

## *Chapter 18*

### **Mangrove Protection Initiatives and Farmed Shrimp**

This chapter shows how the sometimes destructive effects of shrimp farming on mangrove forests led some environmental groups to try to block expansion of the industry. In response, the shrimp aquaculture industry developed a voluntary programme to certify responsible aquaculture practices. As well, various intergovernmental organisations have joined forces to improve the environmental performance of shrimp farming.

## Introduction

Shrimps, or prawns, are harvested both from wild stocks and from ponds and other enclosures where the marine crustaceans are cultured. The farming of shrimp has often proved to be more profitable than other coastal agriculture alternatives such as cattle grazing or rice farming. Thanks in part to encouragement by multilateral and bilateral lending agencies — particularly the World Bank, the Asian Development Bank, the Inter-American Development Bank and, in Latin America, the United States' Agency for International Development (USAID) — shrimp aquaculture has been one of the fastest-growing segments of the seafood industry since the late 1980s. The total annual production of farmed shrimp today exceeds 1 million tonnes. Most comes from shrimp farms located in the coastal zones of Asia and Latin America, though recently a few large farms have also been established in eastern Africa and the Middle East. The bulk of shrimp production comes from small family farms which are a major source of employment in India, Vietnam, Thailand, Bangladesh, and Indonesia. Once a subsistence activity largely serving local communities, shrimp farming has become a predominantly export-oriented industry, mainly serving consumers in developed countries. Japan, Europe and the United States are the biggest importers of shrimps; about one-quarter of the EU's shrimp consumption is estimated to be supplied from prawn farms in developing countries (Gregow, 2000).

The environmental impact of shrimp farming has been a subject of much controversy. One of the most publicised problems is the conversion of mangrove forests to ponds. Mangroves rank among the most productive ecosystems in the world. They play a vital role in protecting coastal areas from the erosive forces of winds and waves and serve as nurseries for many marine species. Thousands of subsistence fishers in the developing world depend on them, as do people who have traditionally practised low-intensity (polyculture) forms of shrimp farming.

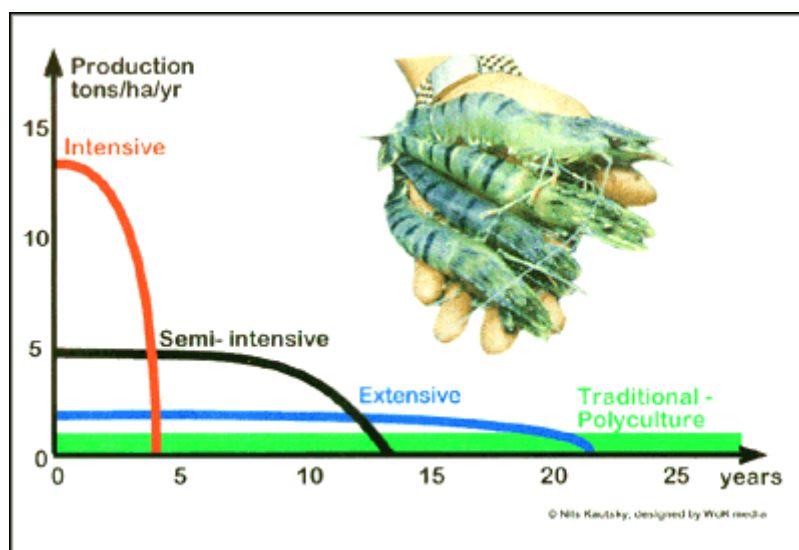
The impression given by much of the literature of non-governmental organisations (NGOs) is that the clearing of mangrove forests for shrimp aquaculture has been one of the leading causes of mangrove forest destruction in the world. To many environmental groups, the “rapid and unregulated expansion” of shrimp aquaculture in developing countries is emblematic of what they see as the careless regard for the environment that too often accompanies global, export-oriented development. As recently as September 2000, Greenpeace International described shrimp farming as:

