

Countries implementation of environmental impact assessment in aquaculture according to information reported to and collected by FAO

Doris Soto, José Aguilar-Manjarrez and Elena Irde

Aquaculture Management and Conservation Service

FAO Fisheries and Aquaculture Department

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ABSTRACT

The present study is an analysis of the information reported to and collected by FAO regarding environmental impact assessment (EIA) in aquaculture through several mechanisms. The most important source of information in terms of global scope and permanence in time derives from the reporting by FAO members on the implementation of FAO's Code of Conduct for Responsible Fisheries (CCRF). Other sources of information on EIA are the National Aquaculture Sector Overviews (NASOs) and the National Aquaculture Legislation Overviews (NALOs), that are published in the FAO Web site. FAO has been monitoring the implementation of the CCRF with a questionnaire that is distributed to member countries, Regional Fishery Bodies and Non-governmental organizations (NGOs). Within this questionnaire some portions are related to aquaculture and some are specific to the existence and effectiveness of environmental assessments. The responses provided through this questionnaire offer the information and views of government authorities themselves. The information provided in the NASOs has been primarily provided by experts on aquaculture and by national authorities while NALOs are prepared by desk studies and validated by national authorities.

From the CCRF reporting for the period 2004–2006, and from NASOs and NALOs for the period 2004–2005 it is possible to identify 89 countries out of 131 with some kind of environmental assessment in place for aquaculture activities. However, the CCRF reporting reveals that effectiveness is generally low if assessed at all. Monitoring related to EIA is also rarely mentioned. A current revision to the CCRF reporting system for aquaculture offers an opportunity to consider some issues that can enhance reporting on EIA, monitoring and overall effectiveness. Such reporting should increase the demand for better implementation of EIA as a tool for sustainability of aquaculture.

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Introduction

FAO has been collecting information about the implementation and use of environmental impact assessment (EIA) for aquaculture at a global level through several mechanisms. The most important source of information in terms of global scope and permanence in time derives from the information received from FAO member countries on progress made in the implementation of FAO's Code of Conduct for Responsible Fisheries (CCRF) (FAO, 1995). Other valuable sources of information on EIA in aquaculture, are the National Aquaculture Sector Overviews (NASOs), and the National Aquaculture Legislation Overviews (NALOs) prepared by FAO's Aquaculture Management and Conservation Service (FIMA) and FAO's Development Law Service (LEGN). Both resources are made available online on the FAO Web site.¹

The CCRF is a *global Code of Conduct* which, in a non-mandatory manner, establishes principles and standards applicable to the conservation, management and development of fisheries, including aquaculture. FAO member governments, along with many stakeholders of the sector, have been involved in implementing its provisions, and FAO has also been assisting its member governments in this process.

The present study utilizes information officially reported by member countries in compliance with the CCRF to provide a global overview of EIA implementation and a short temporal trend in implementation according to these responses. The picture is complemented with data and information obtained from NASOs and NALOs. Since this information gathering process will continue, the present document also analyses potential improvements to it in order to better describe the current use and implementation of EIA in aquaculture and ways to improve its effectiveness.

THE FAO CODE OF CONDUCT FOR RESPONSIBLE FISHERIES

The process leading to the adoption of CCRF was initiated in 1991 by the Committee on Fisheries (COFI) of FAO after a multistakeholder consultation process, and it was formally adopted in 1995 by over 170 Member Governments of the FAO Conference. The CCRF represents the most significant globally recognized international framework for marine, coastal and inland fisheries, including aquaculture. Although a voluntary instrument, the Code also contains provisions that are based on relevant rules of international law, including those reflected in the United Nations Convention on the Law of the Sea (UNCLOS). The CCRF is to be interpreted in light of the 1992 Declaration of Cancun, and the 1992 Rio Declaration on Environment and Development and Agenda 21 adopted by the United Nations Conference on Environment and Development (UNCED). The Code sets out principles and international standards 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. The Articles of the Code cover all major issues and practices in fisheries, including fisheries management, fishing operations, aquaculture development, integration of fisheries into coastal area management, post-harvest practices, trade, and fisheries research; general principles; and provisions related to its implementation, monitoring, updating and the special requirements of developing countries.

