CRITICAL ANALYSIS OF CERTIFIED ORGANIC SHRIMP AQUACULTURE IN SIDOARJO, INDONESIA

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Background and scope of assignment

The shrimp aquaculture industry is fraught with environmental and socio-economic concerns, which has led to consumer boycott in many countries as well as initiated organic certification projects.

The Japanese company Alter Trade Japan, Inc. (ATJ) started to market "ecological" shrimps in 1994. Conventional extensive shrimp farms in Sidoarjo, East Java, Indonesia were selected as suitable to supply Japanese consumers with farmed shrimps. In the year 2000, ATJ started an organic certification project with German Naturland as certifier, and the first certified farms were established in July 2002. These certified shrimps are sold to the Swedish consumer's cooperative (KF/COOP), which previously refrained from selling farmed shrimps due to the environmental and socio-economic problems associated with this product.

The Swedish Society for Nature Conservation (SSNC) has since the mid-1990s campaigned against the consumption of farmed shrimps. The potential and limitations of certifying farmed shrimps has also been discussed with KF/COOP during 2001-2002. SSNC has on several occasions contracted Dr. Patrik Ronnback as consultant and adviser (see for example Ronnback, 2002). Ms. Gudrun Hubendick from SSNC also visited the certified shrimp farms in Indonesia in May 2002 together with the Indonesian NGO Wahli, Surabaya.

The scope of this assignment was to evaluate the certified shrimp farms on-site based on the consultant's long-term research experience of shrimp farming and sustainability concerns. The following critical questions are addressed:

- *Is KF/COOP giving correct information about the certified shrimps to consumers?*
- *Do the certified shrimp farms adhere to Naturland standards?*
- *Are Naturland standards justifiable in the context of sustainable development?*
- *What are the prime objectives of certifying farmed shrimps, and can these be fulfilled?*

This report is based on first-hand information gathered during a field trip to Sidoarjo, Indonesia in October 2003. The scientific literature was also reviewed (see Ronnback, 2001 and 2002 and references therein). Background material also included interviews with more than 100 stakeholders in the area conducted by two local Indonesian NGOs – Sawitwatch and Wahli (Hubendick, 2003).

The news and the facts presented in this report is by the author and do not necessarily reflect the view of SSNC.

Itinerary and activities in the field

• *2 Oct*	*am*	*arrive Surabaya*
	fm	*shrimp farms in Sidoarjo*
• *3 Oct*	*am*	*office of Alter Trade Japan (ATJ)*
	fm	*shrimp farms and mangrove plantation in Sidoarjo with ATJ*
• *4 Oct*	*am*	*office of ATJ*
	fm	*travel to Situbondo*
• *5 Oct*	*am/fm*	*shrimp hatcheries in Situbondo*
	fm	*travel to Surabaya*
• *6 Oct*	*am/fm*	*shrimp farms in Sidoarjo*
• *7 Oct*	*am*	*shrimp farms in Sidoarjo*
	fm	*office of ATJ and shrimp processing plant with ATJ*
• *8 Oct*	*am*	*travel to Sweden*

Ms. Gudrun Hubendick represented the Swedish Society for Nature Conservation during the entire visit. During all activities unaccompanied by ATJ, Mr. Ludvig Hubendick from Sawitwatch translated Bahasa Indonesia to Swedish.

Study area and farming technique

The Sidoarjo area in eastern Java, Indonesia harbours around 15,000 ha of shrimp ponds. Currently around 2500 ha are certified organic according to Naturland standards. These farms can be classified as extensive systems based on means of water exchange and input levels of lime, organic fertilisers, tea seed (saponin), shrimp (*Penaeus monodon*) and milkfish (*Chanos chanos*) fry, etc. (Table 1). The use of organic fertilisers promotes natural food availability, and consequently there is no need to use formulated feed given the low stocking density of shrimp fry.

Table 1. Grow-out pond characteristics for certified tiger shrimps (*Penaeus monodon*) in Sidoarjo, Indonesia.

Average pond size (ha)	3
Stocking density (seed/m^2)	1 - 3
Seed source	Hatchery
Crops per year	2.5
Annual production	- 100 kg/ha/yr
Feed source	Natural
Fertilisers	Yes
Water exchange	Tidal and some pumping
Aeration	No
Diversity of crops	Polyculture

Advertisement and information given by KF / COOP

The Swedish company KF/COOP uses a number of different sales arguments for certified shrimps. Some of the key arguments are analysed below.