... an unsustainable industry, migrating from place to place, leaving behind a trail of degraded landscapes stripped of biodiversity, and destitute people. Not only coastal wetlands, *particularly mangroves*, and the coastal communities that depend on them, but also farming areas have been destroyed, particularly in India and Bangladesh, where small farmers who once harvested rice, millet and other crops near the sea in small plots of land, have been dislodged by force, or by salinisation from the encroaching shrimp ponds. On the whole, shrimp farming brings few benefits to local communities. Employment levels per hectare of land farmed for shrimp are relatively low, while at the local level shrimp farming creates unemployment and underemployment by displacing other local economic activities. ([www.greenpeace.org/politics/wto/shrimp.html](http://www.greenpeace.org/politics/wto/shrimp.html)) [emphasis added]

The industry, naturally, refutes these claims. While admitting that somewhere between 55% and 60% of the 31 million hectares once covered by mangrove forests have already been destroyed, they argue that less than 5% of that loss can be attributed to

shrimp farming.<sup>1</sup> Though mangrove-dominated ecosystems are suitable sites for extensive aquaculture, the industry has come to realise that they are generally not as profitable for semi-intensive and intensive operations as sites located inland of the high-tide mark; indeed, virtually all of the growth in shrimp aquaculture over the last decade has come from farms built away from saline areas. Poorly managed semi-intensive and intensive farms create their own set of problems, however, and many have had to be abandoned within a few years. Figure 18.1 depicts an environmentalist's subjective impression of the sustainability of different forms of shrimp culture based on past performance.

Figure 18.1. One view of the sustainability of different forms of shrimp culture



Source: Nils Kautsky, as reproduced in *Quarto* (1998).

Despite early discord and misunderstandings between environmental NGOs, producers and governments of importing and exporting countries, a much higher degree of international consensus is beginning to emerge. Environmental NGOs — which can be credited with creating greater awareness of the conflicts between industrial-scale shrimp farming and mangroves — are now working with intergovernmental bodies to promote a code of conduct for shrimp aquaculture. For its part, the industry itself is on the verge of introducing its own “Responsible Aquaculture Programme”, complete with a system of certifiable standards for sustainable aquaculture farming. What is perhaps unusual about the history of this issue is that those opposed to the early practices of the shrimp aquaculture industry sought change through means other than government-imposed import prohibitions or other trade-related measures, preferring instead to put pressure on lending institutions while working with shrimp-producing countries and policy makers to encourage more sustainable use of coastal zones.

### Development of the environmental measures

In 1992 a small group of like-minded NGOs and scientists concerned about the degradation of mangrove forest ecosystems worldwide, and that wanted to reverse that

1. Global Aquaculture Alliance, [www.gaalliance.org/issu2.html](http://www.gaalliance.org/issu2.html), November 2001.

degradation, founded a new organisation, the Mangrove Action Project (MAP). MAP's central aim is to promote the rights of local coastal peoples, including fishers and farmers, in the sustainable management of coastal areas. MAP has defined its role as providing essential services to grassroots associations and other proponents of mangrove conservation, including: *i*) co-ordinating an international NGO network and information clearinghouse on mangrove forests; *ii*) promoting greater public awareness of mangrove forest issues and of the basic needs and struggles of third-world coastal fishing and farming communities; and *iii*) developing technical and financial support for NGO projects. MAP supports a bottom-up approach and works with local stakeholders to find viable, long-term, equitable solutions to their problems.

MAP frequently called for voluntary consumer boycotts of all farm-raised shrimp, with little success.<sup>2</sup> One important vehicle for spreading their message has been the organisation of opponents of shrimp farming in certain communities. In October 1996, for example, MAP, along with 20 other local and international NGOs from the Americas, Europe and Asia, organised a forum in Choluteca, Honduras, on "Aquaculture and its Impacts". At the conclusion of the forum, the participants issued "The Choluteca Declaration", a document setting out 18 specific demands relating to shrimp aquaculture and mangrove forests ([www.dec.ctu.edu.vn/cdrom/cd6/projects/shrimp\\_tribunal/pov3.html](http://www.dec.ctu.edu.vn/cdrom/cd6/projects/shrimp_tribunal/pov3.html)). Among other demands, the Declaration called for application of "the precautionary principle to every step in the development of shrimp aquaculture", and exhorted funding agencies like the World Bank to stop financing aquaculture development. Its final demand was for "a global moratorium on any further expansion of shrimp aquaculture in coastal areas until the criteria<sup>3</sup> for sustainable shrimp aquaculture are put into practice."<sup>4</sup>

Earlier in that same year, over 200 representatives of governments and NGOs around the world met at the United Nations in New York in an NGO-organised, self-proclaimed Shrimp "Tribunal". The purpose of the Tribunal was to assess how well governments in major shrimp-producing countries were living up to their commitments to implement sustainable development practices. Seven governments stepped forward to make statements and respond to NGO questions about the environmental, social and economic impacts of shrimp production, and to describe actions taken by them to address those impacts and assure the sustainability of shrimp production.

