

# Aquaculture of Marine Shrimp in Southeast Asia and China: Major Constrains for Export

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Together with China, the countries of Southeast Asia are the world's main countries producers of farmed aquatic organisms. Considering cultured marine shrimps alone, their production share amounts to some 70 % of global production, equalling around 1.4 million ton a year. This article reviews the culture status of shrimps, product quality and its traceability, together with the major constraints and the future direction considered for development. The author hopes that this overview of the major issues will provide a sound basis for regional planning and development.

## Review of shrimp farming in the region

### Brunei Darussalam

There are two species of marine shrimps cultured in the country. The blue shrimp (*Litopenaeus stylirostris*) has been just cultured since 2001, when the Super Shrimp Company from United States first entered Brunei Darussalam. Black tiger shrimp (*Penaeus monodon*), which is second species for aquaculture in Brunei, has been cultured for a few years longer. At present, 13 farms account for 160.9 ha under shrimp culture, while production amounted to a total of 394 ton in 2005. The government plans to expand the culture area to around 500 ha.

The government also provides the land and seawater pumping facilities. Black tiger shrimp is transported for sale to the nearby Malaysian province of Sabah. Blue shrimp is sold in Brunei Darussalam and processed for exporting.

### Cambodia

Although the black tiger shrimp (*Penaeus monodon*) has been cultured for 15 years, its production remains small with a mere 75 tons in 2004, which is a significant reduction from 500 tons in 1993. After repeated failure in culturing black tiger shrimps, the exotic white shrimp (*Litopenaeus vannamei*) was introduced a few years ago. However, the newly introduced species has also suffered repeated disease outbreaks, which remain a major constraint and as a result, the production has dwindled over the years. It appears that the major problem in advancing shrimp culture in Cambodia has been its reliance on foreign investment and culture technology, mainly from private interests in Thailand and Taiwan which have had little obligations in sustainable development.

### Indonesia

Shrimp farming in Indonesia has steadily increased over the last decade. Indonesia has plans to massively increase culture shrimp production. In 2000, the area of land under



marine shrimp culture was about 419,252 ha, but the government hopes to soon more than double this to 913,000 ha. Culture shrimp production increased exponentially from 2002 (159,597 ton), 2003 (168,662 ton) to 2004 (242,560 ton).

The production of white shrimp from aquaculture is progressively taking a larger share from other shrimp species, especially from the black tiger shrimp, which has suffered from severe disease outbreaks. In 2002, it accounted for 46,757 ton (29.3 %) and in 2003, 115,441 ton (47.61%) of production. White shrimp production is expected to continue to increase.

#### **Malaysia**

Malaysia is another Southeast Asian country that would like to increase production of marine shrimp aquaculture. White shrimp production was only permitted in mid 2005. Total shrimp production from aquaculture has slightly increased from 15,500 ton in 2000 to 29,800 ton in 2003.

Malaysia has some advantages for the export of cultured products to the USA and Europe. It is not subjected to antidumping law restrictions by the USA, and gets very low rates under the Generalised System of Preferences (GSP) from EU.

#### **Myanmar**

Shrimp culture has been practiced with technology imported from Thailand. The feed is also imported from there. However, a new fish feed factory (which also produces

shrimp feed) started operations last year. Harvested shrimp is mostly exported to Thailand for processing.

In 2003, the yield was around 19,221 ton increasing to 23,408 ton in 2004. White shrimp culture was permitted in 2001. Viral disease outbreaks are still the main constraint on shrimp farming in the country.

#### **Philippines**

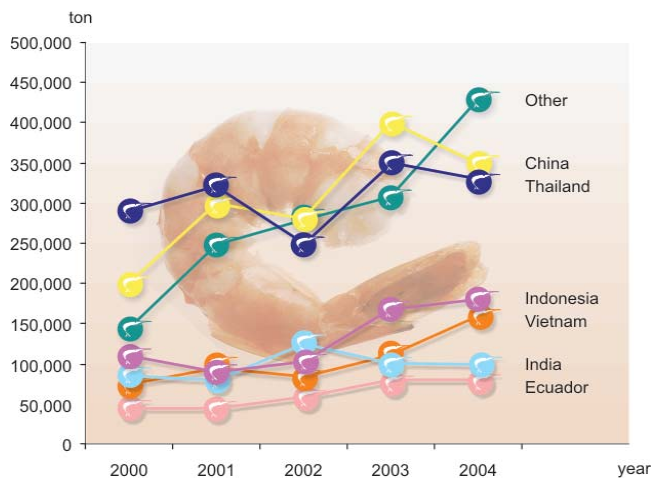
Philippines used to be a strong producer of cultured shrimp. During the period 1990-1993, production was around 100,000 ton/yr, but then viral diseases started to occur frequently, and production decreased greatly, with only around 42,000 ton being produced in 2003. The culture area also decreased, with farmers moving away from shrimp production, from 47,700 ha in 1993 to 36,600 ha in 2003. The number of processing factory has similarly decreased from 58 in 1993 to 13 factories ten years later.

