

met and targets are defined. New data emerging from a monitoring process must be handled and used to contribute to a continuous updating of the plan, and thus serve as the basic information for decision makers.

### 9. Use scenarios as a pointer and not as a prediction of development

Presentation of mathematical-economic scenarios can easily give the impression of order and predictability of aquaculture development. But scenarios rarely reflect the dynamic complexities of the real world. Scenarios should be used as a pointer to the direction of development and to help correlate key indicators. When used carefully, scenarios are a powerful tool that most stakeholders can understand and relate to during the planning process.

### 10. Ensure simple and realizable planning guidelines

Perhaps the most important aspect of this principle is to ensure that the planning guidelines and the tools can be used and implemented by district or provincial decision makers with limited financial and technical input from

outside. However, the need for external support may vary considerably between regions.

## The future planning

Through a continuous participatory approach in Can Loc district the consultants generated high expectations and local ownership of the planning process among most stakeholders. This raised the risk of disappointment if expectations are unmet, so there is an immediate need to follow up on the plan and implementation results with workshops and adjustments of the plan for the following year.

The capacities of local authorities and key stakeholders were improved during the process through interviews and workshop exercises which focused on combining objectives, targets and constraints in scenario based discussions. The workshop participants (including farmers and extension workers) handled these exercises with ease and with extensive use of local knowledge.

To ensure replicability, the planning guidelines produced will be tested in at least two other districts with different

contextual conditions. While doing this the planners must pay particular attention to the principle of having peoples' participation throughout the process. Generally, the planning guidelines must be thought of as a dynamic tool which can be adjusted to meet the local conditions and the specific capacities of the planning team and the local aquaculture/agriculture administration.

### References

- FAO. 2004. Policy Research – Implications of Liberalization of Fish Trade for Developing Countries - A Case Study of Vietnam. Nguyen Thanh Tung, Nguyen Van Thanh and Michael Phillips. Project:
- PR-26109, July 2004. [www.nri.org/projects/fish-trade/vietnam.pdf](http://www.nri.org/projects/fish-trade/vietnam.pdf)
- MRC. 2002. Freshwater aquaculture in the Lower Mekong Basin. Technical Paper No. 7, October 2002. Mekong River Commission.

# Aquaculture production, certification and trade: Challenges and opportunities for the small-scale farmer in Asia

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## Introduction

This article is focused on small-scale farmers in Asia and the challenges and opportunities they face in participating in global market chains for products from aquaculture. The purpose of focusing on small-scale farmers is to raise attention to this large and important part of the aquaculture sector, and the influence of production and market changes on the livelihoods of the many people involved.

Statistics on the small-scale aquaculture sector are poor, but it is important for rural development, employment

and poverty reduction. The bulk of aquaculture production in many countries in Asia is from small-scale, family owned and operated operations, perhaps making up to 80% of the farming community in some countries. Small-scale farms may be diffused through a local area district, or highly concentrated around specific resource (e.g. water supply). The sector, whilst innovative and a highly important part of the regions aquaculture production, faces increasing constraints, particularly for export crops such as shrimp.

Aquaculture is under transformation. It is not only growing in response to the huge demand for global seafood products, and stagnation in capture fisheries, but especially for higher value internationally traded export species such as shrimp there is a trend towards a more integrated production-distribution chain with more focus on coordination between the aquaculture farmers, the processors, and the retailers and to some extent to consumers and restaurants. It is no longer enough for the farmer and organizations helping farmers to focus only on increased production, but it is now also important

to understand how to link farmers to the production chain, how to produce high quality and safe products, and how to have on-farm management practices that are highly efficient, taking account of the surrounding environment and social issues related to production. A further factor is the trend towards traceability, certification, and improved farm management which are driving costs and responsibilities down the market chain to the farmer.

These global trends require changes in management of both large and small scale-farms to stay competitive. Whereas some larger farms with large product volumes and access to finance usually have the capacity to adapt, and benefit from such trends, there are still many uncertainties related to the influence of such trends on small-scale aquaculture producers and their adaptation and participation in modern aquaculture production and market chains.

