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PRODUCTION AND EXPORT OF SHRIMP OF BANGLADESH : PROBLEMS AND PROSPECTS

M. M. Rahman and M. M. Hossain
Department of Fisheries, Ministry of Fisheries and Livestock, Bangladesh, Dhaka

ABSTRACT

A study on problems and prospects of shrimp production and marketing from Bangladesh on the basis of secondary information was carried out from July to October 08. Shrimp farming has emerged one of the important economic activities in Bangladesh and become the second largest export industry after garments. Shrimp aquaculture in coastal areas plays a major role providing employment, income and food security to remote coastal people where alternative livelihood options are limited. Shrimp culture system is extensive to improved extensive type with total production of 55000 mt of brackish water shrimp and 12000 mt of freshwater shrimp. In coastal Bangladesh, shrimp culture has led to many social and environmental problems. In export markets, shrimps are great but many challenges remain ahead because of increasing requirements of quality, food hygiene and development of technological and trade barriers in large shrimp markets in USA and EU countries. However, challenges lies with good aquaculture practice and competitive export, which are the effective tools for poverty alleviation and national development program for Bangladesh.

Key words : Production, Export, Marketing, Shrimp

INTRODUCTION

Shrimp plays an important role in the economy of Bangladesh. It is the second largest export industries after garments from which Bangladesh earned as US$ 456 m in the year 2006 (BFFEA, 2008). Among shrimp producing countries, Bangladesh ranks fourth with respect to area of shrimp farming and sixth in volume of production. The fisheries sector including shrimp, contributes about 6% to the national GDP and 5% to the national export earnings. Shrimp alone contributes about 93% of sectoral export earning and 4.99% of the national earning item in Bangladesh (DoF, 2007a).

However, shrimp culture is an old practice in the coastal areas in Khulna, Satkhira, Bagerhat and Cox's Bazar districts. In the past, people trapped tidal water in low lying inter tidal lands by constructing small dikes and harvested shrimp and finfish after 3-4 months. There was no stocking of fry under this system and only wild seeds of shrimp and fish carried by tidal water were allowed to grow without any form of management. Shrimp species harvested from the country are mainly black tiger shrimp (Bagda), brown shrimp (Horina), Indian white shrimp (Chaka) and giant freshwater shrimp (Golda).

After the independence of the country, interest in shrimp production grew with rising price and demand in international markets. Shrimp farms were establishing in peripheral lands near the mouth of coastal rivers where inundation of saline water is possible. From the late 70's to early 80's, shrimp culture system expanded steadily. The industry grew rapidly to the mid 1990's. There was concomitant growth of other allied activities including establishment of processing plants, ice plants and shrimp depots. Local shrimp hatcheries did not become established until the late 1990's. In 1994 white spot disease spreaded throughout the semi-intensive farms and extensive farms. Most investors incurred heavy losses in successive years and outsiders lost interest in this business.

Freshwater shrimp or Golda farming started in the mid 1970's and achieved steady growth during the late 1980's and 1990's. Such farming was subjected to less criticism than brackish water shrimp farming. Freshwater shrimp farms in rice fields were found mainly around coastal districts with some exception into inland districts with perennial water bodies. Environmental problems sometimes associated with shrimp farming were mainly related with habitat destruction and environmental degradation. Shrimp farming is associated with substantial social impacts and changes in pattern and distribution of wealth. Almost all farm produced shrimp are exported as processed frozen sea food. A percentage of cultured shrimp is locally consumed particularly in the main cities. Shrimp marketing is a complex channel from farm to processing plants through a network of intermediaries like faria (small traders), agents and depo holders. The processors sell to international buyers, although some get their products processed in local processing plants. Bangladesh shrimp export continues to grow except during 1998-99 due to the EU embargo on shrimp. The sector has not been able to expand its market compared with other competitor countries. The producers and traders of shrimp also faced marketing problem in terms of quality and standard imposed by international buyer and consumers, while the products suffered from lack of sustained access to greater global market. Therefore, the present investigation was done to identify the present problems and prospects on production and export of shrimp of Bangladesh.

