of marine genetic resources** used in patented inventions, with the possible exception of the high ratio of patents related to organisms from hydrothermal vents.¹⁶
- **Incentives** are needed to **improve capacity-building and access to resources**, in particular in relation to oceanographic tools and molecular technologies.¹⁷ Participation is needed in research cruises, exchange programmes and patent pools.¹⁸
- **A funding mechanism** example is UNITAID, which supports the Medicines Patent Pool, whereby pharmaceutical patent holders voluntarily license their drug to other drug manufacturers in exchange for royalty payment.¹⁹
- **Impacts** range from minimal to non-existent when the size of the samples is small and the collection is a one-off event. Impacts could increase if repeated collections or great quantities of samples are necessary. Impacts are also more likely when targeted organisms are rare, have a restricted distribution, or are located in pristine or sensitive environments. **Sometimes harvesting** rather than sampling is involved where bulk processing is undertaken e.g. krill or Sargasso weed.²⁰
- Suggestion for development of voluntary **codes of conduct**.²¹
- **Environmental impact assessments** and **strategic environmental assessments** are **rarely undertaken** in connection with research related to marine genetic resources, which made it difficult to assess **cumulative impacts**.²²

4. Access-related issues; types of benefits and benefit sharing

- **Difficulty of identifying partners** for benefit-sharing arrangements for marine genetic resources in ABNJ compared to the bilateral approach that existed for genetic resources within national jurisdiction.²³
- **Non-monetary benefits** could be shared with all States through the allocation of those benefits towards addressing global issues, such as climate change.²⁴
- Diffuse **societal benefits** can be had from increased scientific knowledge. **Partnerships** are examples of sharing of non-monetary benefits, but often created on the basis of informal

personal contacts between researchers in various countries and academic institutions, since identifying the responsible entity in a governmental structure could sometime be difficult.²⁵

- The FAO International Treaty on Plant Genetic Resources for Food and Agriculture (**ITPGRFA**) is an example of **multilateral benefit-sharing** which included the possibility of monetary and non-monetary benefits, such as the **funding of research projects** and **access to samples**.²⁶ Sharing of monetary benefits through a public trust fund is envisaged under the Nagoya Protocol.²⁷
- A number of provisions of **UNCLOS**, including the general provisions related to marine scientific research, embody some aspect of benefit sharing²⁸ but the regime established for the Area is a good example of such aspects under **UNCLOS**.²⁹
- Under **Norwegian** law, **a permit is required** for marine samples to be taken from areas within national jurisdiction and for samples to be taken by Norwegian nationals from **ABNJ**.³⁰
- There are difficulties in **tracing** where **MGRs** originate from.³¹ **Access agreements** need to be understandable by, and respect the jurisdiction and sovereignty of, the coastal States concerned.³² Developing States could benefit from the example of access agreements developed in other sectors, including the forest sector.³³ They could **share patent rights** with developing coastal States.³⁴ Whereas patents are usually only held by those who made a discovery, the **benefits arising out of the use** of such patents could be shared.³⁵
- Both **public and private funds** contributed to scientific research leading to the development of pharmaceutical products.³⁶ A large part of the costs are born by the private sector as States usually provided funding for an initial short- to medium phase and the pharmaceutical sector usually bore the cost for longer-term research.³⁷ Universities defined the research agenda and if no useful compound emerged for future applications, researchers would continue their basic research projects.³⁸ **Accidental discoveries** are more likely made by **academia** than by industry.³⁹
- **Large commercial profits from MGR** are rare, but the **future potential** of marine genetic resources is significant and is **expected to increase**, in particular for microorganisms.⁴⁰
- **Benefits for industrial uses** would become **available more quickly** in light of the fewer tests necessary for industrial uses compared to those required for pharmaceutical uses.⁴¹

Definitions of bioprospecting and marine scientific research:

- **All activities of research** in the marine environment qualified as **marine scientific research** under **UNCLOS**.⁴²
- **Bioprospecting is not defined** in **UNCLOS** and the proposed definitions of bioprospecting left out part of the activities carried out on board ships by research institutions in the context of pure research which does not necessarily search for genes.⁴³
- The **distinction between pure and applied research is not always clear-cut**.⁴⁴ The nature of bioprospecting is to look for commercially valuable compounds.⁴⁵
- Most of the material collected is the result of **academic research**.⁴⁶
- Shifts in the strategies of **companies** had occurred whereby these companies had reduced their own research activities and are, instead, **buying licenses and lead compounds** from smaller academic groups and companies.⁴⁷

5. Intellectual property rights issues

- **Patent trolls**⁴⁸ and **thickets**⁴⁹ impede innovation.⁵⁰
- There is a need to develop **benefit sharing mechanisms** that avoid these practices.⁵¹
- There is a possibility of using **open innovation approaches** that would particularly benefit developing countries.⁵²
- Industry interest in a system that led to **advances in technology without the challenges** associated with the patent system.⁵³
- The **ultimate goal** of research on genetic resources is the development of **novel processes and products** or the **improvement of existing ones**, so the question of the role played by patents in the context of benefit sharing is of paramount importance to countries that could not conduct marine research on their own.⁵⁴
- There is a question how countries that do not have the necessary **capabilities** could ensure that the TRIPS Agreement⁵⁵ and discussions related to oceans could support each other. The further extension of the **transition period** under Article 66.1 of the TRIPS Agreement for Least-Developed Country Members was under discussion before the TRIPS Council.⁵⁶ The transition period may provide an environment under which these countries may develop their own capacity.⁵⁷
- **Re patentability:** Often only genetically modified microorganisms are patentable⁵⁸ but patents are regulated differently under different domestic intellectual property law systems and some jurisdictions allow for the organisms in their natural state to be patented.⁵⁹
- When the same genetic material is found in multiple national jurisdictions, benefit sharing takes place according to the CBD definition of "country of origin". With regard to marine genetic resources of ABNJ, an understanding of what constituted the "**country of origin**" may be required.⁶⁰
- How to allocate responsibility for **benefit sharing between research institutions** which conduct research expeditions in ABNJ, and those which later develop commercial applications?⁶¹ While most research cruises are sponsored by States, the results of the research and derivatives may be handled by private enterprises and researchers, and the users of the resources are not necessarily those that had sourced the organism.
- The **allocation of benefits** could be addressed **before the commercialization** process, in contracts between the research institutions and the entities which subsequently carried out the commercial development, especially when the research institutions are aware that commercialization would ensue. But this may not always be possible since commercial development by the private sector could be based on the findings of an academic publication without the prior knowledge or agreement of the academic entity.⁶²
- Concerning **mapping the origin** of MGRs: geo-referencing based on species named in patents is useful, although not entirely reliable.⁶³ Studies are needed to determine whether the State institutions sponsoring research cruises are also those who had filed for the patents.⁶⁴
- Under the patent laws of certain States, the **disclosure of the origin** of genetic resources is **not required**.⁶⁵