## Certification in aquaculture

Certification is rapidly being introduced to aquaculture, including mandatory and voluntary schemes. There are already a number of voluntary schemes emerging and the number of certification programs and labels for aquaculture products is expanding. Development and implementation of certification schemes is considered as one tool to help towards a more sustainable aquaculture production and at the same time link and inform different stakeholders in the production chain (Anon, 2007).

At the same time, the trends towards certification risk disadvantaging small-scale aquaculture farmers unless positive actions are taken to involve small-scale farmers and develop focused strategies to ensure their participation. Surprisingly, no certification scheme as yet targets the small-scale sector, but there could be significant social and economic benefits if the small-scale sector can be effectively serviced to participate in modern market chains. Some of the constraints the small-scale aquaculture sector faces related to certification include:

- Small volumes of product from individual farms and large numbers.

- Low or no market incentives as yet to become involved in certification.
- Complex marketing channels making traceability difficult.
- Limited access to market, technical and business knowledge and related infrastructure.
- Limited or inequitable access to financial services for investment in changes that may be required for certification.
- Farms may not be formally registered and may not be organized into producers groups.
- Traders-credit relations.
- May not be producing an export product, and therefore producing to least cost to sell within a less wealthy domestic market.
- Commercial/government servicing less oriented towards the small-scale farmer.
- Risk management strategies of larger traders and buyers, requiring large volumes of product, working against small-scale farmers producing small quantities of product.

The above issues need to be addressed. It is a matter of great importance to the industry and to a large number of people who depend on aquaculture as their main livelihood to engage small-scale farmers in the development of certification schemes, to ensure equitable participation. There is a need to better understand the process, standards, their applicability, and the opportunities and challenges for small-scale farmers to benefit from certification systems.

It is unlikely in the near future that many individual small-scale farms can be easily certified, but one way forward may be to promote group certification or certification of clusters of small-scale farmers, that has been used successfully in other agriculture sectors (e.g. organic products, IFOAM, undated). The nature of small-scale farmers is that they only produce small quantities of their product, making it difficult and inconvenient for larger buyers that prefer larger volumes. The need for solutions to allow small-scale

farmers to participate in market chains requiring certified aquaculture products is therefore evident.

## Example from India

As a part of a technical collaboration between the Marine Products Export and Development Authority (MPEDA) and NACA, on shrimp disease control and coastal management in India, a village demonstration program was conducted from 2002 onwards. The objectives of the program were:

- To reduce the risk of disease outbreaks and improve shrimp farm production
- To organize the farmers under "Self Help Groups" / "Aquaclubs" for sustainable production
- To produce better quality shrimps in socially acceptable, environmentally sound and economically viable manner.

The program was successful in improving organization of the small-scale sector and reduced risks, with nearly 800 shrimp farmers now participating, across all of India's shrimp aquaculture producing states. Key elements of success include:

- The development of locally-appropriate "Better management practices" (BMPs) formulated with farmers, based on a science-based epidemiological study of shrimp disease risks and the International Principles for Responsible Shrimp Farming (MPEDA/NACA, 2003 and FAO/NACA/UNEP/WB/WWF, 2006)
- Support to formation of farmer clubs (so-called "Aquaclubs") within villages, and within "clusters" of farmers. Clusters were defined as a group of inter-dependent shrimp ponds, often situated in a specified geographical locality and dependent on the same water source
- One of the most significant outcomes of this project is the reduction in disease prevalence and improved farm profitability as a result of BMP implementation in Aquaclub farms. Successful implementation of BMPs reduced disease prevalence and increased the number of planned (normal) harvests leading to better crop outcomes, improved efficiency

in use of key inputs (feed, seed) and profits. Another key to success was the development of farmer clubs, leading to a number of key benefits including:

