

September 2006

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para la  
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## COMMITTEE ON FISHERIES

### SUB-COMMITTEE ON AQUACULTURE

#### Third Session

New Delhi, India, 4-8 September 2006

### BETTER MANAGEMENT OF AQUACULTURE: THE FUTURE

#### SUMMARY

Aquaculture faces criticism that it causes adverse environmental, social and other impacts. However, many past and on-going experiences indicate that improved management could avoid or reduce such negative impacts and could improve the sector's sustainability. Aquaculture is growing and expanding and is expected to meet the increasing demand for aquatic food products in the coming years. Thus, all concerned aquaculture stakeholders are considering the management of the sector a high priority. Better management is attempted using various methods (e.g. Codes of Conduct, good aquaculture practices, practice and product certification, labelling, etc.) with varying degrees of success. This working document discusses the current status of the application of improved management practices and certification in aquaculture, particularly in shrimp farming, using the knowledge gained through years of experience of the Consortium on Shrimp Farming and the Environment. It also talks about opportunities for expanding the application of better management practices (BMPs) to other types of aquatic commodities and presents the International Principles on Responsible Shrimp Farming drafted by the Consortium. The Sub-Committee is invited to: (a) comment on the status of aquaculture management, implementation of BMPs, and practice and product certification in aquaculture in Member countries; (b) comment on opportunities for and constraints to developing and implementing BMPs and certification systems in aquaculture in Member countries; (c) advise FAO on how to proceed, during the intersessional period, with further developing international principles, BMPs, certification standards, and other mechanisms for improving aquaculture management; and (d) offer any interest and assistance for collaborating with the Secretariat, during the intersessional period, towards working on such principles and management practices and their applicability to different aquatic commodities.

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1. It has been argued that if blame must be assigned for any adverse impacts of aquaculture, it should be placed not on aquaculture itself but on the way it is undertaken<sup>1</sup>. This implies, rightly, that more responsible management practices could avoid or reduce the negative impacts of aquaculture and would improve the sector's sustainability.
2. Aquaculture is growing and expanding. It is essential for the world's food supply, and poised to meet the growing demand for aquatic food products in the years to come.
3. From the recent research and reviews it is evident that the global aquaculture sector is moving forward with some key trends. The main trends are:
  - increasing demand for aquaculture products;
  - increasing intensification of production systems;
  - continuing diversification of production systems and species farmed;
  - increasing influence of markets, trade, consumers and consumption; and
  - enhanced regulation and better governance
4. The combined effect of these trends is the drive towards overall improved management of the sector at both the individual farm level and specific sectoral level (see COFI:AQ/III/2006/8 for details).
5. The process of management encompasses all aspects of the aquaculture sector. In terms of aquaculture, it includes many actions and stakeholders, including physical resources, services, production practices, policies, institutions, research, and actions by state, the private sector and civil society. As aquaculture is a complex production sector, better management does not occur simultaneously throughout, but rather will materialize as different pressures and priorities are applied, which could be regulatory, economic, market, environmental or social.

### **Aquaculture sustainability**

6. Driven by concerns that some forms of aquaculture (mainly shrimp and salmon) are environmentally unsustainable, socially inequitable, and that products are not safe for consumers, over the years, there have been attempts to respond to the consequent public perceptions and market requirements. Food safety standards have been elevated and international trade regulations tightened. Policy and regulations governing environmental sustainability have been put in place in many countries, requiring aquaculture producers to comply with more stringent environmental mitigation and protection measures.
7. In some countries, these changes were initiated by the aquaculture sector itself, usually within the more organized private industry sector to ensure its sustainability and protect operations from poorly managed activities. The private sector has made significant advances in the management of its activities and there are many examples of improved management of farming systems that have reduced environmental impacts and improved efficiency, including profitability, in all regions.
8. During the second session, after discussing the issues on shrimp aquaculture sustainability, the Sub-Committee on Aquaculture recommended, that FAO should implement the recommendations of the Expert Consultation on Good Management Practices and Good Legal and Institutional Arrangements for Sustainable Shrimp Culture that was held in Brisbane, Australia, in December 2000<sup>2,3</sup>.

<sup>1</sup> T.A. Anderson & Sena De Silva. 1998. *Strategies for low pollution feed*. Aquaculture Asia III (1) p. 18-22.

<sup>2</sup> FAO. 2003. Committee on Fisheries. *Report of the second session of the Sub-Committee on Aquaculture*. Trondheim, Norway, 7-11 August 2003. FAO Fisheries Report. No. 716. Rome, FAO, 2003. 91p.