- Adopting a **requirement for disclosure** would **not impose any additional burden** on patent authorities since they would not be required to investigate the origin or compliance with benefit-sharing but simply ensure that the declaration of origin had been made by an applicant.⁶⁶
- There is a **lack of an obligation to disclose the origin** of organisms.⁶⁷
- **Checkpoints** to determine the geographical origin of marine genetic resources could be placed including:
 - (1) the stage at which a product is approved for commercialization or
 - (2) in the context of a material transfer agreement.

Disclosing origin upstream of the commercialization process could be more effective. Information from taxonomic data could assist in determining the geographical origin of an organism.⁶⁸

6. Global and regional regimes on genetic resources, experiences and best practices

- **CBD and the Nagoya Protocol are a good starting point** to discuss access and benefit-sharing mechanisms for marine genetic resources in ABNJ. A **closed-list** approach to marine genetic resources such as ITPGRFA's is **problematic** as such resources could potentially include thousands of species, many of which are still to be discovered.⁶⁹
- Challenges from handling of contracts and keeping track of transactions can be addressed by the model provided by the **WHO Pandemic Influenza Preparedness Framework**, which is less burdensome than the use of standard material transfer agreements, as provided for in the context of the ITPGRFA.⁷⁰
- Where it is difficult to conclude access and benefit-sharing agreements, **voluntary codes of conducts for scientists** with the aim of fostering the public domain nature of research results is a form of non-monetary benefit-sharing.⁷¹
- ITPGRFA:
 - recognizes FAO as a **third-party beneficiary who may act to enforce treaty rights** in cases where the provider of genetic resources does not seek enforcement.⁷²
 - has **non-obligatory contribution of material** to the multilateral system by private enterprises.⁷³
 - is limited to type of genetic resources used for **food and agriculture**, with other uses having to be negotiated on a bilateral basis under the CBD.⁷⁴
- Concerning **lack of capacity of developing countries** to develop and use marine genetic resources:⁷⁵
 - **Capacity-building provisions** of the CBD and the Nagoya Protocol could be drawn upon.⁷⁶
 - The **UNCLOS regime on the transfer of marine technology** is still a useful reference but limited implementation of Part XIV.⁷⁷

- Concerning **Article 16** of the **CBD**⁷⁸ on technology transfer: the extent of technology transfer to developing countries is difficult to assess, often taking place on a bilateral basis and that contracts may not be publicly available.⁷⁹
- Patenting needs to be **practiced responsibly** by ensuring that patents do not exclude others from using the materials.⁸⁰
- UNCLOS embodies notions of **equity** that could be applied, but issues of the legal status of MGR ABNJ should not hinder a **pragmatic solution** for benefit sharing.⁸¹
- **The conservation** of marine biodiversity in ABNJ is a **benefit to mankind as a whole** and should be a component of an access and benefit-sharing regime.⁸²
- **Fair and equitable access to samples and data** is one of the most immediate and promising ways of sharing benefits with humankind as a whole, in light of the current inequities in terms of physical access to ABNJ and of access to samples and data.⁸³
- One of the most important ways of sharing benefits is to be able to **use the resources**. The ITPGRFA had been successful in this regard by unlocking genetic diversity.⁸⁴

7- 8. Exchange of information on research programmes regarding marine biodiversity in ABNJ; International cooperation and coordination; capacity building and the transfer of marine technology

- There are adverse impacts on the marine environment from the **lack of a coordinated management approach** in ABNJ.⁸⁵ e.g. potential cumulative adverse impacts on seamounts resulting from cobalt-crust mining combined with bottom trawling.
- **Environmental impact assessments (EIAs)** may give information on other human activities on MGR in ABNJ.⁸⁶
- Current **knowledge of biodiversity** associated with polymetallic **sulfides and cobalt-rich ferromanganese crusts**, as opposed to polymetallic nodules, is **extremely limited**.⁸⁷
- **Examples of international cooperation and capacity-building projects:** (1) The European Marine Board is composed of various funding and research institutions. Landlocked countries in the European area with an interest or capacity in marine biotechnology research could use the marine stations in coastal States. (2) ISA's Endowment Fund provided some financing for marine scientific research programmes, including in the Clarion Clipperton Zone, for the benefit of developing States and technologically less developed States.⁸⁸

II. Workshop on conservation and management tools, including area-based management and environmental impact assessments

1. Key ecosystem functions and processes in ABNJ

- A connection exists between the **loss of marine biodiversity** and the **loss of ecosystem services**. Many functions and processes in areas beyond and within national jurisdiction are either similar or closely linked.⁸⁹ **Endemism** of chemosynthetic organisms is particularly **high** in environments such as hydrothermal vents, cold seeps and seamounts. **Whale carcasses** provide a habitat to a high level of endemic species.⁹⁰ Activities having impacts on ecosystem functions and processes in ABNJ include seabed mining, pollution, the dumping of waste and unregulated harvesting of resources.⁹¹