In December, 2004, Specific Pathogen Free (SPF) white shrimp spawners were permitted to operate in an attempt to restore national shrimp production. To ensure the disease free status of the SPF fry, certification was issued by the SEAFDEC Aquaculture Department (AQD) in Iloilo and at the Research station of the government's Bureau of Fisheries and Aquatic Resources (BFAR).

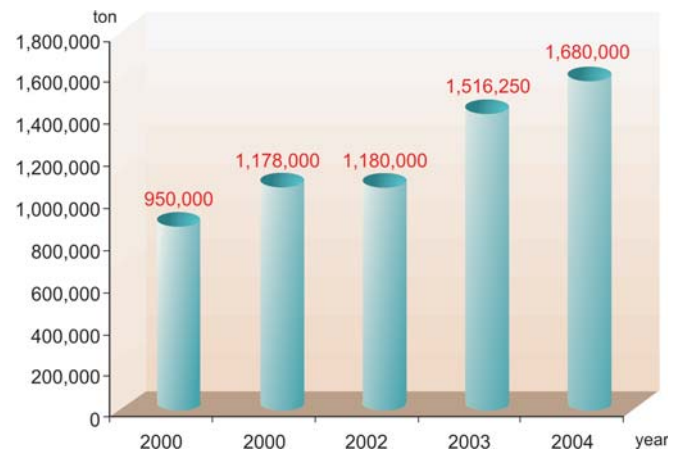
#### **Singapore**

Singapore imports raw shrimp and exports processed cultured shrimp products. Singapore is not a cultured

World cultured shrimp production 2000-2004 (metric tons)



Total cultured shrimp production 2000-2004 (metric tons)



Source: World Shrimp Farming (2004)

shrimp producing country. In 2003, around 21,157 ton was imported and 4,913 ton was exported. Live shrimp is directly transported from farms to restaurants. Local consumption for cultured shrimp is around 16,359 ton/yr.

In 2001, white shrimp and blue shrimp were introduced for culture in the country and a production of 4 ton was achieved. In 2004, the production of farmed marine shrimp was around 19.1 ton from just two farms totalling 3 ha of cultured area. However, at present, no marine shrimp farms are operating due to disease outbreaks.

### Thailand

In 1991, Thailand became the first country to export cultured shrimp to the world market. If in the last 2-3 years China has been able to produce more cultured shrimp than Thailand, around 60 % of this huge production is for local consumption. Thai shrimp production has steadily increased over the last decade. Until the introduction of white shrimp in year 2001, the main cultivated species was black tiger shrimp. Nowadays, the main cultured shrimp is white shrimp, which accounts for more than 90% of total shrimp production.

Although several risk assessment studies have been made, viral disease such as White Spot Syndrome Virus (WSSV), Taura Syndrome Virus (TSV) and Haematopoietic Necrosis Virus (IHHNV) are still the main constraints for shrimp farming.

### Vietnam

With a seashore length of 3,600 km, Vietnam has excellent potential for marine shrimp culture. In 2000, the area under marine shrimp culture was 224,407 ha with a yield of

104,519 ton, mostly produced by traditional and semi-intensive methods. In 2004, yield increased to 290,501 ton and the culture area expanded to 592,585 ha.

Culture of the SPF white shrimp has just been permitted in the central and northern parts of the country where it already dominates production, while black tiger shrimp remains the main culture species in the south.

### China

China is now the leading producer of cultured marine shrimp in the world with a yield of 760,459 ton in 2003, equalling around 45 % of total global production. White shrimp was first introduced for culture in 1988 but culture initially failed due to unsound farming practices. Successful culture of white shrimp was achieved in 2001 with the production of 304,182 ton. The main areas where marine shrimps are cultured are in Guangdong, Hainan and Fujian provinces, which together share around 70 % of total production in the country.



The production in 2003 was 760,459 ton, with around 308,947 ton being freshwater shrimp species. The production from brackish water areas was around 296,312 ton. The white shrimp production was about 80 % of the total marine shrimp production with the remaining 20% consisting of Chinese white shrimp (*Penaeus chinensis*) at 8.11% (61,685 ton), tiger shrimp at 6.72 % (51,026 ton) and Kuruma shrimp (*Penaeus japonicus*) at 5.58 % (42,429.8 ton).