<sup>3</sup> FAO/Department of Agriculture, Fisheries and Forestry Australia. 2001. *Report of the FAO/Government of Australia Expert Consultation on Good Management Practices and Good Legal and Institutional Arrangements for Sustainable Shrimp Culture*. Brisbane, Australia, 4-7 December 2000. FAO Fisheries Report. No. 659. Rome, FAO. 77p.

9. In several countries, aquaculture producers are introducing environmental certification of aquaculture products, either individually or in a coordinated manner, in order to credibly demonstrate that their production practices are non-polluting, non-disease transmitting and/or non-ecologically threatening<sup>4,5</sup>. Some countries are attempting to introduce state-mediated certification procedures to certify that aquaculture products are safe to consume and farmed in accordance with certain environmental standards. Most of the work done on improved management has been on salmon and shrimp, mainly due to their high commodity value and the importance attached as the most internationally traded products.

### **International Principles for Responsible Shrimp Farming**

10. The members of the Consortium Program on Shrimp Farming and the Environment, including FAO, World Bank, NACA, WWF and UNEP, have been active during the intersessional period making efforts towards implementing those recommendations. Taking advantage of a series of technical and thematic reviews, meetings and consultation and case studies conducted worldwide<sup>6</sup>, involving a wide range of stakeholders, from government, private and non-government organizations, the Consortium has drafted the *International Principles for Responsible Shrimp Farming*<sup>7</sup> (COFI:AQ/III/2006/Inf. 8).

11. Over 35 complementary case studies prepared by more than 100 researchers in more than 20 shrimp farming countries which have been developed through consultation with numerous stakeholders throughout Asia, Africa and the Americas, and the cases ranging from specific interventions within single operations to thematic reviews of key issues in shrimp aquaculture provided the scientific basis for the *International Principles*. Those studies were conducted with the overall goal of documenting and analyzing experiences around the world in order to better understand what works, what doesn't and why. Subsequently, the *International Principles* were presented and discussed at an international workshop on shrimp farming hosted by the Government of China, co-organized by FAO and NACA in Beijing during November 2004 and a special session on Aquaculture Management held at the World Aquaculture Society (WAS) Conference hosted by the Government of Indonesia during May 2005. These events provided the platform for discussion with experts, scientists, farmers, policy makers, civil society and other stakeholders for building consensus on the principles.

12. The *International Principles* have also been widely distributed for comments and inputs and made available for public comment through the internet since early 2005<sup>8</sup>. The 10<sup>th</sup> Governing Council of NACA at its 17<sup>th</sup> meeting in February 2006 reviewed and endorsed the *International Principles* which are presented to the Sub-Committee along with this working document as an information document (COFI:AQ/III/2006/Inf. 8).

13. The purpose of these *International Principles* is to provide principles for management of shrimp aquaculture that provide guidance in implementation of the FAO Code of Conduct for Responsible Fisheries in the shrimp aquaculture sector.

14. The *International Principles* consider the technical, environmental, social and economic issues associated with shrimp farming and provide a basis for industry and government management to improve the overall sustainability of shrimp farming at national, regional and global levels. Each principle contains a justification, and some specific criteria to support their

<sup>4</sup> ABCC. 2004. "Código de conduta para desenvolvimento sustentável e responsável da carcinicultura brasileira". ABCC - Association of shrimp growers of Brazil.

<sup>5</sup> FAO. 2006. *The state of world aquaculture 2006*. FAO Fisheries Technical Paper. No. 500. Rome, FAO. xxxp (In preparation).

<sup>6</sup> World Bank, NACA, WWF and FAO. 2002. Shrimp Farming and the Environment. A World Bank NACA, WWF and FAO Consortium Program .To analyze and share experiences on the better management of shrimp aquaculture in coastal areas. Synthesis Report. Published by the Consortium. 119p.

<http://www.enaca.org/modules/mydownloads/viewcat.php?cid=19>

<sup>7</sup> FAO/NACA/UNEP/WB/WWF. 2006. International Principles for Responsible Shrimp Farming. Network of Aquaculture Centres in Asia-Pacific. Bangkok, Thailand. xxpp (In preparation).