2. Impacts and challenges to marine biodiversity beyond areas of national jurisdiction

- There is particular concern over the impacts of **overfishing, climate change and ocean acidification**. Fishing is currently the main threat to marine biodiversity in ABNJ. There are concerns about the impacts of bottom fisheries.⁹²
- Regional fisheries management organizations (**RFMOs**) **need to be strengthened**. This could be achieved by expanding their mandates to apply ecosystem approaches, including biodiversity considerations, conducting performance reviews, sharing best practices and improving their monitoring and surveillance mandate. The need to improve transparency and accountability of RFMOs was recognized in "The Future We Want".⁹³
- In terms of **best practices**, while the Antarctic Treaty System provides a unique context, lessons could be learnt from the experience of the Commission on the Conservation of Antarctic Marine Living Resources (**CCAMLR**), including its application of an **ecosystem approach, the use of a common database and information system and 100% observer coverage**. The **enforcement measures** of the North East Atlantic Fisheries Commission (**NEAFC**) are an example of a best practice.⁹⁴
- RFMOs need to consider the impacts of fishing on **non-target species**, such as migratory species of seabirds and turtles, and to address gaps in knowledge of such impacts. There are inherent difficulties in managing a wide range of target and non-target migratory species. RFMOs should take into account the impacts of **other human activities** on fisheries productivity when adopting management measures.⁹⁵
- There was a debate about **moratoria** on high seas fishing and area closures as means to improve conservation of marine biodiversity in ABNJ:
 - **Uncertainty about deep ocean and pelagic biology and processes** and the relative importance of management measures on these processes, means the high seas, or regulatory areas of RFMOs, should be closed to fishing activities, at least temporarily, until the mandates of RFMOs are expanded and/or reformed to be better equipped to manage fisheries

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- Involving the work of RFMOs or closing the high seas to fishing may have a **counter-effect** of encouraging unrestrained fishing and illegal, unreported and unregulated (IUU) fishing in those areas.⁹⁶
- **Bottom fishing:** The General Assembly addressed the impacts of destructive fishing practices on vulnerable marine ecosystems (VMEs) and ensuring the **long-term sustainability** of deep-sea fish stocks in particular in resolution 61/105, and there have been related developments in FAO and in relevant RFMOs. But we need **further efforts** in the **implementation** of these commitments, including through the **protection of habitats** and the establishment of **area closures**. Some RFMOs had adopted restrictive definitions of VMEs, leaving the most VMEs without protection.⁹⁷
- **RFMOs:** Progress in the work of RFMOs includes on-going **performance reviews**, the establishment of **area closures** and **new RFMOs**. There is a general trend in the **reduction of fishing effort in the deep sea**, in particular in the North-East Atlantic. Deep-sea fisheries require larger vessels and more complex gear and are therefore less attractive from an economic perspective. Developments within the International Commission for the Conservation of Atlantic Tunas (ICCAT) to reduce catch limits led to improvements in the status of relevant stocks.⁹⁸ A **disaggregated analysis** of the performance of RFMOs presents an obstacle to identifying which ones had been successful or not and the lessons that could be learned. The success or failure of RFMOs depends on the **political will** or lack thereof of their member States.⁹⁹ Pressures beyond the mandates of RFMOs include impacts from shipping, seabed mining, climate change, ocean acidification, ocean noise and land-based sources of pollution.¹⁰⁰
- **MPAs** would provide benefits to biodiversity conservation including the **prevention of cumulative impacts** and the **management of user conflicts**. Challenges included the establishment of such areas in the **pelagic** realm where species travelled long distances, when MPAs would need to be established throughout the range of such species. Protected areas need to be relevant from an ecological and biological perspective rather than necessarily be extensive in size.¹⁰¹
- **Cross-sectoral integrated management approaches** should be developed. We need to address the accelerating impacts from various pressures as well as manage conflicting uses. We need management measures that would address possible future impacts in addition to those already taking place.¹⁰²
- **EBSAs:** Concerning the CBD process on the application of criteria for ecologically or biologically significant marine areas (EBSAs):
 - The **naturalness criterion** is one of the least useful for the purposes of identifying candidate areas for MPAs. Recoverability criteria should be considered.¹⁰³
 - The level of **information** currently available from the CBD process is too **limited** to adequately assess all the criteria and facilitate the identification of suitable areas.¹⁰⁴
 - We need **systematic assessments**, improvements in data quality and more scientific research.¹⁰⁵

- Most of the data currently available is **fisheries-dependent data**, and we need large scale cross-sectoral initiatives such as the Census of Marine Life to continue gathering the required data.¹⁰⁶
- Close **collaboration** between the CBD and other bodies, such as FAO, the United Nations Environment Programme (UNEP) and RFMOs, has demonstrated the benefits of **sharing data and expertise** across sectors.¹⁰⁷
- We need **collaboration** between the process to identify EBSAs and the Regular Process for Global Reporting and Assessment of the State of the Marine Environment, including Socio-Economic Aspects.¹⁰⁸
- **Capacity-building** and **increased political awareness** are essential.¹⁰⁹