In 2003, around 200,000 ton of cultured marine shrimp were exported, which accounts for around 37% of total production. The export quantity is second only to that of river eel.

## Meeting international standards

Cultured shrimp and related products have often been rejected from importing countries as they were judged to be below the minimum quality level. Around 1990, the first rejection was made by Japan, on the basis that the shrimps were contaminated with oxytetracycline above the maximum residue level (MRL) allowed. Thailand and other countries in Southeast Asia have subsequently been forced to control the antibiotic use in order to continue to export.

Since then, a series of product quality standards have been proclaimed by other importing countries such as USA, and by the European Union (EU). The green labelling of products from farm to table and other regulations were announced by the EU. Soon afterwards some additional measures were announced which were not all quality related but which could be considered as non-tariff barriers (NTB).

The most significant crisis for shrimp product exporting countries was in 2003. The EU rejected imports on the ground that high levels of chloramphenicol, and of nitrofurans and its metabolites were detected. Almost all shrimp exporting countries in Southeast Asia and China were accused of using illegal antibiotics in shrimp farming.

The latest crisis was in 2004 when an antidumping measure was adopted by the USA for shrimp products from all exporting countries in Asia and South America. Exporting companies were informed that in future, they would have to pay an additional tax and deposit an additional year's tax in advance by way of a 'continuous bond'. These companies were quick to claim that this new measure was a new non-tariff barrier that contravened the Free Trade Agreement (FTA) promoted by the USA, and which is under negotiation between the USA and several ASEAN member



countries. On the basis of these new requirements, mitigating measures such as farm standards and product certification were initiated by Southeast Asian countries producing cultured shrimp. Measures to ensure the traceability of shrimp products have also been drawn up for implementation.

## Improving the quality and traceability of shrimp products in Thailand

### Product quality

Product quality and related shrimp farm standards and certification have been highlighted in the preparation of guidelines such as Good Aquaculture Practice (GAP) and Code of Conduct for responsible shrimp aquaculture and their implementation in many ASEAN countries. The Code of Conduct (CoC) for responsible shrimp aquaculture was an initiative launched in Thailand in 1997 based on FAO's Code of Conduct for responsible fisheries, ISO 14001 and HACCP. A grant was provided by the World Bank to facilitate its development and implementation.

The CoC contains three main principles to which shrimp farmers must comply:

- Premium product standards
- Environment-friendly operations
- Residue free products.

The CoC checklist for farms (hatcheries and shrimp ponds) was developed with support from the French Ministry of Agriculture and Fisheries in late 2000. The Thai Department of Fisheries has since presented the CoC for responsible shrimp aquaculture at various conventions such as the World

Aquaculture Society annual conferences and meetings or NACA conferences and FAO workshops. The standard CoC guidelines have also been presented to importing countries.

The CoC for responsible shrimp aquaculture has also now been adapted and implemented in Malaysia.

Importing countries, companies and supermarkets in the west have recently been trying to set up a standard for importing shrimp products. For example, the Aquaculture Certification Council (ACC), in cooperation with the Global Aquaculture Alliance (GAA), has defined the ACC standard for shrimp product imports. This standard was developed at the same time as the CoC was being drafted in Thailand. Professor Claude Boyd of Auburn University in the USA was the technical consultant for both standards, which in practice are very similar.

For the ACC standard, farmers, feed factory owners and post-harvest processors are requested to apply as members. An annual membership fee must be paid thereafter. The ACC auditors of farmers, feed factories and processors also need to be trained by ACC trainers. Trainee ACC auditors need to pay for the training. Undoubtedly, the costs for certification development at various levels of shrimp industry will increase the overall cost of production. Even though Thai shrimp farmers have already complied with regulations such as the CoC, they are facing further difficulties, and will get less for selling their products. If we add this to the prediction that the supply of cultured shrimp will exceed the demand on the world market soon, producers are facing a gloomy future.

### Shrimp product traceability

Along with the requirement for shrimp quality and residue management, importing countries now require shrimp products to be traceable. Work on product traceability was initiated five years ago in Thailand by the Department of Fisheries. It has been ensured by issuing a movement document (MD) that follows the shrimp from the hatchery throughout production. For shrimp fry, the movement document is known as the fry movement document (FMD). The shrimp farmer will get this document from the hatchery when purchasing seed, and will have to submit it to the district fisheries office or local farm association in order to obtain a MD once the shrimp is harvested. Processors and exporters get the MD from the shrimp farmer, and have to submit it to the Department of Fisheries in Bangkok in order to obtain exporting product certification. This process is summarized in the figure.

