

Socio-economic status of crab collectors and fatteners in the southwest region of Bangladesh

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Abstract

The study was conducted to assess the socio-economic conditions of mud crab (*Scylla serrata*) collectors and fatteners in Khulna and Satkhira districts. From January to June 2009, 40 crab collectors and 40 crab fatteners were considered where 45% of the crab collectors collected crabs from the Sundarban and fattening of mud crabs were generally done in bamboo cages and in ponds. Data analyses revealed that most of the crab collectors and fatteners were Hindus and few were Muslims. In the study area, 40% and 55% crab collectors and fatteners respectively were from the age group of 31-40 years. The crab collectors (80%) had above 6-10 members in their family and 55% of the crab fatteners had above 6-10 members. There were 45% of the crab fatteners had 151 decimal and above land, but 35% of the crab collectors had 0-50 decimal which was very small. Annual income of the crab collectors was less than Tk.90,000, where the lowest annual income of the crab fatteners was Tk. 90,000-150,000. Natural disasters and other constraints affected the livelihood of crab collectors and fatteners in the southwest region. So, crab collection and fattening are alternative sources of income and sustainable livelihood for the disadvantaged people in the southwest Bangladesh.

Keywords: Crab collectors, Crab fatteners, Socio-economic conditions and Southwest Bangladesh

Introduction

The mud crab (*Scylla serrata*) is widely distributed in the Indo-West-Pacific region as mangrove associated fauna (Macintosh *et al.*, 2002). Mud crabs occur abundantly in the coastal region of Bangladesh particularly in the estuaries, tidal rivers of the Sundarban mangrove swamps and coastal ghers (Khan and Alam, 1992). Crabs belong to the family Portunidae of the class Crustacea play a vital role in the ecological balance. It offers excellent food for estuarine crocodiles, sharks, estuarine groupers turtles and grey headed fishing Eagles (Lee, 1992).

Millions of poor fishers, traders and transporters are directly or indirectly dependent on crab fishery in Bangladesh (Zafar, 2004; Patterson and Sainuel, 2005). There are various types of livelihoods in the coastal region of Bangladesh such as finfish fishing, shrimp culture, agriculture, wood collection, shrimp fry collection and crab collection and fattening. The crab harvest and culture is new alternative livelihoods and have a great prospect in Bangladesh. Continued increase in export of live mud crab plays an important role to the foreign exchange earnings of Bangladesh (Azam *et al.*, 1998). The aim of this study is to find out general background and socio-economic status of mud crab collectors and fatteners in the southwest region of Bangladesh.

Materials and Methods

The field survey was conducted in four upazilas namely Paikgacha and Koira under the district of Khulna, and Shymnagar and Kaligonj under the district of Satkhira. From January to June 2009, 40 crab collectors and 40 crab fatteners from eight villages under four upazilas of two districts were selected. Social status of crab collectors and fatteners such as age, sex ratio, education, religion, sanitation, family size, drinking water facilities, medical facilities, economic status like occupation, sources of income, daily expenditure, credit facilities, crab collection techniques, fattening methods and marketing channels (source of collection, transportation and selling system) were collected using questionnaire through one to one interview, **PRA** tools like focus group discussion (**FGD**). Crosscheck interviews were conducted with key informants such as 10 school teachers, 10 local leaders, 4 Upazila Fisheries Officers and 6 relevant NGO workers to verify the information from questionnaire interviews and FGD. The interviews of the respondents were conducted in their offices.

Table 1. Crab collectors, crab fatteners and data collection methods involved in different villages of four upazilas under Khulna and Satkhira districts

District	Upazila	Village	No. of crab collectors	Village	No. of crab fatteners	Data collection Methods
Khulna	Paikgacha	Korolia	7	Korolia	5	Questionnaire Interviews
		Bhatikhali	5	Shibbati	2	
		Alamtata	4	9 No. ward	3	
				15 No. ward	2	
	Koira	Horia	4	9 No. ward	3	Group Discussion
				Horia	5	
Satkhira	Kaligonj	Tarail	5	Ghonargan	6	Questionnaire Interviews
				Tarail	2	
				Narayanpur	4	
	Shymnagar	Dakinakhali	4			Group Discussion
		Munshigonj	6	Dakinakhali	8	
		Inosura	5			
		Total	40	Total	40	

The collected data were summarized carefully before actual tabulation. Some of the data were collected into local units and these data were converted into international units. The processed data were transferred to a master sheet from which classified tables were prepared revealing the findings of the study. Preliminary data sheets were compared with computer spread sheets to ensure the accuracy of the data. After data entry, "Microsoft Excel" and "SPSS" (Statistical Package for Social Science) computer package was used to perform descriptive statistical analysis of data.