3. New and emerging uses of, and experimental activities in, ABNJ

- These include **climate engineering** (potentially having the most significant effect); **ocean fertilization** (potential to affect large areas); **marine debris** and the presence of microplastics in the oceans (lack of technology to remove them); increasing demand for **aquaculture** (which may develop in ABNJ with the development of mobile cages) and underwater **noise**.¹¹⁰
- New and emerging uses and experimental activities are primarily carried out within areas of national jurisdiction since the relevant **technologies have not been fully developed** for use in ABNJ and the **cost** for such development has been **prohibitive**. New and emerging uses and experimental activities may **conflict** with existing uses of ABNJ such as fishing, seabed mining and the laying of submarine cables.¹¹¹
- We need **assessments of their impacts, including cross-sectoral** environmental impact assessments. Cross-sectoral environmental impact assessments issues include the identification of the entity that would carry out these assessments and the body to which the results of such assessments would be reported. Even where there had been assessments, these had not been comprehensive.¹¹²
- It is important to **share information and data** regarding the impacts of new and emerging uses of, and experimental activities in, ABNJ.¹¹³
- **Legal framework and enforcement mechanisms:**
 - The overarching framework is UNCLOS.¹¹⁴
 - The 1972 Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (the **London Convention**) and its 1996 Protocol is relevant to many activities.¹¹⁵
 - Some of the new and emerging uses and experimental activities may already be covered by **existing instruments**.¹¹⁶
 - **Ocean noise and pollution:** several sectoral bodies addressed noise pollution in the marine environment. Convention on Migratory Species of Wild Animals (Bonn Convention) and CBD recommendations on assessments of noise pollution.¹¹⁷
 - There may be a **gap** concerning the assessment of potential impacts of **seismic testing**.¹¹⁸
 - **Noise pollution** from seabed mining in ABNJ could fall within the competence of the **ISA**.¹¹⁹

- **Ocean fertilization:** experimental activities should be designed so that the **impacts** of such activities on marine and coastal ecosystems could be measured.¹²⁰
- **Governance of climate-related geo-engineering:** This was identified as a **gap**. The CBD is doing work to analyze the regulatory framework for climate-related geoengineering.¹²¹
- **Responsibility for controlling and regulating** new and emerging uses and experimental activities which may have negative impacts in ABNJ: It is important to establish the **responsibility of States** for activities in ABNJ. This is not always possible, particularly in relation to unlawful or unregulated (rogue) experiments. It is the **responsibility of flag States** in ABNJ or of States within the jurisdiction of which activities took place which may have negative impacts in ABNJ. Identification of the responsible flag State may be complicated by cases where there had been re-flagging or when flags of convenience had been used. It is important to provide reparations or compensation when UNCLOS is infringed.¹²²

4. Types of area-based management tools

- There is a **central role of UNCLOS** and the United Nations Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (United Nations Fish Stocks Agreement or **UNFSA**) in defining the rights and duties of States for taking measures for the management of marine resources and the protection and preservation of the marine environment.¹²³
- **The role of regional organizations and initiatives in taking measures in ABNJ:**
 - **OSPAR:** The panel discussed the experience and lessons learned in the context of the 1992 Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR Convention), especially the cross-sectoral approach to the establishment of MPAs in ABNJ. The process within OSPAR was an attempt by its Parties to implement their obligations under UNCLOS and non-Parties are not bound by the measures adopted. The process focused on achieving an objective and provided a framework for cooperation to that end. The adoption of the measures necessary to achieve that objective was a matter for the competent sectoral organizations. The OSPAR experience was one of trial and error from which to learn.
 - **CCAMLR:** The only good example of the establishment of an integrated area-based management tool could be found in the context of CCAMLR. The process to establish specially protected areas in the context of the Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean was also noted.¹²⁴
 - **Concern about using the OSPAR experience as a model:** OSPAR and other regional seas conventions do not have the competence under UNCLOS, as well as the legitimacy, to take measures in ABNJ such as the establishment of MPAs. The ISA has exclusive competency in the Area. Some argue that the concerns about the OSPAR example of cross-sectoral cooperation do not provide a sufficient basis to reach the conclusion that an implementing agreement to UNCLOS was needed. That discussions among States are ongoing on the need for a legal regime for the conservation and sustainable use of marine biodiversity in ABNJ attests to the concerns of many States over regional or cross-sectoral approaches and initiatives.¹²⁵

- An **implementing agreement** to UNCLOS could be drafted so as to legally bind non-parties to regional organizations by the measures adopted by these regional organizations. Thus, at the global level, there would be an obligation to comply with the decisions of regional bodies.¹²⁶
- Substantial progress had been made by RFMOs in managing fisheries in an ecosystem context, with a view to addressing the impacts of fishing on marine biodiversity in ABNJ. But **subsidies and overcapacity** still posed major problems. **Lack of political will** within RFMOs is an issue: the extent of political will and the measures adopted differed in various regions.¹²⁷
- There must be substantive reasons why the developments within the **OSPAR** area have not been replicated in other regions. The financial situation of a region or State could impede the development of adequate management measures. The lack of agreement or action in a particular region should not prevent actors from taking appropriate management measures. If a conclusion is reached at the global level that some protective measures are required but no action is taken at the regional level, such measures should be adopted at the global level.¹²⁸
- There may be restrictions on the **freedom of navigation** resulting from the establishment of MPAs or area closures in ABNJ but the establishment of such areas does not necessarily entail the prohibition of all human activities there. Regional organizations having established such areas could, while allowing entry into the areas for navigation purposes, require non-Parties to report entry into, and exits from, these areas.¹²⁹
- **IMO:** Some intergovernmental organizations such as the International Maritime Organization (IMO) might have the capacity and ability to take into account a multitude of activities other than shipping when designing their area-based management tools, including addressing **cumulative impacts**. Other international organizations may have similar capabilities and abilities which vary depending on the organization.¹³⁰
- **Transparency:** Some recent global initiatives related to oceans, including in relation to ABNJ, need to be more **transparent** and to take better account of the interests of, and the need for involvement of, **developing countries**. Be careful investing in those initiatives while there is no universal regime for addressing the conservation and sustainable use of marine biodiversity in ABNJ.¹³¹

5. Assessments of sectoral and cumulative impacts

- **The extent to which environmental impact assessments are already being conducted in ABNJ**
 - **Mining:** The **ISA** requires **EIAs** as a pre-condition to mining activities.¹³²
 - **Deep sea fisheries:** General Assembly resolution 61/105 requires **assessments** of the impacts of destructive fishing practices on VMEs. As of 2011, all RFMOs had completed or almost completed evaluations of the implementation of the resolution. But the process of **implementation is incomplete** and difficult to assess given that, in some cases, there have been management or institutional failures in some RFMOs.¹³³
 - **IMO:** IMO has developed **guidance** for conducting impact assessments and the London Convention and Protocol also required such assessments. The assessments required under UNGA resolution 61/105 and under IMO instruments have not been

consistent. There is also variability in the quality of the assessments carried out and the biggest challenge is the ability to assess activities jointly in a coordinated manner.¹³⁴

