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COMMITTEE ON FISHERIES

Thirtieth Session

Rome, Italy, 9-13 July 2012

World fisheries and aquaculture: status, issues and needs

Executive Summary

This paper aims to set the scene for discussion by COFI of the status, issues and needs relating to world fisheries and aquaculture. It reviews the role of the biennial flagship publication State of World Fisheries and Aquaculture (SOFIA) in supporting the work of decision makers in general and that of COFI in particular, and draws attention to some specific messages in SOFIA 2012 concerning the current status, recent trends and prospects in the fisheries and aquaculture sector. It points to some selected developments relating to the states of world fisheries and aquaculture. It is thus intended to draw attention to certain aspects which are likely to be discussed under this agenda item, without in any way confining discussion to these selected topics.

The Committee is invited to:

- comment on FAO's role in reporting on the state of world fisheries and aquaculture and how COFI can best contribute to this and benefit from it;
- comment on the extent to which the SOFIA publication serves this role and how it can be improved; and
- provide guidance for FAO's future work in this regard.

INTRODUCTION

1. The State of World Fisheries and Aquaculture (SOFIA) publication has traditionally been produced as a document made available on the first day of COFI sessions with a summary presentation made just prior to the session. The presentation thus helped set the scene for discussions under several agenda items, and was often referred to during interventions.
2. Recognizing the relevance of the subject of the state of world fisheries and aquaculture to the work of COFI, it has been decided to include a dedicated item in the provisional Agenda for the 30th Session of COFI in order to provide delegates with the opportunity to discuss the general topic of the state of fisheries and aquaculture, whether at the global, regional or national level, and to precede this agenda item with the presentation summarizing the SOFIA 2012 publication.
3. The purpose of the present paper is to a) consider the role of the SOFIA publication in supporting the work of decision makers in general and that of COFI in particular, b) to present some selected messages in SOFIA 2012 concerning the current status, recent trends and prospects in the fisheries and aquaculture sector, c) to point to some selected developments relating to the states of world fisheries and aquaculture. It is intended thereby to serve as a backdrop for discussions under this agenda item which are expected to be wide-ranging in terms of subject and geographical scope.

THE SOFIA PUBLICATION: INFLUENCE, UTILITY AND EVALUATIONS

4. The stated intention of the SOFIA publication is to provide a useful tool for facilitating a balanced and comprehensive understanding of the fisheries and aquaculture sector, particularly its international aspects¹. SOFIA 2012 will be the tenth edition in the biennial series which started with SOFIA 1994, and so it seems appropriate at this stage to take stock of the impact the publication has had in terms of influence on shaping public opinion and policy-making, and the extent to which it has been utilised as an authoritative reference source for whatever purpose. Such impact is difficult to assess and may warrant a dedicated in-depth study. However, indications can be provided by reference to some reviews and evaluation of SOFIA and related publications which it draws upon and by some quick analyses of uptake by the media and access to the publication through the FAO web site. Some such indications are provided in the following paragraphs in order to provide some preliminary information to the Committee; they are in no way intended as a definitive review.
5. The SOFIA accounts of the state of world fishery resources attract more attention than most other sections. A brief academic commentary on SOFIA 2010², although making some criticisms, stated that overall the report, like its predecessors, "provides an excellent starting point for debates about the status of global fisheries, rather than settling them...". A much earlier study of reporting on the status of marine fish stocks³, including that in SOFIA 1996, concluded that "the FAO assessments plus efforts to estimate global fish production constitute the best scientific observations currently available to characterize the state of global marine fisheries". Both articles went on to propose that there should be more engagement of external parties in the status reviews such as those presented in SOFIA.
6. Reports on the state of marine fishery resources have been provided to COFI in one form or another since 1974 and through a series of regular stand-alone publications from 1994. Subsequently, all editions of SOFIA have also drawn extensively on this work in a dedicated section which is probably the most consulted part of SOFIA. An auto-evaluation in 2005 of the Department's work programme on monitoring and reporting on global marine resources and relevant environmental and ecological changes stressed the importance of this work due to the great public interest it commands and the fact that it has had great influence on the evolution of the fisheries management context and

¹ Foreword. SOFIA 2002.