By 1998 the Tribunal announced that it had achieved its initial goals:

Governments, international agencies, industry, and increasingly the public recognise that there are serious problems with industrial shrimp production. ... The Tribunal has found that in many instances needed laws and policies are already in place, but are not actually being implemented. We have seen and are encouraged to note that there has been a start to dialogues between environmental and community groups and industry on more sustainable practices.<sup>5</sup>

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2. Several other NGOs have also urged voluntary consumer boycotts; see Miller (1999).
  3. One difficulty has been in obtaining international consensus on what those criteria might be. Attempts to use existing international frameworks have focused on relevant multilateral environmental agreements, particularly the 1971 Convention on Wetlands (the Ramsar Convention), the Biodiversity Convention, and the FAO Code of Conduct for Responsible Fisheries, adopted in 1995.
  4. Lately MAP has begun to address other serious problems affecting mangrove forests, such as logging, oil, charcoal and tourism industries.
  5. Mangrove Action Project, P.O. Box 1854, Port Angeles, WA 98362-0279, USA, e-mail: mangroveap@olympus.net.

Nonetheless, NGO campaigns against unsustainable shrimp farming continued, through umbrella organisations such as the Shrimp Sentinel Online (an electronic elaboration of the Shrimp Tribunal) and the Industrial Shrimp Action Network, as well as MAP and a long list of international and local environmental organisations. Notably, these coalitions of international and local NGOs were instrumental in getting moratoriums on new shrimp farms declared or recommended in several exporting countries. The following is a brief overview of initiatives in Honduras and Tanzania (by way of example), focusing on the period of most intense activity, 1995-98.

### *Honduras*<sup>6</sup>

In September 1994 a ship owned by Greenpeace arrived in the Gulf of Fonseca, the body of water around which most of Honduras's shrimp farming operations are located. The purpose of the ship's visit was to focus attention on the interrelation between land and ocean ecosystems, of which the Fonseca Gulf provided an excellent example, given its plentiful mangrove swamps. Greenpeace met with various NGOs from Honduras, El Salvador and Nicaragua to discuss the economic and political roots of mangrove destruction. Volunteers from Greenpeace and the Honduran environmental organisation, CODDEFFAGOLF (Committee for the Defence and Sustainable Development of the Flora and Fauna of the Fonseca Gulf), also took part in a protest in the shrimp-farming areas, where they displayed banners with messages calling for a halt to the exploitation of mangroves.

In August 1996, after strong urging from CODDEFFAGOLF, the Honduran government decreed a one-year moratorium on new licences for shrimp farms. In spite of the moratorium, some 60 new shrimp farms were established over the following year. On 22 July 1997, around 3 000 fishers and other sympathisers of CODDEFFAGOLF marched on the nation's capital, Tegucigalpa. Several days of sit-ins and high-level meetings with federal officials followed, and in the end the government promised to increase enforcement and to extend the moratorium through June 1998. A new decree (No. 105-97) was issued, thereby widening the moratorium to include a ban on expansion of existing shrimp farms in the Gulf of Fonseca. The decree also called for environmental impact studies to identify what measures would be necessary to conserve mangrove forests and coastal wetlands, assure the sustainability of the shrimp industry, and reduce the negative impacts of giant shrimp farms on local communities. According to CODDEFFAGOLF, during the six months following passage of the decree, no studies were undertaken, and shrimp farming continued to expand uncontrollably. Yet satellite imagery of the Gulf of Fonseca region shows that mangrove areas have increased in the last ten years.