- **Relative difficulty of conducting assessments of sectoral and cumulative impacts in ABNJ**
 - For any given site, there are likely **fewer pressures** than in a similar site in coastal areas, but assessing **cumulative impacts** might still be **challenging** because of the interplay between different types of impacts.¹³⁵
 - Since there are fewer activities in ABNJ, it may be **easier and less costly** to undertake such assessments there rather **than in coastal areas**.¹³⁶
 - In the short-term, this gives greater confidence in sector-specific EIAs and strategic environmental assessments (SEAs), but the goal has to be to **address the aggregate impact** of human activities.¹³⁷
- Since the main activity having negative impacts on marine biodiversity in ABNJ is fisheries, it might be possible for RFMOs to undertake **cumulative impact assessments** in those areas, taking into account other impacts through a precautionary approach.¹³⁸
- While some States currently had insufficient **capacity** to undertake such assessments, this should not prevent States from adopting the required measures and engaging in a learning-by-doing process through a staged-approach. But this could increase the burden and costs of the process for those wanting to undertake activities.¹³⁹
- Capacity to **independently verify EIAs** conducted in ABNJ is an issue. Verification capacity remains limited.¹⁴⁰
- **Trigger point for requiring EIAs:** On the basis of the available scientific knowledge, it is already possible to determine such **trigger points**. But for ABNJ there are certain uncertainties which do not exist for assessments on land. There is a trade-off between overly permissive and overly restrictive regulations.¹⁴¹
- The experiences accumulated in assessing areas within national jurisdiction could be considered for ABNJ. Lessons could be learned from the application of marine spatial planning in near-shore areas.¹⁴²
- **Governance**
 - Although arrangements generally existed to carry out the necessary assessments at the sectoral level, the question of an overarching framework arises. UNGA resolution **61/105** in addressing and strengthening the deep sea fisheries regime is **important**, in spite of it being a non-legally binding instrument. The effective functioning of a **soft-law** arrangement, such as resolution 61/105, **does not prevent adoption of a binding instrument** to govern the conservation and sustainable use of marine biodiversity in ABNJ. The deep sea fisheries regime may have been stronger if a binding instrument had been concluded.¹⁴³
 - **Some legally binding instruments are not adequately implemented** or have not gained sufficient participation and increasing awareness of issues and political will, regardless of the nature of the instrument or mechanism employed, is more important. National regulations may have to be made compatible with international approaches.¹⁴⁴

- Whether a new overarching instrument is adopted or not, it is crucial to have a global understanding of who the relevant **stakeholders** are in ABNJ, as well as to consider whether new arrangements would make accountability and compliance better.¹⁴⁵

6. Technological, environmental, social and economic aspects

- Whether the process for **identifying stakeholders** for the management of ABNJ could follow the approach applied for areas within national jurisdiction: A similar approach might be used to identify **stakeholders**, but that the outcome would necessarily be different. Information from intergovernmental organizations could also be used to supplement the list of stakeholders beyond the known ones, such as fishers and bioprospectors. The Caribbean Large Marine Ecosystem project is an example of engagement of a wide range of stakeholders, including RFMOs and other regional organizations, UNEP and academic institutions.¹⁴⁶
- **Nansen project**: this is an initiative of the FAO to support the implementation of the ecosystem approach in the management of marine fisheries. It is also aimed at assisting developing countries in gathering information and data for that purpose. It includes scientific research as well as policy components and is active in various States.¹⁴⁷

7. Existing regimes, experiences and best practices

- We need to achieve the **CBD goal** to establish **representative networks of MPAs by 2020**. It is good to link this goal with other efforts to address impacts on the marine environment and the provision of ecosystem services.¹⁴⁸
- **Large areas** are needed to support ecosystem processes in the open oceans given that these processes worked on a far greater scale. There is a potential role of **bioregionalization** here.¹⁴⁹
- **Challenges in creating MPAs for pelagic species**: given the **migratory nature** of these species, mobile MPAs should be considered. MPAs could not be enough on their own if measures to address the impacts of activities taking place outside of the areas, but which could affect the ecological integrity of the areas, are not also adopted.¹⁵⁰
- **Efforts to create MPAs in ABNJ**: OSPAR and CCAMLR could be used as models for other areas. But these measures only dealt with certain activities and did not address cumulative effects. Existing experiences are limited to developed countries, and there would be merit in considering other models for other regions where different circumstances prevailed. **Regional capacity** is needed to be built, including for monitoring and the conduct of impact assessments.¹⁵¹
- **Biodiversity considerations** are not taken into account by all RFMOs, particularly tuna RFMOs, in the adoption of conservation and management measures. Even sustainable fisheries would have impacts on the marine environment and would lead to changes in marine ecosystems and life cycles. There is a need to establish some **MPAs where fisheries activities are not permitted**. Tuna fisheries do not physically impact the seabed. Progress is being made in RFMOs to take ecosystems considerations into account.¹⁵²
- **The difference between the CBD criteria for EBSAs and those for VMEs**: The EBSA process aims at providing **scientific information to enhance protection of specific areas**, but does not have consequences in terms of policy or management. Whether an EBSA should be the basis for an MPA depends on whether an activity is causing damage to that

area. An EBSA could be protected by tools other than a MPA. Conversely, **the identification of a VME has consequences in terms of policy and management.** For this reason, policy makers may be reluctant to recognize the science underpinning the identification of VMEs.¹⁵³

