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STRATEGIC SCIENTIFIC AND TECHNICAL ISSUES RELATED TO THE IMPLEMENTATION OF THE STRATEGIC PLAN FOR BIODIVERSITY 2011-2020

BIODIVERSITY, FISHERIES AND AQUACULTURE

INTRODUCTION

1. The Conference of the Parties to the Convention on Biological Diversity, in decision XII/1, requested the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA) to review the main implications and findings of the fourth edition of the *Global Biodiversity Outlook* (GBO-4) and its underlying technical reports, as well as additional information from fifth national reports and other submissions. The Subsidiary Body was also requested to identify, for consideration by the Conference of the Parties at its thirteenth meeting, further opportunities and additional key actions, including, among others, the contributions of collective actions of indigenous and local communities for the achievement of the Strategic Plan for Biodiversity 2011-2020 and the Aichi Biodiversity Targets, and other actions for the targets where there has been the least progress at the global level (decision XII/1, para. 18). In its multi-year programme of work (decision XII/31), the Conference of the Parties decided, inter alia, to consider, at its thirteenth meeting, the implications of the findings of GBO-4 and strategic actions to enhance national implementation, in particular through mainstreaming and the integration of biodiversity across relevant sectors, including agriculture, forests and fisheries.

2. Section I of the present document describes status and trends related to achieving sustainable fisheries and aquaculture. Section II describes suggested ways and opportunities to mainstream biodiversity in fisheries and aquaculture. Except where otherwise noted, information or conclusions in this note are derived from GBO-4, including its supporting documents.¹

3. An earlier draft of this document was posted for peer review. The earlier draft was revised in response to comments provided by Argentina, Brazil, Mexico, the Food and Agriculture Organization of the United Nations, the United Nations Division on Ocean Affairs and the Law of the Sea, the United

* UNEP/CBD/SBSTTA/20/1/Rev.1.

¹ These are: (1) PBL Netherlands Environmental Assessment Agency. 2014. How Sectors can Contribute to Sustainable Use and Conservation of Biodiversity. Secretariat of the Convention on Biological Diversity, Montreal, Canada. Technical Series No. 79; and (2) Leadley, P.W., Krug, C.B., Alkemade, R., Pereira, H.M., Sumaila U.R., Walpole, M., Marques, A., Newbold, T., Teh, L.S.L, van Kolck, J., Bellard, C., Januchowski-Hartley, S.R. and Mumby, P.J. (2014). Progress towards the Aichi Biodiversity Targets: An Assessment of Biodiversity Trends, Policy Scenarios and Key Actions. Secretariat of the Convention on Biological Diversity, Montreal, Canada. Technical Series No. 78.

Nations Environment Programme, the United Nations Environment Programme's World Conservation Monitoring Centre, the Global Forest Coalition/Indigenous Peoples' and Community Conserved Territories and Areas Consortium, the Inter-American Institute for Global Change Research and the Organisation for Economic Co-operation and Development. The revised document is being submitted as information to the Subsidiary Body at its twentieth meeting.

4. Among the twenty Aichi Biodiversity Targets, the present note focuses on progress towards achieving Target 6: *“by 2020, all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits.”* The note also addresses, to a lesser degree, the aquaculture element of Target 7: *“by 2020 areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.”*

5. The Conference of the Parties highlighted the importance of strategic actions to enhance national implementation in particular through mainstreaming and integration of biodiversity in the fishery sector as one of the main issues to be addressed at its thirteenth meeting (decision XII/31).

6. Article 6(b) of the Convention on Biological Diversity stipulates that the Parties shall, in accordance with their particular conditions and capabilities, “integrate, as far as possible and as appropriate, the conservation and sustainable use of biological diversity into relevant sectoral or cross-sectoral plans, programmes and policies”, while Article 10(a) stipulates that “each Party shall, as far as possible and as appropriate [...] integrate consideration of the conservation and sustainable use of biological resources into national decision-making.” According to Article 2, “Sustainable use” means “the use of components of biological diversity in a way and at a rate that does not lead to the long-term decline of biological diversity, thereby maintaining its potential to meet the needs and aspirations of present and future generations.”

7. The preparation of the present note draws on, in addition to the findings of GBO-4, the guidance of the Conference of the Parties contained in decisions X/29 and XI/18 as well as the outputs of various expert processes² that informed the Conference of the Parties at its tenth and eleventh meetings in its consideration of this subject matter.