¹ National Aquaculture Sector Overviews: www.fao.org/fishery/naso/search/en
National Aquaculture Legislation Overviews: www.fao.org/fishery/nalo/search/en

The CCRF is increasingly being recognized as a reference and framework of basic principles and norms which all stakeholders concerned with sustainable aquaculture development can use as a common platform for better understanding, consultation and collaboration. FAO is required to monitor progress made in the implementation of the Code under article 4.2 of the CCRF.²

The CCRF is addressed primarily at States, and stipulates actions that should be taken by States and national authorities and institutions. However, it is also addressed to people, interest groups and private institutions that are involved in or concerned with fisheries and aquaculture. In fact, in the case of aquaculture development, it is evident that responsibilities beyond the local farm level need to be shared by many players. Providing an “enabling environment” for sustainable development in aquaculture, as in agriculture, is therefore not only the responsibility of governments and legislators, but also of the media, financial institutions and Non-governmental Organizations (NGOs), as well as of social and natural scientists, manufacturers and suppliers of inputs, as well as processors and traders of aquaculture products.

Article 9 “Aquaculture development” of the CCRF, covers major aspects of aquaculture (Box 1) and culture-based fisheries, although there are also significant provisions in other sections of the Code having an important bearing on aquaculture and its general development context, for example, recommendations regarding

BOX 1

Implementation of the CCRF regarding Aquaculture Development

As a primary goal, aquaculture development should conserve genetic diversity and minimize negative effects of farmed fish on wild fish populations, while increasing supplies of fish for human consumption.

Resources, such as water, bays or land space are often used by more than one user or have the potential for different uses. To avoid disputes and conflict between different users of resources, countries should have policies and plans to ensure that resources are used and allocated on a fair basis.

Countries should take steps to ensure that the livelihoods of local communities, including access to, and productivity of, fishing grounds, are not negatively affected by aquaculture developments. Procedures for monitoring and assessing the environmental effects of aquaculture should be established. In addition, care should be taken to monitor the types of feed and fertilizer used in farming fish. The use of disease-control drugs and chemicals should be minimal because these can have important negative impacts on the environment. It is also important to ensure the safety and quality of aquaculture products.

Where the effects of fish farming may extend beyond a country’s waters, countries should consult with neighbouring countries before introducing non-native species of fish for farming. To minimize disease from new species, countries need to establish mutually agreed codes of practice or behaviour for introducing and transferring aquatic plants and animals from one place to another. In planning aquaculture projects, techniques should be developed by countries and the industry for restoring and increasing the supply of endangered species (those species that may die out if corrective action is not taken).

Source: FAO. 2001. What is the Code of Conduct for Responsible Fisheries? Rome, FAO. 19 p. (available at www.fao.org/docrep/003/x9066e/x9066e01.htm#f)

² “4.2 FAO, in accordance with its role within the United Nations system, will monitor the application and implementation of the Code and its effects on fisheries and the Secretariat will report accordingly to the Committee on Fisheries (COFI). All States, whether members or non-members of FAO, as well as relevant international organizations, whether governmental or non-governmental should actively cooperate with FAO in this work.”

impacts on local communities, fisheries management, fishing operations, coastal area management, post-harvest practices, and the quality, safety and trade of fish and fishery/aquaculture products.

FAO has been monitoring the implementation of CCRF since 2000 with a questionnaire distributed to member countries, Regional Fishery Bodies and international NGOs.³ Within this questionnaire some specific portions are related to aquaculture, in particular Article 9, but also some elements from Articles 5 and 10. This questionnaire is distributed every two years, approximately one year in advance to the biennial COFI meeting. For example, the questionnaire for 2006 was distributed in May of that year to countries and other organizations and responses were received in FAO until August. The analysis of responses was then provided in a working document for discussion at the twenty-seventh session of COFI in March 2007 (FAO, 2007). This same information, but with a more detailed analysis on aquaculture issues, is usually presented as a working document at the COFI Sub-Committee on Aquaculture (COFI SCA), which last time took place in October 2008.

