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FAO's ROLE FOR IMPROVED INTEGRATION OF FISHERIES AND AQUACULTURE DEVELOPMENT AND MANAGEMENT, BIODIVERSITY CONSERVATION AND ENVIRONMENTAL PROTECTION

SUMMARY

There is global agreement on the fundamental need to ensure that human development is undertaken in a sustainable manner that ensures conservation of living natural resources, ecosystems and environments but progress to this end has been slow. This paper outlines the reasons why the development of fisheries and aquaculture can, in certain circumstances, conflict with biodiversity conservation and environmental protection, the already agreed approaches and tools for achieving integration, the challenges that are preventing greater progress in implementation, and what FAO is currently doing to address these challenges. Finally, the paper proposes some areas in which FAO's own contribution to ensuring integration of development and conservation in implementation could be strengthened and invites COFI to comment and advise on the way ahead.

INTRODUCTION

1. The need to ensure that human development is undertaken in a sustainable manner that ensures conservation of living natural resources, ecosystems and environments is reflected in a multitude of global binding and non-binding instruments. The inseparable link between conservation and development is the basis of the vision of the Fisheries and Aquaculture Department: "A world in which responsible and sustainable use of fisheries and aquaculture resources make an appreciable contribution to human well-being, food security and poverty alleviation".

2. Despite this global understanding, in practice it has proven very difficult to achieve the desired compromise between human use and conservation in many areas of natural resource use including fisheries and aquaculture. As a result, efforts continue at national, regional and global level to improve integration of conservation and development activities. This paper considers why progress has and continues to be slow, describes what FAO is currently doing to address the challenges and proposes some areas in which FAO's own contribution to ensuring integration of development and conservation in implementation could be strengthened.

SOCIAL, ECONOMIC AND CULTURAL IMPORTANCE OF FISHERIES AND AQUACULTURE

3. In 2008, nearly 81 percent of the world fish production of 142 million tonnes was directly consumed as human food. Global fish consumption increased from an average of 10.1 kg per capita per year in 1965 to 17.0 kg in 2008, making up 15.6 percent of the global population's animal protein consumption. Aquaculture remains the fastest-growing animal-food-producing sector and its rate of growth outpaced human population growth. Aquaculture was responsible for nearly 46 percent of the world's fish production for human consumption in 2008 and for 37 percent of the total world fish production.

4. In 2008, FAO estimated that there were 45 million part-time and full-time and about 6 million occasional fishers and fish farmers employed in the sector, representing 3.5 percent of those economically active in the broad agricultural sector worldwide. Fish farmers comprised almost 11 million of this total[1]. A recent study indicated that an additional 85 million people are employed in the post-harvest sector[2].

5. An estimated 37 percent of total fish production entered into international trade either as food or feed products in 2008 and the value of fishery trade reached over US$100 billion in export value. Approximately 50 percent of this amount originated from developing countries. Fishery net exports of developing countries (i.e. the total value of fish exports less the total value of fish imports) are higher than those of several other agricultural commodities such as rice, meat, sugar, coffee and tobacco.

6. Recreational fisheries have also grown, including in developing countries as economies improve. In the European Union recreational fishing provides approximately 60 000 jobs and generates US$33 billion per year[3]. Although accurate global information is scarce, recreational fisheries have become an important factor to take into account in global planning.

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[1] FAO. 2011. The State of World Fisheries and Aquaculture 2010. FAO, Rome

[2] World Bank, FAO and WorldFish Center. 2010. The Hidden Harvests the global contribution of capture fisheries. World Bank Agriculture and Rural Development Department Sustainable Development Network. Conference edition. 102p.

[3] Dillon, B. 2004. A bio-economic review of recreational angling for bass (*Dicentrachus labrax*). UK, Scarborough Centre for Coastal Studies, University of Hull.

7. An often neglected activity is the harvest and trade of ornamental aquatic organisms which has grown into a lucrative business with ornamental fish exports in the world estimated to have reached a value of US$337 million in 2008 (FI Trade Statistics Database). However, this is an area, together with recreational fisheries, where no standard guidelines for monitoring and management have yet been established.

IMPACTS OF FISHERIES AND AQUACULTURE ON BIODIVERSITY AND THE ENVIRONMENT

8. Technological developments, including the use of more powerful vessels, more efficient synthetic fishing gears and sophisticated fish finding equipment, have all contributed to an increased capacity to catch fish. Without wise management and responsible use, capture fisheries can and frequently are leading to serious negative impacts on the resources and ecosystems on which they depend.