MATERIALS AND METHODS

The paper is mainly based on secondary information most of which have been collected from the following sources :

(i) Recent annual and project reports of DoF, reports of other organizations like Export Promotion Bureau (EPB), Bangladesh Frozen Food Exporters Association (BFFEA), Bangladesh Bureau of Statistics (BBS) and Bangladesh Fisheries Research Institute (BFRI),

(ii) Available documents from different related research publications,

(iii) Documents from recent newspaper reports ; and

(iv) Information from upazila level offices of DoF at shrimp area.

RESULTS AND DUSCUSSION

Shrimp production in Bangladesh

Shrimp aquaculture is the fastest growing enterprise in Bangladesh. Traditionally shrimp aquaculture is practiced by trapping and holding the fry with incoming tidal water in the paddy field, enclosures and polders/impoundments. Fish, shrimps, crab etc. were being harvested from these areas. During 70's, Bangladesh started export of shrimp in the world market and simultaneously shrimp production got momentum through aquaculture.

Shrimp farming

Location

Shrimp farming areas were mostly concentrated in few upazila of the districts Khulna, Bagerhat, Satkhira and Cox's Bazar in early 70's. The shrimp farming area expanded very rapidly during 1980 – 90. In 1982-83, the area was around 39,496 ha, while now it is around 115,088 ha which is 3.43 times more than the past (DoF, 2007a).

Characteristics of shrimp area

Ecological characteristics of shrimp area are intersected by numerous rivers where river water contains salinity for 6 – 7 months of the year. Most of the land area is low lying and subjected to daily tidal inundation where tidal fluctuation varies between 2.25 – 0.75m. This tidal fluctuation along with salinity has major influences for the utilization of land.

Farming systems

Different types of farming systems have been evolved in shrimp areas. In case of Bagda shrimp, three farming system can be identified based on intensity of production. These are as follows :

a. **Extensive system** : Most of the shrimp farms are in this system. It is the tide fed traditional system of shrimp culture, selective stocking and feeding with local feed was done to increase production and productivity. Stocking density was 2-3/m^2.

b. **Improved extensive culture system** : There is a little difference between the extensive and improved extensive system except that the farms are of recent origin. Stocking density was also as the extensive system. Water supply was either tide fed or pump fed. High protein diets were supplied in this system.

c. **Semi intensive culture system** : The pond under semi intensive farms was homogenous and size varied from 1 to 2 ha. Pond dikes were higher than extensive type which accommodated about 1m depth of water. Water was pumped from adjacent brackish water rivers. Stocking density of hatchery post-larvae (PL) was at higher rate (10 – 15/m^2) supported by pellet feeding and artificial aeration through paddle wheels. The production ranged from 2 – 4 mt/ha from a single harvest per year. Semi intensive shrimp farming is uncommon in Bangladesh, only thirty seven

farms were established covering an area of 48 ha. These farms were converted to other uses due to the outbreak of white spot disease from 1994 (DoF, 2007a).

Stocking of post-larvae (PL)

Shrimp farmers stocked PL in several stages and many of them started stocking during the winter months at early November. Winter stocking is considered risky because of mortality due to law temperature. Normal stocking started from February. Total stocking density currently varied from 15000 to 30000/ ha with a density of 1.6/m^2 (DoF, 2007a).

Shrimp production

Average shrimp production in the past was less than 200 kg/ha and total average white fish production with shrimp in the shrimp sample farm was about 220 kg/ha (Nuruzzaman, 2006). Mixed cultivation of Bagda and Golda and other shrimp species is most common in coastal district, where 52% production in weight was Bagda and the rest was other shrimp species. Most of the shrimp farms harvested sizable predatory fish like Vetki (sea bass), Baila (gobbies) and Tengra (small cat fish). Recent field information revealed that Bagda shrimp production has increased significantly in last 2 – 3 years reaching about 200 – 250 kg/ha (DoF, 2007b).