² Pauly, D. & R. Froese. 2012. Comments on FAO's State of Fisheries and Aquaculture, or SOFIA 2010. Marine Policy 36: 746-752.

³ Alverson, D. & K. Dunlop. 1998. Status of world marine fish stocks. Fisheries Research Institute, University of Washington

practice since the early 1990s. It stated the view that the ownership of these reviews should be broadened and a more systematic means of assembling information should be utilised, and confidence in the data used should be explicitly referenced. Progress has since been made on all of these aspects, reflected most recently in production of the 2011 edition of the review⁴ and the corresponding section in SOFIA 2012. A more systematic system for assembling information on the state of fisheries, fishery resources and fisheries management has been developed as the Fisheries Resources Monitoring System (FIRMS) Partnership with 10 regional fishery bodies as Partners and FAO as the Secretariat (see <http://firms.fao.org/firms/en>). This initiative was accelerated in response to the call in the Strategy-STF⁵ for "a process for scientific oversight of fishery status and trends information, including the global inventory of fisheries and fish stocks, the global reviews of fishery status and trends prepared for the biennial State of World Fisheries and Aquaculture (SOFIA) and the ongoing submissions to FIGIS⁶".

7. An autoevaluation conducted in 2004 of the Department's work on global analysis of economic and social trends in fisheries and aquaculture, the work programme which produced SOFIA, concluded that SOFIA is a high profile reference document of good quality, objective and easy to read but went on to recommend that the target audience should be more clearly identified so as to align the contents and style optimally. It stated that a study in December 2004 of citations of SOFIA in journals numbered 203 with about equal representation in science-focused and management-focused journals. This compared with 126 citations of the Code of Conduct for Responsible Fisheries documents. A questionnaire survey of users of SOFIA confirmed the importance of SOFIA as a background and general reference publication and noted that a majority of respondents rated the quality of SOFIA as "very good".

8. The 2007 Independent External Evaluation (IEE) of FAO stated that SOFIA "had now developed to become the most influential publication in global fisheries"⁷. The recent evaluation of the FAO's support to implementation of the Code of Conduct for Responsible Fisheries included an assessment of the four SOFIA editions produced in the period 2004-2011. The draft evaluation report rated SOFIA well overall although scores ranged among the seven attributes assessed, from good for relevance to the Code to poor for gender mainstreaming, and it concurred with the IEE statement quoted above. The draft report proposes that SOFIA should in future issues contain a stand-alone section on the Code. It further proposes that the quality and interest in SOFIA could be further improved by engaging additional external experts in its preparation.

9. Preliminary analysis of web traffic in accessing issues of SOFIA on line indicates a high and increasing level of interest in SOFIA and that interest is sustained for several years after the publication date. The highest annual traffic recorded was for SOFIA 2010 in 2011 with about 170 000 web visits (all language versions combined) followed by SOFIA 2006 in 2008 with about 130 000 visits. Although visits drop in the years following publication, there is still interest in the publications for many years afterwards. For example, SOFIA editions for 1996 to 2008 all registered between about 10 000 and 25 000 visits in 2011. Analysis of monthly data indicates that peak views are usually evident in the first full month following publication and these peak view monthly figures have also shown an increasing trend reaching about 20 000 views in the month following publication of SOFIA 2010 (a level similar to the peak views for SOFA⁸ 2010). It would seem likely that initial interest following publication of an edition of SOFIA is mainly on Part 1 dealing with the current status and recent trends of world fisheries and aquaculture, whereas interest sustained through later years focuses more on the parts dealing with selected issues and highlights of special studies, and to a lesser extent on the outlook section, which vary substantially in subject matter among editions. Appendix lists the topics covered in the issues, highlights and outlook sections of SOFIA since the 1998 edition when the

⁴ Review of the state of world marine fishery resources. FAO Fisheries Technical Paper No. 569.

⁵ The Strategy for Improving Information on Status and Trends of Capture Fisheries (Strategy-STF), adopted by COFI-25 and the FAO Council and endorsed by the UNGA in 2003. See paragraphs 34-38.