9. Detrimental impacts on aquatic ecosystems arise through both direct and indirect effects of fishing such as:

- Unsustainably high levels of fishing effort giving rise to excessive mortalities of target and non-target species. The latest available estimates are that 26 percent of marine stocks are overfished and 6 percent are depleted. Similar problems certainly exist in inland fisheries but the global status of inland stocks is largely unknown because of poor reporting. Unless properly managed, fisheries can also have direct impacts on ecosystems, for example through destruction of hard structures on bottom habitats.
- Introduction of alien species and irresponsible stocking programmes also have direct impacts and are a major concern, particularly for inland capture fisheries. Alien species may prey on, compete with and spread disease to local species, change the tropho-dynamics of an ecosystem and some species can also significantly change aquatic habitats. However, responsible stocking programmes sustain some fisheries and can provide desirable ecosystem services and allow production in degraded environments.
- Indirect effects occur through changes in ecosystem structure and functioning such as changes in the size and trophic structure of ecosystems through selective removal of large species and specimens. Selective fishing can also induce genetic changes in fish populations such as a decrease in the overall size and age at maturation. These changes can reduce the resilience of stocks and ecosystems to change and stress.
- Fishing operations may also result in environmental problems due to the use of technologies and practices that consume excessive amounts of fossil fuel, adding to global greenhouse gas (GHG) emissions and pollution. Abandoned, lost and discarded fishing gears in marine environments can contribute to chemical contamination of food webs as they decompose and may kill fish through ghost fishing.

10. The negative effects of aquaculture on biodiversity and the environment can take place through: (i) increasing demands on trash fish, fish meal and oil from capture fisheries as major constituents of feeds for aquaculture; (ii) unsustainable demand for wild seed and juveniles for fattening (e.g. shrimp, eels and tuna); (iii) alteration of inland and coastal habitats for the construction of ponds and farms; (iv) nutrient and organic enrichment of recipient waters and sediments, resulting in build-up of anoxic conditions and modification of biodiversity of benthic communities; (v) release of chemicals used to control water conditions and diseases; (vi) negative effects from escaped farmed organisms on genetic diversity and on biodiversity and ecosystems. Aquaculture can also have positive effects on biodiversity, e.g. from hatchery larvae for restocking of endangered species, and on depleted stocks by releasing pressure on overexploited capture fishery resources by providing alternative sources of fish.

IMPACTS OF OTHER SECTORS ON FISHERIES AND AQUACULTURE, BIODIVERSITY CONSERVATION AND THE ENVIRONMENT

11. Fishing and aquaculture are not the only source of human impacts on aquatic ecosystems. Coastal and offshore mining, oil and gas extraction, coastal and riparian zone development, pollution from land-based sources, including industrial and agricultural activities, and shipping are some of the sectors outside of fisheries and aquaculture that also impact on aquatic ecosystems. According to the United Nations Environment Programme (UNEP) (2006)[4] coastal and marine ecosystems are rapidly deteriorating because of human pressure; almost 80 percent of the sources of which originate on land.

12. Inland waters are considered to "have suffered the most intense human-induced impact of all ecosystems over the past 100 years"[5] and this also strongly impacts inland fisheries, aquaculture and their development opportunities. Degraded inland waters also cause deterioration of coastal habitats (e.g. red tide, coral bleaching). Habitat degradation from poor forestry practices, hydrological development, mining, agriculture, livestock grazing, road construction and urbanization have all reduced the capacity of many inland and coastal waters to support aquatic biodiversity, fisheries and aquaculture.

THE AGREED APPROACHES FOR INTEGRATING FISHERIES AND AQUACULTURE DEVELOPMENT WITH BIODIVERSITY CONSERVATION AND ENVIRONMENTAL PROTECTION

13. The approaches and frameworks required to ensure sustainable development are well understood and described by the international community. The basic instrument for marine fisheries is the United Nations Convention on the Law of the Sea of 10 December 1982 which addresses the rights and responsibilities of States in relation to the utilization and conservation of marine living resources. The non-binding Agenda 21 of the United Nations Conference on the Environment and Development (UNCED) in 1992 included Chapter 17 on protection of the oceans and seas and development of their living resources[6]. It is noteworthy for its emphasis on an integrated approach to sustainable development and on the application of a precautionary approach.

14. The Code of Conduct for Responsible Fisheries (the Code) was adopted by the Twenty-eighth Session of the FAO Conference on 31 October 1995. The Code "sets out principles and international standards of behaviour for responsible practices with a view to ensuring the effective conservation, management and development of living aquatic resources, with due respect for the ecosystem and biodiversity"[7]. While almost all of the Code is directly relevant to this paper, the principle of integration is well illustrated by Article 10 of the Code on the Integration of Fisheries into Coastal Area Management which calls upon States to "ensure that an appropriate policy, legal and institutional framework is adopted to achieve the sustainable and integrated use of the resources, taking into account the fragility of coastal ecosystems and the needs of communities"..

[4] UNEP/GPA. 2006. The State of the Marine Environment: Trends and processes. UNEP/GPA, The Hague

[5] Welcomme, R.L., I.G. Cowx, D. Coates, C. Béné, S. Funge-Smith, A. Halls, and K. Lorenzen. 2010. Inland capture fisheries. *Phil. Trans. R. Soc. B,* 365: 2881-2896.

[6] http://www.un.org/esa/dsd/agenda21/res_agenda21_17.shtml

[7] FAO. 1995. Code of Conduct for Responsible Fisheries. Rome, FAO. 41p.