The relevance of the CCRF reporting for countries and for FAO

For FAO, one of the main goals of the CCRF questionnaire and reporting on implementation has been to address Article 5 regarding special requirements of developing countries in the implementation of the Code, and to enable FAO and partners to focus development assistance in this regard. The other main goal for FAO is to provide a global perspective on the progress made in CCRF implementation by countries, regions, and by regional fishery bodies. Such reporting is very relevant for the discussions and decisions of both COFI and the COFI SCA since it is clearly understood that effective national institutional arrangements and capacity, policy, planning and regulatory frameworks are essential to support the sustainable development of aquaculture. On the other hand, the information provided by countries on CCRF implementation can be used to improve cooperation among all stakeholders at the national, regional and inter-regional levels.

The CCRF questionnaire and the inclusion of EIA information

The aquaculture components of the CCRF questionnaire were designed to obtain information about the different aspects considered by Article 9, including the responsible development of aquaculture under national jurisdiction, and within transboundary aquatic ecosystems, the proper use of aquatic genetic resources and the development of responsible aquaculture at the production level (FAO, 1995). The questionnaire also includes specific references to EIA.

Question number 14 of the CCRF questionnaire, inviting a description of the legal and institutional framework for the development of responsible aquaculture, gives the opportunity for responding countries to report on the inclusion of EIA within such frameworks. More specifically, questions 16 and 16a refer to the existence of some kind of environmental assessment and also request information about its effectiveness. However, the questionnaire does not provide further information or indication on how to assess effectiveness or how to report on it.

As an answer to the requests by COFI and COFI SCA and with the objective of improving the response rate, quality of responses, and to increase the value of the reporting for members, FAO is currently reviewing the questionnaire and the whole reporting system. One of the problems is that not all the major aquaculture countries complete a CCRF questionnaire and although the information on aquaculture can be

³ Questionnaire for monitoring the implementation of the 1995 FAO Code of Conduct for responsible Fisheries; the International Plans of Action on Capacity, Sharks, Seabirds, and Illegal, Unreported and Unregulated Fishing; and the Strategy for Improving Information on Status and Trends of Capture Fisheries

complemented with the NALOs and NASOs, the content of these documents is not updated continuously. While the CCRF reporting takes place every two years and therefore it can provide permanent updating of the information which can, in turn, be coupled with FAO statistics using FAO FishStat Plus software (FAO, 2008a).

An important added value of the information and responses provided through the CCRF questionnaire compared with that provided and discussed in other review papers on EIA in aquaculture included in the present volume (FAO, 2009) is that the CCRF responses and often NASOs and NALOs provide the information and views of government authorities themselves.

NATIONAL AQUACULTURE SECTOR OVERVIEWS AND NATIONAL AQUACULTURE LEGISLATION OVERVIEWS

The National Aquaculture Sector Overview (NASO) collection provides a general overview of the aquaculture sector of FAO member countries. The NASOs contain summarized information on the history of aquaculture; human resources involved in the sector; farming systems distribution and characteristics; main cultured species contributing to national production; production statistics; description of the main domestic markets and trade; promotion and management of the sector; and development trends and issues at the national level. The information provided in the NASOs has been primarily provided by experts on aquaculture and by national authorities and, supplemented by graphs created by FAO to illustrate reported production statistics. Ninety five NASOs have been published on the FAO Web site so far.

The National Aquaculture Legislation Overviews (NALOs) are a series of country reports on national aquaculture laws and regulations, prepared by the FAO Development Law Service in collaboration with the FAO Aquaculture Management and Conservation Service. The NALOs reflect the multi-faceted diverse character of aquaculture, demonstrated by the wide range of legislation pertaining to different sectors that governs the sector. The NALOs are tackling as diverse issues as access to land and water, EIA, aquatic animal disease control and food safety. Several of these issues are not unique to aquaculture but are regulated in general laws on e.g. building and planning, environmental law, veterinary control and food processing. Many of the laws and regulations in place today were developed without aquaculture in mind and may therefore be poorly adapted to the requirements of aquaculture or applied in an inconsistent manner. The NALOs were prepared as desk studies based on FAOLEX⁴ and national legislative databases, and have been validated by national authorities and experts. Forty two NALOs have been published on FAOs Web site to date.

The majority of NASO's and NALOs were prepared during 2004–2006 periods. However, NASOs will be updated every 4-5 years whereas NALOs will be updated on a regular basis, every 2-3 years.

