

Shrimp Fry Collection as Alternative Livelihood: A Case Study on the Southwest Coastal Region of Bangladesh

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Abstract

Shrimp fry collection has contributed to a greater scope as an alternative occupation for the livelihood of the marginal farmers at the southwest coastal belt of Khulna since 1970s. This paper attempts to find out the livelihood approach of shrimp fry collectors. In the livelihood approach, human capital, social capital, physical capital, financial capitals and natural capital are considered. All those are taken as factor of indices to come to the conclusion of shrimp culture as an alternative occupation to the livelihood of the marginal farmers of the southwest coastal belt of Khulna. The outcome shows that majority of the poorest fry collectors livelihoods are not secured for a greater part of the year. The areas can be described as 'distressed livelihoods', they face multiple vulnerabilities caused by environmental hazards, market-related risks and income uncertainties which enhance the overall threshold of vulnerability. So a policy and strategy should be adopted to improve these marginal population livelihoods.

Key words: Shrimp culture, fry collector, livelihood, human capital, social capital, physical capital, financial capitals, natural capital.

Background of the study

The Southwest Coastal Region of Bangladesh is a tidal flood plain located at the southern end of the Ganges delta in Bangladesh. People in south-west coastal region were highly dependent on the natural resource base to sustain their livelihoods (Halim et al, 2001). The shrimp sector was the third largest earner of foreign exchange of Bangladesh (Ahmed, 1996). There are various types of livelihoods in the coastal region of Bangladesh. The shrimp fry collectors are new alternative livelihoods and have a great prospect in Bangladesh. It is estimated that nearly forty-five percent of the landless households living in the coastal region are involved in shrimp fry collection, and this combined with shrimp fry trading contributes nearly 60% of the total income of landless people (Hossain, 2006). Since 80s fry collection has become the chief source of livelihood for women and children in many coastal areas (Halim et al, 2001). It is difficult to determine how many people are actually involved in fry collection since some are engaged in the activity on a full time basis and some as a part time occupation. Fry collection also makes a significant contribution to the shrimp related incomes of the marginal farmers who are mostly poor or moderately poor. It is estimated that between 100,000 and 300,000 people are involved in fry collection (Frankenberger, 2012). In many areas, richer farmers forcibly have taken land from

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poorer people for shrimp farms and the rural poor people then become converted to laborers and were engaged to collect wild shrimp larvae (or fry) from coastal rivers and marshes (Khatun, 2004).

During peak fry collection periods (locally known as Ghone), women spent the entire night for collecting fries. Shrimp fry collection starts from the month of Boishak (mid April) and peaks in the month of Jaishtho (mid May). This fry collection continues through the month of Bhadro (mid September) when the numbers of fry collected start falling (Halim, 2001). Most women and children maintained their livelihood by collecting shrimp fry, preparing gher as day labourers, clearing the shaowla and working in the processing plant. Most of the shrimp fry collectors collected fry in the Shibsha, Pashur, Mongla, Chunkuri and other rivers of greater Khulna region (Hossain, 2006). Men and women frequently borrowed from private money lenders (dadondars) and shrimp fry traders at excessive interest rates in order to purchase boats and fishnets. High levels of indebtedness were the common feature of the areas. Shrimp culture has changed the livelihood pattern of the coastal region people of Bangladesh. The development trend of the shrimp fry communities was too much low. Most of the shrimp fry collectors were living with great sorrows. This study would be helpful to find out the vulnerability of the shrimp fry collectors community.

General Overview of the Shrimp Sector in Bangladesh

Coastal shrimp aquaculture was initiated in Bangladesh in the 1970s. Bangladesh possesses certain natural factors that have favored the development of the shrimp sector (BCAS, 2001). In particular, Bangladesh has a big inter-tidal range and large areas of low-lying land. It is estimated that there are 2.5 million hectares of tidal land in the coastal areas. Large areas of flat land have been available for expansion of aquaculture production. Coastal shrimp aquaculture is mainly confined to two Divisions: Khulna and Chittagong. More than 70 percent of the shrimp farming takes place in the Districts of Khulna, Satkhira and Bagerhat in the Khulna Division. In Chittagong, coastal shrimp aquaculture is carried out in Coxes Bazaar, Chittagong and Noakhali (WB/NACA/WWF/FAO 2000).