<sup>8</sup> <http://www.enaca.org/modules/tinyd2/index.php?id=1>

implementation. The criteria may be used by States and the private sector for development of more specific Codes of Practice or management practices for shrimp farming adapted to local farming conditions, and social, economic and environmental contexts. These codes and management practices may then be used to develop standards. A certification system to assess compliance to the standards and to certify compliant farms may also be developed by the public sector or by other appropriate stakeholders or partners.

15. The *International Principles* provide the basis for stakeholders to collaborate for a more sustainable development of shrimp farming. For governments, they provide a basis for policy, administration and legal frameworks that can be renewed (or formulated where there is none), adjusted, funded and implemented to address the specific characteristics and needs of the sector in order to protect and enhance the industry, the environment, other resource users and consumers. Typically, existing legislation and guidelines have been modified from those developed for other industries and may need improvement to address all the key aspects of aquaculture management. Strengthening of institutional arrangements, capacity and partnerships is also important to ensure the cooperation and coordination of all relevant institutions with jurisdiction over natural resources, animal and public health.

16. There are eight principles. They deal with (i) siting of farms, (ii) design and construction of farms, (iii) minimizing the impact of water use, (iv) responsible use of broodstock and postlarvae, (v) efficient use of feeds and feed management, (vi) good health management, (vii) ensuring food safety and the quality of shrimp products, and (viii) social responsibility.

#### **Better management practices (BMPs)**

17. The term BMP has been used in several ways. It can refer to the best-known way to undertake any activity at a given time. In this sense, it probably refers to the practice or practices of only one or a very few producers. Better management practices can also be used to define a few, often different, practices that increase efficiency and productivity and/or reduce or mitigate impacts. Better practices are often required by government or others to encourage a minimum acceptable level of performance (and eliminate bad practices) with regard to a specific activity. In this sense, the term is used in opposition to unacceptable practices.

18. BMPs in aquaculture context have been used to outline norms for responsible farming of aquatic animals and plants. In aquaculture, better management practices have been developed largely for shrimp and salmon aquaculture, although some efforts are being made to develop BMPs for other aquatic commodities such as tilapias, catfish, molluscs, eels, etc, and marine cage culture.

19. In shrimp aquaculture, the experience of the Consortium shows that well designed BMPs can support producers to:

- increase efficiency and productivity by reducing the risk of shrimp health problems;
- reduce or mitigate the impacts of farming on the environment;
- improve food safety and quality of shrimp farm product; and
- improve the social benefits from shrimp farming and its social acceptability and sustainability

20. During the course of the Consortium's work, a number of individual better practices relating to different on-farm and off-farm activities as well as varying by intensity, scale and species have been identified. These practices were then analyzed both to understand how they were developed (e.g. what problem did they solve and what result did they achieve), how they work, and what it would take for them to be adopted by other producers. In the process of undertaking these studies, it has become clear that better practices today still fall short of what is needed and what appears to be possible.

21. In all likelihood, today's better practices will therefore be tomorrow's norm and the day after that an unacceptable practice because it has been superseded. The challenge is to encourage

their further adoption while at the same time pushing even further to find yet better practices. In short, the goal must be to constantly seek out better practices, not just because they reduce impacts, but also because they are more efficient and more profitable. The goal is to improve the norm rather than to simply establish a bar and declare everything above it to be best or good practice and everything below to be bad or unacceptable.

22. From the Consortium's work, it became evident that there may not be any "best" practices available at this time. The Consortium has, however, identified a number of better practices which could, in many instances improve the situation. Their impacts on resource use efficiency, productivity and more importantly on profitability, environment and social aspects can be similarly striking when compared to worse practices.

23. Better Management Practices can be country specific, or developed for a particular location, taking account of local farming systems, social and economic context, markets and environments. BMPs are often voluntary practices, but can also be used as basis for local regulations, or even certification programmes.

### **Aquaculture certification**

24. There is increasing interest in certification of products from different forms of aquaculture. Responding to the request made by the Sub-Committee on Aquaculture, the Consortium developed a web site<sup>9</sup> providing information on certification of shrimp aquaculture products, and issues related to the development and implementation of certification systems for shrimp aquaculture. It gives general information on other aquaculture certification schemes, and through the publications section links to related experiences in capture fishery, agriculture, forestry and other sectors. The web site provides an opportunity for stakeholders to submit experiences and opinion on all aspects of shrimp aquaculture certification.

25. Certification has been introduced to capture fisheries for some time. Guidelines for eco-labeling of capture fishery products have been developed by FAO in 2005<sup>10</sup> and efforts are being made to develop eco-labeling guidelines inland fisheries<sup>11</sup>. Recent attention is given to certification of aquaculture products.