The ponds are owned by small-scale farmers?

Pond units are owned by individuals or families, and there is no village co-operative farming. Pond owners are rich and powerful people from the area, and none of these can be referred to as small-scale farmers. The very high price of buying or leasing shrimp ponds prevents all but the very rich to enter the industry.

The total area of certified shrimp ponds (2500 ha) is distributed among 120 owners, i.e., more than 20 ha per owner on an average. The annual lease fee for one hectare of shrimp pond lies in the order of 5000 SEK, while the price of buying ponds is around 100,000 SEK per each hectare (1 USD ≈ 7.5 SEK). Consequently, the market value of each pond complex is around 2 million SEK.

Traditional farming practices?

KF/COOP claims that the ponds are more than 200 years old, and that their consumers are supporting sustainable and traditional farming practices. The certified ponds are, however, not traditional farming systems. Although some ponds were constructed more than 100 years ago, new ponds have been taken up since the 1970s. Furthermore, the current farming practices are not traditional. Rather, they are less than 30 years old. Stocking of shrimps started first in the 1970s, and prior to that the prime target had always been milkfish (*Chanos chanos*). Interviewed farmers also said that there previously was an abundance of mangroves both inside ponds as well as on pond dikes, but during the 1980s and 1990s most farmers changed farming practices and removed their mangroves.

Sustainability and life span of shrimp ponds

The shrimp farming industry has been fraught with major disease problems the last two decades, and in many countries ponds have been abandoned or left idle after only 5-10 years in production. The extensive shrimp ponds in Sidoarjo have the last ten years experienced escalating problems with increased shrimp mortality, and productivity has dropped with around 40% according to ATJ. There may be several reasons behind this including mismanagement, pollution, poor weather conditions and lowered quality of stocked seed. However, the main causative factor for increased mortality, at least indirectly, is the prevalence of diseases in the area. Given these escalating disease problems the long-term sustainability of shrimp farming in the area can be questioned.

The organic project has a mangrove restoration program?

KF/COOP claim that the organic project has a mangrove restoration program, which is incorrect. ATJ neither have the expertise nor any plans to invest in mangrove restoration. On the contrary, the entire project may constitute a threat to mangrove conservation locally as well as internationally (see below).

Compliance with Naturland's standards

Mangrove degradation and deforestation

According to Naturland standards for organic aquaculture (article D.1.1, Dec 2002): *"…it is not permitted to remove or damage mangrove forest for purposes of construction or expansion of shrimp farms."* It is, however, self-evident that the historical as well as on-going establishment of shrimp ponds in the Sidoarjo delta has caused massive mangrove degradation and deforestation. Most of the existing pond cover of 15,000 ha in the Sidoarjo delta is former mangrove forest, and today only a thin belt of mangroves is left along the coast plus some occasional trees along channels and rivers (only 1-5% of the original forest cover remains). Shrimp farms can only be certified to organic aquaculture *"if the former mangrove area does not exceed 50% of total farm area"* (Naturland article D 1.2), and consequently most, if not all, of the certified ponds does not comply with this overarching requirement. Furthermore, Naturland standards require that former mangrove area in property of the farm shall be *"reforested to at least 50% during a period of maximum 5 years"*, but since ATJ or the certified farmers have no mangrove restoration program in the area this important requirement is not complied with either.

As mentioned above, the certified ponds were not all constructed hundreds of years ago. Rather, many ponds were likely constructed in the 1970s and 1980s with the rise of market for shrimps. While travelling in the area it also became evident that some farmers were cutting down mangroves to give way for new shrimp ponds. However, ATJ saw no problem in certifying newly established shrimp ponds even though they may be located directly on former mangrove land.

Planting of mangroves on pond dikes

"In order to stabilise/enhance the ecological system … at least 50% of total dike surface shall be covered by plants" (Naturland, article D.2.4). ATJ standards require that mangroves or other native trees are planted every 7th meter on pond dikes. The planting of mangroves on the dikes of 2500 ha of certified ponds may require up to 1 million mangrove seedlings, but surprisingly there is no mangrove nursery in the area. ATJ had neither estimated the number of mangrove seedlings needed for the certified ponds nor engaged in any mangrove restoration program. The Indonesian Government had supplied seedlings to 130 ha, which corresponds to around 5% of the area of certified shrimp ponds. Thus, farmers are almost exclusively expected to obtain seedlings from the natural mangrove forest, potentially further degrading the already marginalised forest.