⁶ The Fisheries Global Information System, a framework which incorporates FIRMS.

⁷ IEE Report, paragraph 480.

⁸ The State of Food and Agriculture.

structure of the publication became standardised in its present form, and the variety of topics covered is clearly evident. Many of these topics remain relevant for years to come.

10. Analysis of citations⁹ of SOFIA in scholarly and academic journals also shows a continuously increasing trend from 2 in 1996 to 248 in 2011 while citations for which individual SOFIA editions were identified rose from 18 for SOFIA 1996 to 178 for SOFIA 2008. Again, although citations wane after an initial peak, the publication is still referred to many years after publication with, for example, SOFIA 1998 still being referenced in articles published in 2011.

11. As for media uptake, SOFIA has increasingly attracted media attention and SOFIA 2010 received excellent press coverage, including through web streaming its official presentation at COFI 29, resulting in some 500 tracked media stories, including nearly 30 in top-tier major media sources. It also generated 20 percent of all permission requests for content reproduction of material in the Department's publications.

12. The SOFIA publication, which has now reached its tenth edition, seems to have served reasonably well in reporting on the state of world fisheries and aquaculture as assessed by various evaluations, commentaries and uptake statistics. However, it can be improved and suggestions would be welcome.

SOME SELECTED MESSAGES IN SOFIA 2012

13. SOFIA 2012, like its predecessors, contains a rich variety of information on the current status, recent trends, current and emerging issues, highlights of studies and future prospects for world fisheries and aquaculture. Here some selected messages in the publication are presented, with a focus on Part 1 (status and trends) and one of the highlight studies which deals with forecast modelling. These elements of the publication are selected because they are more specific in nature and may serve to provoke discussion, not because they are any more important than the other parts.

14. World fish food supply has grown dramatically in the last five decades, with an average growth rate of 3.2 percent per year in the last five decades, outpacing the increase of 1.7 percent per year in the world's population. World per capita food fish supply increased from an average of 9.9 kg in the 1960s to an estimated 18.6 kg in 2010. Fish accounts for about 16.6 percent of the world population's intake of animal protein and 6.5 percent of all protein consumed. Globally, fish provides about 3.0 billion people with almost 20 percent of their intake of animal protein, and 4.3 billion people with about 15 percent of such protein.

15. Overall global capture fisheries production continues to remain stable at about 90 million tonnes worth an estimated US\$217.5 billion in 2010. Global aquaculture production has continued to grow, albeit more slowly than in the 1980s and 1990s, and world aquaculture production attained another an all-time high in 2010 at 60 million tonnes (excluding aquatic plants and non-food products), with an estimated total value of US\$119 billion.

16. Fisheries and aquaculture provided livelihoods and income for an estimated 54.8 million people engaged in the primary sector of fish production in 2010, of whom an estimated 7 million were occasional fishers and fish farmers. Apart from the primary production sector, fisheries and aquaculture provide numerous jobs in ancillary activities. All of this employment, together with dependants, is estimated to support the livelihoods of 660–820 million people, or about 10–12 percent of the world's population.

17. The total number of fishing vessels in the world in 2010 is estimated at about 4.36 million, which is similar to estimates for previous years. Of these, 74 percent are considered to operate in marine waters.

18. As regards the state of marine fishery resources, the proportion of overexploited stocks has continued to increase, albeit at a slower rate, and accounted for about 30 percent of all assessed marine stocks in 2009. Increases in production from these overexploited stocks may be possible if effective

⁹ Using Scopus which is the world's largest citation database of peer-reviewed literature.

rebuilding plans are put in place in accordance with the Johannesburg Plan of Implementation which demands that all overexploited stocks be restored to the level that can produce maximum sustainable yield by 2015, a target that seems unlikely to be met. The fraction of fully exploited stocks, which produce catches that are very close to their maximum sustainable production and require effective management to avoid decline, has shown the smallest change over time, with its share at about 57 percent in 2009. The remaining 13 percent of stocks were non-fully exploited in 2009, and these are under relatively low fishing pressure and have some potential to increase their production although they often do not have a high production potential and require proper management plans to ensure that any increase in the exploitation rate does not result in further overfishing.

