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# **SHRIMP FARMING IN INDIA - ROOF WITHOUT A STRONG FOUNDATION**

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## **ABSTRACT**

Although shrimp farming in India has grown into a multi-crore industry in recent years, it has carried with it some of the inherent problems and a few generated out of indiscriminate action on the part of over-enthusiastic entrepreneurs. Some of the major problems currently faced by the industry are, inadequate supply of choice seed, lack of quality indigenous feed, disease problems, environmental stress and wanton conversion of fertile agricultural land and pristine mangrove ecosystem. A few of these problems have recently become the subject of public debate. This paper elucidates some of these bottle necks and suggests remedial measures.

## **INTRODUCTION**

Shrimp farming has made substantial progress in India during the last few years mainly because of its export potential, high profit margin, excellent extension work done by various government agencies and above all the active participation of large industrial houses. Currently more than 80,000 ha of water spread area (WSA) is under shrimp cultivation although it forms < 7% of the total available area for aquaculture practices (MPEDA, 1992). During 1993, India was placed fourth among the shrimp producing countries in the world through aquaculture with a production figure of 65,000 tonnes. Majority of the Indian shrimp farmers produce around 5-6 t/ha by employing semi-intensive culture techniques. Reports of higher yields of 12-16 t/ha are also available from the east coast using intensive culture techniques. Notwithstanding the progress we have made in this field, it is high time for us to take stock of the situation and also answer a few important questions. For instance, are we progressing in the right direction? Are we not causing damage to the environment? Some of these pertinent aspects intimately related to sustainable shrimp farming still remain to be tackled effectively. In this paper we examine some of these important aspects which are directly related to the success of the shrimp farming industry in India and also suggest viable solutions for sustainable production.

### **Major problems**

Although shrimp farming at the moment looks a very lucrative venture, it is also faced with a number of problems and threats which may even jeopardise the very

existence of this industry, if proper remedial measures are not taken at the right time. The main challenges faced by this young industry are, inadequate supply of choice seed, lack of high quality indigenous feed, disease problems, environmental stress and indiscriminate conversion of land. We shall address them one by one.

### **Environmental stress and land conversion**

There is an ever increasing concern that shrimp culture practices may destroy the puritan environs of some of the hitherto untouched coastal ecosystem (Anon, 1994). It is feared (may prove to be true) that pumping in large quantities of sea water for shrimp culture purposes may contaminate the freshwater tables below. Also, semi-intensive and intensive culture practices would generate large amount of wastes, mainly unutilised feed and excreta. These wastes once flushed out into the coastal waters can lead to eutrophication and even cause alterations in soil characteristics. These wastes may become a source for the introduction of pathogens into the farms and from there into the coastal ecosystem.

Indiscriminate conversion of land for construction of shrimp farms is another unhealthy trend. It is now reported that large areas of agricultural land are being converted into shrimp farms along the east coast (Anon 1994). Mangroves are the other affected coastal ecosystem. These are unique to the tropical estuaries and coastal areas. These are very productive ecosystem (Snedaker 1978) and harbour a large variety of flora and fauna including several species of commercially important fin and shell fishes (Achuthankutty 1990). These are also recognised as the nursery ground for penaeid shrimps (Macrae 1974; Penn 1981; Achuthankutty and Nair 1983). The Indonesian capture shrimp fishery was found to have a strong correlation with the distribution and abundance of mangrove forests (Martosubroto and Naamin 1977). Deforestation of mangrove vegetation for shrimp farming purposes have considerably degraded this ecosystem in Philippines, Thailand, Ecuador and many other coastal countries (de la Cruz 1984; Librero 1984).

It is therefore, very important that shrimp aquaculturists should take the public, particularly the local populace into confidence before venturing into setting up large shrimp culture facilities and also involve them in these projects. They should also carefully select the site so that no agricultural land or mangrove ecosystem are converted for this purpose. Care must also be taken to minimise discharge of wastes into the coastal ecosystem and monitor and control the population of micro-organisms, particularly the pathogens. For this purpose, feeding ratios should be scientifically managed so that only minimum food remains in excess in the ponds thereby reducing the chances of soil

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putrification.