15. The application of the ecosystem approach to fisheries (EAF) and to aquaculture (EAA) contribute to the implementation of the provisions of the Code. The role and importance of EAF was recognized in the Reykjavík Declaration on Responsible Fisheries in the Marine Ecosystem in 2001 and endorsed at the World Summit on Sustainable Development in 2002. The Twenty-seventh Session of the Committee on Fisheries (COFI) in 2007 broadly agreed that "EAF was the appropriate and necessary framework for fisheries management" and highlighted the "need for aquatic production to follow an ecosystem approach to aquaculture". EAF and EAA are holistic strategies for managing capture fisheries and aquaculture that integrate the ecological, socio-economic and institutional dimensions.

INSTITUTIONAL CHALLENGES

16. While governments and stakeholders have identified the broad approaches required to ensure sustainable use, implementation still lags behind, as evident from the preceding sections of this paper and the responses of FAO Members summarized in COFI/2011/2. Some of the institutional reasons for slow progress considered to be particularly important and widespread are described here.

Sectoral and institutional fragmentation

17. The introduction of EAF and EAA require that the relevant components of management need to be more comprehensive, reflecting the significant interactions within and between ecosystems in which fisheries and aquaculture are conducted. This requires wider and more effective inter-sectoral and cross-institutional communication and cooperation.

18. At the scale of UN and other global inter-governmental organizations, adoption of the ecosystem approach has broadened the scope of all organizations working in sustainable development and conservation. While FAO is the UN leading agency with regard to fisheries and aquaculture, numerous other inter-governmental organizations and agencies within and outside the UN system have environmental and conservation mandates. Within the framework of an ecosystem approach, their mandates overlap with that of FAO and vice versa. For example, the mandates of the Convention on Biological Diversity (CBD), UNEP, the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and the Convention on the Conservation of Migratory Species of Wild Animals (CMS) all overlap with that of FAO's and with each other's. These mandates are potentially complementary and provide valuable opportunities for greater cooperation and more effective use of specialized expertise but also increase the risk of duplication and confusion. In addition, greater cooperation involves substantial transaction costs and requires commitment and a common vision at all levels from the different departments and Ministries within countries to regional and global levels. At present, these conditions are not being fully met and excess sectoral and institutional fragmentation and conflicting priorities frequently hinder the endeavours toward responsible integrated and sustainable fisheries and aquaculture governance.

National capacity

19. A second major institutional challenge is that most, if not all countries and regions, lack sufficient capacity for effective monitoring and management across their fisheries and aquaculture sectors. This is evident from the challenges to implementing the Code reported in COFI/2011/2. Of the countries that responded, at least 50 percent mentioned insufficient capacity (human, institutional and financial) as a major constraint. The percentage of those indicating capacity development (human and institutional) as a solution to overcoming these constraints is even higher, to the order of 60 percent globally and rising to above 70 percent in some regions. Capacity development was also referred to in several of the main recommendations from the 2009 COFI meeting[8].

[8] Examples of these are paragraphs 21, 43, 80, 90 and 100 of the 2009 COFI report. Also the abstract of the report mentions "The Committee [...]agreed on the fundamental importance of capacity building to assist developing countries

20. Insufficient monitoring, research and managerial capacity have been a problem in many countries, even under the restricted single-species, or target-species, approach to fisheries and aquaculture. The institutional challenges associated with the development of national capacity for improving the integration of fisheries and aquaculture production with biodiversity conservation and environmental protection through an ecosystem approach are now even wider. Continued and strengthened efforts to improve capacity for integrated approaches are therefore required and must include attention to building or reinforcing cooperation and communication between agencies responsible for these different mandates and for different sectors.

Poor information

21. The assessment and management of the impacts of fisheries and aquaculture sectors on biodiversity conservation and environmental protection requires good understanding and monitoring on all inputs and outputs of the many stages of sectoral activities that interact with the natural environment, either directly or indirectly. These were summarized in paragraphs 8-12.

22. While progress in implementation of EAF and EAA is leading to improvements in monitoring across these broad measures in some areas, the inadequacy of data is still a widespread problem. It is particularly difficult at the two ends of the spatial scale: in large-scale fisheries on highly migratory and straddling stocks and in small-scale coastal and inland operations. In the latter case, small-scale fisheries are typically household-based activities, dynamic, diffuse, and difficult to collect statistics from, with the result that most countries do not adequately support institutions to collect the required information.

23. It is also generally agreed that the state of knowledge on production from inland fisheries and the numbers of people involved in the supply chain of this sector are extremely poor and vastly underestimated in some countries[9]. In addition, more than half of the inland catch is currently reported as unidentified[10]. Stocking programmes and introduction of exotic species are similarly frequently poorly documented.

OTHER OBSTACLES TO IMPLEMENTATION

24. The report to COFI on progress in implementation of the Code (COFI/2011/2) describes some of the constraints to improved implementation of responsible fisheries being encountered by Members. Overall, 47 percent of countries that responded to the questionnaire referred to financial constraints and 37 percent to constraints on the human resources available as hindering their progress. Problems or inadequacies in relation to institutional and legal frameworks were each cited by 27 percent of responding countries.

implement the Code". FAO. 2009. *Report of the twenty-eighth session of the Committee on Fisheries. Rome, 2–6 March 2009*. FAO Fisheries and Aquaculture Report. No. 902. Rome, FAO. 64p.

