

SHRIMP CULTURE RIGHT FROM SEED TO MARKETING AND STORAGE: COMPREHENSIVE STUDY OF VILLAGE DHAMAKHALI, NORTH 24 PARGANAS

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Abstract

Aquaculture is aqua based culture. In this globalization era where all production become profitable, aquaculture also not an exceptional but create a new imprint in global market. Where India and Bangladesh plays a major role in total production. Now small riverside villages, coastal land make profit through this culture Dhamakhali is a midsized village located in the district of North 24 Parganas (sandeshkhali 2 block) in the state of West Bengal in India. Dhamakhali, actually, is at the confluence of two rivers- Chhoto Kalagachhia and Rampur. Hatchery cycle is very well maintained in this area. This village totally dominated by shrimp farming and also creates a local market base. But recently the area face problem for salt water seepage in field and degrading the production.

Key words-Aquaculture, Globalisation, Hatchery, Shrimp.

INTRODUCTION :

Aqua based production and trade in aquaculture products continues to grow at a fast pace, responding to increased global demand for fish, shrimp, molluscs and other aquatic products. In 2004, aquaculture production reached 59 million tonnes, with a farm gate value of \$70 billion. Developing countries dominate aquaculture production and trade, contributing over 80% of production and 50% to the value of internationally traded aquatic products. Aquaculture is making an increasingly significant contribution to the global seafood trade, as well as to domestic consumption, and will continue to grow due to stagnating wild capture fisheries supplies.

With increasing volume of production, trade and consumption there is a concurrent and increasing demand for improved sustainability, social acceptability, and human health safety from the aquaculture sector. To assist in achieving these objectives, the members of the Food and the Agriculture Organization of United Nations (FAO) in

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1995 adopted the Code of Conduct for Responsible Fisheries, providing a framework for responsible development of aquaculture and fisheries.

INTERNATIONAL ASPECT

Shrimp Farming

Shrimp farming has been one of the fastest growing aquaculture sectors in Asia and Latin America, and recently Africa, but also one of the most controversial. Rapid expansion of shrimp farming has generated substantial income for many developing countries, as well as developed countries, but has been accompanied by rising concerns over environmental and social impacts of development. Major issues raised include the ecological consequences of conversion of natural ecosystems, particularly mangroves, for construction of shrimp ponds, the effects such as Stalinization of groundwater and agricultural land, use of fish meal in shrimp diets, pollution of coastal waters due to pond effluents, biodiversity issues arising from collection of wild brood and seed, and social conflicts in some coastal areas.

The FAO Committee on Fisheries Sub-Committee on Aquaculture in its second session held in Trondheim, Norway, in 2003 agreed that a set of “core” management principles should be developed to support sustainable development of aquaculture, with a priority to shrimp farming requiring improved management. The recommendation and partnership provides the basis for development of an internationally accepted set of principles that can be widely adopted.

TABLE: SHRIMP CULTURE GROWTH RATE BY MAJOR PRODUCING REGIONS:2005-2009 vs. 2009-2013

Continent / Country	2005-09	2009-13
S-E ASIA	6.3%	4.4%
CHINA	10.6%	0.4%
INDIA/BANGLADESH	-4.0%	10.9%
AMERICA	5.7%	4.8%
AFRICA	3.1%	10.0%
SOURCE :Fisheries and aquaculture information and statistics service.		

NATIONAL ASPECT

Agriculture and fishing in India have traditionally been strong export markets. For instance, roughly 70% of the overall population remains rural, and in certain states, like Andhra Pradesh, farming is a major part of the economy. Roughly twenty years ago, some people in this state began to experiment with small-scale shrimp farms. While some of these people have been fishermen who have been seeing a recent

decline in catches in the ocean, most are private businessmen. Fairly recently, over the past five years or so, aquaculture has taken off in India. It is no longer the enterprise of small-scale farmers. Rather, Indian business is investing heavily in this industry. Currently, there are over 80,000 hectares of shrimp farms which are expected to grow rapidly.

DESCRIPTION

Marine product exports from India have grown from Rs. 4 billion in 1985-6 to Rs. 8.75 billion in 1990-1. Many of India's big ten business conglomerates have gotten into the business of aquaculture. The Tata Group has gone into collaboration with the state government of Gujarat to establish a shrimp farm worth Rs. 80 million. Tata Iron and Steel, a subsidiary of Tata Group, has established a Rs. 200 million aquaculture project in a joint venture with the Orissa state Government. The Thapar Group, another of the big ten, has invested in a 110 hectare farm near Nellore in Andhra Pradesh. Finally, Unilever, a subsidiary of Hindustan Lever Ltd., has been involved in shrimp hatcheries in the states of Tamil Nadu and West Bengal. These projects had been started as far back as 1977. This is because aquaculture provides a quick profit with a quick turnover. Therefore Indian business finds it very lucrative. Much of this excitement over aquaculture comes from the fact that shrimp is a short duration crop that receives high investment returns and enjoys an expanding market. Another use of aquaculture is that it provides employment. The World Bank, for instance, has lent \$96.8 million for the development of Indian aquaculture. The World Bank expects aquaculture to create about 2 million jobs for India. Furthermore, aquaculture employs those fishermen who have been unable to compete with large corporate fishing vessels for the diminishing limited resources of the seas.