### *Tanzania*

In early 1997 an Irish-owned company, African Fishing Company (AFC), submitted a formal environmental impact assessment (EIA) to the Tanzanian government on its proposal to establish almost 20 000 hectares of shrimp farms in the Rufiji Delta, the largest continuous block of mangrove forest in East Africa (53 000 hectares). In June the government directed the country's National Environmental Management Council (NEMC) to undertake its own EIA, which was completed in August. The NEMC urged the Tanzanian government to reject the project because of its environmental impacts, and

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6. This account is based mainly on Smith (1998).

recommended that “a moratorium be declared on all commercial mariculture in Tanzania until the government establishes proper guidelines for the development of commercial aquaculture in the country and that aquaculture should not be conducted in ecologically sensitive areas like mangroves”. Nonetheless, the Tanzanian government approved the AFC project in November 1997.

From an early stage, a group calling itself the Journalists’ Environmental Association of Tanzania (JET), along with several other environmental organisations, had expressed strong opposition to the project. To attract attention to their campaign, JET enlisted the help of the Swedish Society for Nature Conservation and environmental organisations from Kenya, India and the United States (including MAP). In February 1998 these organisations convened a workshop on mangroves and aquaculture in Mombasa, Kenya, under the auspices of the East Africa Wild Life Society (EAWLS). The “Mombasa Declaration on Mangrove Conservation & Industrial Shrimp Aquaculture”, issued at the end of the workshop, called upon the governments of eastern Africa to encourage sustainable natural or traditional shrimp aquaculture, and appealed specifically to Tanzania to reconsider its decision to approve the proposed large-scale industrial shrimp farm in the Rufiji Delta.

In April 1998, a group of more than 2 000 residents of the Rufiji Delta, aided by the Lawyers Environmental Action Team (LEAT), filed an application with the Tanzanian High Court for permission to sue the government over its approval of the AFC project. Although they encountered initial setbacks, the LEAT lawyers eventually won an injunction to stop the proposed shrimp farm. Among other resources tapped to help them prepare their case, the lawyers enlisted the assistance of the Environmental Law Alliance Worldwide (E-LAW), an online network of environmental lawyers and scientists based in the United States, who volunteer their time to serve low-income communities around the world (E-LAW, 2001).

### Trade issues and exporters’ responses

The effects of the various mangrove-protection campaigns and initiatives on the export of shrimp from aquaculture farms in developing countries have never been measured, in part because farms in many of the countries targeted by the campaigns were already suffering from other problems, particularly shrimp diseases. However, it is clear that the campaigns had important impacts in other ways.

First, the campaigns seem to have influenced the process of financing shrimp farms. During the 1980s, multilateral lending institutions had provided loans to several developing countries for shrimp aquaculture projects as part of a drive to encourage non-traditional exports (to repay external debt) and more generally to enter onto an export-led development path. Although the World Bank’s International Finance Corporation (IFC) continued to provide funds to private investors for the expansion of shrimp farming throughout the 1990s, they required compliance with defined environmental standards.<sup>7</sup> Second, the campaigns forced national policy makers, regulators and producers to become much more sensitive to mangrove ecosystems and

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7. As shrimp volume continues to increase and profits diminish, consolidation and integration are occurring in the shrimp farming business. This is a typical evolution, and one that can be observed throughout the agricultural and fisheries sectors. It is leading to the involvement of larger companies, especially in those segments of the business that offer economies of scale, such as genetic improvement, feed manufacturing, and processing.

their role in protecting the natural resources on which some of the poorest members of their societies depend.

The resentment of some developing country governments to what they saw as outside interference in their chosen development path impelled them to seek assistance from sympathetic intergovernmental organisations of which they were members (see below). The industry itself, or at least a major element of it, decided, however, to pursue a route that would distinguish those producers that practised “responsible shrimp farming” from those that did not, in the hope that the former group would thereby be spared further NGO campaigns and recompensed for their more responsible behaviour through higher prices.

The institution established by the industry to carry out this mission, the Global Aquaculture Alliance (GAA), was founded in 1997 by a score of aquaculture industry leaders “to facilitate co-operation among varied elements of the industry, to resolve problems, and [to] maintain public confidence in aquaculture products”. Activities of the GAA are overseen by a 12-person board, which includes active aquaculture professionals from both exporting and importing countries. Its direct membership of 1 500 consists of founding, governing, sustaining, and individual members. It also includes a much larger indirect membership through affiliated national producer associations from Brazil, Honduras, Ecuador, Colombia, Guatemala, Australia, Thailand and India. Members range from small family operations to multinational corporations. It also represents the entire value chain of hatcheries, farms, feed companies, processors, importers, retailers and food service companies.