ANALYSIS OF THE INFORMATION PROVIDED BY CCRF REPORTING, NALOS AND NASOS REGARDING IMPLEMENTATION OF EIA IN AQUACULTURE

From the 166 aquaculture producing countries in the world (FAO, 2008a), the information available on EIA amounts to 131 countries as follows: information from 52 countries comes only from NASO/NALO; information from other 50 countries comes from both NASO/NALO and CCRF reports, and for 29 countries we obtained the information only from CCRF reporting. To facilitate the analysis of information on EIA, the producing countries were divided in seven different regions: Africa, Asia, North America, Latin America and the Caribbean, Europe, Near East and South West Pacific; a summary of this analysis is provided below.

⁴ FAOLEX is a comprehensive and up-to-date computerized legislative database, one of the world's largest electronic collection of national laws and regulations on food, agriculture and renewable natural resources. (faolex.fao.org/faolex/index.htm).

EIA in the CCRF responses

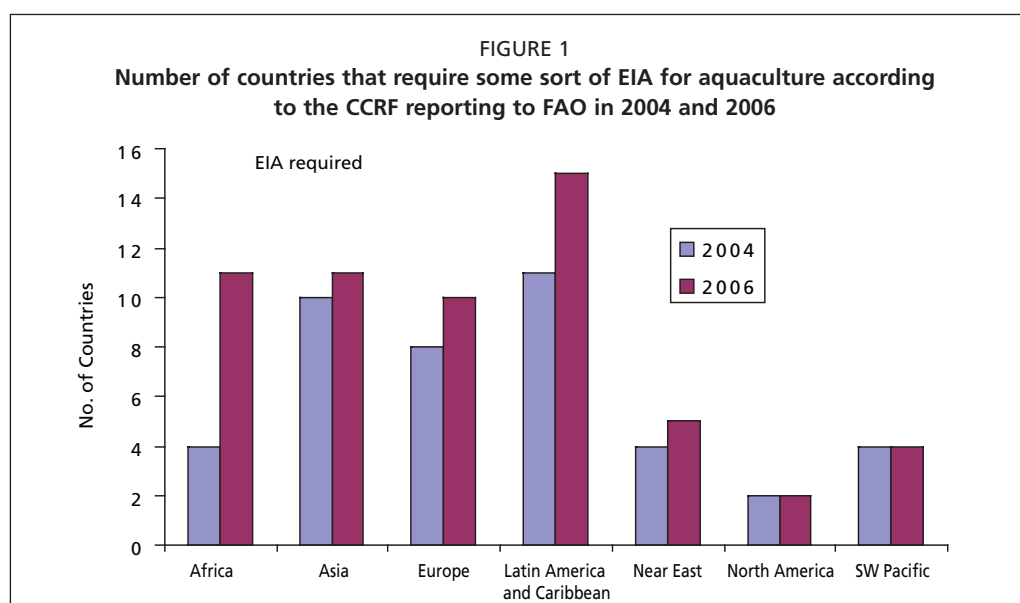
In general, since the reporting process started in 2002, the responses from countries to the full CCRF questionnaire have been declining. In 2006, eighty countries (i.e. 55 percent of the countries receiving the questionnaire) responded although this response is slightly better than that of 2004 (67 countries or 45 percent). Nevertheless a large proportion of the main aquaculture countries have responded to both questionnaires (2004 and 2006).