8. For example, the Conference of the Parties, at its tenth meeting, endorsed guidance on collaboration with FAO and relevant international and regional organizations, including regional fisheries bodies (RFBs) and regional fisheries management organizations and arrangements (RFMO/As), as appropriate, and in accordance with international law, including the United Nations Convention on the Law of the Sea, to ensure the sustainability of fisheries, by managing the impacts of fisheries on species and the wider ecosystem to achieve the outcomes of Target 6, by implementing the ecosystem approach including though measures such as eliminating illegal, unreported and unregulated (IUU) fishing, minimizing the detrimental impacts of fishing practices, and mitigating and managing by-catch sustainably and reducing discards, in order to attain a sustainable exploitation level of marine fishery resources and thereby contributing to a good environmental status in marine and coastal waters (decision X/29, para.13).

9. Likewise, in decisions X/29 and XI/17, the Conference of the Parties to the Convention, emphasized the importance of collaborating with the Food and Agriculture Organization of the United Nations (FAO) and the regional fisheries bodies (RFBs) and regional fisheries management organizations and arrangements (RFMO/As) with regard to addressing biodiversity considerations in sustainable marine fisheries.

10. It should be also noted that the Executive Secretary has been closely collaborating with FAO and RFBs and RFMO/As on the work within the Convention on applying the scientific criteria for

² Please refer to documents UNEP/CBD/SBSTTA/14/INF/6 and UNEP/CBD/SBSTTA/16/INF/13.

ecologically or biologically significant marine area (EBSAs) and the work of FAO on vulnerable marine ecosystems (VMEs), pursuant to the requests by COP in these decisions as well as decision XII/22. The CBD Secretariat has facilitated the application of the EBSA criteria by convening a series of regional workshops since the tenth meeting of the Conference of the Parties. To date, workshops have been conducted in eleven regions, covering nearly 70 percent of the world's ocean thus far. Additional workshops are being convened in the remaining regions. The information provided by the EBSA and VME processes could provide useful contributions to several of the Aichi Biodiversity Targets. Based on the guidance from UNGA and the technical guidance from FAO contained in the International guidelines for the management of deep-sea fisheries in the high seas, Regional Fisheries Management Organizations (RFMOs) have established processes and taken measures related to Vulnerable Marine Ecosystems to prevent significant adverse impacts from fishing activities. Information on measures taken to protect VMEs by RFMOs are compiled in the VME database, hosted by FAO.

11. It needs to be also highlighted that several of the Aichi Biodiversity Targets are relevant to and have implications for achieving Target 6 (sustainable fisheries), particularly those targets that address pressures and improving the status of biodiversity by safeguarding ecosystems, species and genetic diversity. For example, achieving sustainable fisheries also involves eliminating, phasing out or reforming harmful subsidies (Target 3) that create overcapacity in the fishing sector. Addressing the impacts of other pressures, such as pollution from land-based sources (Target 8) and invasive alien species (Target 9), provides for a means to ensure sustainable fisheries. With a rising human population and increasing per capita consumption, direct pressures on biodiversity will increase, unless efforts are undertaken to make production and consumption more sustainable (Target 4).

12. The present note addresses the above-mentioned requests and guidance by COP in two main sub-sections, including: (a) status and trends in relation to achieving Aichi Biodiversity Target 6; and (b) suggested ways and opportunities to mainstream biodiversity into fisheries.

13. In contrast to the scope of Aichi Target 6 (e.g. all fish and invertebrate stocks), the present note focuses on marine and coastal fisheries and to a lesser extent addressing inland fisheries and aquaculture. Inland fisheries and aquaculture also have important implications for biodiversity and sustainable development and should often be addressed through a different set of management interventions, responding to their respective issues and management challenges. It is also important to identify additional and more specific management interventions to address the biodiversity and sustainable development issues and challenges for inland capture fisheries and aquaculture.

I. STATUS AND TRENDS RELATED TO ACHIEVING SUSTAINABLE FISHERIES AND AQUACULTURE

14. Fisheries and aquaculture plays a significant role in eliminating hunger, promoting health and reducing poverty (FAO, 2014). Fisheries are essential for humans, not only in terms of livelihoods, local economies and the well-being of coastal communities, but also in terms of food security and providing essential sources of protein (Kok et al., 2014). Since the 1950s, rising food demands have put increasing pressure on marine resources. Global per capita fish consumption has increased from an average of 9.9 kg in the 1960s to 19.2 kg in 2012 (FAO, 2014), much of that increase, especially since the late 1990s being due to aquaculture.

