Shrimp Farming and the Environment

The World Bank, NACA, WWF and FAO Consortium Program to analyze and share experiences on better management of shrimp aquaculture in coastal areas

Aquaculture is an important economic activity in the coastal area of many countries and offers a number of opportunities to contribute to poverty alleviation, employment, community development, reduction of overexploitation of natural coastal resources, and food security in tropical and sub-tropical regions.

Global production of farmed aquatic animals and plants in 1999 reached 42.8 million MT with a value of US$ 53.6 billion. Of this, crustacean farming (shrimp, prawn and other minor crustaceans) accounted for about 3.7% of the total yield and represented 16.5% of the total revenue from aquaculture worldwide. The yield from shrimp farming alone represented about 2.6% of the total aquaculture output that year or more than 1.1 million MT at a value of about US$ 6.7 billion. In 1999, yields from shrimp aquaculture represented more than 28% of the total shrimp market. The three main cultivated species (*P. monodon*, *P. vannamei* and *P. chinensis*) account for more than 82% of total production. While *P. monodon* ranked 20th by weight in terms of global aquaculture production by species weight in 1999, it ranked first by value at US$ 3.6 billion. The annual average increase in farmed shrimp production was 5-10% in the 1990s. This achievment was driven by the high value and market demand for shrimp that attracted considerable private and public sector investment.

Development of coastal aquaculture, and shrimp farming in particular, has generated debate in recent years over the social and environmental costs and benefits. Rapid expansion of shrimp farming in some countries in Latin America and Asia has focused attention on the need for effective management strategies. Such strategies are needed to enhance the positive contributions that shrimp farming and other forms

of coastal aquaculture can make to economic growth and poverty alleviation in coastal areas, while controlling negative environmental and social impacts that may accompany poorly planned and regulated developments.

Recognizing that challenges for better management of shrimp aquaculture around the world are complex, and that improved practices often result from identifying and analyzing lessons learned and exchanging such information, the Consortium Program entitled "Shrimp Farming and the Environment" has been developed. The partners are the World Bank, the Network of Aquaculture Centres in Asia-Pacific (NACA), the World Wildlife Fund (WWF) and the Food and Agriculture Organization of the United Nations (FAO). The consortium supported 35 complementary case studies prepared by more than 100 researchers in more than 20 shrimp farming countries. These cases have been developed through consultation with numerous stakeholders throughout Asia, Africa and the Americas. Cases range from specific interventions within single operations to thematic reviews of key issues in shrimp aquaculture. The cases have been presented and discussed at more than 150 meetings and workshops worldwide. The goal of the cases is to document and analyze experience around the world in order to better understand what works, what doesn't and why.

The Consortium Program is based on the recommendations of the FAO Bangkok Technical Consultation on Policies for Sustainable Shrimp Culture[1] , the World Bank review on Shrimp Farming and the Environment [2], and an April 1999 meeting on shrimp management practices hosted by NACA and WWF in Bangkok, Thailand.

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[1] FAO. 1998. *Report of the Bangkok FAO Technical Consultation on Policies for Sustainable Shrimp Culture. Bangkok, Thailand, 8-11 December 1997*. FAO Fisheries Report No. 572. Rome. 31p.

[2] World Bank. 1998. *Shrimp Farming and the Environment – Can Shrimp Farming be Undertaken Sustainability?* A Discussion Paper designed to assist in the development of Sustainable Shrimp Aquaculture. World Bank. Draft.

There are six objectives to the Consortium Program:

1. Generate a better understanding of key issues involved in sustainable shrimp aquaculture;
2. Encourage a debate and discussion around these issues that leads to consensus among stakeholders regarding key issues;
3. Identify better management strategies for sustainable shrimp aquaculture;
4. Evaluate the cost for adoption of such strategies as well as other potential barriers to their adoption;
5. Create a framework to review and evaluate successes and failures in shrimp aquaculture which can inform policy debate on management strategies for sustainable shrimp aquaculture; and
6. Identify future development activities and assistance required for the implementation of improved management strategies that would support the development of a more sustainable shrimp aquaculture industry.

The Consortium is giving special attention to poverty, labour and equity issues, and the work will provide an assessment of the use of investments in shrimp farming as a means of alleviating poverty through targeted development interventions in coastal areas.