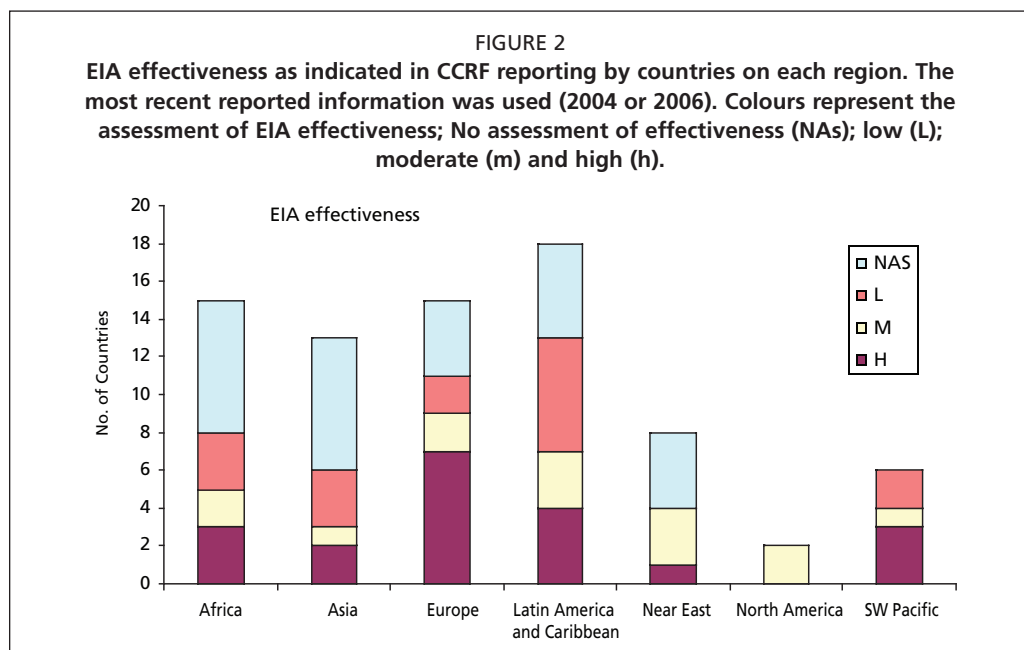
The comparison of the responses for the 2004 and 2006 biennium indicates an increase in the number of countries implementing some kind of EIA. Largest increase in response is mainly presented in two regions: Africa, and Latin America and the Caribbean (Figure 1). In general, according to the answers, EIA seems to be provided for in legislation, but in wider environmental regulatory frameworks rather than in aquaculture specific legislation, and EIA is therefore often being applied to many activities, including aquaculture. In a few countries where aquaculture is just starting, the responses to the CCRF questionnaire indicate some form of EIA (usually devised for other sectors) as initial tool to manage aquaculture in the absence of other regulations more specific to aquaculture.

Many of the reported EIA required for aquaculture refer to large scale activities, however since the questionnaire does not specify a scale, it is not clear if this is the most general case.

Another interesting observation is that there is little relationship between EIA and measures to reduce the risk of using exotic species in aquaculture. In fact from all the responding countries in 2006, only two countries out of 56 reported some specific management measures for the use of exotic species indicating that EIA was required for this specific situation. However five countries where EIA assessment for aquaculture has not been implemented indicated that they have some measures in place to reduce the risk of using exotic species. Indeed, the issue of a permit or licence to farm fish is now very widespread and regarded as a pre-requisite for the initiation of the activity and in some cases several different permits or licences are required (e.g. in relation to water use; waste discharge; chemical use; use of introduced species; conversion of land/habitat, etc.). More recently, when comparing 2004 and 2006 responses, it seems that a license is contingent upon EIA compliance amongst other more specific conditions.

An important element of the present analysis comes from the evaluation of EIA effectiveness in the countries' responses (Figure 2). Only 26 percent of the countries reporting that they use EIA for aquaculture indicate that this environmental assessment is effective or report it as good. Largest absence of assessment is shown in the Near





East, Asia and Africa, while Europe shows the highest number of countries indicating EIA as highly effective. North America's EIA effectiveness is shown as moderate.