The overall ambition of planting mangroves on pond dikes is also open to debate. It should be made perfectly clear that this effort have limited, if any, effect on securing the provision of ecosystem goods and services generated by viable mangroves. The majority of important ecosystem services such as fisheries production, nutrient assimilation, erosion control, etc. can only be provided by extensive mangrove cover in the intertidal zone (not on top of pond dikes). This planting of mangroves can, at best, stabilise pond dikes, but it should never be used as an argument for mangrove restoration.

Compliance with Indonesian legislation?

ATJ standards for certified shrimp farms require the preservation of a mangrove greenbelt of at least 200 meters along the coast and 7 meters along rivers. It is unlikely that 200 meters of mangroves is conserved along the entire Sidoarjo coast, and whether any certified shrimp farms are located too close to the sea requires further investigation. It is, however, alarming that these standards does not comply with Indonesian legislation on forestry (no. 41, article 50, yr. 1999), which states the no one is allowed to cultivate or encroach a forest area (a) 200 meters along rivers in a swamp area, and (b) 130 times the difference between maximum and minimum tide along the coast. The latter estimate amounts to 380 meters of mangroves to be conserved along the Sidoarjo coast, based on a maximum tidal amplitude difference of 2.9 m (min: 0.02 m, max: 2.92 m) in Surabaya (Dec 24, 2003).

Negative impacts on surrounding water bodies

ATJ has no program aimed at monitoring the water quality of pond effluents as well as in the recipient, which according to Naturland *"has to be monitored and documented on an at least monthly base by the farm"* (Naturland, article D.2.1). Furthermore, there is no treatment of pond effluents that may carry high nutrient and sediment levels. Once a year, most of the pond sediment is also flushed out into surrounding waterways, potentially causing siltation and eutrophication problems. Once again the organic standards are not followed: *"organic sediments shall be removed on a regular base from the channels and brought to appropriate utilization"* (Naturland, article D.2.2)

Organic hatcheries?

Naturland aquaculture standards generally require non-use of antibiotics and other chemicals, but the certified shrimps from eastern Java only partially have to comply with this. The organic shrimps are currently certified under Naturland's *"2/3 lifespan"*. This implies according to Naturland that the product only has to spend 2/3 of its life under organic production practices, which is a serious shortcoming from an environmental perspective. The reason for this is that there is no organic hatchery in Java, Indonesia, and consequently the shrimp fry is supplied from conventional hatcheries that use chemicals and antibiotics. An organic hatchery line was initially supposed to be in place in 2002, but this has been postponed to Dec. 31 2004.

It is possible to refrain from using antibiotics and some chemicals according to one interviewed hatchery manager. However, the shrimp fry mortality rose markedly to 80-85%, compared to 40% previously when chemicals and antibiotics were used freely. It still remains to be seen whether an organic hatchery line can be implemented at all, and if the hatcheries can succeed long-term in refraining from the use of antibiotics and some chemicals given the increased prevalence of disease problems. Nonetheless, the ethical problem of eyestalk ablation, a procedure that crushes the eye of the mature female broodstock, will still persist. This is not in line with the standards that *"mild, non-mutilating measures for obtaining larvae shall be preferred"* (Naturland, article D.4.1).

Training of staff

Another important standard requirement of Naturland is that the *"staff shall be trained regarding the basic principles of organic aquaculture"* (Naturland, article D.10.1), which actually constitute a prerequisite for the long-term viability of certified systems as well as trust between farmers, ATJ, Naturland and consumers. ATJ had no set program to train and inform shrimp farmers, which likely explains the general lack of knowledge on certification objectives among farmers. For instance, many farmers had limited understanding and appreciation of why mangroves should be planted on pond dikes. Farmers argued that only 10-15 years ago the government recommended farmers to remove all mangrove trees from within ponds as well as from pond dikes. The farmers did not appreciate the planting of mangroves, but since it was a prerequisite to become a certified producer earning a premium of USD 1 per kg shrimp, the farmers complied with the standard.