15. Sustainable fisheries and aquaculture and the conservation of biodiversity are key components of sustainable development. As part of the 2030 Agenda for Sustainable Development adopted in September 2015, fisheries and the conservation biodiversity are mentioned, inter alia, under Sustainable Development Goals 14 and 15.

16. United Nations post-2015 development agenda and the Sustainable Development Goals reflect this interlinkage. Efforts to manage fisheries sustainably face several challenges in enhancing cross-sectoral coordination and collaboration among various stakeholder groups.

17. GBO-4 recognized that significant progress has been made towards meeting some components of the majority of the Aichi Biodiversity Targets, but also noted that in most cases this progress would not

be sufficient to achieve the targets, and additional action was required. Indicators suggested that, based on current trends, pressures on biodiversity would continue to increase at least until 2020, and that, globally, the proportion of fish stocks within safe ecological limits is projected to decline slightly at least until 2020, although there is uncertainty about the exact trajectory. Progress towards sustainable management and stock recovery in some areas is offset by unsustainable practices in fisheries elsewhere.

18. About 260 million people are directly (capture) or indirectly (processing and ancillary services) employed in the fisheries and aquaculture sector (Teh and Sumaila, 2013), and it is estimated that the sector supports the livelihoods of 10 to 12 percent of the world's population (FAO, 2014). There are approximately 22 million small-scale fishers worldwide, who make up about 37 percent of the estimated 58 million fishers in the primary production sector and for an estimated 4.72 million fishing vessels (Teh and Sumaila, 2013; FAO, 2014). It is estimated that total global aquaculture employment lies somewhere between 27.7 and 56.7 million full and part time jobs, considering farmers and all employment associated with the sector (Phillips et al. 2015) and more than half of the workforce in inland fisheries is made up of women (FAO 2012).

19. Fish remains among the most traded food commodities worldwide. In 2012, about 200 countries reported exports of fish and fishery products. The fishery trade is especially important for developing nations, in some cases accounting for more than half of the total value of traded commodities. Since the beginning of 2000s, capture fisheries production has become relatively stable, whereas aquaculture is the fastest-growing food production system globally, with an average annual growth rate of 8.6 percent between 1980 and 2012 (Kok et al., 2014; FAO, 2014).

20. In 2010, inland and marine capture fisheries and aquaculture together produced 158 million tonnes of fish worldwide, of which 86 percent (136 million tonnes) was utilized as food for people. This makes up around 16.7 percent of all animal protein consumed globally (FAO, 2014; Kok et al., 2014).

21. Given that the human population is projected to rise to over 9 billion by 2050 (United Nations, 2015), the role of fisheries and aquaculture will become even greater in ensuring the food security (Jennings et al., 2014). The fisheries and aquaculture sectors face the challenge of increasing global demand for seafood, which is projected to grow from around 150 million tonnes in 2010 to over 210 million tonnes in 2050. According to the FAO, in 2011, about 61 percent of marine fish stocks were fully fished and 28.8 percent of marine fish stocks were estimated to be fished at a biologically unsustainable level, thus overfished (FAO, 2014).

22. Overexploitation of fish and other marine organisms puts significant pressure on biodiversity. As highlighted in GBO-4, overfishing continues to be a major problem. Persistent overfishing has a severe impact on marine biodiversity, driving the collapse and local extinction of a number of species. In some regions, exploitation rates have been significantly reduced, and depleted stocks have rebounded, as in the case of the Northeast Atlantic. Destructive fishing practices, such as dynamite fishing and bottom trawling in vulnerable habitats such coral reefs, seagrasses, cold-water corals and sponge grounds is of particular concern. Given the world's enormous dependence on fisheries as major sources of sustenance and livelihoods, achieving sustainable fisheries is a critical aspect of achieving not only environmental/ecological goals, but sustainable development in general, including by addressing poverty reduction and food shortages, among other key issues.

23. In the past, fisheries management in the marine environment has focused on addressing overfishing with management responses directed towards restricting catch or reducing fishing effort (e.g. imposition of catch quotas, bag limits, minimum size regulations, limited entry, temporary area closures and closed fishing seasons) (Turner et al., 1999, Garcia et al., 2014). Since the introduction of the ecosystem approach to fisheries the scope of management has broadened significantly.