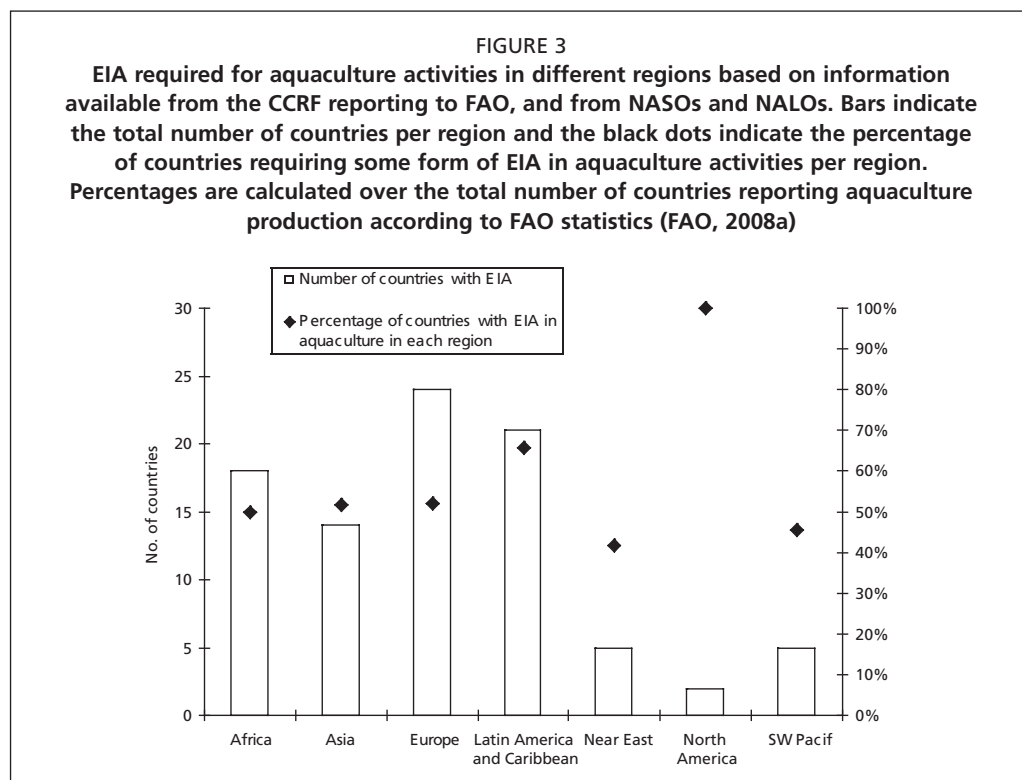
None of the countries indicating that EIA is effective mention or describe how they measure or assess effectiveness, and with one exception none of them refer to indicators or other ways to evaluate it. Nevertheless, one country reports EIA as effective and indicates that "they have been very successful in avoiding major disease outbreaks, maintaining resource and environmental sustainability and in meeting social and economic needs of regional communities". However this country refers to the whole suite of management measures that are in place to make aquaculture sustainable and therefore it is difficult to judge EIA effectiveness independently for aquaculture.

There is also a problem with the understanding of "effectiveness" of EIA. Some countries in their responses describe EIA as effective when it is well implemented in terms of a set of demands and procedures but there is no clear description of the final result or a follow up procedure. Other countries understand EIA as effective when there is an environmental management plan for an activity that has been approved.

Although the questionnaire includes a specific question regarding monitoring of aquaculture operations, the answers are very general and often vague and in most cases there is no specific connection to the EIA. On the other hand, a large number of countries refer to the lack of monitoring systems or capacity for field evaluations and checking effectiveness, while others refer to the absence of guidelines on standards and indicators to be used along the whole EIA process including the assessment of effectiveness. In several countries, EIA is not required specifically for individual fish farms, while other mechanisms are reported to be in place for the management of environmental effects of aquaculture, including planning, regulation, codes of conduct, infrastructure, monitoring and response mechanisms. Finally, an important number of countries report the need for technical training of personnel and suppliers in order to perform adequate EIAs and to be able to check effectiveness.

EIA in NALOs and NASOs

The NALOs provide a good source of information on legal frameworks and regulations not only for EIA, but also for aquaculture planning and operation, including authorization systems, access to land and water, water quality and wastewater, fish movement, disease control, drugs, feed, as well as food safety. However, they do not describe the effectiveness of EIA or monitoring schemes that have been put in place.



NASOs mention key information on EIA however in general they do not report on EIA effectiveness and monitoring.

Figure 3 shows the occurrence of EIA in different countries/regions based on information available from the CCRF for the period 2004–2006, and for NASOs and NALOs for the same period. In total 89 countries have requirements for some sort of environmental assessment in place for aquaculture activities and the relative implementation per region is generally around 50 percent while in North America it is 100 percent because both the United States of America and Canada do require environmental assessment procedures for aquaculture.

CONCLUSIONS AND RECOMMENDATIONS

In general, NASOs and NALOs as well as reviews conducted for other purposes, probably provide more extensive and useful information on policies, regulations and the institutional framework for responsible aquaculture than most CCRF questionnaire responses. However, the later are important sources of information and, as mentioned earlier, give indications on countries need for assistance.