- Regular information exchange/sharing of knowledge on Better Management Practices among farmers within the group and increased awareness among farmers.
- Cooperation in buying high quality farm inputs (seed, feed, lime etc.) at competitive price.
- Increased interaction between farmers and input suppliers/farmed product buyers.
- Stronger bargaining power of clubs in the purchase of farm inputs and sale of harvest, in the former case leading to reduced prices for bulk purchase.
- Increased co-operation in sharing common facilities and in area improvements such as deepening of water inlets and unclogging of water supply/drainage canals.
- Collective approach to dealing with common problems including local environment protection especially protection of common water sources.
- Facilitation of farm licensing and formal registration of clubs with government. The formal registration has also recently opened opportunities for group members to access financial support from local Banks.
- Although the farmers are not yet formally certified, a farmer club and cluster management system in place provides a basis for moving forward towards voluntary certification.

## Ways forward

The small-scale sector is the largest producer and the “mainstay” of Asian aquaculture. It is an innovative sector, but faced with many problems and constraints in the modern trade and market environment. The sector is socially and economically important and cannot be ignored. Fortunately, recent experiences show that there are ways to assist small-scale farmer participation in modern market chains and trade.

One important way is the organization of farmers into producer groups. Examples from India and elsewhere show organized farmers can speak with a louder voice in negotiating prices for inputs such as feed and seed and potentially also have a better platform for more organized marketing and price negotiation when selling the product. A farmer group also allows buyers and extension facilities to have a focal point and hence reach a larger number of farmers with reduced costs. The way forward then is for public and private sector investments to assist the small-scale sector adapt and participate in modern market chains for aquaculture products.

The public investments needed include:

- Development of policy that is more favorable to the small-scale sector, and at the very least based on the requirement and realities of the small-scale aquaculture farmer.
- Technical and marketing services more oriented towards small-scale aquaculture producers, as well as the small-scale traders and businesses associated with the sector.
- Facilitating access to financial and insurance services in rural aquaculture farming areas.
- Market access arrangements that support small-scale producers.
- Information services that cater to the needs of rural farmers.
- Encouraging private investment in small-scale aquaculture production and services.
- Social ‘safety nets’ for the most vulnerable producers and traders.
- Orientation of educational and research institutions towards supporting the small scale aquaculture sector.

Trade rules and guidelines, including certification guidelines, also need to consider carefully the needs and realities of the small-scale sector.

There are many opportunities for private investment to support millions of small-scale farmers. Private sector investments are needed in:

- Technical and marketing services for small-scale aquaculture producers.

- Information services.
- Micro-finance and financial services.
- Insurance services.
- Input packaging and delivery for small-scale farmers.

We also consider there is a business case for investment in the small-scale sector. In India, for example, an investment of \$80,000 in technical servicing in 2006 led to crop improvements worth \$2 million. Given that 70-80% of producers in Asia are small-scale, an investment in servicing the small-scale sector could therefore be a potential profitable one.

“Corporate social responsibility” also has a role to play in private sector involvement in small-scale farmers, particularly the larger retailers and trading businesses that are becoming increasingly powerful. These larger businesses should be encouraged to adopt more CSR initiatives in the aquaculture sector, such as

- Facilitating market access for small-scale aquaculture producers.
- Provision of technical and financial assistance to small-scale producers to comply with market requirements.
- Brand development and marketing favorable to aquaculture products from smaller producers.

Certification and quality assurance schemes are also needed that are relevant and practical for small-scale aquaculture producers. A focus on the advantages from small-scale producers should also be possible both in relation to environmental and social issues related to the production. Development of a small-scale certification scheme oriented towards “Fair trade” as applied to some agriculture products should also be explored.

Whilst many challenges clearly remain, with many questions, it is time to recognize the crucial role of small-scale aquaculture farmers in Asian aquaculture production and trade. The small-scale sector is the largest producer and the “mainstay” of Asian aquaculture. It is an innovative sector, but faced with many problems and constraints in the modern trade and market environment. It needs investment from public and private sector to compete and thrive in the modern aquaculture scene. There

are many opportunities for assistance and investment. Ideas and partnership are certainly welcome!