[9] Focused studies and production models indicate that actual production could be 4–5 times higher than the 10.2 million tonnes reported to FAO. Sources: Welcomme, R.L. An Overview of Global Inland Fish Catch Statistics. Fishery Dependent Information Conference. 23-26 August 2010. Galway, Ireland; World Bank, FAO and WorldFish Center 2010. The Hidden Harvests: the global contribution of capture fisheries. WorldBank Agriculture and Rural Development Department Sustainable Development Network. Conference edition. 102p.

[10] FAO. 2011. The State of World Fisheries and Aquaculture 2010. FAO, Rome

25. These problems are consistent with previous studies on the challenges being encountered in striving for implementing the Code. Within these categories, common problems being experienced by countries include: high levels of biological and ecological uncertainty about the status of resources and the likely consequences of any management action; poorly or loosely defined objectives for fisheries management leading to reactive rather than proactive management; the frequent absence of effective or appropriate systems of user or access rights; absence of or inadequate participation by fishers and other stakeholders in management; insufficient capacity in national and regional fisheries management authorities; and widespread illegal, unreported, and unregulated (IUU) fishing resulting from inadequate monitoring, control and surveillance systems, including the legal frameworks.

26. Another problem is that fisheries and aquaculture are often not well represented in integrated policy and spatial planning mechanisms such as environmental policy-making, the development of cross-sectoral strategies addressing poverty reduction and food security, or integrated management of coastal areas, river basins or watersheds. This is likely to lead to neglect of the sector in planning and setting priorities. The ability and capacity of fisheries agencies to effectively engage in such processes is often constrained because of inadequate staffing and range of technical expertise. As regards participation by fishing and fish farming communities and other primary stakeholders, they are rarely adequately organized and empowered to appropriately represent their interests in cross-sectoral policy and planning processes.

27. In addition, the political and public perception of fisheries and aquaculture is being harmed by widespread messages on the negative impacts of the sector on biodiversity conservation and protection of habitats. While the concerns and criticisms are well-founded in many cases, some of the most highly publicized have been based on inaccurate and exaggerated claims and forecasts. This adds to the risk of the social and economic benefits of the sector being lost through neglect or through excessive restriction based on misleading information. Governments, Regional Fishery Bodies (RFBs), FAO and the fishing and aquaculture industry need to be more active in: (i) making progress to address legitimate criticism, and (ii) refuting exaggerated claims and publicising, in a balanced manner, the success stories on responsible management that are taking place.

28. Climate change impacts are likely to amplify natural variations and to exacerbate existing stresses on aquatic resources and ecosystems. In the oceans, climate change is expected to result in increases in sea surface temperature, global sea level rise, decreases in sea-ice cover and changes in salinity, wave conditions, and ocean circulation. On land, climate change will affect the availability of water, river flow regimes (particularly in flood plains), the size of lakes, etc. and the needs for water of other activities competing with fisheries. The implications of climate change for fisheries and aquaculture and FAO's current and proposed actions to respond to the threats are dealt with in COFI/2011/6.

29. While the need for improved integration applies to all fisheries, the Twenty-eighth Session of COFI in 2009 gave special attention to small-scale fisheries. At that meeting "Many Members supported the need for FAO to establish a specific global programme dedicated to small-scale fisheries". Particular problems faced by this sub-sector in reconciling development with conservation include: (a) it is usually the sub-sector for which the populations involved have the fewest alternatives for income-generating activities, and is thus the most vulnerable to the loss of aquatic productivity; (b) it is the sub-sector with most pressure for short-term increase in fishing pressure; and (c) it often operates mostly on the coastal zone, with potentially important impacts on vulnerable marine ecosystems.

CURRENT FI ACTIVITIES AIMED AT IMPROVED INTEGRATION

30. Promoting responsible fisheries management and aquaculture development consistent with the principles of long-term sustainable use and conservation, as entrenched in the Code and the four associated International Plans of Action (IPOAs), constitutes the core objective of FAO Fisheries and Aquaculture Department (FI)'s work. As a result almost all of FI's work programme directly or indirectly contributes to achieving integration of development and conservation but some examples considered to be particularly relevant are summarized here.

Poverty reduction and food security

31. Poverty reduction and food security are among the principal overarching goals of FAO and the UN system as a whole. The FI strategy is to address some of the principal causes of continued poverty and vulnerability among fishing and fish farming communities.

32. The focus of the FI Programme is to reduce vulnerability due to:

- unsustainable management systems and practices for fisheries and aquaculture production;
- marginalization and inadequate power of small-scale fishers, fish farmers, fish workers and their communities; and
- exposure to natural disasters and climate change consequences.

33. Current activities include the assessment of the social and economic contribution of small-scale fisheries and aquaculture through a series of country case studies, the implementation of a four-year regional fisheries livelihoods programme for South and Southeast Asia, the assessment of regional and national priority assistance needs in both small-scale fisheries and aquaculture, and an examination of the development of an international instrument on small-scale fisheries (see also COFI/2011/8). FI is cooperating closely with FAO Strategic Objective I - Improved preparedness for, and effective response to, food and agricultural threats and emergencies – in a number of countries including: Bangladesh, Cambodia, Congo (DR), Dominica, Haiti, Indonesia, Myanmar, Pakistan, Philippines, St Lucia, Somalia, Vietnam and is developing specific guidance materials to prepare for and respond to disasters and emergencies in collaboration with UN partner organizations as well as humanitarian Non-Governmental Organizations (NGOs).