Since its creation, the GAA’s core activity has been to develop a “Responsible Aquaculture Programme” (RAP), based on a set of guiding principles intended to improve the efficiency and long-term sustainability of the aquaculture industry and, ultimately, to provide certified products to those consumers who want assurances that they can buy farm-raised seafood in good conscience. The GAA’s approach started from the premise that, given the diversity of designs and management practices around the world, it is impractical to expect all shrimp farms to achieve programme standards at the same time. The programme therefore allows producers to progress through four levels of achievement. At completion, participants are to receive certification of their shrimp farming process as part of the “Best Aquaculture Practices” programme.

One of the first GAA activities was sponsorship of a meeting of international mangrove experts in Bangkok to develop a report and recommendations relative to the mangrove issue. The report concluded that shrimp farming had destroyed less than 5% of the world’s mangrove resource, but recommended a series of practices to eliminate further destruction. Those recommendations became the first of a series that GAA published as the “Codes of Practice for Responsible Shrimp Farming”, which was completed in 1999. With respect to mangroves, the second guiding principle admonishes companies and individuals engaged in aquaculture to “utilise only those sites for aquaculture facilities whose characteristics are compatible with long-term sustainable operation with acceptable ecological effects, particularly *avoiding unnecessary destruction of mangroves* and other environmentally significant flora and fauna” (emphasis added). Individual codes of practice have also been developed for particular aspects of shrimp aquaculture; the one for mangroves starts by recommending that no new shrimp farms be developed within mangrove ecosystems (Box 18.1).

According to the GAA, “The Codes of Practice were created as flexible guidelines for the formulation of site-specific systems of responsible shrimp production. Implementation methods will vary based on individual farm methods, goals and local

conditions.” Nonetheless, in the first step towards certification — taking the Best Practice Pledge — participants agree to make their best effort to apply them. The second and third steps involve a self-assessment audit and the preparation of an environmental management plan. Certification itself begins with an initial inspection of the management plan by a certifying company, accredited by the Aquaculture Certification Council (ACC), an independent certifying organisation. The ACC Certification Committee then reviews the recommendation and, if it is in order, issues a three-year certificate with a unique number.

**Box 18.1. The GAA’s recommended management practices relating to mangroves**

It shall be the objective of all adherents to this Code not to harm mangrove ecosystems, and whenever possible, to preserve and even enhance the biodiversity of these ecosystems. The following practices will ensure the protection of mangrove ecosystems:

1. New shrimp farms should not be developed within mangrove ecosystems.
2. Realising that some mangrove must be removed for canals when new shrimp farms are sited behind mangroves, a reforestation commitment of no net loss of mangroves shall be initiated.
3. Farms already in operation will continue ongoing environmental assessments to recognise and mitigate any possible negative impacts on mangrove ecosystems.
4. All non-organic and solid waste materials should be disposed of in an environmentally responsible manner, and wastewater and sediments shall be discharged in manners not detrimental to mangroves.
5. The shrimp aquaculture industry pledges to work in concert with governments to develop sound regulations to enhance the conservation of mangroves, including regulations regarding restoration of mangrove areas when old farms located in former mangroves are decommissioned.
6. The shrimp aquaculture industry will promote measures to ensure the continued livelihood of local communities that depend upon mangrove resources.

*Source:* Global Aquaculture Alliance, [www.gaalliance.org/code1.html](http://www.gaalliance.org/code1.html), accessed 12 November 2001.

Originally, the GAA had envisaged a consumer-oriented programme, which would have required preserving the identity of the certified product throughout the distribution channel. To confirm this “chain of custody”, an annual audit of each processor would have been required to assure that documented control systems were in place to separately track certified and uncertified products through the processing plant. However, because of new consumer fears over food safety that arose early in 2002 (specifically, the discovery of banned antibiotics in the shrimp of some exporting countries), which raised the spectre of certifiers being held liable for ensuring the safety of the product, the GAA retreated from its original idea. Food safety and some traceability components were retained, but the revised programme is now aimed at major buyers, *e.g.* seafood companies, rather than final consumers. This eliminates the need for chain-of-custody certification and reduces costs.