Expansion of shrimp cultivation has also resulted in forced displacement of marginal farmers and the landless from common property (Khas lands) and has led to the privatization of public lands. The introduction of the shrimp economic system has led to growth in income inequality and the exacerbation of existing unequal gender and class relations. Shrimp farming provides a new context in which gender and class modes of domination operate (BCAS, 2001). There were 18 NGOs that operate in the study area. There were no programs exclusively carried out for fry collectors in the entire area.

Main Shrimp Collection Areas and Peak Seasons for Wild Shrimp Collections over the Past Ten Years

Table 1: Main Shrimp Collection Areas

Division of the country	Coastal District	Coastal Thanas	Main fry collection area
Chittagong	Cox's Bazar	Teknaf, Ukhia, Cox's Bazar Sadar, Moheskhali, Chokaria,	Teknaf, Naf River, Shapari island, Ukhia, Sonarpara, Cox's Bazar, Bakhali River, Matamuhuri River, Moheskhali Channel, Chokaria, Napithkhali, Chofuldandi, Moheskhali and Sonadia islands
	Chittagong	Banskhali, Double Mooring, Sitakunda, Mirsharai, Anowara	Potenga, Sitakunda, Mirsharai, Anowara
	Feni	Sonagazi	Sonagazi, Muhuri River
	Noakhali	Noakhali Sadar, Companigong, Hatiya	Down stream of Meghna River
	Loksmipur	Ramgati, Loksmipur	Ramgati, Loksmipur
Barishal	Bhola	Charfassion	Down stream of Meghna River
	Barguna	Patharghata	Bishkhali River, Baleshar River
	Potua khali	Kalapara, Potua khali Sadar, Galachipa	Mohipur, Galachipa, Charkajal, Andharmanik River, Kuakata sea beach
	Perojpur	Motbaria, Perojpur Sadar	
Khulna	Bagherhat	Rampal, Mongla, Morrelgong, Bagerhat Sadar	Pashur River, Panguchi River
	Khulna	Paikgacha, Koira, Botiaghata, Dakope, Dumuria, Tala	Sibsha River, Bhadra River, Kapotakshi River, Koira
	Satkhira	Satkhira Sadar, Debhata, Assasuni, Shamnagar, Kaligong	Ishamati River, Kaksheali River, Kalindi River, Kholpetua River, Madar River

Source: Case Studies on Shrimp Aquaculture Management in Bangladesh: Components of the WB/NACA/WWF/FAO Programme on Shrimp Farming and the Environment 2000.

Objectives

- To evaluate shrimp fry collectors' livelihood through the sustainable livelihood framework.

Materials and Methods

Two types of data (primary and secondary) were collected for performing this research work. For the study purpose, social science methods and tools were used including households questionnaire survey, focus group discussion and interview of resource person to collect information and insight.

Observation of the shrimp fry collectors' community has been made by taking photograph of their housing conditions, observing practices of indigenous technology and other service facilities.

Observation survey was conducted to collect the various qualitative information, which were directly or indirectly influenced their livelihood. After reconnaissance survey (observation survey) in the study area, a well-defined and structured questionnaire was prepared. Sample household survey was conducted using structured questionnaire that also included mostly open-ended. Mainly the household heads were interviewed. The sample survey that covered the study area, analyzes the livelihood of the fry collectors through a technique named “Cluster Sampling”. In cluster sampling, the population was divided into nine groups and it was done on the Geographical basis. Each group, which was considered as cluster, was treated as sampling unit. Those clusters were defined on i.e. *Para, Mohalla, Colloney and Bari etc* basis. Each cluster enclosed the near about neighboring houses. The sample size was determined by considering every cluster as a single unit for the study. Then 10% households of the respective clusters were remarked and surveyed randomly. Only those households were surveyed who directly or indirectly depend on shrimp fry collection activities because in this study only the shrimp fry collectors were the target groups.

Books, Reports, Journals and other published documents were used to collect the basic and relevant information for the study as secondary data.