In addition, ground water resources in nearby location are being spoiled because they are also becoming highly salinized. Unfortunately, Salt water from the ocean is pumped into these shrimp ponds in order to sustain life. The need to continually replenish and replace this water ends up spoiling the underground drinking water for people living nearby.

Salt is not the only problem which comes from seepage. Another problem is that shrimp farmers use many pesticides, some of which are banned in other countries. Not only does this pesticide seep through and affect other farming and drinking water, but it also break down the immune systems of the shrimp themselves. Because of this environmental uncertainty, which is added to an erratic market that aquaculture is normally subjected to, PREPARE projects the average life of a shrimp farm is only about five years. Therefore, environmentalists argue that aquaculture is

a scheme where the rich get richer while creating a negative impact in the overall national economy.

CASE STUDY ON DHAMAKHALI

The traditional brackish water pond culture is widely practiced now in India (macro scale) as well as in dhamakhali (study area as micro scale in sandeshkhali 2 block). The main species are white fish and shrimp, which collected from river at the time of "morani" as natural fry, which usually considered by farmer. The useful time is magh, falgun and chaitra in Bengali year. But the species *P.monodon* stocked by farmer as a main crop or with white fish. In dhamakhali (sandeshkhali 2 block) shrimp is main crop (there is no agricultural land). The basic economy of that area also based on the min collection from the river, which dominated by women of that area. Production is dependent on the abundance of wild fry and the season. In traditional culture fertilizer is used very rare only at the time of pond preparation for grow out season. Production depends entirely on the natural condition. Yields are low, though the process is totally natural and in natural process species is more resistant to diseases.

Due to the rapid progress the culture has been transferred into scientific as well as business centric culture. And the production increased to 600 to 1000/kg/ha/year with supplemental feeding. But there is also develop the multi level culture from min harvest to market (**fig 1**).and they introduce a broad porous market based economy to of that area that leads to the transformation of agricultural land (low profit land) to aquaculture (high profit) but in this transformation aila play an important role. Shrimp farms use a one-phase or two-phase production cycle. With the two-phase cycle, they stock juvenile shrimp from hatcheries in nursery ponds and then, several weeks later, transfer them to grow out ponds. With the one-phase cycle, the nursery ponds are eliminated, and the shrimp are stocked directly into grow out ponds, after having spent a short period in acclimation tanks (more below).

LOCATION:

Dhamakhali is a mid sized village located in the district of North 24 Parganas in the state of West Bengal in India. It has a population of about 2781 persons living in around 467 households. The distance between kolkata and dhamakhali is about 40 kms (25 mile). The geographical location of dhamakhali is 22-21-20 sec N and 88-52-32 sec E.



IMAGE 1: LOCATION MAP OF DHAMAKHALI.

TYPES OF SPECIES :

WHITE FISH	SHRIMP
Telapia, Parse, As parse, As vangon, Gol vangon, Pona.	Bagda, Chingri, Honne chingri , Chamne chingri, Chapra.

SOCIO-ECONOMIC CRITERIA

- a) LAND COST: Land cost determines that economic evaluation can be determined at present and also compare with past. In our study area we find that the supplemental economic base is formed due to the non-agricultural land. But till now the traditional farmers do not give any tax to the government though the land is used for shrimp culture .
- b) ACCESSIBILITY: It is more important for daily as well as for any type of economic operation .cost must increase if equipment carried out by hands. It is mainly the symbols of high technology and low cost. So accessibility is more important for marketing.
- c) In dhamakhali (Arshad Molla`r hat), we came to know by market survey that the road construction is so bad and they use 407 for marketing mainly. And in dharirjungle we also found that farmers brought their product to dhamakhali for marketing by sheep.
- d) MARKETING OUTLETS: Market have an impact on management. If the shrimp have to be shipped. Some distance to a market it give a better opportunity to take market. In our study area there is a local market from where the product distributed towards major market like MALANCHO , SEALDAH , KOSBA , BARASAT etc.

- e) LABOUR: Primary labour related to fry collection mainly living adjacent to the firm side and also they are very cheapest. And in veri, labour hired for food distribution , cleaning up the pond, security, shrimp collection etc.

In our study area we found the wage structure of labour in a veri.

	Men/ fishery	wage	Women	Wage
BIG VERI	25 men	3500-4000	3-5	2500-3000
SMALL VERI	Family women Dominated.	-	-	-

Source : primary survey.