19. IUU fishing and related activities threaten efforts to secure long-term sustainable fisheries and promote healthier and more robust ecosystems. Of particular concern are those vessels flying flags of “non-compliance”, which are flags belonging to States that are either unable or unwilling to exercise effective control over their vessels. As a result, the burden of controlling these rogue vessels is gradually falling on coastal States, port States, RFBs and others. It is anticipated that a set of voluntary criteria will be agreed for assessing the performance of flag States together with a list of possible actions to be taken against vessels flying the flags of States not meeting such criteria and possibly an agreed procedure for assessing compliance.

20. There has been an increasing trend in the proportion of fisheries production used for direct human consumption rather than for other purposes. Whereas in the 1980s about 68 percent of the fish produced was destined for human consumption, this share increased to more than 86 percent in 2010, equalling 128.3 million tonnes. Waste from commercial fish used for human consumption is increasingly used in feed markets, and about 36 percent of world fishmeal production was obtained from offal in 2010.

21. Fish and fishery products continue to be among the most traded food commodities worldwide, accounting for about 10 percent of total agricultural exports and 1 percent of world merchandise trade in value terms. The share of total fishery production exported in the form of various food and feed items increased from 25 percent in 1976 to about 38 percent in 2010. In the same period, world trade in fish and fishery products grew significantly also in value terms, rising from US\$8 billion to US\$102 billion due to sustained demand, trade liberalization policies, globalization of food systems and technological innovations. In 2009, reflecting the general economic contraction, trade dropped by 6 percent compared with 2008 in value terms as a consequence of falling prices and margins. In 2010, trade rebounded strongly, reaching about US\$109 billion, with an increase of 13 percent in value terms compared with 2009. In 2011, increasing prices and strong demand in developing countries pushed trade volumes and values to the highest level ever reported and preliminary estimates indicate that exports exceeded US\$125 billion. Since late 2011 and early 2012, the world economy has entered a difficult phase characterized by significant downside risks and fragility, and key markets for fisheries trade have slowed sharply.

22. Fish prices contracted in 2009 but have since rebounded. The FAO Fish Price Index indicates that average prices in 2009 declined by 7 percent compared with 2008, then increased by 9 percent in 2010 and by more than 12 percent in 2011. Prices for species from capture fisheries increased by more than those for farmed species because of the larger impact from higher energy prices on fishing vessel operations than on farmed species. In the last few decades, the growth in aquaculture production has contributed significantly to increased consumption with a consequent price decrease, with average unit values of aquaculture production and trade declining in real terms. Subsequently, owing to increased costs and continuous high demand, prices have started to rise again.

23. The OECD–FAO AGLINK–COSIMO Projection System is one of the most comprehensive models for the analysis of international agriculture and food markets. The model is used to generate medium-term projections on annual supply, demand and prices for selected agricultural commodities, now including fish. In 2011, for the first time the OECD–FAO Agricultural Outlook publication included a separate chapter on fish, illustrating the main results of the fish model. The fish chapter was also incorporated in the 2012 edition, which covers projections for the period 2012–2021. The main outcomes of the latest projections included the following: Stimulated by higher demand for fish, world

fisheries and aquaculture production is projected to reach about 172 million tonnes in 2021, a growth of 15 percent above the average level for 2009–11. The increase should be mainly driven by aquaculture, rising by 33 percent over the period 2012–2021 compared with the 3 percent growth of capture fisheries. Notwithstanding its slowing growth rate, aquaculture will remain one of the fastest growing animal food-producing sectors and total production from capture and aquaculture will exceed that of beef, pork or poultry.

24. The portion of capture production used to produce fishmeal will be about 17 percent by 2021, representing a decline of 6 percent compared with the 2009–2011 average owing to the growing demand for fish for human consumption. In 2021, fishmeal production should be 15 percent higher compared with the 2009–2011 average but almost 87 percent of the increase will derive from improved use of fish waste.