Result and discussion

Profile of the study area

Khulna is the third largest well known divisional city of Bangladesh. Khulna lay on an important location at the lower extreme of the Ganges delta. Paikgacha upazila is situated at the middle part of Khulna district and to the south-west direction of Khulna Metropolitan area. Paikgacha is the smallest upazila of Khulna district in respect of population.

Table 2: Demographic information of the study area

Year	Population			Growth rate (%)	Density Per sq km.
	Male	Female	Total		
1981	1849	1577	3426	2.55	427
1991	2817	2392	5209	2.51	542
2001	4272	3482	7854	2.42	683

Source: BBS 1981,1991 and 2001

The upazila consists of 10 unions, 171 mouzas and 212 villages (BBS, 2001). The average household size of the upazila is 5.5 persons. The upazila occupies an area of 411.91 sq km including 27.32 sq km river area (BBS, 2001). The study area is situated at the Gruaikhali union of Paikgacha upazila. Population growth rate was high due to intensive illiteracy of the inhabitant. They were completely deprived from the light of modern civilization and knowledge.

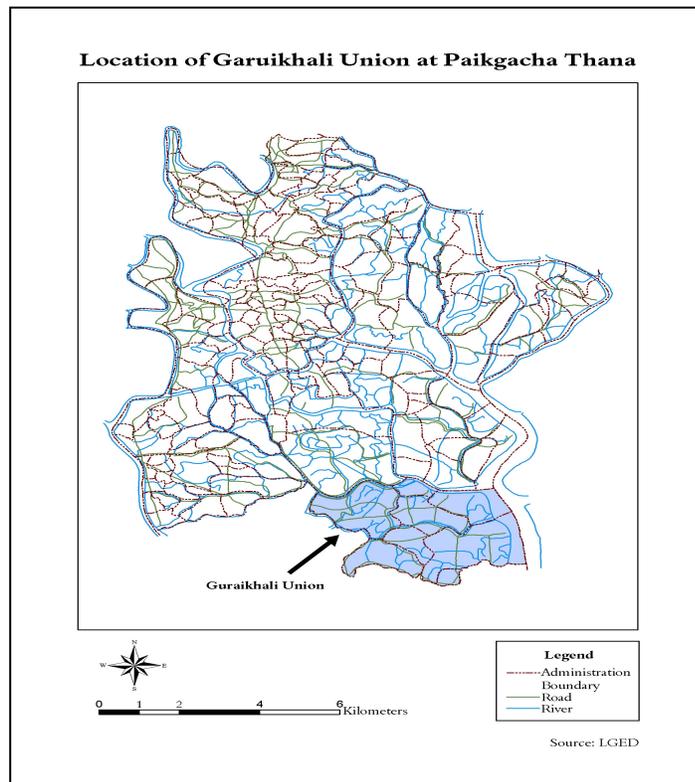


Figure1. Location of the study area

Existing land use

Diversified uses of land were common feature of the study area. *Khals* and canals were used for shrimp culture. Some lands of the study area were predominantly used and some were seasonally used for shrimp culture. Rest of seasons those lands were used for agricultural purposes.

Table 3: Existing land use pattern of the study area:

Land use	Total area (acre)	Percentage (%)	
Settlement	924	26	
Commercial	143	4	
Water body	Pond, ditches, River	285	8
	Permanent <i>Gher</i>	355	10
<i>Ghaer</i> & Agriculture	675	19	
Agriculture	712	20	
Institution	249	7	
Road	107	3	
Others	106	3	
Total	3556	100	

Source: Union council record book, 2001

Some lands, which were totally free from shrimp cultivation and used for permanent irrigation purposes were considered as pure agriculture land. Physical conditions of road networks were partly semi-pucca (Haring born bond) and mostly khacha (mud). Settlement was another significant feature of land using, which covered most of the highlands of the study area. Land using pattern of the study area was mainly dominated by a low and low-middle income shrimp fry collectors settlement.