Implementation of an ecosystem approach

34. The EAF and EAA are strategies that promote conservation, sustainable use and equitable sharing of ecosystem services. Guidance developed by FAO (e.g. FAO, 2003[11]; 2005[12]; 2008[13]; 2010[14]) assists users by taking them through practical steps of planning and implementation while recognising the need to be consistent with local context, means and culture. The importance of marine protected areas, as tools for sustainable resource utilization and conservation within an EAF/EAA framework, is also recognized and FAO is currently finalizing guidelines on marine protected areas and fisheries.

[11] FAO. 2003. *The ecosystem approach to fisheries*. FAO Technical Guidelines for Responsible Fisheries. No. 4, Suppl.2. Rome, FAO. 112 p.

[12] FAO. 2005. *Putting into practice the ecosystem approach to fisheries*. Rome, FAO. 76 p.

[13] FAO. 2008. *Human dimensions of the ecosystem approach to fisheries*. Rome, FAO. 152 p

[14] FAO. 2010. Aquaculture development. *4. Ecosystem approach to aquaculture (EAA)*. FAO Technical Guidelines for Responsible Fisheries. No. 5, Suppl. 4. Rome, FAO.

35. Through a number of extra-budgetary supported projects it has been possible to introduce concepts and methodologies relevant for EAF application to several regions through dedicated workshops (e.g. South and Southeast Asia, Pacific Island States, Africa and Caribbean region). At present, mid to large size projects aimed at promotion and implementation of EAF are also being implemented, for example in a project targeting the coastal countries of Africa, as well as through six Fisheries Management Support projects in the Mediterranean. The Organization is, together with UNEP, executing the Canary Current Large Marine Ecosystem (CCLME) project, in a combined effort to reverse the degradation of the Canary Current large marine ecosystem, while the Bay of Bengal Large Marine Ecosystem (BOBLME) Project is supporting the countries bordering the Bay of Bengal to work together on a coordinated programme of action designed to improve the lives of the coastal populations. Both of these LME Projects are supported by core funding from the Global Environment Facility (GEF) and co-financed by a number of partners. Similarly, GEF provided core funding for a global project to reduce the environmental impacts associated with tropical shrimp trawling[15] and more recently for a regional project in SE Asia to manage trawl bycatch[16]. In May 2009, FAO and the Asia Pacific Fishery Commission (APFIC) held a regional consultative workshop on the practical implementation of the ecosystem approach to fisheries and aquaculture, which has triggered increasing interest by member countries to implement the EAF and EAA[17].

36. As guidance for EAA application becomes available, field activities aimed at facilitating implementation of an ecosystem approach are being undertaken within the aquaculture sector. Furthermore, considering the increasing interactions between capture fisheries and aquaculture, FAO has also initiated pilot EAF/EAA implementation activities in some countries. One such case is the "Estero Real" in Nicaragua, where heavy sedimentation from poor watershed management, increasing use of pesticides and loss of mangrove forests are threatening coastal aquaculture, fisheries and biodiversity of the mangrove ecosystem[18].

Managing impacts of fishing on resources and ecosystems

37. Management of fishing methods and technology are one important part of minimising the destructive impacts of fisheries. FAO, in partnership with others, including UNEP, International Maritime Organization (IMO), International Labour Organization (ILO) and GEF[19], has addressed at different times, various elements of technology use in capture fisheries, including;

- development of policy associated with the impact of fishing on the environment;
- development of policy guidelines concerning best practices for fishing operations and the production of supporting implementation programmes; and

[15] FAO EP/GLO/201/GEF: "Reduction of Environmental Impact from Tropical Shrimp Trawling through the Introduction of Bycatch Reduction Technologies and Change of Management"

[16] GEFSEC PROJECT ID: 3619: Strategies for trawl fisheries bycatch management (REBYC-II CTI) *in preparation*

[17] APFIC. 2009. APFIC/FAO Regional consultative workshop on Practical implementation of the ecosystem approach to fisheries and aquaculture, 18–22 May 2009, Colombo, Sri Lanka. FAO Regional Office for Asia and the Pacific, Bangkok, Thailand. RAP Publication 2009/10, 96p. http://www.fao.org/docrep/012/i0944e/i0944e00.htm; http://www.beijer.kva.se/ftp/WIOAQUA/FAORAP2009.pdf

[18] Centro de Investigación de Ecosistemas Acuaticos. 2005. *Linea de base y referencia de gobernanza Puerto Morazán*. Universidad Centro Americana, Managua Nicaragua, Publicación occasional. 56p.