Given that the current CCRF reporting system for aquaculture will be modified for future reporting in order to make it more specific and more useful to FAO and to members, a new questionnaire can be more specific about EIA implementation and effectiveness. It could, for example include some indicators of effectiveness that can guide countries improvement and indicate assistance needed, both being very important from FAO's perspective and of great value for member countries. Effectiveness could be related to: i) a well designed EIA in place for aquaculture, e.g. whether it includes screening, scoping and assessment of significance of impacts (FAO, 2009); ii) monitoring after the project starts; iii) the presence of feedback mechanisms and management measures responding to monitoring results.

It will be necessary to modify the questionnaire to provide more guidance on responses and indicators that could be used. A working document discussed in 2008 by COFI SCA IV (FAO, 2008b) suggested a benchmark approach against the most desirable level of management that suits individual countries' conditions and that can

be assessed in terms of progress in a stepwise mode. The questionnaire should also provide the opportunity for clear indication of shortcomings in national efforts to implement EIA as an effective instrument to guarantee sustainability of aquaculture.

The COFI SCA IV document proposes that to better understand the progress of CCRF implementation, the information provided in the questionnaire can be sorted into three categories: i) essential mechanisms, without which aquaculture cannot be managed within the CCRF framework; ii) enabling mechanisms, that are necessary to support the implementation of the basic governance instruments, and iii) enhancing measures or mechanisms to further improve the overall management of the sector. In this case the requirement of EIA for aquaculture activities should be considered essential and the implementation of full assessments should be related to the severity and scale of associated environmental risks of the proposed activity. The enabling mechanisms, as a second stage in the progressive CCRF implementation, could include the EIA monitoring and feedback mechanisms and therefore the evaluation of effectiveness could be done at this stage.

The recommendations compiled by Hambrey (2009) in the synthesis review of the present publication should also be considered. For example the CCRF questionnaire should include some question regarding strategic environmental assessment considering the cumulative impact of aquaculture activities. Many countries do not conduct EIA in small-scale aquaculture, however small farms can be too many for the carrying capacity of a waterbody, and although individual farms may have adopted Best Management Practices, the cumulative environmental effect can be overriding.

Another important element to consider in the questionnaire is a clear indication that EIA and monitoring are implemented as part of a wider management framework or “system” for aquaculture that includes a policy and strategy and agreed environmental objectives with associated indicators, standards and reference points. All of these should be part of the essential mechanisms explained above and as such should be clearly reflected in the reporting system.

All of the above elements shall be considered in the design of the new questionnaire for the CCRF reporting to be tested in some countries and to be further submitted to COFI SCA for approval and implementation within the countries.

BIBLIOGRAPHY

- FAO. 2009. Environmental impact assessment and monitoring of aquaculture. FAO Fisheries and Aquaculture Technical Paper. No. 527. Rome, FAO. 672 p.
- FAO. 1995. Code of Conduct for Responsible Fisheries. FAO, Rome. 41p. (available at www.fao.org/DOCREP/005/v9878e/v9878e00.htm).
- FAO. 2007. Progress in the implementation of the 1995 Code of Conduct for Responsible Fisheries, related international plans of action and strategy. Committee on Fisheries. Twenty-seventh session. Rome, Italy, 5 – 9 March 2007 (available at <ftp://ftp.fao.org/docrep/fao/meeting/011/j8929e.pdf>).
- FAO. 2008a. FishStat Plus [online] - Universal software for fishery statistical time series (*version 2.3*) (available at <http://www.fao.org/fishery/statistics/global-aquaculture-production/query/en>).
- FAO. 2008b. Improving the progress reporting on the implementation of the 1995 FAO Code of Conduct for Responsible Fisheries (CCRF), provisions relevant to aquaculture and culture-based fisheries. Paper presented at the fourth session of the Sub-Committee on Aquaculture, Puerto Varas, Chile, 6-10 October 2008. COFI/AQ/IV/2008/4. <ftp://ftp.fao.org/docrep/fao/meeting/013/k2846e.pdf>
- Hambrey, J. 2009. Global review and synthesis of case study reviews of EIA and monitoring in aquaculture in four regions and for salmon aquaculture, pp. xx-xx. In FAO. Environmental impact assessment and monitoring of aquaculture. FAO Fisheries and Aquaculture Technical Paper. No. 527. Rome, FAO. 672 p.