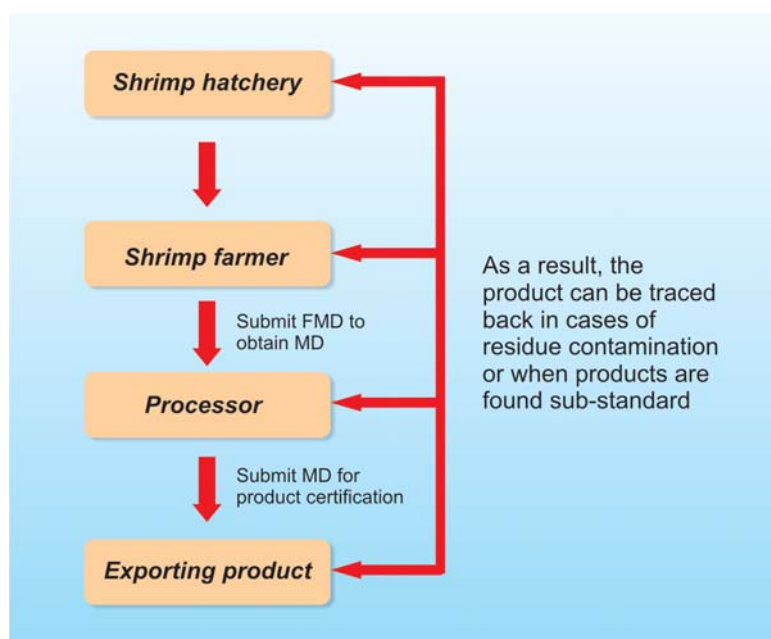
The Radio Frequency Identification Device (RFID) is another initiative aimed at improving shrimp product traceability. The RFID bar code can be tagged to the package showing the details of the product, including farming practice, feed used, product transportation and processing. It is being implemented by exporting companies, in cooperation with the Thai Department of Fisheries and the Ministry of Science and Technology. At present, there are three companies implementing the RFID, and more than ten companies are implementing product traceability.

### Future directions

Shrimp farming is likely to be dramatically expanded in many countries in Asia and South America. This will likely lead to a surplus in the supply of shrimp products as demand is increasing much slower.

The production of farmed shrimp will reach around 1.8 million ton in the next two years, with nearly 70% of it supplied by the ASEAN countries and China. As a consequence of the oversupply, it is to expect that the selling price at the farm gate (farm gate price) will be lower than it is today. Meanwhile, shrimp importing countries will increasingly concentrate on product quality and traceability, with a vast range of producing countries to choose from.

As a result, shrimp farmers need to learn how to produce shrimp at the lowest cost while complying with standards acceptable to the Western consumers. The concerned government agency in producing countries, such as the



Process for certifying the traceability of shrimp in Thailand

Department of Fisheries, must look closely at farming practices, and provide all necessary support to ensure that product standards and traceability are respected. These measures should help farmers, and will make shrimp culture more sustainable. Each producing country can have its own standards and certification process, but these must be compatible with international standards. A lasting dialogue, not only negotiation, between producing countries and importing countries is needed to make sure importers and producers understand both sides of the picture. Ideally, the importers would require a continuous supply of quality cultured shrimp with guarantees, while producers would receive a reasonable price covering the production cost and profit incentive. It is important to be aware that a large proportion of the shrimp farmers in the region are still small-scale operators and relatively poor. A certification body set up by importing countries would not be in the interests of producer countries, unless they consider the financial viability of smaller farm operators in view of the burden of surcharge in certification expense. Charging shrimp farmers directly for certification would simply make the farming of shrimp financially unviable, at least for small-scale operators.

One has to really hope that the pending issue of farmed shrimp product quality will be solved in the near future, so that both consumers and farmers can get what they need: safe products grown in sustainable farming conditions, which comply with international standards while enabling producers to sustain their livelihoods.

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**Siri Ekmaraj** was nominated by the Ministry of Agriculture and Cooperatives of Thailand as SEAFDEC Secretary-General, starting in October 2005. He graduated from the Faculty of Fisheries, Kasetsart University, Thailand (B.Sc. in Marine Science) in 1972; Faculty of Engineer, University of Alberta, Canada (M.Sc. in Environmental Engineer) in 1979; and Faculty of Applied Biological Science, Hiroshima University, Japan (Ph.D. in Aquatic Ecosystem Management Science) in 2001. He has vast experience working with coastal, particularly shrimp, aquaculture as well as coastal zone management and development, and represents Thailand in several committees regarding fisheries.

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