25. Growing income and urbanization will entail an increasing consumption of fish in fillets or prepared and preserved forms, thus creating more residual production to be used in fishmeal manufacturing. Fishmeal produced from fish waste should represent 43 percent of world fishmeal production in 2021.

26. The fish sector is expected to enter into a decade of higher prices, but also higher production costs due to the underlying positive trend in demand, income and population growth, increasing meat prices, a generally weak US dollar and limited growth of capture fisheries production, as well as rising costs for some of the most important input factors such as energy and feed. Prices for fishmeal and fish oil are expected to grow significantly. Higher prices for meat will stimulate demand for fish and fishery products for human consumption leading to increases in fish prices, which will encourage more aquaculture production.

27. World per-capita apparent fish consumption is expected to reach 19.6 kg in 2021, 16 percent higher than the average level for 2009–2011. The average annual growth rate will be lower in the second half of the projection period, when fish will start to become more expensive than red meats. Per capita fish consumption will increase in all continents except in Africa (owing to population growing faster than supply).

28. By 2018, farmed fish is expected to exceed captured fish for human consumption for the first time, and its share is projected at 52 percent in 2021. In quantity terms, world trade of fish for human consumption is expected to expand by 25 percent in the period 2012–2021. Developing countries will continue to account for about 67 percent of world exports.

29. The next decade is likely to see major changes in the macroeconomic environment, international trade rules and tariffs, market characteristics, resources and social conduct. Climate change impacts may also bring increasing uncertainty in many food sectors and might represent a compounding threat to the sustainability of capture fisheries and aquaculture development. Moreover, increased risks of species invasions and the spread of diseases raise additional concerns. Fish diseases could have major impacts on supply, demand and trade in domestic and international markets, as resulting trade restrictions might alter markets for extended periods.

SOME SELECTED DEVELOPMENTS RELATING TO THE STATE OF WORLD FISHERIES AND AQUACULTURE

30. As also reported in SOFIA 2012, Regional Fishery Bodies (RFBs) are the primary organizational mechanism through which States work together to ensure the long term sustainability of shared fishery resources. In light of the fact that the legal framework of several RFBs appears to be outdated against the background of modern critical fisheries management issues, the need for RFBs to modernize their constitutive agreements and ensure better compliance with fishery instruments has been noted in several fora. In this regard, some RFBs have decided to undergo independent reviews of their performance in order to make up for their weaknesses, while other RFBs are still to launch this

process¹⁰. Since the last session of COFI three FAO Article VI bodies have undertaken the process of independent review: the Fishery Committee for the Eastern Central Atlantic (CECAF); the South West Indian Ocean Fisheries Commission (SWIOFC) and the Committee for Inland Fisheries and Aquaculture of Africa (CIFAA). One Article XIV body, namely the General Fisheries Commission for the Mediterranean (GFCM), has set up a Task Force aimed at improving and modernizing the legal and institutional framework of the Commission that is consistent with the recommendations made by the independent panel that reviewed its performances. FAO supports RFBs through the Regional Fishery Body Secretariats Network (RSN). The Third meeting of the Regional Fishery Body Secretariats Network (RSN-3) was held in Rome, Italy, 7-8 February 2011, immediately after the last session of COFI¹¹ and the Fourth Meeting is scheduled to be held on 13 July 2012. RSN-3 discussed a range of subjects of particular relevance or importance to RFBs including relevant decisions by COFI. The current activities of RFBs which have been established within the FAO framework will be reported to this session of COFI in the form of a made-available document.