In developing its private certification and accreditation programme, which has been operated since 2002 by the Aquaculture Certification Council (ACC), Inc.



([www.aquaculturecertification.org](http://www.aquaculturecertification.org)), the GAA's Technical Committee studied many international and national models, both public and private — particularly for organic agriculture, forest products and marine fish — and consulted numerous stakeholders and independent experts. As of September 2005, five hatcheries, 15 shrimp farms, and four shrimp processing plants had been certified to the GAA standard. Certification itself is carried out by any of more than 65 ACC-accredited certifiers, most of whom are individuals based in developing countries.

In the meantime, developing-country governments have started to develop similar programmes, in parallel or in co-operation with the GAA. Thailand's Department of Fisheries (DOF), for example, has developed a Code of Conduct for shrimp farming very similar to that of the GAA. Testing of the Code was carried out at two demonstration sites along the Rayong River, where techniques compatible with its standards were already being practised. Among the activities in which these farms engage are the raising of mangrove seedlings, which are later transplanted to supplement and increase the natural growth of mangroves along the canals. Other shrimp farmers in the area are taught about the mangroves' benefits as natural filtration systems, storm buffers and habitats for diverse ecosystems. The government's aim is to designate shrimp produced according to the standards set by the Code of Conduct as "quality shrimp". This designation is meant to guarantee that the shrimp are a quality product that is safe to consume, and that they are grown in an environmentally responsible manner. The "quality shrimp" stamp of approval also entitles producers to market their products at a premium price (Heerin, 2002).

## Responses to developing-countries' concerns

### *International responses*

NGOs also attempted to exert their influence through intergovernmental organisations (IGOs), notably the Food and Agricultural Organisation's (FAO) Fisheries Department and the World Bank. Commercial shrimp farmers were unfamiliar with these bodies, but soon learned the importance of participating to assure that both sides of each issue are heard. Both of these IGOs responded in ways that were sympathetic to the desire of their member countries to continue exporting shrimp, but that also recognised the environmental problems that shrimp aquaculture was creating.

The FAO set the tone of the recent international initiatives by organising a multi-stakeholder Technical Consultation on Policies for Sustainable Shrimp Culture, in Bangkok in December 1997. In addition to delegates from 11 of the world's leading shrimp-farming nations, the list of participants included representatives from the GAA, Greenpeace International and the World-Wide Fund for Nature (WWF). To quote from the abstract from the final report (FAO, 1998):

The Technical Consultation ... produced a consensus that sustainable shrimp culture is practised and is a desirable and achievable goal, which should be pursued. There is ample reason for considering shrimp culture, when practised in a sustainable fashion, as an acceptable means of achieving such varied national goals as food production, employment and generation of foreign exchange. Achievement of sustainable shrimp culture is dependent on effective government policy and regulatory actions, as well as on the co-operation of industry in utilising sound technology in its planning, development and operations. Noting that appropriate government responsibilities regarding aquaculture development are outlined in the Code of Conduct for

Responsible Fisheries (CCRF), adopted by the FAO Conference in 1995, the Consultation recommended a range of desirable principles to be followed in the establishment of legal, institutional and consultative frameworks and government policies for sustainable shrimp culture.

The consultation also recommended a number of specific areas for research and, in particular, it recommended that the FAO convene several other follow-up consultations. Since then, the FAO has sponsored a wide range of activities, most of which support efforts to implement the CCRF in relation to shrimp culture activities. In 1998, for example, experts were invited to develop criteria and indicators to assess progress towards implementing the code. Among the criteria are several that relate to the status of mangrove protection programmes and the impact of all users on mangroves.

Since 1999, the FAO has combined forces with the World Bank,<sup>8</sup> the Network of Aquaculture Centres in Asia-Pacific (another intergovernmental organisation), and the WWF, in the interest of co-ordinating a joint programme “to analyse and share experiences on the better management of shrimp aquaculture in coastal areas”. To date, the Shrimp Aquaculture Consortium has produced a large number of case studies on different aspects of shrimp aquaculture, a draft set of objectives for shrimp aquaculture management, and considerable information on applicable laws (and their enforcement) in countries that culture shrimp. The case studies are credited with documenting some of the positive social benefits to local communities from shrimp aquaculture (which, in the case of Mexico’s study, “may have changed the ways NGOs look at the shrimp aquaculture industry”, according to the Consortium) and highlighting inadequacies in several countries’ regulatory frameworks. The inventory of national laws has facilitated peer reviews and the development of suggestions for good regulatory practice (Howarth *et al.*, 2001).