24. At the FAO/UNEP Expert Meeting on Impacts of Destructive Fishing Practices, Unsustainable Fishing, and Illegal, Unreported and Unregulated (IUU) Fishing on Marine Biodiversity and Habitats in 2009, the following major factors were identified as constraints to effectively addressing overfishing: (i) lack of alternative livelihoods, particularly in rural areas; (ii) lack of allocation of rights appropriate to

the social and economic context of the fishery; (iii) inadequate governance, particularly lack of institutional cooperation and coordination, both between fisheries and environmental agencies and across industry sectors; (iv) conflicting objectives, differences in risk tolerances, and differing expectations of the diverse groups of stakeholders; (v) insufficient capacity in management institutions, particularly for monitoring, control and surveillance; (vi) incomplete knowledge about the resources and their ecosystems; and (vii) difficulty to carry out experiments with proper replication, in real-world fisheries.

25. Concerns are being raised, among others, with regard to the needs to ensure: (a) that by-catch is within safe ecological limits; (b) that habitat impacts are sustainable; and (c) that cumulative impacts from fisheries and other human activities on ecosystems are adequately managed.

26. Freshwater fish stocks are vulnerable to environmental degradation, including habitat loss, impacts on water connectivity and pollution, overfishing of certain high value or vulnerable fish species as well as the development of water management structures, including dams, floodplain management, river training and drainage of wetlands, which impact connectivity and disrupt migration routes for many important freshwater and anadromous fish stocks (FAO, 2014). Since 1900, 64–71 percent of the world's wetlands have been lost and the rate of loss is most extreme in the freshwater wetlands of Asia (Davidson 2014). The maintenance of environmental flows is essential in order to sustain migration, feeding, spawning and nurseries (FAO, 2014) which are essential for wild fish recruitment. It is estimated that up to one third of the world's 15,000 inland fish species are at risk from major dam developments in three major rivers alone (Winemiller et. al., 2016). The value of inland fisheries and inland aquatic ecosystems is thought to be greatly underestimated (FAO, 2014), and the nutritional and livelihood contributions fisheries make to rural populations are often not adequately considered. There is a need for rehabilitation and management interventions for land and water, towards balanced objectives that sustain freshwater aquatic ecosystems and their related aquatic biodiversity while providing, inter alia, hydropower generation, irrigation, flood control and protection, water for human consumptive purposes (FAO, 2014).

27. Aquaculture potentially impacts biodiversity in a number of ways, but primarily through the consumption of resources (land/space, water, energy) and the production and release of wastes (uneaten food, fecal and urinary wastes, chemicals, pathogens and escaped farmed aquatic organisms) into the natural environment. Aquaculture has also been responsible for the clearance of mangrove habitats in some coastal areas in tropical zones with relevant landscape impacts and direct consequences to biodiversity including coastal fisheries. Of perhaps greatest importance from a biodiversity perspective is the transfer of alien species and strains that are frequently used in aquaculture, which may induce changes in wild populations and communities through ecological and genetic effects (e.g. brood stock capture, environmental effects of culture facilities of changes) interactions Lorenzen et al. 2012, Soto et al. 2012). With the exception of Atlantic salmon (Thorstad et al., 2008), impacts on wild populations remain poorly studied. Nevertheless, practical guidelines to address these impacts are readily available.³

28. A range of pressures and unsustainable activities also impact the services provided by the oceans, including services that support fisheries. This includes decline in the number of nursery habitats such as oyster reefs, seagrass beds, and wetlands (Barbier et al., 2011).

II. SUGGESTED WAYS AND OPPORTUNITIES TO MAINSTREAM BIODIVERSITY IN FISHERIES AND AQUACULTURE

29. The overarching principles of sustainable fisheries have been agreed to, and are stipulated in, a number of international instruments, including the United Nations Convention on the Law of the Sea; the 1993 FAO Compliance Agreement; the 1995 United Nations Fish Stock Agreement, the 1995 FAO Code of Conduct for Responsible Fisheries and the 2009 FAO Agreement on Port State Measures to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing. Together with other accompanying guidelines and action plans, such as the Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries as well as the 2012 FAO Voluntary Guidelines on Responsible Governance of Tenure of Land,

³FAO Technical guidelines for responsible Fisheries, 5. Aquaculture. <http://www.fao.org/fishery/topic/166351/en>

Forests and Fisheries, these represent a comprehensive global framework for fisheries policy and management and support mainstreaming of biodiversity in fisheries and aquaculture.