Livelihoods

The livelihood approach is more established on food security. An important strength of the livelihoods frame is compared to earlier development frameworks. It emphasizes peoples potential in a holistic way rather than stressing on their problems, constraints and needs. It understands that livelihoods and institutions that influence and shape livelihoods are dynamic. The sustainable rural livelihoods framework is a qualitative approach seeking to understand relationships rather than producing quantities figures. DFID (2000) employs the framework to derive sustainable means of fighting rural poverty in an environmentally sustainable way.

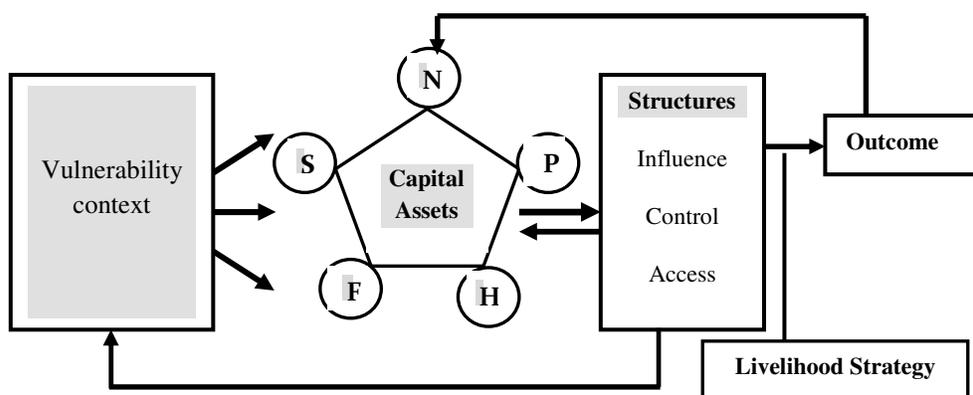


Figure 2: The sustainable livelihood frame (DFID, 2000 modified)

The livelihood systems frame (Fig 2) is a way of looking and analyzing the system of households' internal and external factors that affect its socio-economic survival. It looks into livelihood strategies of people in a given vulnerability context. People have access to six forms of capital assets (natural, physical, human, social and financial). These are the resources, which people can make use of and combine in order to carry out livelihood strategies and achieve certain outcomes. These outcomes have positive as well as negative impacts on the livelihood. Structures and process (institution) are critical in determining who gains access to which assets and to define the actual value of certain assets. Markets and legal restrictions have a profound influence on the context to which one capital asset can be converted into other types of capital assets.

Livelihood capital assets

Human capital (skills, Knowledge, good health)

(a) Fry collectors are usually very poor

Wild fry collection is a poverty driven occupation. The FGD and semi-structured interviews have mentioned that 86 percent of the collectors are landless. Fry collectors primarily come from the lower social strata and are looked down upon by the rest of the community. Ironically, fry collection is stigmatized by the broader community despite its central importance in maintaining the whole shrimp sector. Women engaged in fry collection are especially stigmatized, and sexual harassment is a common occurrence. From field survey, it was informed that 68% women faced sexual harassment. Fry collectors often originate from landless and displaced households from the areas where the expansion of shrimp farming into agricultural areas took place and from landless migrants coming from other regions. Employment in fry collection is significantly mobile depending upon the demand and supply of shrimp fry. Because of this variability it is very difficult to determine the total proportion of household income that is derived from fry collection at any one time. Because alternative economic activities such as share-cropping and agricultural laboring are declining with the expansion of shrimp culture, many fry collection households are abandoning traditional occupations and becoming more dependent on fry collection. Those that are primarily dependent on it earn 70-80 percent of their income from it (DOF and DFID 2001a).



Figure 3: children are collecting shrimp fry



Figure 4: Housing condition of Shrimp fry collectors

(b) Most fry collectors are poorly educated

More than 80 percent of fry collectors were functionally illiterate. This number reached 93 percent for women fry collectors (DOF and DFID 2001b). Seventy four percent of the children involved in fry collection were school dropouts. There are lower age fry collectors in the Southeast coastal areas than in the Southwest. The vast majority of young girls that are involved in fry collection are sorting fry on the beach. The FGD and semi-structured interviews have mentioned that there was no opportunity of technical education. Local people were not skilled in other works, except shrimp fry collection. Their knowledge was much underprivileged regarding environmental concern. Their health condition was deplorable. They also practice indigenous technology for fishing, fry collecting, constructing dwelling units and disaster mitigation. There was no concerning agency at the exclusion of disaster preparedness. They practice with the indigenous ideologies and activities.