Support of a more scientific nature is being provided by the International Tropical Timber Organization (ITTO). One of the activities it has helped finance is the International Society for Mangrove Ecosystems (ISME), an international NGO located at the University of Ryukyus in Okinawa, Japan. Since its founding in 1990, the ISME has established four regional centres, in Brazil, Fiji, Ghana and India. In December 1997 ISME began work on establishing a Global Mangrove Database and Information System (GLOMIS), which addresses the need for assembling (often local) knowledge on the structure and dynamics of different types of mangrove ecosystems and on their socio-economic value (Vannucci, 1998; see also [www.glomis.com](http://www.glomis.com)).

### ***National initiatives***

National governments have generally provided support for more sustainable shrimp production through the IGOs of which they are members. Several national aid agencies of OECD member countries are official partners of the World Bank’s Fisheries and Aquaculture Network, for example. A few member countries have, in addition, supported smaller-scale activities. In 1999, Germany’s GTZ (*Gesellschaft für technische Zusammenarbeit*) provided financial support to Naturland, one of the world’s major certifying organisations for organically grown produce, to set up a pilot project in Ecuador to produce shrimp according to organic principles. (Ecuador, along with Thailand, is a leading supplier of shrimp to Germany.) This project, the first of its kind,

8. The World Bank operates a Fisheries and Aquaculture Network that involves the same organisations, plus a number of research institutes, government fisheries agencies and aid agencies.

involves three farms. After a long period of preparation, Naturland finally issued its standards on organic shrimp production at the end of 1999; in 2000 it certified the first shipment of organic shrimps from these farms ([www.naturland.de/englisch/frame\\_defs/framedef.html](http://www.naturland.de/englisch/frame_defs/framedef.html)). Since then, shrimp farms in Brazil, Indonesia, Peru, Thailand and Vietnam have also received organic certification, not all by Naturland.

### **Concluding observations**

Thanks in large part to NGO campaigns to increase awareness of the damage being caused to mangrove forests by poorly planned and executed shrimp aquaculture operations, some positive changes in the shrimp farming industry are starting to occur. Significantly, the campaigns appear to have been instrumental in convincing several multilateral lending agencies to sharply reduce their funding for shrimp farms that involve the destruction of mangrove forests. They have helped galvanise local groups that have been adversely affected by shrimp aquaculture; in several cases, pressure from local groups led to moratoriums being declared on the expansion of new farms, though the moratoriums have often been overturned or ignored. Perhaps most importantly, they have spurred a major part of the industry to develop its own Responsible Aquaculture Programme, based on quantitative standards and third-party certification. It is significant that the GAA, which developed the RAP, as well as several environmental NGOs active on this issue, have from the start participated in virtually all of the intergovernmental events and activities relating to shrimp aquaculture that have taken place over the last four years.

In contrast to the way that turtle protection in harvest shrimp fisheries has been addressed, the approach of NGOs and governments to the shrimp-mangrove issue has largely followed the route of participative action at the global level, and development-oriented action at the national level. The result is a gradual but steady appreciation of the problem among all stakeholders and comprehensive action towards protection of mangroves. In particular, governments of importing countries have not attempted to apply any trade restrictions on farmed shrimp, and NGOs have not called for them. At the same time, research is starting to be directed at issues relating to shrimp aquaculture and mangrove ecosystems. These initiatives, along with technical and financial assistance on developing sustainable alternatives to farming shrimp on land formerly occupied by mangrove forests, may yet help protect mangrove forests from excessive destruction while allowing exports from sustainably managed aquaculture to prosper.