The Consortium Program was initiated in August 1999, and comprises 35 complementary case studies on different aspects of shrimp aquaculture (Annex 1). The case studies provide wide geographical coverage of major shrimp producing countries in Asia and Latin America, as well as Africa and the Middle East, and studies and reviews of a global nature. The subject matter is also broad, from farm level management practice, poverty issues, integration of shrimp aquaculture into coastal area management, shrimp health management and policy and legal issues. The case studies bring together unique and important insights into the global status of shrimp aquaculture and management practices. While there is no major shrimp farm development to date in Africa and the Middle East, that case provides guidance on important

issues to consider in the face of potential shrimp farm development in the region. A synthesis report on the Consortium Program has been prepared[3] and case studies are available in printed and web versions (http://www.enaca.org/shrimp).

The approach of the Consortium has been to promote consultation with a wide range of stakeholders. The synthesis report and case studies have incorporated the views and inputs from a wide range of stakeholders, from local communities to global multilateral organizations. The case study findings have been presented at various meetings, including an FAO/Government of Australia Expert Consultation[4] and a stakeholder consultation to be hosted in Washington DC by the World Bank in early 2002.

Several case studies have been developed through widespread consultation with local farmers and communities, through community workshops and participatory meetings. In Bangladesh, for example, researchers consulted stakeholders at all levels; from poor women and landless households involved in shrimp fry collection to senior government officials involved in policy development. This type of open and participatory approach to the case study research and preparation of reports has provided a good opportunity to gain understanding, generate consensus and identify management experiences from the perspectives of a wide range of stakeholders.

The reports are intended for discussion with a wide audience, an approach that is designed to ensure that the findings will be based on widespread consultation and will have widespread impact and relevance.

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[3] World Bank/NACA/WWF/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. Work in Progress for Public Discussion. The World Bank, Washington, DC.

[4] FAO. 2001. *Report of the FAO/Government of Australia Expert Consultation on Good Management Practices and Institutional and Legal Arrangements for Sustainable Shrimp Culture.* Brisbane, Australia, 4-7 December 2000. FAO Fisheries Circular No. 659.

A web site giving information on the case studies has been developed (http://www.enaca.org/shrimp) and the site gives links to a number of other relevant information sources on shrimp aquaculture. Translations of case study materials into Spanish, Portuguese, Thai and Mandarin Chinese, have been initiated to disseminate findings to non-English speakers.

There are indications already that the consortium approach and case study findings are having positive impacts. A few are listed below to indicate the types of impacts that can be expected.

- In Mexico, the findings are changing the ways NGOs and foundations view and engage the shrimp aquaculture industry to work together to reduce agro-chemical runoff from commercial agricultural farms.
- In Brazil, one case has provided the basis for putting in place polcies and investment screens for supporting more sustainable shrimp aquaculture management practices.
- The outcome of a multi-country, thematic analysis of shrimp disease issues has helped promote regional cooperation on the movement of animals in Latin America both among governments and shrimp producers. This case has also raised awareness of inter-regional cooperation in aquatic animal disease control within the Asia-Pacific Economic Cooperation (APEC) forum and provided a base for a new FAO Regional TCP project to assist 14 Latin American countries.
- A study in Vietnam explored the role of shrimp aquaculture in coastal community development. This case has raised awareness in the country about the potential connection between aquaculture and poverty alleviation. It has already led to a new government policy orientation towards poverty-focussed aquaculture development.
- In Bangladesh, a case promoted dialogue between NGOs and the government and led to wider appreciation of social issues in shrimp culture development. The case also contributed to the development of management strategies for a World Bank supported project in coastal areas.

- In Colombia, a case explores the use of an artificially expanded natural mangrove as a biofilter to treat effluent from a shrimp farm. There is considerable interest in the incorporation of natural biofilters in shrimp operations as a way to avoid pollution and, in the case of Colombia, the pollution taxes they generate.

The findings from some of the cases were discussed at the FAO/ Government of Australia Expert Consultation[4], where initial agreement was reached on a set of objectives and operating principles for sustainable shrimp aquaculture management. These and other relevant information will soon be presented to an intergovernmental forum for formal agreement. FAO is facilitating this process. Related issues will also be discussed during the first meeting of the COFI Sub-Committee on Aquaculture to be held in Beijing, China P.R. in April 2002. The Consortium Program has therefore provided an important basis for consensus building for better management of shrimp aquaculture.