30. Fisheries management agencies have been aware of, and to varying extents, working on biodiversity-related issues for some time. The FAO Code of Conduct and its supporting documents, in particular the FAO Guidelines on the Ecosystem Approach to Fisheries,⁴ recognize the importance of explicitly including ecosystem considerations in fisheries management, including at the national level. The United Nations Fish Stocks Agreement also requires States Parties to it to take the precautionary and ecosystem approaches to fisheries. If the guidance in these documents were fully implemented, biodiversity considerations would be better addressed in fisheries management. Fisheries management bodies at all levels are the main entities to address the impacts of fisheries on biodiversity. However, there is a need for: (i) strengthening of fisheries management agencies; (ii) constructive interagency collaboration; and (iii) full and meaningful participation of a wide range of biodiversity experts and relevant stakeholders in the fisheries management process (decision XI/18).

31. Engaging the fishing sector is critical to the successful implementation of sustainable marine conservation and management measures. The governance of marine fisheries and the conservation of marine biodiversity continue to evolve and interact with each other on an ever-widening range of issues. Coherence of these governance streams remains critical if each is to achieve its goals. However, the degree of coherence in policies and programmes for implementation is still highly variable among issues. Devolution of marine resources (including both fisheries management and marine conservation) to indigenous peoples and local communities, shared governance and co-management arrangements are approaches that are being applied in different regions and have contributed to successful fisheries management and conservation outcomes, especially in small-scale fisheries in developing countries.

32. There is a need for enhancement of the mandates of fisheries management bodies with regard to governance and assessment, where this has not already happened, so that biodiversity considerations are explicitly a core part of their work and accountability, and not just mentioned in their mandates. Also needed are the political will and resources to enable fisheries management agencies to fully deliver on a mandate to address fisheries and biodiversity issues. Regional cooperation among fisheries (and other) agencies becomes even more important as mandates are enhanced. Appropriate approaches for addressing biodiversity considerations in fisheries management will be situation-specific and depend greatly on the capacities and information available. Management agencies should be equipped with the best available scientific information, however, substantial progress can be made even in very data-limited situations through collaboration with different sectors, application of advanced technology, modelling, etc.

33. GBO-4 identified the following actions that would help to accelerate progress towards Target 6 (while also contributing to other targets), if more widely applied:

- (a) Promoting and enabling dialogue and enhanced cooperation and information exchange between fishing and conservation communities and the corresponding national agencies and associations;
- (b) Making greater use of innovative fisheries management systems, such as community co-management, that provide fishers and local communities with a greater stake in the long-term health of fish stocks (Target 18);
- (c) Eliminating, reforming or phasing out subsidies that contribute to excess fishing capacity (Target 3);
- (d) Enhancing monitoring and enforcement of regulations to prevent illegal, unregulated and unreported fishing by flag-vessels;

⁴ FAO Technical Guidelines for Responsible Fisheries, <http://www.fao.org/docrep/005/y4470e/y4470e00.htm>.

(e) Phasing out fishing practices and gear that have serious adverse impacts on the seafloor or on non-target species (Targets 5 and 12);

(f) Further developing protected area networks and other effective area-based conservation measures, including the protection of areas particularly important for fisheries, such as spawning grounds and vulnerable areas (Targets 10 and 11).

34. GBO-4 outlined that progress towards achieving Target 6 could be accelerated by sustainably managing fisheries on coral reefs and closely associated ecosystems, in addition to managing coastal zones and inland watersheds in an integrated manner so as to reduce pollution and land-based activities that threaten these ecosystems.

35. GBO-4 also noted that making greater use of innovative fisheries management systems, such as community co-management (which provides fishers and local communities with a greater stake in the long-term health of fish stocks) and the elimination, phasing out or reform of subsidies that contribute to excess fishing capacity, phasing out harmful fishing practices, and further developing area-based management measures would help to accelerate progress towards Target 6.

36. Mainstreaming of biodiversity in fisheries requires the engagement of all stakeholders, including resource users, consumers, the private sector as well as the public sector. A broad range of approaches to mainstream biodiversity in fisheries exist, in particular the ecosystem approach to fisheries (EAF), which are described in further details below.

Assessment and monitoring

37. Information on stock structure, abundance, distribution, population parameters and spatial dynamics is required. New technologies for observation provide detailed information about habitat characteristics and information on ecosystem structure and function, which can complement information from research vessel surveys and analysis of commercial fisheries data. Improved collaboration between environmental and fisheries institutes could provide this type of information, as well as information regarding the understanding of underwater landscapes and of habitat continuity, the conservation of structural features in the habitat, and the importance of scales in habitat characterization and rehabilitation. The 2011 Joint Expert Meeting in Bergen (see document UNEP/CBD/SBSTTA/16/INF/13) noted that there is a clear need to further develop assessment methods for low-value and/or data-poor marine fisheries.