- **Both the ESBA and VME processes** are informed by the **best available science** and the **EBSA process could play a part in the selection of VMEs.** Benefits could be gained from the input of science across sectors, through a bottom-up contribution, as this would reduce duplication in research efforts and enhance coordination among policy-making processes.¹⁵⁴
- **Challenges in monitoring activities conducted in ABNJ:** There is a need to **identify stakeholders**, which often are resource users, in order to foster coordination and cooperation among them. This would assist in monitoring in ABNJ and would also create an incentive for compliance with regulations and thus overcome issues linked to lack of political will.¹⁵⁵
- **The potential conflicting uses of ABNJ, such as bottom fishing activities and seabed mining:** co-ordination is needed among competent bodies. The establishment is needed in the Pacific Ocean of new RFMOs which had the mandate to take into account activities other than fisheries. Any measures adopted by RFMOs or regional environmental organizations in this regard would be without prejudice to the work of the **ISA**, which had the mandate for mining activities in the Area.¹⁵⁶
- **The role of cross-sectoral coordination:** whether lack of cross-sectoral coordination between organizations presented an obstacle in achieving the goals set by States.¹⁵⁷
 - **All activities** impacting marine biodiversity in ABNJ need to be addressed, as well as issues of competing jurisdictions and uses and cumulative effects of current and future activities.¹⁵⁸
 - There is a need to **co-ordinate the implementation** of measures at the sectoral and regional levels.¹⁵⁹
 - The process is not one of competition but rather of **complementarities and co-ordination** between various competent organizations.¹⁶⁰
 - It is challenging to conserve and sustainably use marine biodiversity in ABNJ without an **overarching legally-binding mandate and framework setting out goals and purposes.**¹⁶¹
 - There is the need for an **instrument** to provide for **integrated MPAs** in ABNJ.¹⁶²
 - Under the current legal regime, interested States are able to establish a **regional organization** to coordinate sectoral activities. While this does not impose obligations on **third States**, it is possible to build into a regional mechanism an undertaking for third Parties to not undermine the objectives of the measures adopted by that mechanism. e.g. the Specially Protected Areas of Mediterranean Importance process in the Mediterranean.¹⁶³
- **Challenges in achieving cross-sectoral coordination:** Further efforts are needed to **improve coordination among stakeholders** and to **achieve a cross-sectoral approach** to management. The **Sargasso Sea** initiative shows that meetings of relevant bodies often occur at the same time, making it difficult to coordinate policy discussions. Co-ordinating activities in the United Nations system and at the sectoral level is an ongoing challenge.¹⁶⁴
- **Possible ways forward**

- (a) development of new mechanisms¹⁶⁵ or
- (b) the expansion of mandates of existing bodies.¹⁶⁶
 - a new global mechanism could provide **international support for areas in need of protection** and could be complemented by measures adopted at the regional level. This would be an approach that would combine areas with greater protection with areas of managed allowed activities.
 - The issue of the instruments that may be the **most efficient** to achieve an appropriate management of MPAs in ABNJ: it is doubtful that memoranda of understanding would constitute the best mechanism.¹⁶⁷

8. Exchange of information on research programmes regarding marine biodiversity in areas beyond national jurisdiction; international cooperation and coordination; capacity building and the transfer of marine technology

- The interconnectedness of areas within and beyond national jurisdiction was examined in relation to the spatial distribution of data.¹⁶⁸
- The available data **does not follow the legal boundaries of maritime zones** and therefore data has to be assessed in a broad context.¹⁶⁹
- There is **no centralized data repository** for the results of research in ABNJ.¹⁷⁰
- While several types of data are often available, such **availability is not well advertised** outside developed countries, and there should be greater efforts to make use of, and optimize, existing data infrastructure.¹⁷¹

Concerning compatibility of measures for areas within and beyond national jurisdiction:

- Such compatibility is a **two-way process**.¹⁷²
- **Obligations in international instruments** support or provide for such compatibility, in particular the United Nations Fish Stocks Agreement.¹⁷³
- **Examples** of efforts to ensure compatibility of measures include:
 - the **Pacific Oceanscape** initiative and
 - the **High Seas Pockets** Special Management Areas of the Western and Central Pacific Fisheries Commission.¹⁷⁴
- Compatibility does not mean the adoption of the same measures but that measures should have **equivalent effect**. For instance, the fact that an MPA area exists within national jurisdiction does not necessarily mean that there should be such a protected area in the contiguous area beyond national jurisdiction.¹⁷⁵

Marine Scientific Research

- **Further scientific research** in ABNJ is **needed** to fill data gaps.¹⁷⁶
- **Resolutions of the General Assembly** recall the importance of marine science. Examples of international collaborative marine scientific research projects include Census of Marine Life.¹⁷⁷

- **South-South co-operation** for marine scientific research is **limited** and progress is mostly in developed regions. As a result, there is a need to increase South-South cooperation, including in relation to marine genetic resources.¹⁷⁸
- **Capacity-building** in both developed and developing countries for marine science in ABNJ is **needed**. Funding for projects in ABNJ under the Global Environment Facility was discussed.¹⁷⁹

Technology Transfer

- In light of the limited implementation of Part XIV of UNCLOS on the development and transfer of marine technology, there are **difficulties** in achieving technology transfer.¹⁸⁰
- Technology transfer could take **different forms**, including **provision of software or data access**.¹⁸¹
- In light of the fact that several research initiatives are **independent**, there is a **need for global mechanisms** for technology transfer and data sharing, as well as to protect **commercially confidential data** and **address data access**, including through data protocols.
- The **Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services** could have a role in data and information sharing. The role of the **clearing-house mechanism** under the Intergovernmental Oceanographic Commission of UNESCO may be a more appropriate option. The establishment of a mechanism for sharing of marine scientific research data should be included in the post-2015 development agenda.¹⁸²
- **Direct participation in joint research projects** is more effective, in terms of building capacity, than information sharing. Increased cooperation between regional institutions, regional training programmes and workshops, mentoring, partnership, linkages between North and South regional institutions and global scholarships are beneficial. Capacity-building should not be considered as a single activity but as complex series of inter-related activities. Sustainable capacity-building activities are needed.¹⁸³

¹ Intersessional Workshops aimed at improving understanding of the issues and clarifying key questions as an input to the work of the Working Group in accordance with the terms of reference annexed to General Assembly resolution 67/78: Summary of proceedings prepared by the co-Chairs of the Working Group (Advance, Unedited version). At http://www.un.org/depts/los/biodiversityworkinggroup/documents/BBNJ_Worshops.pdf (Report).