Golda (Prawn) farming

Freshwater prawn (Golda) is very popular local food and was affordable by rural people. After 1975, prawn were being exported to the international market and the price was also increased gradually in domestic market. The prawn farming area was expanded very fast and it was about 10% per year. At present different categories of land and water bodies occupied about 50,000 ha for prawn aquaculture (DoF, 2007a). It was found that prawn was cultivated with other aquaculture species, agriculture and horticulture crops.

Benefit generated through shrimp aquaculture

Earning of foreign exchange

In 1998, earnings from shrimp export were about US$ 260m and export increased to US$ 456m in 2007 (BFFEA, 2008). This growth rate was about 20% over a decade. Table 1 shows the export statistics of frozen shrimp and fish from Bangladesh during 1997 – 1998 to 2006 – 2007. In the early 80's, Japan was the main importer of Bangladeshi shrimp. For last two decades, the USA and the EU countries have become the dominant markets for Bangladeshi shrimp. Amount and values of frozen fish and shrimp export to EU countries during the last six years are shown in Table 2.

High return per unit of land, labor and capital

The comparative economic rate of return was very high in case of shrimp production. The appraisal report of the Third Fisheries Project of DoF projected 20% return compared to rice and shrimp production remained much profitable per unit area. During 1994 – 95, crop season average income of shrimp per acre of land was recorded of Tk. 21,000 where for rice it was about Tk. 8,250.

Table 1. Fish and Shrimp export from Bangladesh during 1997 – 1998 to 2006 – 2007. Quantity : Million lbs, value : Crore Taka and million dollar

Year	Products	Weight (lbs)	Value (Crore Tk.)	Value (m $)	Percentage of contribution to total export earning (in Taka)
1997-98	Shrimp	41.07	1181.47	240.41	5.83
	Fish	19.78	151.65	33.43	
1998-99	Shrimp	44.28	1162.20	242.23	5.41
	Fish	14.07	153.95	28.09	
1999-00	Shrimp	62.73	1615.38	322.43	6.28
	Fish	11.50	107.13	21.39	
2000-01	Shrimp	65.37	1885.15	349.75	5.77
	Fish	11.33	72.64	13.48	
2001-02	Shrimp	66.61	1447.76	252.18	4.76
	Fish	21.75	137.38	23.93	
2002-03	Shrimp	56.48	1719.88	297.04	5.10
	Fish	17.09	143.39	24.77	
2003-04	Shrimp	73.05	2139.46	362.87	5.71
	Fish	11.43	161.46	27.38	
2004-05	Shrimp	74.20	2250.16	365.82	5.90
	Fish	21.91	337.82	54.92	
2005-06	Shrimp	83.80	2712.46	403.58	4.56
	Fish	24.06	373.19	55.53	
2006-07	Shrimp	88.12	3155.93	456.98	4.90
	Fish	24.03	402.85	58.34	

Source : BFFPA (2008)

Table 2. Export of Bangladeshi shrimp and fish to EU during last six years

Year	Total export (mt.)	Value (Million Tk.)	Export to EU (mt.)	Value (Million Tk.)
2001-02	41482	16370.00	19235	7925.70
2002-03	47371	19415.90	21941	9392.60
2003-04	54141	23634.70	25522	11775.00
2004-05	63377	25717.00	27508	12628.95
2005-06	68468	30300.00	29177	15230.00
2006-07	73703	3352.88	36851	1660.00

Source : DoF (2007)

Contribution of shrimp sector to the national economy and rural livelihood

The macro economic benefits from the shrimp sector include foreign exchange earning, diversification of the economy and the stimulation of backward and forward economic linkages. The shrimp sectors contribution to GDP was about 6% and shrimp generated

US$ 456.98 m in export revenue in 2006 – 07, which was accounted for 4.77% of the country's export earnings (BFFEA, 2008).