38. Tools for assessment in data-poor situations exist, and their wider use would provide benefits for both addressing biodiversity considerations and ensuring sustainable use of target species. However, further work is required, particularly the development of harvest strategies in data-poor situations.

Ensuring compliance with existing agreements

39. The United Nations Convention on the Law of the Sea, the United Nations Fish Stocks Agreement and the FAO Code of Conduct for Responsible Fisheries remain key to achieving sustainable fisheries. In particular, the Code of Conduct (FAO, 2014) continues to be a reference framework for national and international efforts, including in the formulation of policies and other legal and institutional frameworks and instruments, to ensure sustainable fishing and production of aquatic living resources in harmony with the environment. A study conducted by Picther et al. (2013) found that limited compliance with the Code of Conduct correlates negatively with biodiversity, supporting the need for international development efforts to focus on regions with poor management performance, high biodiversity, rapidly increasing human populations and a high dependence on fishery livelihoods. The authors also promote favoring small-scale fisheries, with a focus on the effective implementation of community- and ecosystem-based management (aspects of which are embedded, inter alia, in the Code). Box 1 illustrates an approach taken by Madagascar to ensure compliance at the national and regional scales.

Box 1. Case study on ensuring compliance at national and regional scales

Madagascar has implemented a Fisheries Monitoring Center (CSP) that ensures compliance with laws and regulations by all vessels operating in its national waters and by all operators in the fishing and aquaculture sectors. Its monitoring, control and surveillance activities for traditional, industrial and commercial sectors contribute to the protection and conservation of fisheries and aquaculture resources. Madagascar's monitoring activities are part of the regional plan for fisheries surveillance in the South Western Indian Ocean (PRSP) to which five fisheries ministries of the Comoros, France/Reunion Island, Madagascar, Mauritius and Seychelles agreed on through a joint statement. It is a framework partnership which was signed on 24 January 2007, by the European Commission and the Indian Ocean Commission (IOC). It implements a regional plan for fisheries surveillance in the South Western Indian Ocean. The Regional Fisheries Monitoring Plan was designed to be the main tool for the regional strategy for fisheries monitoring required by IOC Member States in strengthening cooperation between the operational structures, data exchange for the organization of regional joint patrols fisheries surveillance and fighting illegal fishing. The Regional Fisheries Monitoring Plan has helped to strengthen national surveillance effort by pooling, coordinating and optimizing the use of patrol vessels of IOC Member States (IOC, 2014).

40. At its tenth meeting, the Conference of the Parties to the Convention encouraged Parties and other Governments to fully and effectively implement paragraphs 113 through 130 of the United Nations General Assembly resolution 64/72 on responsible fisheries in the marine ecosystem, which addresses the impacts of bottom fishing on vulnerable marine ecosystems and the long-term sustainability of deep-sea fish stocks in areas beyond national jurisdiction, in particular paragraphs 119 and 120. These paragraphs call on States and/or regional fisheries management organizations or arrangements (RFMO/As), consistent with the FAO International Guidelines for the Management of Deep-Sea Fisheries in the High Seas (FAO, 2009) and consistent with the precautionary approach, to conduct impact assessments, conduct further marine scientific research and use the best scientific and technical information available to identify areas where vulnerable marine ecosystems are known or likely to occur, to either adopt conservation and management measures to prevent significant adverse impacts on such ecosystems or to close such areas to fishing, and to adopt measures to ensure the long-term sustainability of deep-sea fish stocks (both target- and non-target stocks), and not to authorize bottom-fishing activities until such measures have been adopted and implemented (decision X/29, para. 54).

41. As noted in the FAO/UNEP Expert Meeting on Impacts of Destructive Fishing Practices, Unsustainable Fishing and Illegal, Unreported and Unregulated (IUU) Fishing on Marine Biodiversity and Habitats (see document UNEP/CBD/SBSTTA/14/INF/6), improved monitoring, control and surveillance are necessary. Remote systems, like vessel monitoring systems (VMS) may be effective, if connected to monitoring, control and surveillance capabilities and accompanied by deterrent penalties in case of non-compliance. Improved monitoring, control and surveillance capacity is essential for effective deterrence of illegal fishing and is useful in fighting unreported fishing. When observers are present, additional measures to address potentially destructive fishing practices become available, such as flexible, real time closures of areas triggered by detection of the presence of vulnerable species or habitats.