Control system

Farmed shrimp are among the most, if not the most, difficult certified food product to control due to a number of reasons. The production cycle from the *cradle* (broodstock fishery) to the *grave* (packaging and labelling shrimp at processing plant) include many separate economic activities that are carried out by a wide variety of stakeholders. These stakeholders are normally spread out over large geographical areas, some very remote with limited logistical setup. Many stakeholders are also rich and powerful people from the area, and this local elite may have limited understanding and experience of control systems. Furthermore, the product is highly commercial and consequently the risk of misinformation and cheating is evident. Shrimp farmers openly told that some mixed certified and non-certified shrimp prior to transportation to warehouses. ATJ had also experienced major corruption where warehouses had mixed large volumes of shrimp to receive a premium price for the entire batch. Another shortcoming is that ATJ's control system is dependent upon credible information being given by the pond caretakers, who are then placed in a vulnerable position. The caretaker is used as informer, but it must be remembered that the informer (caretaker) is actually paid by the pond owner, i.e., the very person the caretaker is supposed to inform ATJ about.

What are the prime objectives of certifying farmed shrimps?

Certification programs have the potential to mark the way for sustainable production systems, and organic and fair trade labelling generally has a very good reputation among consumers. In this context it becomes evident that key players in this process such as Naturland, ATJ and KF/COOP have far-reaching responsibilities. Initial labelling of products or producers that later proves to be partially insufficient or incorrect may lead to reduced credibility of certified products in general among consumers.

The certified shrimps from eastern Java are without doubt somewhat less unsustainably produced than shrimps farmed in some non-certified semi-intensive and intensive systems. This is, however, not a difficult task to fulfil considering the serious environmental and socio-economic concerns of some non-certified systems. On the other hand, if the overarching objective with certification programs is to push the development towards sustainable production practices, at least in the foreseeable future, we must reformulate our analysis. Instead of discussing the details of certification standards, we should focus on some fundamental questions.

- *Can these certified shrimps ever be farmed in a sustainable manner?*
- *Can these certified shrimp farms replace non-certified semi-intensive and intensive systems?*
- *Can the set standards become guidelines for future shrimp farm developments?*
- *Can certified shrimp farms be sufficiently controlled?*
- *Will the availability of certified shrimp reduce the consumption of non-certified shrimps?*

In the foreseeable future the certified shrimp farms in Sidoarjo will not be sustainable from an environmental perspective. The historical as well as on-going conversion of mangroves to accommodate shrimp ponds needs to be addressed in depth. Furthermore, the removal of pond sediments as well as the development and long-term sustainability of an organic hatchery line remain unsolved. Although some of these concerns could be ameliorated given adequate focus and resources, the issue of increased disease prevalence is difficult to combat. Furthermore, a number of social concerns need to be addressed in a context of social sustainability

The certified shrimp ponds in Sidoarjo are so-called extensive farming systems with very low productivity (≈ 100 kg/ha/yr) compared to non-certified semi-intensive and intensive systems (in the order of 1000 – 10,000 kg/ha/yr). Farmers applying more intensive practices will not willingly reduce farming intensity as it will reduce the potential financial profitability per unit area. Consequently, extensive systems are highly unlikely to replace semi-intensive systems, which by far dominate world production of cultured shrimp, unless very large areas of new ponds are opened. This may, however, create new conflicts over water and land resources with other users. The extensive systems are always located in the intertidal zone, and the establishment of new ponds would in many countries be at the expense of mangrove resources.

The certified extensive systems cannot replace the more intensive systems, but what about taking some market shares, i.e., reduce the consumption of non-certified shrimps? The answer to this question is open to debate, but new markets will likely open for well-informed consumers that previously refrained from eating cultured shrimps. This would then result in a net increase in the demand for farmed shrimps.

CONCLUSIONS

This report illustrates that KF/COOP provides consumers with partially incorrect information about certified Indonesian shrimp. Furthermore, the certified farms fail to comply with numerous of the standards set by Naturland. The project may, for example, constitute a threat to mangrove conservation and also violate basic Indonesian environmental legislation. The most serious shortcoming with certifying extensive shrimp farms is, however, that these systems may never fulfil any of the overarching objectives such as long-term sustainability or reduced consumption of non-certified shrimps. Extensive systems can never take market shares from non-certified systems of higher intensity, without large-scale conversion of coastal areas throughout the tropics.

Literature cited

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