Social capital (network, membership of groups, relation of trust)

Day after day, the shrimp fry collectors community is losing their social capital. In terms of social capital, traditional safety nets have broken down. Patronage networks are no longer based on kinship ties. Political and commercial ties have replaced many of these traditional ties (Chowdhury 2001). Among the poor, party activists or clients of the power elite have been able to retain access to Khas land. Thus political capital has become more important in determining access to resources. The poor fry traders are stigmatised and socially isolated.

From the FGD and Semi-structured interview, the respondent mentioned that the social relationship has been abolished among them. Their participation and entrance to the Social welfare organization (*Club/ samity*) were much unfortunate. Relationship and faith towards each other are reducing rapidly in the respect of early age. Shrimp areas are also attracting the less skilled from outside the region, reducing local opportunities and creating competition with a larger labor pool. Many outsiders have been provided employment on shrimp farms at the expense of the poor who live locally, destabilizing communities and undermining personal and social networks. The introduction of migrant labor has created greater personal insecurity for women and sexual harassment is on the rise. The increased commercialization of social relations has also led to a breakdown of traditional mechanisms for insuring social justice in communities. The pre-shrimp moral economy in which mutual obligations supported mutual rights has been disrupted by more impersonal contractual relations introduced by outsiders that do not belong to the village (BCAS,2001).

Physical capital (transport, shelter)**(a) Transportation**

Transportation facilities of the study area entirely depended on inland water transportation. They maintained their communication to other urban and rural areas with the help of that inland water transportation. The road network facility of that area was not well developed. There was no Bituminous road at all in that area.

(b) Housing Condition

The shrimp fry collectors lived in four types of houses such as mud wall with golpata shed, mud wall with tin shed, semi pucca and pucca houses. Most of the collectors (55%) lived in tin shed houses, whereas 15%, 20% and 10%, shrimp fry collectors lived in mud walled with golpata shed, semi-pucca and pucca houses, respectively. Electric services facilities were absent there. They mainly depended on lighting source on Kerosene oil.

(c) Sanitation Facilities

The shrimp fry collectors used two types of toilet such as (i) pucca toilet and (ii) bamboo walled, ring slave with good drainage system. In the study area, 35% of the collectors used safety (pucca toilet) toilet, whereas 65% of them used bamboo walled, ring slave toilet.

Financial capitals (saving, supplies of credit)

In terms of access to credit, shrimp fry collectors in the area have limited access. They rarely have access to NGO credit. Most fry collectors are in a cycle of debt with the traders who buy their catch at reduced prices. Wealthy shrimp farmers and traders have a significant control over the price paid to the fry collectors for fry. From field survey, it was informed that 60% of the shrimp fry collectors did take loan or dadon. Most of them had received loan from the Dadondar with intensive interest. Higher rate of interest was the main constraint for their socio-economic developments. They were always bound to debt the vicious circle of poverty. Saving practices were entirely nil of the study shrimp fry collector's community. Very few of them saved a little amount of money yearly. Due to natural disasters in every year or season, they cannot escape from laon or dadon.