[19] Examples of partnerships include: (i) FAO-UNEP. 2009. *Abandoned, lost or otherwise discarded fishing gear.* Macfadyen, G.; Huntington, T.; Cappell, R. (eds). UNEP Regional Seas Reports and Studies, No. 185/FAO Fisheries and Aquaculture Technical Paper, No. 523. Rome, UNEP/FAO. 115p.; (ii) FAO participation in IMO MEPC correspondence Group meetings to review of MARPOL Annex V and its Guidelines; (iii) FAO. 2009. *Fishing operations. 2. Best practices to reduce incidental catch of seabirds in capture fisheries.* FAO Technical Guidelines for Responsible Fisheries. No. 1, Suppl. 2. Rome, FAO. 49p.; (iv) FAO/ILO/IMO cooperation on the safety at sea in the fisheries sector and (v) FAO-UNEP-GEF global project on Reduction of Environmental Impact from Tropical Shrimp Trawling through the Introduction of Bycatch Reduction Technologies and Change of Management FAO EP/GLO/201/GEF.

- cooperation with IMO and others in the revision of MARPOL Annex V and its guidelines to address and reduce problems associated with marine pollution, including that generated from fishing vessels' activities.

38. The absence of an integrated approach and of policy in some critical areas such as energy use has significantly constrained the research, development and uptake of innovative low impact fuel efficient capture technologies. Further efforts to support policy development in the sector will require for example: fishery based environmental impact assessment procedures; a fisheries strategy for the implementation of elements of Annex V of MARPOL; energy conservation concepts; and further development of procedures for the assessment of appropriate technology covering all aspects of fleet restructuring.

39. High seas bottom fisheries and their impacts on vulnerable marine ecosystems (VMEs) are a major topic of global concern within the international community. The FAO developed *International Guidelines for the Management of Deep-sea Fisheries in the High Seas* (Deep-sea Guidelines, adopted in August 2008) through extensive stakeholder collaboration and input. Other UN agencies, Inter-Governmental Organizations (IGOs) and NGOs have also been extensively involved in this work, including the CBD. FAO has now also developed and is starting to implement a programme on implementation of the Deep-sea Guidelines which is based on collaboration among partners and includes specific activities to increase collaboration and communication between the different stakeholders on deep-sea fisheries in the high seas.

Incentives

40. Incentives that capture market forces are increasingly being used to achieve sustainable outcomes. Ecolabels are one such mechanism. An ecolabel is a tag placed on a product that certifies that the product was produced in a sustainable, environmentally-friendly way. They are designed to influence the purchasing decisions of consumers and the procurement policies of retailers selling fish and seafood products, and to reward producers using responsible fishing practices. FAO has developed Guidelines for the Ecolabelling of Fish and Fishery Products from Marine Capture Fisheries that set out at the minimum substantive requirements and criteria for ecolabels. Similar guidelines for inland fisheries will be considered for adoption by this session of COFI.

41. FAO is also in the process of developing international guidelines on aquaculture certification. These guidelines will provide guidance for the development, organization and implementation of credible aquaculture certification schemes, addressing a range of issues which should be considered relevant for the certification in aquaculture, potentially including: (a) animal health and welfare; (b) food safety; (c) environmental integrity, and (d) socio-economic aspects associated with aquaculture.

Aquaculture

42. FAO is also making an effort to improve adoption and compliance of the Code in terms of aquaculture. As a part of this there is an improvement process for the Code aquaculture questionnaire as a self-assessment tool, also identifying those aspects dealing with environmental protection and biodiversity conservation. Other elements are the FAO Technical Guidelines for EAA[20] and specific guidelines to ensure environmental sustainability and biodiversity conservation such as the guidelines to improve conservation of genetic resources[21], in addition to many other relevant FAO technical papers on aquaculture including on e.g. environmental impact

[20] FAO. 2010. Aquaculture development. *4. Ecosystem approach to aquaculture (EAA)*. FAO Technical Guidelines for Responsible Fisheries. No. 5, Suppl. 4. Rome, FAO.

[21] FAO. 2008. Aquaculture development. *3. Genetic resource management.* FAO Technical Guidelines for Responsible Fisheries. No. 5, Suppl. 3. Rome, FAO. 125 p. (Available at www.fao.org/docrep/011/i0283e/i0283e00.htm)

assessment in aquaculture, integrated mariculture, integrated rice-fish farming and others[22]. The FAO Commission of Genetic Resources for Food and Agriculture and FI have developed a Multi-Year Programme of Work that addresses, *inter alia*, information, policies and status of aquatic genetic resources.

43. FAO is also conducting pilot EAF/EAA implementation activities in some countries such as the Estero Real project referred to earlier. Elsewhere, field and normative activities are being used to actively promote aquaculture practices integrated with agriculture and animal production[23], which also reduces farming impacts on biodiversity and ecosystems by improving utilization of wastes and more efficient use of land and water resources. Further, the Organization maintains the Database on Introduction of Aquatic Species[24], which includes records of transboundary movement of species due to fisheries, aquaculture, biological control and ornamental purposes, as well as socio-economic and environmental impacts related to those movements. Environmental risk assessment and risk analysis/assessment tools are being used and responsible feeding strategies are being encouraged in order to better integrate aquaculture development with biodiversity conservation and environmental protection, optimizing feed manufacturing practices[25] and minimizing the use of wild fishery resources for the feeds.