31. The world's oceans provide a range of benefits for human well-being and prosperity – food production, employment creation, temperature moderation, carbon sequestration, nutrient cycling, habitats and biodiversity, tourism, energy, and others. Humans, however, have put the oceans under risk of irreversible damage by over-fishing, climate change and ocean acidification (from absorbed carbon emissions), increasing pollution, unsustainable coastal area development, and unwanted impacts from resource extraction, resulting in loss of biodiversity, decreased abundance of species, damage to habitats and loss of ecological functions. Ocean fisheries and aquaculture are among humanity's best opportunities to deliver highly nutritious food to a growing population. FAO is leading the Global Environmental Facility (GEF) supported programme for the sustainable management of marine resources in Areas Beyond National Jurisdiction (ABNJ) which aims to promote efficient and sustainable management of fisheries resources and biodiversity conservation in the ABNJ and to meet related global targets agreed in international fora. The ABNJ Programme is an innovative and comprehensive initiative comprised of four projects which bring together governments, regional management bodies, relevant private sectors and industries and non-governmental organizations for the purpose of working towards ensuring the sustainable use and conservation of the ABNJ biodiversity and ecosystem services. The Program concentrates on a long-term plan to establish strong networks, best management practices and facilitated information sharing needed to make a transformational impact towards responsible and sustainable use of ABNJ resources.

32. The System of Environmental-Economic Accounts (SEEA) is a system for organizing statistical data for the derivation of coherent indicators and descriptive statistics to monitor the interactions between the economy and the environment to better inform decision-making. A process of revision to the SEEA is underway and FAO is collaborating with the UN Statistics Division on the development of standard macro indicators to measure sustainability of natural resources, where fishery resources are one of the main targets, as well as indicators and accounts for ecosystem services.

33. At its Twenty-ninth session, the Committee supported FAO's efforts to improve the integration of fisheries and aquaculture development and management with environmental protection and conservation of biological diversity.¹² Discharge of garbage at sea, especially those types of garbage which if not disposed of safely, may pose a significant risk to the environment or fish used directly or indirectly for human consumption. Such garbage may include animal carcasses, abandoned, lost or otherwise discarded fishing gear, as well as other forms of garbage that may harbour pathogens and or contaminants. FAO has been working with the International Maritime Organization (IMO) on the revision of the Guidelines for the Implementation of Annex V of the International Convention for

¹⁰ FAO recently published an FAO Fisheries and Aquaculture Circular No. 1072 covering some of performance reviews conducted relatively earlier. The second volume is being prepared for covering performance reviews conducted later.

¹¹ FAO. 2011. Report of the Third Meeting of Regional Fishery Body Secretariats Network, Rome, 7-8 February 2011, *FAO Fisheries and Aquaculture Report No. 980*. FAO. Rome. 61pp.

¹² FAO. 2011. Report of the Twenty-ninth Session of the Committee on Fisheries. *FAO Fisheries and Aquaculture Report No. 973*. FAO. Rome. 64p. (paragraph 45)

the Prevention of Pollution from Ships (MARPOL). As the revised Guidelines may directly or indirectly influence the fisheries and aquaculture sector, FAO needs to develop a guide providing interpretations of those provisions that are relevant for the sector.

Appendix

SOFIA CONTENTS (ISSUES, HIGHLIGHTS AND OUTLOOK), 1998–2010

2010
ISSUES
<ul style="list-style-type: none"> • Trade measures against IUU fishing • Maintaining biosecurity in aquaculture • Which fish to eat: enjoying the benefits while minimizing the risks • Fisheries sector transparency
HIGHLIGHTS
<ul style="list-style-type: none"> • Climate change implications for fisheries and aquaculture: overview of current scientific knowledge • From drain to gain in capture fisheries rents: a synthesis study • Abandoned, lost or otherwise discarded fishing gear • Private standards and certification in fisheries and aquaculture: current practice and emerging issues • Aquaculture development in Southeast Asia: the role of policy • Human dimensions of the ecosystem approach to fisheries • Geographic information systems, remote sensing and mapping for the development and management of marine aquaculture • Global review of aquaculture development 2000–2010 • Using the Internet for fisheries policy and management advice
OUTLOOK
<ul style="list-style-type: none"> • What future for inland fisheries?
2008
ISSUES
<ul style="list-style-type: none"> • Climate change implications for fisheries and aquaculture • The safety of fishing vessels and fishers: an opportunity to address safety in a holistic fashion • Private and public standards and certification schemes: synergy or competition? • Marine genetic resources in areas beyond national jurisdiction as related to marine biodiversity and the sustainable use of living marine resources
HIGHLIGHTS
<ul style="list-style-type: none"> • Ecosystem approaches for fisheries management in the Benguela Current Large Marine Ecosystem • Increasing the contribution of small-scale fisheries to poverty alleviation and food security • A global study of shrimp fisheries • Marine capture fisheries management in the Pacific Ocean: status and trends • Use of wild-fishery resources as seed and feed in aquaculture
OUTLOOK
<ul style="list-style-type: none"> • Constraints on growth in the aquaculture sector