MAJOR FINDINGS:

West Bengal ranks second and third respectively in terms of area under shrimp culture and production with respect to all India total. Data are collected from two village Dhamakhali and Dwarirjungle in sandeshkhali 2 block. We have used FGD and household survey method to select the farmers and their size holding of land by structured interviews. Before getting into the analysis it is important to have a brief idea about the history of shrimp culture in the study areas, which gives us certain insights. In Sandeshkhali-II block there was no brackish water shrimp culture before 1975. Only tank fisheries existed in this area. Local people used to lead a life of immense hardship depending on cultivation of paddy and out-migrating as casual labourers for their livelihood. One-crop paddy cultivation was the major means of land use in this area. In 1992-93 *boro* paddy cultivation started with the help of additional irrigation facilities. But in early 1997 because of low water level, irrigation became a major problem for the paddy cultivators and they reported low returns. The farmers faced a grave situation and as an alternative shrimp culture in owned land started sprouting. On the other hand, farmers who had leased out their land to big fisheries started facing problem of repayment of the lease money or in some cases profit shares. The landholders who could not use their land in other ways, decided to culture shrimp on their own, so that in the years of good production, good returns will be ensured. Similar was the case with Darirjungal Gram Panchayat where the large shrimp farms started coming in 1985 and many small farmers had leased-out their river side lands to big fisheries. Recently, after 1996 farmers have started culturing shrimp in their own land.

METHODS: the study totally done by personal questionnaire and focus group discussion.

CULTURAL COMBINATION

The study area consist mainly shrimp culture. The whole areas have 2 big veri of about 200 bigha to 700 bigha. Without this there are small pond cultures. There are a combination of shrimp and white fish (tilapias , parse, vetki. Crab). There is no combination of shrimp and paddy in dhamakhali. But in dwarir jungle we found some farmer who related firming as well as aquaculture. But in the combination of shrimp and fish, time factor is more important. Shrimp dominated in January to April when white fish happening throughout the year.

Cultural way also play an important role in controlling the production of shrimp. There are three basic type of culture . EXTENSIVE culture includes low input systems by low stocking densities , no external nutritional inputs, tide based water exchange and the production less than 500 kg/ha/year. SEMI-INTENSIVE way includes fertilizer use, combined with supplemental feeding , intermediate stocking , occasional pumping of water and yields of 1-2 tones/ha/year. And INTENSIVE means high density of fry, formulated complete feeds , aeration and water pumping with yields of more than 2 tones/ha/year. In our study area the main way is extensive traditional method including monoculture and alternative cropping culture.

SOURCE OF FRY:

Fry means the number of young species. In our study area the local women and then send collect most sources of fry to hatchery. But in big farmers does not depend upon the local min, they import min from Chennai and hydra bad.

TABLE: Price of min.

	PRICE
LOCAL MIN	300 Rs / 000 piece
IMPORTED FRY (MIN)	400Rs/piece

Source: primary data.

The Hatchery Cycle: Whether gravid (ready-to-spawn) shrimp are captured in the wild or matured in the hatchery, they invariably spawn at night, but with photoperiod manipulation, they can be induced to spawn at any time. Depending on a number of variables (temperature, species, size, wild/captive and number of times previously spawned), they produce between 50,000 and 1,000,000 eggs. After one day, the eggs hatch into nauplii, the first larval stage. Nauplii, looking more like tiny aquatic spiders than shrimp, feed on their egg-yoke reserves for a couple of days, and then metamorphose into zoeae, the second larval stage, which have feathery appendages and elongated bodies but few adult shrimp characteristics. Zoeae feed on algae and a variety of formulated feeds for three to five days and then metamorphose into mysids, the third and final larval stage. Mysids have many of the characteristics of adult shrimp, like segmented bodies, eyestalks and shrimp-like

tails. They feed on algae, formulated feeds and zooplankton. This stage lasts another three or four days, and then the mysids metamorphose into postlarvae. Postlarvae look like adult shrimp and feed on zooplankton, detritus and commercial feeds. (Ref; Scholarly article of poulomi bhattachariya.)

In shrimp hatcheries, live food is provided throughout these early larval stages to improve survival and growth. As farms evolve from low to high stocking densities, the quality of feed becomes very important. Most extensive farms (low stocking densities) don't feed at all; shrimp feed on naturally occurring food organisms in the pond. Other extensive farms use small amounts of feed and fertilizer to stimulate a natural food chain. On semi-intensive farms, with many more shrimp scouring the bottom of the ponds, most of the feed is consumed by the shrimp and less is available to serve as a stimulant to the natural food web. Therefore, the quality of the feed is more important because the shrimp get most of their nutrition from it. On super-intensive farms, where bacteria develop, the shrimp graze, so the protein levels in the feeds can be reduced. Hatcheries, which maintain concentrated stocks of live feeds and developing larvae, are particularly susceptible to diseases, which can be introduced with each new batch of wild brood stock, a known source of pathogens.