### **Inadequate seed production**

To achieve an yield of 5-6 t/ha of tiger shrimp (*Penaeus monodon*) by adopting the semi-intensive culture techniques, it is estimated that about 0.3 million PL 20 need to be stocked per hectare. In the event of extending the farming activity to 100,000 ha in a couple of years time, the minimum seed requirement would be around 60 billion annually for two crops. Are the existing hatcheries capable of producing seed in such bulk quantities? Even today one of the major constraints in development of shrimp farming is the inadequate supply of choice seed. Although there are about 21 hatcheries operational in India (Anon 1992) and many more are in the pipe line, majority of them are producing seed much below their installed capacity. This leads to the shortage of seed for farmers and many of them are forced to stock the ponds much below the required number. Quite often either they have to go for other species or leave the ponds unstocked. All these lead to great financial losses.

Dependence on wild spawners is the major cause for this uncertainty. There are reports of huge escalations in the price of spawners in recent years, leading to unhealthy competition among hatcheries. Removal of spawners from the wild stock can also have adverse effect on capture fishery resources. The only viable alternative for increasing production of seed without depending on wild spawners is to develop techniques to rear them under captivity. Until the shrimp farmers are assured of adequate supply of the choice seed further expansion of this industry should be discouraged.

### **Need for quality indigenous feeds**

Nutrition is an important area which needs immediate attention. It is a well known fact that expenditure on feed generally exceeds 50 % of the total recurring expenditure. The locally produced feeds are generally considered inferior to the imported feeds and hence many Indian farmers prefer the latter. Therefore, there is an urgent need for the development of low cost, nutritively efficient, indigenous feeds so as to minimise expenditure on this item. Further, the Indian shrimp hatcheries depend only on live feeds (phytoplankton, rotifers and *Artemia nauplii*) which require constant attention, elaborate laboratory arrangements and space. It is high time that suitable technology is developed for commercial production of formulated micro-encapsulated feeds for the larval stages. This would ensure adequate food supply to the larval stages.

## **Disease control**

Our knowledge on diseases in the cultured shrimps is meagre. A major disease breakout in the culture system (both in hatchery and pond) can have disastrous consequences. Therefore, it is essential to develop expertise in identifying the causative factors and combat the diseases before there is a major outbreak. Incidentally, there are a few reports of Baculo virus infection of tiger shrimps from the east coast. These incidences should be carefully monitored and remedial measures taken immediately so that the infection will not pose a major threat to the Indian shrimp culture industry. One must also be on the look out for other types of infections and diseases by regular monitoring of the system.

## **SUGGESTIONS**

To make shrimp culture an environment friendly, sustainable and profitable venture we would like to suggest the following course of action.

1. First and foremost, the local population should be convinced of the benefits accrued by establishing the aquaculture ventures and involve them in these projects.
2. Conversion of agricultural land and mangrove ecosystem should be minimised. Such WSA should be identified for this purpose which otherwise is a waste land.
3. Hatchery seed production should be further enhanced by establishing new hatcheries and increasing the production levels of existing hatcheries. More hatcheries on public section should be established to ensure adequate seed supply to small scale shrimp farmers. Until adequate seed supply is ensured, further expansion of farming activities should not be encouraged.
4. Viable technology should be developed to rear spawners under captivity so as to minimise dependence on wild spawners. This would make spawners available for hatchery at any given time and also lessen pressure on wild spawning population and the consequent impact on the capture fishery.
5. There is an urgent need for the development and commercial production of low cost, nutritionally efficient, indigenous feeds so that dependence on expensive imported feeds can be considerably reduced. There is scope for establishing a number of feed mills in India utilising the locally available raw materials. It is also important to develop indigenous technology for commercial production of micro-encapsulated feeds which

can substitute live feeds in the hatchery. This would also provide job opportunities to the local population.

6. Infections and diseases in shrimp culture system should receive greater attention. Enough expertise should be developed to identify and combat they diseases before destroys the entire system. As more and more farms are likely to go into production, the chances of disease outbreak will also increase. We should be well equipped and prepared to control the outbreak and minimise the damages.

7. Waste generation and accumulation (excess feed and excreta) are common in high-tech culture systems. To minimise the waste production, food rationing should be scientifically managed. Water quality of the farms and adjacent coastal waters should be regularly monitored.

8. We suggest that each maritime state should prepare a district-wise master plan delineating the suitable areas for shrimp aquaculture. These areas should be provided with all necessary infrastructural facilities such as common water intake and outlet channels, roads, electricity, freshwater, etc. and lease out the land to the entrepreneurs. Establishment of hatcheries and feed mills should be encouraged in all such districts so as to ensure adequate seed and feed supply to the shrimp farmers. We also suggest the formation of a district level technical committee which will monitor the environmental impact to the coastal ecosystem due to shrimp farming and should also be empowered to take necessary remedial measures.

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