2006
ISSUES
<ul style="list-style-type: none"> • The Code of Conduct for responsible fisheries: moving into the second decade of implementation • Sustainable growth and expansion of aquaculture: an ecosystem approach • The allocation of fishing rights: an evolving issue • Impact of market-based standards and labels on international fish trade • HIV and AIDS in fishing communities: a public health issue but also a fisheries development and management concern
HIGHLIGHTS
<ul style="list-style-type: none"> • Rehabilitation of riverine habitat for fisheries • Responsible fish trade and food security • Trash or treasure? Low-value/trash fish from marine fisheries in the Asia–Pacific region • Conservation and management of shared fish stocks: legal and economic aspects • Marine capture fisheries management in the Indian ocean: status and trends • Refueling the fishing fleet • Causes of detentions and rejections in international fish trade
OUTLOOK
<ul style="list-style-type: none"> • Revisiting global projections • Medium-term challenges and constraints for aquaculture
2004
ISSUES
<ul style="list-style-type: none"> • Capture-based aquaculture • Labour standards in the fishing sector • Fisheries management and CITES • Trade implications of fish species and fish product identification • Depleted stocks recovery: a challenging necessity • Governance and management of deep-water fisheries
HIGHLIGHTS
<ul style="list-style-type: none"> • Scope of the seaweed industry • Global aquaculture outlook: an analysis of production forecasts to 2030 • Impacts of trawling on benthic habitats and communities • Measurement of fishing capacity • Re-estimating discards in the world's marine capture fisheries • Fisheries subsidies • African freshwaters: are small scale-fisheries a problem?
OUTLOOK
<ul style="list-style-type: none"> • The coming decade: constraints and opportunities • 2015 and beyond: future scenarios for world fisheries and aquaculture

2002
ISSUES
<ul style="list-style-type: none"> • Implementing the ecosystem approach to capture fisheries management • Reliable statistics as an essential basis for effective fisheries management • Catch certification and catch documentation • Poverty alleviation in small-scale fishing communities • Antibiotic residues in aquaculture products
HIGHLIGHTS
<ul style="list-style-type: none"> • Fisheries and long-term climate variability • The search for an operational definition of subsidies provided to the fisheries sector • Techno-economic performance of marine capture fisheries • Aquaculture development in China: the role of public sector policies
OUTLOOK
<ul style="list-style-type: none"> • Trends in long-term projections of fish production and consumption • Food and employment: the prospects
2000
ISSUES
<ul style="list-style-type: none"> • Fishers' safety • Fish quality and safety • Property rights and fisheries management • Illegal, unreported and unregulated fishing • Indicators of sustainable development and the precautionary approach in marine capture fisheries • Monitoring the impact of fishing on marine ecosystems • Genetically modified organisms and fisheries • Ecolabelling in fisheries management
HIGHLIGHTS
<ul style="list-style-type: none"> • Understanding the cultures of fishing communities: a key to fisheries management and food security • The economic viability of marine capture fisheries • Trends in world fisheries and their resources: 1974-1999
OUTLOOK
<ul style="list-style-type: none"> • Recent trends and possible consequences for world fisheries and aquaculture • Medium-term outlook: fish consumption in 2010 • Long-term outlook: some plausible structural changes in production and demand

1998
ISSUES
<ul style="list-style-type: none">• National fisheries governance• Creating an enabling environment for sustainable aquaculture• Integrating fisheries into coastal area management• Control and reduction of fishing capacity• Reduction of by-catch and discards
HIGHLIGHTS
<ul style="list-style-type: none">• Inland fisheries resources: their status and use• Fishers and fishing fleets
OUTLOOK
<ul style="list-style-type: none">• Global food supplies and fish• Demand for fish and fishery products• Supply of fish and fishery products