26. Increased awareness among consumers over how food is produced, recent food safety concerns, as well as increasing competition in seafood trade, are all driving interest in certification. Recent food safety concerns arising from analyses of anti-microbial chemicals in farmed shrimp have further driven the interest in certification of shrimp products. Several schemes are now being developed - some for processes, others for products - but there is as yet no widely accepted or adopted international certification standard or certification systems for aquaculture products.

27. Consumer awareness about how seafood products are produced is high and certification of aquatic products from aquaculture is given increased attention. Broadly speaking, recent legislation in both Europe and the US require mandatory certification to identify whether products are produced from aquaculture or wild caught. These markets increasingly recognize that some form of certification is a way of assuring buyers and consumers that fishery products are safe and coming from aquaculture farms or capture fisheries adopting responsible management practices.

28. FAO is currently assisting Chile to develop a compliance monitoring and certification system for the new environmental regulation of aquaculture law (RAMA).

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<sup>9</sup> <http://www.enaca.org/modules/tinyd2/index.php?id=16>

<sup>10</sup> FAO. 2005. Guidelines for Ecolabelling of Fish and Fishery Products from Marine Capture Fisheries. Rome, FAO. 2005. 90p.

<sup>11</sup> FAO Expert Consultation - Guidelines on Ecolabelling of Fish and Fishery Products from Inland Fisheries Rome, Italy. 23 May 2006 - 26 May 2006

29. The *International Principles for Responsible Shrimp Farming* would provide an important basis for developing standards for certification of shrimp aquaculture products. Further development of principles with other aquaculture systems and species will provide the basis for certification standards to be applied for other major aquaculture commodities.

#### **Current implementation status**

30. The Washington stakeholder meeting organized by the Consortium programme in 2003 emphasized the importance of moving towards implementation of the BMPs findings from the Consortium Program. Experience has shown that implementation requires careful consideration of a number of factors. In general, the following issues are regarded as particularly important for implementation:

- the benefits and costs to farmers for implementation of BMPs;
- seeking positive social and environmental impacts and synergies from the implementation of better management;
- understanding constraints to implementation, and how might these be overcome, particularly among small-scale producers (especially in Asia), many of whom may face special constraints to implementation; and
- exploring how solutions could be planned, implemented and enforced both at the national and local levels.

31. The adaptation of BMPs to local levels needs to be based on careful consideration of local circumstances and involve local stakeholders. In practice, considerable local differences in implementation occur; ideally farmers should be supported and facilitated to adopt and adapt management practices suited to local conditions. This support is needed, particularly, for the small-scale aquaculture farming sector, many of whom may face considerable constraints – including technical, financial, knowledge and institutional constraints – to adapt and adopt better farming practices.

32. It is clear that compliance with regulations and adoption of BMPs entails cost to farmers. Having the aquaculturists shoulder the cost of preventing the farm effluent from polluting the environment is not necessarily passing on that cost to society. Furthermore, authorities have averred that adopting such measures as BMPs actually pays for itself<sup>12</sup>.

33. While BMPs may pay for themselves, it is important to provide support for small farmers to make the transition into BMPs, rather than leaving this to the market alone. Government support in the short term would provide incentives for their adoption, however, the regulatory and permitting systems can also encourage the identification and adoption of these practices.

34. In the Asian region, there are a number of ongoing BMP programmes on shrimp aquaculture, demonstrating in a practical way the development, uptake and benefits of using responsible management practices. Better Management Practices are being adopted by an increasing number of farmers in India and Viet Nam. Their implementation has been shown to significantly increase shrimp yields and to reduce the risk of disease. In India, their adoption has been facilitated by the farmers being organized into farmer groups with appropriate institutional support.

35. Some of these applications are based on Consortium program case studies and some have been developed under national programmes. In India, implementation of BMPs by small-scale shrimp farmers in Andhra Pradesh reduced disease prevalence by 65 percent and led to a two-fold increase in production, 34 percent increase in size and improvement in quality of shrimps due to non-use of banned chemicals<sup>13</sup>. In Viet Nam, 1.5 times higher seed production by BMP hatcheries with 30 to 40 percent higher selling price for the fry, higher production and higher probability of

<sup>12</sup> Clay, J. 2004. Borrowed from the future. Ford Foundation. USA. 18pp.