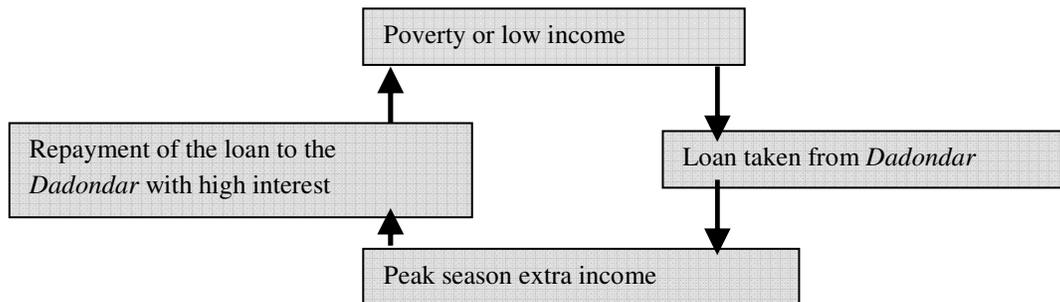


Figure 5: Poverty cycle of the shrimp fry collectors

Natural capital (land, water, wildlife, biodiversity)**(a) Land**

In terms of access to land, the distribution of land is more skewed in this region than in the rest of Bangladesh (Chowdhury, 2001). There are very large numbers of landless and large land-owners. Eighty-six percent of the fry collectors are functionally landless. Chemical status of the soil has been tasted and the soil partials status of the study area was not suitable for agricultural

production, and reduced the production day after day gradually. The soil salinity has increased due to the extensive practices of the gher. The field survey results showed that about 86% of the shrimp fry collectors had very few land (0-50 decimal), while 5%, 7% and 2% of them had 51-100, 101-150 and more than 151 decimal lands, respectively.

(b) Water

For drinking purpose, inhabitants of the study area, depended upon harvested rainwater and a pond. The water quality of the drinkable pond was being deteriorated rapidly due to the pisciculture. For the pond the DO was 5.3332 ppm and 5.4725 ppm whereas the standard of drinkable water should have 6 (ppm) or more DO. For the pond and harvested rain water's P^h value was respectively 7.12 and 7.20 while the standard for drinking water recommended the range between 6.5 to 8.5. There were only two deep tube wells. The water quality of the pond deteriorated gradually day after day.

(c) Wildlife and bio-diversity

More than 300 species are lost for collection of single wild shrimp fry as studied by DOF (Department of Fisheries, 2001). From the FGD the respondent mentioned that Frogs, turtles, Tortoise, Crocodiles, *Ghorials*, foxes and various types of white fishes are indicated as rare species. Kata gher, Dhani lata, Bono lata, Siries, Babla, Paharichatka, Karai now disappeared there, which were grown abundantly before. The interviewees named several aquatic plants and weeds that have completely disappeared now because of shrimp farming in the coastal area. They are Durba (*Cynodon vahlii*), Baju (*Tamarix troupii*), Chehur (*Bauhinia vahlii*), Thankuni (*Centella asiatica*), Ambalisak (*Oxalis corniculata*), Kachuripana (*Eichhorina crassipes*).

Livelihood Outcomes

The majority of the poorest fry collectors that engage in this activity as their main source of livelihood have not food security for a great part of the year. They have poor access to housing and limited or no access to health care. They tend to be illiterate and their children drop out of school out of economic necessity. They also have poor access to drinking water, and sanitation facilities. They are in a cycle of debt with the Dadandars. Poor women and children suffer the most socially and economically as a result of the expansion of shrimp culture. They spend more time in search of fuel and water and their workload has doubled. Social network has been destroying in the study area. Sexual harassment for women has increased and avenues for social justice have declined. Most women engaged in fry collection have very little education, are unaware of opportunities to gain access to health care and credit, and are unaware of their rights. As stated earlier, the majority of the shrimp farms in Bangladesh are located in Southwest region. The growth of shrimp culture in the area has had a significant effect on the livelihood opportunities of the poor. The physical and economic transformation of the area has limited the livelihood options of the poor. The areas can be described as 'distressed livelihoods' or 'livelihoods at risk': they face multiple vulnerabilities caused by environmental hazards, market-related risks and income uncertainties which enhance the overall threshold of vulnerability. Their income could not enhance proportionately with the passage of time. Their income trend could be considered as negative pattern, which does not properly support their livelihood.

Conclusion

The Southwest Coastal Region of Bangladesh has been identified as one of those regions that would be mostly affected by global climate change. The region is already experiencing the effects of rising sea levels, water logging, flood, cyclone, and saline intrusion. As a result, farming systems have been seriously disrupted with few coping mechanisms that are never suitable to adjust with the new situation. Shrimp production in the coastal areas has led to the change of the total landscape. Government should take immediate steps to improve the infrastructures and enhance environment friendly Shrimp sector for sustainable development. Shrimp fry collectors should be provided technical training for encouraging alternative livelihood.

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