This co-operative approach provides an important platform for gaining understanding and sharing experiences globally on shrimp aquaculture management. The next stage of work will likely focus more on support to implement the findings. This reflects a key concern among consortium partners to translate the information generated into improved capacity and better management practice from the pond level to the ecosystem, national and international levels. As aquaculture continues to expand globally, and becomes more diverse and complex, the need to promote co-operation, capture lessons learned, and share learning and experiences will increase. The Consortium's partnership approach shows that such co-operation is not only fruitful in the short-term but also provides a platform upon which such cooperation can be further extended in the future.

Acknowledgements : The case studies supported under the program are jointly funded and executed by the World Bank-Netherlands Partnership Program, WWF, NACA and FAO. The financial assistance from the Government of Netherlands and the MacArthur and AVINA Foundations in supporting the work is also gratefully acknowledged.

Annex 1: Consortium Program Case Studies

Global Thematic Reviews:

- Thematic Review of Coastal Wetland Habitats and Shrimp Aquaculture .
- Codes of Practice for Marine Shrimp Farming.
- Chemicals and Shrimp Aquaculture.
- Thematic Review on Management Strategies for Major Diseases in Shrimp Aquaculture.
- Thematic Overview of Social Equity, Benefits and Poverty Alleviation BMPs of the Shrimp Aquaculture Industry.
- Thematic Reviews on Legislation and Shrimp Aquaculture.
- Global Review of Feeds and Feed Management Practices in Shrimp Aquaculture.

Asia and the Pacific:

- Environmental Management of Shrimp Farming in Australia.
- Social Aspects of Shrimp Aquaculture in Bangladesh.
- Case Studies on Shrimp Aquaculture Management in Bangladesh.
- Shrimp Culture Renovation in Rushan Country, Weihai, Shandong Province, China.
- The Role of Small Farmer Groups and Associations in Sustainable Shrimp Aquaculture Management in India.
- Good Practices for Community-Based Planning and Management of Shrimp Farming in Sumatra, Indonesia.
- Mangrove Management and Aquaculture in the Philippines.
- Report on a Code of Best Practices for Shrimp Aquaculture in Sri Lanka.
- Case Study on Institutional Aspects of Shrimp Aquaculture in Thailand.
- Assistance and Issues in the Implementation of the Code of Conduct for Shrimp Aquaculture in Thailand.
- Coastal Shrimp Aquaculture: Searching for Better Management Strategies – Case Studies From the North and North-Central Coastal Area of Vietnam.
- Silvofishery Farming Systems in Ca Mau Province, Vietnam. Part (a) Background and technical recommendations. Part (b) Socio-economic studies.
- Studies on Mixed Rice-Shrimp Aquaculture Systems in the Mekong Delta.

Latin America:

- Evaluation of Belize Aquaculture, Ltd. - A Super-Intensive Shrimp Aquaculture System in Belize.
- Key Management Challenges for the Development and Growth of a Shrimp Farm in Northeast Brazil - A Case Study of Camanor Produtos Marinhos Ltd.
- Barriers to Investing in Shrimp Aquaculture – Lessons from Brazil.
- The Integration of Mangrove and Shrimp Farming: A Case Study on the Caribbean Coast of Colombia.
- The Adoption of Better Management Practices (BMPs) by the Shrimp Industry on the Caribbean Coast of Colombia.
- Shrimp Aquaculture Certification.
- Case studies on shrimp aquaculture management in Ecuador covering: (1) Shrimp production in mangrove areas; (2) Use of wild shrimp post-larvae; (3) Composition of shrimp pond soil in mangroves areas versus non mangrove areas; (4) Shrimp farm management and concentrations of potential pollutants in effluents; and (5) Water exchange practices.
- Science and Society in the Gulf of Fonseca: The Changing History of Mariculture in Honduras.
- Coastal Water Quality Monitoring in Shrimp Farming Areas with an Example from Honduras.
- Shrimp Aquaculture, People and the Environment in Coastal Mexico.

Africa and the Middle East:

- The Current Status of Shrimp Aquaculture Systems in Africa and the Middle East.