Symptoms: Swimming on surface. It indicates the high density of water and less quantity of oxygen..shrimp size become different.. Gap between muscles and damage.. Body colour become red and shell become soft.. water deposited at tail. . Gill appearance dirty and gill colour become red and black.

All economic activity has an importance that how the activity relate to economic profit. Shrimp culture in modern perspective is very important for their profit structure. It give twice of investment to the farmers. So the culture leads to international marketing from a village of west Bengal. And the local market also controlled by world market.

TABLE : PRODUCTION COST PER BIGHA AREA.

	PRODUCTION COST	QUANTITY
PLs	450 Rs /000 piece	1500 piece /bigha
LIME	20 Rs	2 kg / bigha
FERTILIZER	9 Rs (qurine)	150 gm
POND PREPARATION	800 Rs / bigha	-
FOOD	900 Rs	1100gm / 22 days
UREA	180 Rs	3 kg / bigha
PHOSPHATE	30 Rs	3 kg / bigha
LEASE MONEY	2500 Rs	Yearly
Dap (1026)	1250 Rs	-

SOURCE: primary survey.

From primary source we also came to know that an owner of big veri can profit upto 15 lakh/ year. And where expenditure is only 7 lakh per 500 bigha. So per bigha the cost benefit ratio(CBR)is 1400 : 3000. per secession of shrimp culture. And in small firm farmers also benefit twice of their investment.

MARKETING : Marketing is the very promising factor for any type of culture and to form economic base. In our study area the hasan molar hut is only one market place from where the distribution is done. The neighboring locality of that area also uses this market to sell their product. The owner of "ARAT" only take that product and send for kolkata and also for higher international market like Germany, china, Singapore.

The price rate of that product is determined also by global market on the basis of grade (weight of shrimp without head).

TABLE: SHRIMP GRADE OF GLOBAL MARKET

GRADE	QUANTITY	PRICE STRATA
A	15 piece / kg	Very very high
A1	22 piece / kg	Very high
B	25 piece / kg	High
B1	31 piece / kg	Moderate
C	36 piece / kg	Low
D	41 piece / kg	Very low
Pd	Soft fish	Very very low

SOURCE: MARKET SURVEY.

TABLE: PERSPECTIVE OF ARAT OWNER ABOUT MARKETING OF FISH.

NAME	Area from fishcoming	Fish	remarks
Md. Abdul Molla	Manipur , gopalghat	Bhangar , Shrimp , Bagda , Vetki	a)from min collection to arat there are many middleman. b)international market increases the profit like japan and Thailand. c)vehicle uses for local area is "407". d) Local market only get the pd grade shrimp. e) No store facility. Only 1000 to 2000 kg can store by ice. f) Price depends upon quality and grade of shrimp. g) No govt. help. h) road facility is not good. i) profit become 500000 per year and also become loss of 300000.

Akbar Gazi	Manipur. Gopaler ghat , atapur, rampur and sandeshkhali.	Vetki , bagda , golda , parse are main fish.	bought by agent under the auction period. Price depends upon the size. And price also high at march april period and low in monsoon due to high rate of production. Fish send to the company from local market like ITC , IFB , COSBA DIPO , SAMPUO. Only calculator and mobile phone use as toll of connection. Average income 40000 per month. "arat" owner gets 7rs /00 fish for marketing as commission.
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SOURCE: market survey.

STORAGE: Storage facility is more important for perishable goods like fresh vegetable, fish etc. but in this area there is no cold storage facility to store that products. Only 1000 to 1500 kg fish can store in a small store but not for long time. Though the area send their entire product to haldia for international market or to nearest buyers market like sealdah, kolkata , kosbe etc. everyday by the end of noon all owners send their product due to poor storage facility.

MAJOR PROBLEM:

- Uncontrolled expansion of the shrimp industry led to:
- immense environmental and social problems
- Degradation and loss of natural coastal resources
- Unsolved pollution problems
- Despoiling local estuaries and inshore coastal bays
- Fish breeding and nursery habitats lost to shrimp farms.
- Shrimp aquaculture requires clean water , yet for higher production, over feeding, antibiotics, pesticides, chemicals foul the water.
- Buildup on pond floor unused feed, feces lead to shrimp diseases and toxification of pond waters.
- Danger of genetic contamination and lowering biodiversity, especially when farm raised shrimp are released into the wild.

CONCLUSION

At the concluding part of study (about shrimp culture), we can say that the area is dominated by shrimp culture and the future perspective also will be better. But some government help is required for development of that area and also some social action like education and health must be broadened so that every person can be a part of that economy. But due to continuous seepage of sea water into the river may create a problem in the close future.

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