Information and statistics

44. The Global Strategy to Improve Agricultural and Rural Statistics adopted at the UN Statistical Commission in February 2010 provided basic guidelines to integrate agriculture statistics with other national statistical systems using a master sampling framework. As an initial step to improve the integrity and comparability of fishery and aquaculture information with other national statistics, FAO is promoting the separation of fishers and fish farmers from agriculture farmers in the census. This would facilitate development of a collaborative sampling design with other sectors, inter-operability and data extraction of social and economic information and improve sampling design for fisheries, especially for small-scale operations.

45. Through the FishCode STF project, FAO supports the improvement of information on capture fisheries. Major constraints and gaps in routine data collection were identified through five regional workshops organized in collaboration with RFBs. Improvement of information on small-scale fisheries is a major focus point of the project. The project supports field activities and capacity building in a number of countries in Southeast Asia, the Pacific and Africa, set up a regional training course for Africa and developed guidelines for the integrated assessment of small-scale fisheries[26]. The inland fisheries sector is particularly vulnerable to competition from other sectors and improved information on their importance could influence the direction of future development and integration, in particular regarding the hydro-electric and irrigation sectors[27].

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[22] FAO. 2007. *Assessment of freshwater fish seed resources for sustainable aquaculture*. Bondad-Reantaso, M.G. (ed.). FAO Fisheries Technical Paper. No. 501. Rome, FAO. 628 p.; FAO. 2009. *Environmental impact assessment and monitoring in aquaculture.* FAO Fisheries and Aquaculture Technical Paper. No. 527. Rome, FAO. 57p. Includes a CD-ROM containing the full document (648 p.); FAO. 2009. *Integrated mariculture: a global review*. Soto, D. (ed.). *FAO Fisheries and Aquaculture Technical Paper.* No. 529. Rome, FAO. 183p.

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Inter-agency cooperation

46. The very real challenges to effective collaboration of all the relevant agencies have been referred to earlier while numerous examples of existing cooperation have also been described throughout the report so far. Notwithstanding the challenges and constraints, FI has been making substantial efforts to continue in this direction, as already shown in some of the preceding text.

47. As additional examples, FAO is collaborating with CBD and UNEP on a variety of topics, which recently included a joint report on the impacts of destructive fishing practices, unsustainable fishing, and IUU fishing[28], also involving the Fisheries Expert Group (FEG) of the International Union for the Conservation of Nature (IUCN). A wide range of authors from diverse communities and countries have also contributed to FAO's work on marine protected areas and fisheries. The Convention on the Conservation of Migratory Species of Wild Animals (CMS) also covers many species directly or indirectly related to fisheries such as marine turtles, sea birds and sharks and FAO participates in and contributes to these discussions. Recent partnerships on climate change have been initiated through the Global Partnership for Climate, Fisheries and Aquaculture (PaCFA), which is a voluntary partnership, initiated by FAO, the World Bank and the WorldFish Centre, comprising 20 international organizations and sector bodies with a common concern for climate change interactions with global waters and living resources and their social and economic consequences.

48. FAO and CITES have been working closely together on commercially-exploited aquatic species for more than a decade and a Memorandum of Understanding between FAO and CITES was agreed in 2006. This cooperation has had a focus on the criteria for listing species on CITES Appendices I and II as applied to commercially-exploited aquatic species and, through an FAO Expert Panel, on evaluating listing proposals to the CITES Conference of the Parties. It has also included extensive support to management of already listed aquatic species. The cooperation has been constructive and appreciated by members of both organizations even though there remain strong differences of opinion between different countries (within both organizations) on the role of CITES in relation to commercially-exploited aquatic species. There is a need for members of both organizations to strive to agree on the role of CITES, including the interpretation of the existing listing criteria, for this cooperation to be fully effective.

49. The UN-Oceans[29], endorsed by the United Nations System Chief Executives Board in 2003, is an inter-agency coordination mechanism aimed at strengthening coordination and cooperation within the United Nations system on issues related to oceans and coasts. FAO, an original member, plays an active role in contributing to fisheries and aquaculture-related activities. As well, FAO is the lead agency for the UN Atlas of the Oceans, the unique multi-agency online portal to information on the sustainable development of the world's oceans and coasts. The UN-Oceans mechanism could potentially play a greater role in facilitating coordination and cooperation between its member agencies to facilitate optimal use of the specialized expertise and mandates of each.

[28] FAO; UNEP. 2010. *Report of 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. Rome, 23–25 September 2009.* FAO Fisheries and Aquaculture Report. No. 932. Rome, FAO. 32p.

[29] http://www.oceansatlas.org/www.un-oceans.org/Index.htm

STRENGTHENING FAO'S ROLE

50. Notwithstanding the substantial amount of work being undertaken by FAO and other organizations in partnership with their members, it is clear from COFI/2011/2 that much work is still required in terms of the call from the Twenty-sixth Session of COFI in 2005 for a decade of implementation. Application of the new results-based framework in FAO and the use of effective partnerships are increasing the efficiency of FI's activities and it is essential that both these means are used to maximum effect. Nevertheless, the ongoing and increasing requests for additional assistance from countries, regional bodies and partner organizations, considerably exceeds the current capacity of FI and the regional and sub-regional offices to respond fully.