<sup>13</sup> MPEDA/NACA 2004. MPEDA/NACA *Technical assistance on shrimp disease and coastal management*. Report on village demonstration programme-2004. Network of Aquaculture Centres in Asia-Pacific, Bangkok, Thailand. pp119

making a profit, improved yields that were up to four times higher than non-BMP ponds have been recorded<sup>14</sup>. During Tsunami rehabilitation efforts in Aceh (Indonesia), various attempts are being made to apply the *International Principles* for sustainable rehabilitation of shrimp aquaculture, by the Consortium.

### **Future of better management practices**

36. The Second Session of the Sub-Committee on Aquaculture expressed its concern that several shrimp culture certification schemes were being implemented or being developed under various auspices, many with limited or without stakeholder input, which might constitute an important barrier to future international trade and to require developing countries to adapt constantly to new and changing trading rules for aquaculture products. The Sub-Committee requested FAO to review and analyze the various certification systems in place with a view to ensure harmonized approaches and procedures for the development and implementation of shrimp aquaculture product certification systems.

37. FAO's work, in cooperation with partners in the Consortium, has now resulted in the *International Principles for Sustainable Shrimp Farming*. These principles will provide the basis for developing situation-specific or localized BMPs which, implemented, would improve the sector performance and sustainability. The scientific standards and various sustainability indicators required for establishing useful and credible certification systems are still lacking and it is imperative that such standards and indicators are developed soon.

38. Promotion and implementation of BMPs is important, particularly as a measure to protect and assist resource poor small-scale farmers in developing countries. It is important that resource poor small-scale farmers are organized into either a formal association or self-help groups. Organizing farmers into associations or groups can help them: (a) achieve a strong capacity to enter and stay in aquaculture; (b) effectively demand and absorb institutional services and technical assistance; (c) better cope with natural hazards and economic risks; (d) address barriers to property and financial access; and (e) acquire and use capital and operating assets<sup>15</sup>.

39. Experience of FAO and NACA in implementing BMPs in small-scale shrimp sector, through organizing farmers into "clusters" has been very successful<sup>16</sup>. Besides clear increase in production and income, cluster farmers managed to face the challenge of protecting themselves from the impacts of compliance to international trading standards.

### **Self regulation**

40. The organization of the production sector into farmer societies, clusters or self-help groups will strengthen the implementation of or compliance with the requirements in place or that are anticipated for sector regulation. Once farmers are sufficiently empowered to manage their systems and practices and to act collectively, governance of the sector improves substantially. Self-regulation eases the need for stringent command and control measures and reduces costs of enforcing them. As well, it mitigates the adverse effects of either excessive or lax enforcement of regulations.

<sup>14</sup> NACA/SUMA/FSPS/MOFI. 2005. Reducing the risk of aquatic animal disease outbreaks and improving environmental management of coastal aquaculture in Viet Nam: final report of the NACA/SUMA projects FSPS1 [http://library.enaca.org/NACA-Publications/NACA-SUMA\\_Project\\_Completion\\_report.pdf](http://library.enaca.org/NACA-Publications/NACA-SUMA_Project_Completion_report.pdf)

<sup>15</sup> ADB. 2004. An Evaluation of Small-Scale Freshwater Rural Aquaculture Development for Poverty Reduction. Vol I, ADB, Manila. 67pp. <http://www.adb.org/Publications>

<sup>16</sup> *Improving the sustainability of small-scale shrimp aquaculture: experiences in cluster management*. FAO Fisheries Technical Paper (In preparation).

### Conclusions

41. The development of principles for better management of aquaculture provides a basis for stakeholders in government and private sector to improve management of the sector. Such principles provide the basis for legal and voluntary mechanisms to regulate the aquaculture sector; they need to be further developed and promoted. The *International Principles for Responsible Shrimp Farming* represents an opportunity to move forward on this; specifically to translate the principles into practices, standards, and certification schemes. The Sub-Committee has highlighted the importance of initiating action.

42. In this regard, the Sub-Committee is requested to:

- comment on the status of aquaculture management, BMP implementation and product and practices certification in aquaculture in Member countries,
- comment on opportunities for and constraints to developing and implementing BMPs and certification systems in aquaculture and aquaculture products in Member countries,
- advise FAO on how to proceed with further developing international principles, BMPs, certification standards, and other mechanisms for improving aquaculture management during the intersessional period, and
- offer any interest and assistance for collaborating with the Secretariat for working on principles, BMPS, certification standards, etc., on different aquatic commodities during the intersessional period.