Social impact of shrimp farming

The positive impacts of shrimp farming and related activities increased employment and the growth of average wage rates in rural areas. Development of rural infrastructure, improved health, increased access to facilities such as tube wells, sanitary latrines, better housing, a decline in land sales, rise in land prices, greater household food security and greater earning opportunities for women were focused (Pokrat and Bhuyan, 2001).

Problems associated with shrimp farming

Outbreak of disease

Disease have had a devastating impact on commercial shrimp farming in Bangladesh. Amongst all the causative agents, viruses proved to be the most serious due to heavy mortality of shrimp which collapsed the industry in many costal areas of Bangladesh. Among all the viruses, the most serious was white spot syndrome virus (WSSV).

Social problem

In shrimp farming area, growth and production were related with social problems such as conflicts over control of land, water and natural resources, landlessness, unequal distribution of the benefits of shrimp farming, human right violations and gender inequality. Most of the social problems were created by a small wealthy class in the shrimp growing regions that led them to migrate due to poverty of the rural areas.

Environmental problems

Unplanned and rapid expansion of shrimp farming in Bangladesh has caused some environmental problems and ecological changes. Soil salinity, water salinity in canals and ponds, scarcity of drinking water, loss of agricultural land and grazing land and consequent reduction of livestock, destruction of mangroves, over exploitation of wild post larvae of shrimp, reduction of aquatic resources and bio-diversity, loss of trees and plants and adverse effects on cropping intensity, cropping pattern and crop diversity were identified as some of the important environmental problems.

Shrimp marketing

A percentage of cultured shrimp was locally consumed particularly in the main cities. Marketing of shrimp was channeled from farm to processing plants through a network of intermediaries such as faria (small traders), agents and depot holders. Farmers sold either directly to depots or to farias who in turn sold to depots. Faria worked as buying agents of the depots owners who then sold to the processing plants through commission agents. The processors sold to international buyer although some got their products processed in their local processing plants and then exported. In the year 2006 - 2007, the sell values of total agricultural commodities from Bangladesh were US$ 832.27 m. Among the exported commodities included fisheries, raw jutes, tea, vegetables and fish totally contributed US$

526.76m (63%) of total export value and other contributed US$ 305.51m (37% of total export value) which are shown in Fig. 1. In the early 80's, Japan was the main importer of Bangladeshi shrimp. For last two decades, USA and the EU countries have become the dominant importers of Bangladeshi shrimp. Amount and values of frozen fish and shrimp export to EU countries during the last six years are shown in Table 2.

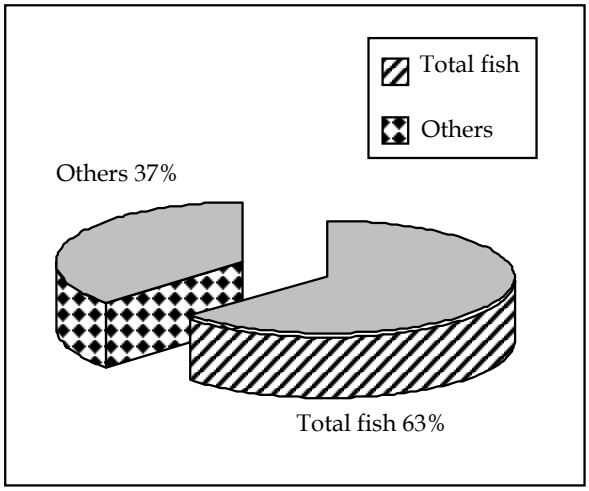

Fig. 1. Place of fisheries in export of agricultural commodities

Quality assurance of shrimp product

External buyers were not satisfied with quality and safety assurance of Bangladesh and now imposed some hard conditions. Particular importance by EU of new system of quality and safety for fish and fish product are hazards analysis critical control point (HACCP), traceability for the quality of aquaculture raw materials. The HACCP is the system of monitoring quality at critical points along the seafood production chain, introduced by the US government ten years ago, has become universally accepted. The HACCP approach provides the greatest protection for the consumer than any of the other approaches for food safety, which includes line inspection, sanitary inspection, raw material testing for indications of fecal contamination, daily contacts surface sanitation and in process of product testing and finally end product challenge test (Bhuiyan, 2007).