Ecosystem-based integrated approaches to mainstream biodiversity in fisheries and aquaculture

42. The ecosystem approach to fisheries (EAF) is an effective means to mainstream biodiversity in fisheries. The EAF acknowledges that ecosystems and biodiversity are central aspects of fisheries and that their status is equal to that of target species considerations. Many institutional, assessment and management initiatives that are part of this approach will have benefits for biodiversity. Fisheries governance must be modernized, formally adopting and effectively implementing the EAF (and the precautionary approach to fisheries), adaptive management processes, participatory decision-making and implementation. For all fisheries, formal management plans based on the EAF should be developed and implemented. For severely depleted stocks, moratoria should be considered and specific rebuilding plans

should be developed. The EAF process allows the major biodiversity issues associated with fisheries to be identified, as a basis for the selection of tools to address them. Box 2 illustrates the approach that Norway is taking to apply the EAF.

43. However, critical challenges still exist beyond the technical aspects of practical day-to-day implementation of the EAF (FAO, 2012). These challenges are not only related to controlling the direct drivers of ecosystem change such as fisheries and aquaculture. The greatest challenges are likely from indirect drivers such as changes in human population, coupled with goals for improved standards of living. At the national level, economic policies as well as social and economic conditions are often in conflict with sustainability objectives. Climate change will likely emerge as a major driver of change in aquatic ecosystems and will, in turn, affect coastal communities. In this situation, modifying governance towards more holistic approaches (such as the ecosystem approach) and ensuring interaction and coordination of competent authorities across sectors and levels will take on increased urgency.

44. Addressing environmental impacts related to selectivity, by-catch, or discards can be addressed through, among others: (i) area-based management tools (e.g., marine protected areas), especially in areas where bycatch and discard rates are high ; (ii) disincentives for discarding; and (iii) the use of improved gears and fishing practices (e.g., rotational harvest, closed areas and seasons). These measures can support addressing different range of biodiversity concerns, and should be part of any dialogue on fisheries management.

45. The ecosystem approach to aquaculture (EAA) should be applied when planning aquaculture development to explicitly address potential impacts on biodiversity and ecosystem services and thus help to minimize risks. Some essential measures include the specific assessment of all risks posed by the activity and designing of mitigation measures such as proper planning of the spatial distribution of aquaculture and estimating carrying capacity of the recipient ecosystem to define maximum production.⁵ Risk assessment and management should be used before starting aquaculture with alien species or strains or when aquaculture involves moving of live animals across natural boundaries.⁶ Implementation of the EAA can be best achieved in designated aquaculture management areas. These can be aquaculture parks, clusters or any area where farms share a common relevant waterbody or source and may benefit from a common management system to minimize impacts and maximize benefits. The management system should balance environmental, socio-economic and governance objectives, and should consider the sharing of benefits with local communities and their involvement (as appropriate) in the development of a management plan, its implementation and monitoring.

⁵ <http://www.fao.org/docrep/013/i1750e/i1750e.pdf>

⁶ <http://www.fao.org/3/a-i0490e.pdf>

Box 2. Case-study of Norway on the application of the ecosystem approach to fisheries

The seas under Norway's jurisdiction represent about six times its land area (Norway, 2014). Historically, overexploitation of fisheries has been the strongest direct human pressure on marine ecosystems. One particular regulation is in place for conservation and sustainable use of marine biodiversity. Namely, the Marine Resources Act (2009) is based on the principle that fisheries management must take place within a sustainable, knowledge-based framework (Norway, 2014). It applies to all wild living marine resources and genetic materials derived from them and not only to resources exploited by traditional fisheries. Every year, the Directorate of Fisheries and the Institute of Marine Research draws up a list of stocks that need to be carefully managed. An integrated management plan for the Barents Sea–Lofoten area has been developed to resolve conflicts between petroleum activities, fisheries activities and to address conservation concerns. Implementation of the plan is ensured through multi-sectoral coordination groups headed by a steering group that is, in turn, coordinated by the Ministry of Environment. Representatives from the Norwegian Petroleum Directorate and the Directorate of Fisheries have worked together to revise laws and regulations covering seismic activities in order to reduce conflicts. A central concept of the plan is that it is based on science and takes a precautionary approach. A similar plan has also been developed for the Norwegian Sea, and the idea is to cover the entire Norwegian Exclusive Economic Zone (EEZ).