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## Acronyms

APHIS	Animal and Plant Health Inspection Service (US)
AQIS	Australian Quarantine and Inspection Service
ASEAN	Association of South-East Asian Nations
BAuA	Federal Institute for Occupational Safety and Health (Germany)
BGA	Federal Health Office (Germany)
BMZ	Ministry of Economic Co-operation and Development (Germany)
CAA	Clean Air Act (US)
CASCO	Committee on Conformity Assessment (ISO)
CBI	Centre for the Promotion of Imports from Developing Countries (Netherlands)
CFC	Common Fund for Commodities
CFC	Chlorofluorocarbons
COLEACP	Europe-Africa-Caribbean-Pacific Liaison Committee
CREM	Consultancy and Research for Environmental Management (Netherlands)
CsC	Commonwealth Science Council
CSE	Centre for Science and Environment (India)
CTE	Committee on Trade and Environment (WTO)
CTF	Consultative Task Force (UNCTAD)
DSB	durian seed borer
EEA	European Economic Area
EFTA	European Free Trade Association
EIA	environmental impact assessment
EPA	Environmental Protection Agency (US)
EPE	European Partners for the Environment
ESA	Endangered Species Act (US)
FAO	Food and Agriculture Organization (UN)
FDA	Food and Drug Administration (US)
FDI	foreign direct investment
FSC	Forest Stewardship Council
GAA	Global Aquaculture Alliance
GATS	General Agreement on Trade in Services

GATT	General Agreement on Tariffs and Trade
GTZ	Agency for Technical Co-operation (Germany)
HACCP	Hazard Analysis and Critical Control Point
IAF	International Accreditation Forum
ICSF	International Collective in Support of Fishworkers
IDM	integrated disease management
IFC	International Finance Corporation
IFCO	International Fruit Container Organisation
IFOAM	International Federation of Organic Agricultural Movements
IGEP	Indo-German Export Promotion Project
IGG	Intergovernmental Group on Tea (FAO)
IGO	intergovernmental organisation
IIED	International Institute for Environment and Development
ILAC	International Laboratory Accreditation Cooperation
ILO	International Labour Organization
IOAS	International Organic Accreditation Service
IPCS	International Programme on Chemical Safety
IPM	integrated pest management
IPPC	integrated pollution prevention and control
IRA	import risk analysis
ISEAL	International Social and Environmental Accreditation and Labelling Alliance
ISO	International Organization for Standardization
ITF	International Task Force on Harmonisation and Equivalence in Organic Agriculture
ITTO	International Tropical Timber Organization
IUC	International Union Chemical testing
JAS	Japan Agriculture Standards
JETRO	Japan External Trade Organization
JWPTE	Joint Working Party on Trade and Environment (OECD)
LDC	least-developed country
LOD	lower limit of analytical determination (or limit of detection)
MAFF	Ministry of Agriculture, Forestry and Fisheries (Japan)
MAP	Mangrove Action Project
MEA	multilateral environmental agreement
MLV	maximum limit value
MRA	mutual recognition agreement
MRL	maximum residue limit

MSC	Marine Stewardship Council
NGO	non-governmental organisation
NMFS	National Marine Fisheries Service (US)
NOP	National Organic Program (US)
NOSB	National Organic Standards Board (US)
NTAE	non-traditional agricultural export
ODS	ozone-depleting substance
OFPA	Organic Foods Production Act (US)
PCP	pentachlorophenol
ppm	parts per million
PVC	polyvinyl chloride
RCO	Registered Certification Organisation (Japan)
RFCOs	Registered Foreign Certification Organisations (Japan)
RIA	regulatory impact analysis
SCS	Scientific Certification Systems, Inc.
SGS	Société Générale de Surveillance S.A.
SMEs	small and medium-sized enterprises
SPS	(WTO Agreement on) Sanitary and Phytosanitary Measures
STIC	Sustainable Trade and Innovation Centre
TBT	(WTO Agreement on) Technical Barriers to Trade
TEAP	Technology and Economic Assessment Panel (UNEP)
TED	turtle-excluder device
UNCED	United Nations Conference on Environment and Development
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNIDO	United Nations Industrial Development Organization
USAID	US Agency for International Development
USDA	US Department of Agriculture
VOC	volatile organic compound
WHO	World Health Organization
WSSD	World Summit on Sustainable Development
WTO	World Trade Organization
WTTC	World Travel and Tourism Council



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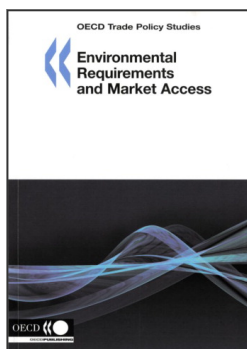
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