#### References

Anon (2007) Aquaculture Certification: A Programme for implementing the recommendation of the Committee on Fisheries Sub-Committee on Aquaculture. Concept paper prepared for the FAO/NACA Expert Workshop

on Development of Guidelines for Aquaculture Certification-27-31 March 2007. FAO and NACA, Bangkok, Thailand. [www.enaca.org/certification](http://www.enaca.org/certification).

FAO/NACA/UNEP/WB/WWF.2006. International Principles for Responsible Shrimp Farming. Network of Aquaculture Centres in Asia-Pacific (NACA). Bangkok, Thailand, 20pp.

IFOAM. Undated. Smallholder Group Certification – Producers. Internal Control Systems for Group Certification – Training Kit for Producers. International Federation of Organic Agriculture Movement.

MPEDA/NACA. 2003. Shrimp health management: Extension manual. Marine Products Export Development Authority (MPEDA), Cochin, India and Network of Aquaculture Centres in Asia-Pacific (NACA). Bangkok, Thailand.

## The successful development of backyard hatcheries for crustaceans in Thailand

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One of the important milestones in freshwater prawn farming occurred in the late 1970s when the United Nations Development Programme decided to fund a three-year FAO-executed project, named 'Expansion of Freshwater Prawn Farming', in Thailand (New, 2000). This project built on the earlier work of the Thai Department of Fisheries (DOF), led by Somsak Singholka and his team at the Chacheongsao Coastal Fisheries Research and Development Centre (former Chacheongsao Fisheries Station) in Bangpakong, Chacheongsao Province. At first it was assisted by one of the pioneers of global *Macrobrachium* culture, Takuji Fujimura, together with visiting FAO project manager, Herminio

Rabanal. Michael New was appointed by FAO in 1979 and he and Somsak Singholka co-managed this project until 1981, after which the Thai government continued this initiative. As a result of these efforts, farmed freshwater prawn production expanded from less than 5 t/yr before the project began (1976) to an estimated 400 t by the time it ended in 1981 (Boonyaratpalin & Vorasayan 1983). Soon afterwards (1984), the DOF was reporting to FAO that Thai production had exceeded 3,000 t/yr (FAO 1989), a very rapid expansion indeed.

This DOF-FAO project not only enabled the establishment of a significant aquaculture sector in Thailand but also

benefited the development of freshwater prawn farming globally. One output was the publication of a technical manual on the topic (New & Singholka, 1985; New, 2002) that was translated into many languages. In addition, the Thai Department of Fisheries hosted 'Giant Prawn 1980, the first international aquaculture conference ever held in Thailand (New 1982), which was attended by 159 international participants from 33 countries and 200 local farmers. Many Thai experts later advised *Macrobrachium* projects and ventures elsewhere in Asia. By 2005, the aquaculture production of *Macrobrachium rosenbergii* in Thailand had risen to 30,000 t/yr (valued at US\$ 79 million) and to more than 205,000 t/yr globally (FAO, 2007). In addition, a similar quantity of a related species, *M. nipponense*, was produced in China in 2007. In total, the global farm-gate value of freshwater prawn farming had reached almost US\$ 1.84 billion/yr by 2007.

Though there was no seawater available, the Bangkok Marine Laboratory which has now been allocated by DOF to the Bangkok Fish Market, successfully cultured to post-larvae stage *Penaeus merguensis*, *P. semi-sulcatus*, *P. latissulcatus*, *Metapenaeus monoceros* and *M. intermedius* in 1972 (Cook 1973). Seawater had to be brought from offshore by boat. All gravid female shrimp were captured in the Gulf of Thailand. Experiments on pond culture of artificially bred seed were carried out at private shrimp farms in Samutsakorn Province and Bangpoo, Samutprakarn Province but the results were not satisfactory.



Concrete tanks for nursing PL.