This report was produced for WWF and the High Seas Alliance by Duncan Currie, a panelist in Workshop II.

² Report, para. 53.

³ Report, para. 53.

⁴ Report, para. 13.

⁵ Report, para. 15.

⁶ Report, para. 28.

⁷ Report, para. 13.

⁸ Report, para. 23.

⁹ Report, para. 23.

¹⁰ Report, para. 23.

¹¹ Report, para. 31.

¹² Report, para. 34.

¹³ Report, para. 34.

¹⁴ Report, para. 53.

¹⁵ A patent troll is a person or company that enforces its patents against one or more alleged infringers in an unduly aggressive or opportunistic way, often with no intention to manufacture or market the product.

¹⁶ A thicket is dense web of overlapping intellectual property rights that a company must hack its way through in order to actually commercialize new technology.

¹⁷ Report, para. 51.

¹⁸ Report, para. 46.

¹⁹ Report, para. 47.

²⁰ Report, para. 53.

²¹ Report, para. 55.

²² Report, para. 55.

²³ Report, para. 65.

²⁴ Report, para. 96.

²⁵ Report, para. 121.

²⁶ Report, para. 124.

²⁷ Report, para. 123.

²⁸ Report, para. 111.

²⁹ Report, para. 66.

³⁰ Report, para. 67.

³¹ Report, para. 71.

³² Report, para. 91.

³³ Report, para. 91.

³⁴ Report, para. 69.

³⁵ Report, para. 96.

³⁶ Report, para. 73.

³⁷ Report, para. 74.

³⁸ Report, para. 76.

³⁹ Report, para. 76.

⁴⁰ Regular Process for Global Reporting and Assessment of the State of the Marine Environment, including Socio-Economic Aspects. Report, para. 76.

⁴¹ Report, para. 76.

⁴² Report, para. 79.

⁴³ Report, para. 80.

⁴⁴ Report, para. 81.

⁴⁵ Report, para. 84.

⁴⁶ Report, para. 85.

⁴⁷ Report, para. 90.

⁴⁸ Report, para. 91.

⁴⁹ Report, para. 92.

⁵⁰ Report, para. 94.

⁵¹ Report, para. 97.

⁵² Report, para. 97.

⁵³ Report, para. 99.

⁵⁴ Report, para. 100.

⁵⁵ Report, para. 102.

⁵⁶ Report, para. 103.

⁵⁷ Report, para. 105.

⁵⁸ Report, para. 114.

⁵⁹ Report, para. 108.

⁶⁰ Report, para. 109.

⁶¹ Report, para. 109.

⁶² Report, para. 110.

⁶³ Report, para. 111.

⁶⁴ Report, para. 113.

⁶⁵ Report, para. 115.

⁶⁶ Report, para. 116.

⁶⁷ Report, para. 116.

⁶⁸ Report, para. 117.

⁶⁹ Report, para. 117.

⁷⁰ Report, para. 119.

⁷¹ Report, para. 122.

¹ Intersessional Workshops aimed at improving understanding of the issues and clarifying key questions as an input to the work of the Working Group in accordance with the terms of reference annexed to General Assembly resolution 67/78: Summary of proceedings prepared by the co-Chairs of the Working Group (Advance, Unedited version). At http://www.un.org/depts/los/biodiversityworkinggroup/documents/BBNJ_Worshops.pdf (Report).

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² The gaps are reported by panellists or in comments made following the panels. Qualifications such as ‘panelists suggested that’ are omitted for brevity and clarity; reference should be made to the original Report for attribution information. The information reported here reflects information provided at the Workshops including the opinions of

various panellists and commentators and does not necessarily represent the views of the High Seas Alliance or its members.

³ Report, para. 13.

⁴ Report, para. 13.

⁵ Report, para. 15.

⁶ Report, para. 15.

⁷ Report, para. 20.

⁸ Report, para. 20.

⁹ Report, para. 21.

¹⁰ Report, para. 22.

¹¹ Report, para. 23.

¹² Report, para. 23.

¹³ Report, para. 23.

¹⁴ Report, para. 23.

¹⁵ Report, para. 25.

¹⁶ Report, para. 26.

¹⁷ Report, para. 28.

¹⁸ Report, para. 28.

¹⁹ Report, para. 28.

²⁰ Report, para. 29.

²¹ Report, para. 30.

²² Report, para. 31.

²³ Report, para. 33.

²⁴ Report, para. 33.

²⁵ Report, para. 33.

²⁶ Report, para. 34.

²⁷ Report, para. 34.

²⁸ Report, para. 35.

²⁹ The provisions of Part XIII related to the participation of coastal States' scientists and to data, samples and research results reflected a counterpart to the possibility for a researching State to access areas under the jurisdiction of a coastal State and use its natural resources rather than benefit sharing. Report, para. 35.

³⁰ Report, para. 36.

³¹ Report, para. 36.

³² Report, para. 36.

³³ Report, para. 36.

³⁴ Report, para. 36.

³⁵ Report, para. 36.

³⁶ Report, para. 37.

³⁷ Report, para. 37.

³⁸ Report, para. 37.

³⁹ Report, para. 37.

⁴⁰ Report, para. 38.

⁴¹ Report, para. 38.

⁴² Report, para. 39.

⁴³ Report, para. 39.

⁴⁴ Report, para. 39.

⁴⁵ Report, para. 39.

⁴⁶ Report, para. 39.

⁴⁷ Report, para. 39.