Traceability of food and fisheries items are becoming as burning issue in the EU countries. According to the International Organization of Standardization (ISO), traceability refers to the ability to trace the history, application, or location of an entity by means of recorded information. Basically, traceability deals with food safety but due to increasing concern of environmentalist and from humanitarian ground some other issue came to focus. Traceability helps to recall easily a product from the market hence the chances of consumer's life threatening risk reduce well (Ahmed, 2007).

Production of seafood depends on the use of quality and appropriate or recommended dose of raw materials used in the shrimp farms. All the raw materials used in different

phases of shrimp culture like hatcheries, culture ponds must be harmless and recommended with its prescribed doses.

Challenges facing the export marketing of Bangladeshi shrimp

Now international trade is becoming more regulated and it is difficult to deal with specially for smaller business operators and developing countries. The two main trading blocks- the USA and the EU are making difficult rules to enter in their markets. Food safety is an important issue to have emerged in recent years. Safe and dependable production of quality seafood export to the global market is recent challenge for Bangladesh. Previously quality issue mainly dealt with decomposition, filth content and pathogenic bacteria contamination from post harvest chain. Recently environmental aspect, human rights, such as child labor, gender issue etc. has gained momentum. These have been compounded by enactment of the Bio-Terrorism Act, Anti Dumping Act and Traceability regulation for shrimp business sector (DoF, 2006). High production cost diminishing selling prices, the absence of quality seed, high incidence of diseases and crop failures now making shrimp culture gradually inviable in Bangladesh. Bangladesh is a natural calamity prone country where every year cyclone, flood, drought hit shrimp farm and processing plants.

CONCLUSION AND RECOMMENDATIONS

The shrimp sub sector now are facing high competition in world market, although average production cost of Bangladeshi shrimp is relatively high due to low technology and aquaculture system. The following measures might be required in building efficient production management and marketing system :

1) All shrimp farms should be taken under registration for better monitoring that may lead to safe production;
2) Inputs of the shrimp farm should be selected very carefully that will not create any harm to the environment;
3) To improve the post harvest supply chain, it is required to support for establishing the shrimp/fish farmers group which lead to encourage coordinated harvesting;
4) Building training capacity for shrimp farming, processing and hatchery operating is needed;
5) Credit support programs for shrimp farmers should be introduced to improve through promotion of contact growing schemes;
6) Quality shrimp feed at low prices should be ensured supporting with development of feed mills;
7) To improve the shrimp quality farm should be practiced standard aquaculture health and better post harvest handling should be practiced;
8) Ice plants should be established as per FIQC standard at rural areas which will produce quality ice for fish, shrimp and prawns;

9) Infrastructure for whole sale market should be established with provision for storing beyond the day receipt;
10) Service center, depots or arats should be developed as per standard and should bring under license system;
11) Fish Inspection and quality control wing of DoF should be strengthened for providing support to the processing plant specially as per HACCP requirement;
12) To facilitate genetic improvement programs for farmed fish and shrimp stock, the programs should be involved with DoF, BFRI, universities and private sectors;
13) Appropriate extension network should be built and guided by applied research for aquaculture;
14) Disease free certified shrimp PL. fish fry and other inputs to be supplied within affordable price to farmers;
15) Promote diversification into other brackish water aquaculture species like mangrove crab and marine finfish; and
16) Bangladesh need to introduce new shrimp species *Penaeus vannamei*, which will reduce production cost and increase production like other Asian countries.

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