51. Any significant increase in support to Members will require additional financial resources that also allow for activity-specific recruitment of the necessary human resources. In order to make a meaningful and sustainable contribution to building capacity that leads to effective integration of development and conservation at national and regional levels, extra-budgetary funds ideally should be either: sufficient to allow for at least medium-term support for broad-based programmatic activities; or be flexible and allow for combination with other available funds and activities in order to provide substantial sustained support for capacity building and to achieve good economies of scale.

52. The increasing use of partnerships with other UN organizations, IGOs and NGOs is also essential but, as presented in paragraphs 17-18, there is a need to rationalize work across these organizations to reduce competition and duplication and to ensure optimal use of the unique expertise and mandates at the core of each organization. The drive and momentum for this rationalization must come from the member countries and donors by ensuring that the organizations which serve them work to maximum efficiency within their mandates and cooperate with and utilize partners in areas where those partners have competitive advantages. This could also be facilitated by a stronger role for coordinating institutions such as UN-Oceans and UN-Water[30].

53. Another important opportunity for strengthening the role of FAO in ensuring integration of development and conservation in fisheries and aquaculture is to help to strengthen and make greater use of relevant RFBs, both those established within the FAO framework and others. The current influence and activities of FAO RFBs vary considerably from body to body but the majority are probably not being used to their full potential for cooperation, exchange and capacity-building of their members and the region as a whole. The primary need here is for greater engagement by members with their RFBs to direct and utilize these bodies to maximum effect. Care also needs to be taken at regional level that, when new institutions are created in response to the need for integrated approaches to ocean and coastal management, they consider the role of existing RFBs and do not result in unnecessary duplication. Further, structural linkages between RFBs and regional economic commissions (RECs) are seen as increasingly critical in ensuring the fishery sector is effectively 'hooked in' to regional economic and policy processes, and given both the policy recognition and access to the resources required to operate effectively. Concerns and priorities raised in RFBs are not always the same as those arising in COFI and there would also be benefit in encouraging greater interaction between the RFBs and COFI. It could be valuable to ensure that RFBs are also represented at the relevant FAO Regional Conferences.

54. The compilation, analysis and dissemination of data and information are among the core activities of FI and FAO as a whole. Many FAO members, particularly in developing countries, have stated that the lack of access to timely, relevant and accurate information is a serious constraint to the implementation of the Code. Finding the best and most efficient means of identifying, providing and sharing such information with Members is a major challenge but raising awareness on the importance of the need for this information is equally difficult. Recent

[30] http://www.unwater.org/flashindex.html

Guidelines on information and knowledge sharing[31] have been created to foster a deeper grasp of these and associated issues.

55. In resource-poor areas there are major obstacles to publishing and sharing local expertise, but programmes to build institutions and research capacity have frequently neglected the need to secure funding and to support the publication of research. The result is a serious, and growing, under-representation within the scientific and development literature of authors closest to the challenges facing fisheries in the developing world.

56. With fisheries and aquaculture issues being more and more often dealt with in non-fisheries policy sectors, there is an urgent need to promote and raise awareness of their importance. Connections must be made with other sectors and communicated to national and regional policy and decision makers to ensure that the related issues are included on the global agenda and considered in national and international policies and action plans.

57. It is also essential to promote and highlight the value and significance of fisheries and aquaculture to both a general public and to other targeted audiences who can influence change. This requires constant and consistent efforts on outreach, awareness-raising and communication activities.

RECOMMENDATIONS FOR CONSIDERATION BY COFI

58. The Committee is invited to:

(a) Recall that in 2005 the Committee on Fisheries committed itself to a decade of implementation of the Code and its associated instruments and consider means of improving progress towards this goal, including consideration of the role of FAO.
(b) Note there is an urgent need to raise awareness of the importance of the fisheries and aquaculture sector for social and economic development and to ensure that the sector is fully taken into account in broader national and international development planning. The Committee may wish to consider means to strengthen the role of FAO in informing and guiding regional and global discussions to this end, including in such venues as Rio+20.
(c) Note the exaggerated negative messages about the conservation and environmental impacts of fisheries and aquaculture and consider ways to counteract them with a more accurate and balanced perspective.
(d) Note that FI is cooperating actively with relevant agencies, but also that the efficiency and effectiveness of such inter-agency and inter-sectoral cooperation needs to be improved at all levels.
(e) Recognize that insufficient capacity is a serious obstacle to progress in implementation of the Code, incorporating improved integration of fisheries and aquaculture development and management in the conservation of biodiversity and environment, and consider means to address this.
(f) Consider means to strengthen the role and effectiveness of RFBs, both those established in the FAO framework and where appropriate other bodies, in achieving improved integration of development and conservation at national and regional scales.
(g) Acknowledge that action is required by FI and member States and provide guidance on how FI might better achieve its mandate.

[31] FAO. 2009. *Information and knowledge sharing*. FAO Fisheries Technical Guidelines for Responsible Fisheries. No. 12. Rome, FAO. 97p.