⁴⁸ A patent troll is a person or company that enforces its patents against one or more alleged infringers in an unduly aggressive or opportunistic way, often with no intention to manufacture or market the product.

⁴⁹ A thicket is dense web of overlapping intellectual property rights that a company must hack its way through in order to actually commercialize new technology.

⁵⁰ Report, para. 41.

⁵¹ Report, para. 41.

⁵² Report, para. 41.

⁵³ Report, para. 41.

⁵⁴ Report, para. 42.

⁵⁵ Agreement on Trade Related Aspects of Intellectual Property Rights

⁵⁶ Report, para. 42. Art 66.1 provides that “In view of the special needs and requirements of least-developed country Members, their economic, financial and administrative constraints, and their need for flexibility to create a viable technological base, such Members shall not be required to apply the provisions of this Agreement, other than Articles 3, 4 and 5, for a period of 10 years from the date of application as defined under paragraph 1 of Article 65. The Council for TRIPS shall, upon duly motivated request by a least-developed country Member, accord extensions of this period.”

⁵⁷ Report, para. 42.

⁵⁸ Report, para. 43.

⁵⁹ Report, para. 43.

⁶⁰ Report, para. 44.

⁶¹ Report, para. 45.

⁶² Report, para. 45.

⁶³ Report, para. 46.

⁶⁴ Report, para. 46.

⁶⁵ Report, para. 46.

⁶⁶ Report, para. 46.

⁶⁷ Report, para. 47.

⁶⁸ Report, para. 47.

⁶⁹ Report, para. 49.

⁷⁰ Report, para. 49.

⁷¹ Report, para. 49.

⁷² Report, para. 50.

⁷³ Report, para. 50.

⁷⁴ Report, para. 50.

⁷⁵ Report, para. 51.

⁷⁶ Report, para. 51.

⁷⁷ Report, para. 51.

⁷⁸ CBD Article 16.1 reads “Article 16. Access to and Transfer of Technology:

1. Each Contracting Party, recognizing that technology includes biotechnology, and that both access to and transfer of technology among Contracting Parties are essential elements for the attainment of the objectives of this Convention, undertakes subject to the provisions of this Article to provide and/or facilitate access for and transfer to other Contracting Parties of technologies that are relevant to the conservation and sustainable use of biological diversity or make use of genetic resources and do not cause significant damage to the environment.” Reference should also be made to Article 16.2-16.5.

⁷⁹ Report, para. 51.

⁸⁰ Report, para. 51.

⁸¹ Report, para. 52

⁸² Report, para. 53

⁸³ Report, para. 53

⁸⁴ Report, para. 53

⁸⁵ Report, para. 55.

⁸⁶ Report, para. 57.

⁸⁷ Report, para. 57.

⁸⁸ Report, para. 58.

⁸⁹ Report, para. 61.

⁹⁰ Report, para. 62.

⁹¹ Report, para. 63.

⁹² Report, para. 65.

⁹³ Report, para. 66.

⁹⁴ Report, para. 66.

⁹⁵ Report, para. 67.

⁹⁶ Report, para. 68.

⁹⁷ Report, para. 69.

⁹⁸ Report, para. 70.

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¹⁰⁵ Report, para. 76.

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¹¹⁰ Report, para. 78.

¹¹¹ Report, para. 79.

¹¹² Report, para. 80.

¹¹³ Report, para. 81.

¹¹⁴ Report, para. 82.

¹¹⁵ Report, para. 82.

¹¹⁶ Report, para. 82.

¹¹⁷ Report, para. 83.

¹¹⁸ Report, para. 83.

¹¹⁹ Report, para. 83.

¹²⁰ Report, para. 84.

¹²¹ Report, para. 84.

¹²² Report, para. 85.

¹²³ Report, para. 87.

¹²⁴ Report, para. 88.

¹²⁵ Report, para. 89.

¹²⁶ Report, para. 90.

¹²⁷ Report, para. 91.

¹²⁸ Report, para. 91.

¹²⁹ Report, para. 92.

¹³⁰ Report, para. 93.

¹³¹ Report, para. 94.

¹³² Report, para. 96.

¹³³ Report, para. 96.

¹³⁴ Report, para. 96.

¹³⁵ Report, para. 97.

¹³⁶ Report, para. 97.

¹³⁷ Report, para. 97.

¹³⁸ Report, para. 98.

¹³⁹ Report, para. 99.

¹⁴⁰ Report, para. 99.

¹⁴¹ Report, para. 100.

¹⁴² Report, para. 101.

¹⁴³ Report, para. 102.

¹⁴⁴ Report, para. 102.

¹⁴⁵ Report, para. 103.

¹⁴⁶ Report, para. 105.

¹⁴⁷ Report, para. 106.

¹⁴⁸ Report, para. 108.

¹⁴⁹ Report, para. 109.

¹⁵⁰ Report, para. 109.

¹⁵¹ Report, para. 110.

¹⁵² Report, para. 111.

¹⁵³ Report, para. 112.

¹⁵⁴ Report, para. 113.

¹⁵⁵ Report, para. 114.

¹⁵⁶ Report, para. 115.

¹⁵⁷ Report, para. 116..

¹⁵⁸ Report, para. 116.

¹⁵⁹ Report, para. 116.

¹⁶⁰ Report, para. 116.

¹⁶¹ Report, para. 117.

¹⁶² Report, para. 117.

¹⁶³ Report, para. 117.

¹⁶⁴ Report, para. 118.

¹⁶⁵ Report, para. 119.

¹⁶⁶ Report, para. 119.

¹⁶⁷ Report, para. 119.

¹⁶⁸ Report, para. 121.

¹⁶⁹ Report, para. 121.

¹⁷⁰ Report, para. 121.

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¹⁷⁸ Report, para. 124.

¹⁷⁹ Report, para. 125.

¹⁸⁰ Report, para. 126.

¹⁸¹ Report, para. 126.

¹⁸² Report, para. 127.

¹⁸³ Report, para. 128.