Access and user rights

46. In fisheries, the implementation of a range of social and economic measures and incentives, in addition to conventional target-species based management measures, has proven to be very effective in reducing overcapacity and overfishing. Fishing rights improve behavior by providing a sense of long-term security in entitlements and an incentive to optimize production in the short- and long-term. A higher degree of participation in the decision-making process (including the possible devolution of some management authority) can increase the legitimacy and relevance of the measures and promote compliance. Addressing tenure governance entails that tenure rights: (i) are recognized, defined, allocated and administered in a fair and equitable way; (ii) respect human rights and reflect societal objectives; and (iii) recognize the potential of the small-scale fisheries sector to contribute to food security and nutrition, poverty eradication, equitable development and sustainable resource utilization (FAO, 2014). Establishing tenure rights is also closely associated with social justice aspects, including the right to secure and just livelihoods.

Market incentives

47. In some places eco-labelling measures have been used to increase the role of consumers, such as certification schemes and sustainable seafood campaigns. These are aimed at increasing consumers' awareness of the sustainability of their seafood purchasing choices. Market instruments have the potential to address biodiversity concerns in many ways, if specific biodiversity considerations are built into these instruments targeting specific biodiversity objectives. However, market instruments cannot be assumed to provide biodiversity benefits unless they are designed into the specific application of a market instrument with specific biodiversity objectives.

Box 3. Case study of Chile on an area-based fishing rights programme

Area-based fishing rights, or Territorial Use Rights for Fishing (TURF), are used as mechanisms to address the problem of open access to resources, which may result in unsustainable harvesting. TURF is an area-based mechanism, allocating a specific area for groups or individuals, including its control on quotas and sustainable use of fish stocks, thereby ensuring accountability to comply with the agreed standards. In some cases, the design of TURF is driven by local communities, and a national or regional government provides legal, operational and sometimes financial support for implementation. In other regions, TURF implementation has been initiated by the government, and fishing rights and co-management responsibilities have been allocated to users based on a national or regional framework. TURFs have been implemented in several countries, particularly in Mexico, Philippines, Spain, Brazil, Belize, Japan, Chile, Fiji, Samoa, Vanuatu and the Philippines. Among the largest area-based fishing rights programmes in the world is the Chilean National Benthic Resource TURF System. The implementation of TURFs is one of the mechanisms used by the country to insure sustainable exploitation of its benthic resources. In order to safeguard local fisheries, the Chilean government has implemented AMERB (Área de Manejo y Explotación de Recursos Bentónicos – Chilean Territorial Use Rights for Fisheries or TURFs), a legal incentive for local fishers to sustainably manage the resources. It is a fisheries management tool introduced in 1991 that gives exclusive use rights to artisanal fishing communities organized to manage and extract benthic resources in a specific area and encourage conservation and sustainable behaviour (Allison et al., 2012). This initiative has required full involvement of local fishers, who are registered in and manage one specific area. Hence, it is an important tool for capacity-building and stakeholder involvement since the success of the initiative depends on the active participation of the fishers.

Policy and institutional strengthening

48. Many opportunities exist in the fisheries and aquaculture sector to reduce pressures on biodiversity. Mainstreaming of biodiversity can be achieved through a broad range of measures that include sustainable catch fisheries, changes in consumption as well as effective governance and compliance with sustainable fisheries measures. The underlying drivers of overfishing and unsustainable aquaculture practices must be assessed if sustainable fishing and aquaculture is to be achieved.

49. In order to reduce the impact of overfishing on marine biodiversity, the role of regional fisheries bodies (RFBs) and regional fisheries management organizations and arrangements (RFMO/As) can be further enhanced. RFBs and RFMO/As have a central role to play in coordinating national efforts and establishing multilateral measures. They should: (i) improve and/or continue the use of measures to control overfishing; (ii) increase collaboration with other mechanisms or organizations to address biodiversity concerns and share information; and (iii) be developed in areas currently not covered.

50. Spatial planning approaches, including marine spatial planning, provides a process and approach for more integrated planning of human activities, including fisheries, aquaculture and conservation of biodiversity. Processes, including marine spatial planning, need to be created or strengthened at national, subregional or regional scales, to support integration of fisheries, aquaculture and biodiversity considerations in coherent ways across sectors.

51. Policies for managing and reducing fishing capacity and for addressing harmful subsidies need to be designed to take into account the full range of biodiversity outcomes, not just improving the status of the target species and the performance of the fisheries. For example, this often requires considering the potential impacts on biodiversity of displaced fishing capacity, and of possible alternative livelihoods of people affected by the policies.

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