Results and Discussion

Crab Collection Techniques

Scylla serrata is common mud crab of the littoral and inter-tidal zones of the Bay of Bengal. The species hardly occurs in sandy and rocky areas over a wide range of salinity, from 2 ppt. to oceanic waters, from the coast to the interior brackish water. Though the crabs prefer mangrove swamp, they also exist in large number in shrimp ponds and in the burrows of the peripheral dikes. It was observed that 45% of the crab collectors collected crabs from the Sundarban mangrove forest, whereas 40% and 15% collected crabs from gher and rivers/canals, respectively. In the study area, 25% crab collectors used cuchia as bait, whereas 25%, 25%, 15% and 10% used eel and tilapia, cuchia and tilapia, cuchia, and tilapia as bait, respectively. The collectors used various types of gears to harvest the crabs such as trap, bait, hook, and by hand picking. Besides these, 50% of the collectors used bait and hook, and 25% each of the collectors used trap (bamboo made) and hand picking. Millions of poor fishermen, traders and transporters are directly or indirectly dependent on crab fishery in Bangladesh (Zafar, 2004; Patterson and Sainuel, 2005).

Crab Fattening Techniques

The mud crabs usually take shelter in burrows during the day and during high tides at night come out in search of food. About 80% of catch from burrows are males. Mud crab has been an incidental product of culture operations in Southeast Asian Countries with prawn and other fin fishes (Chandrasekaran and Perumal, 1993). However, the fattening of mud crabs in the southwest Bangladesh, generally falls under

two major categories, (i) fattening in cages, and ii) growing out in ponds. Cholik and Hanafi (1992) reported the traditional fattening practices in Indonesia. The gravid females are cultured in floating bamboo cages, with 70-110 females, each over 150 g, stocked in a 3 m² cage, after one month of feeding with trash fish, 70-85% of them develop ovaries. Fattening is done in ponds or pens and cages in lagoons. Crab fattening ponds were 1000 m and equipped with sluice gates, fencing and a central platform. The stocking rate for 150 g crab is 2/m² and the holding period is 3-4 weeks. Ahmed (1992) reported that the peak harvesting season of mud crab in Bangladesh coastal brackish water is from middle to late monsoon (June-August). Late pre-monsoon, early monsoon (April-May) and early post monsoon (September-October) was the season of modest harvest. He estimated that the production of mud crabs from Cox's Bazar and Chittagong (600 mt), Noakhali, Bhola, Barisal and Patuakhali (350 mt) and from Bagerhat, Satkhira and Khulna (1200 mt). Ai-ChunXiang *et al.* (2005) conducted a research on feeding trial of mud crab (*S. serrata*) with a series of formulated diets. The formulated feed contained crude protein, crude fat, water, ash, salt, calcium and phosphorus.

Table 2. Crab fattening techniques in the southwest region

Parameters	Fattening in cages	Fattening in ponds
Size	2-3 m ²	350-500 m ²
Water depth	2-3 m	1-2 m
Bamboo mats	Depends on cages	1.5-2.0 m high with 30 cm deep
Lime	200-400 kg/ha	350-600 kg/ha
Stocking density	25-30 crab/m ²	3-5 crab/m ²
Duration	15-30 days	5-6 months
Feed supply	8-14% total body weight/day	7-10 % total body weight/day

Crab marketing channels

The trading pattern of the mud crab involves a series of intermediates between the catcher/farmers and the consumers. The farmers and collectors usually market their catch 2-3 days after catch. During this time the crabs are kept in their homes or boats, either in water or in cages.

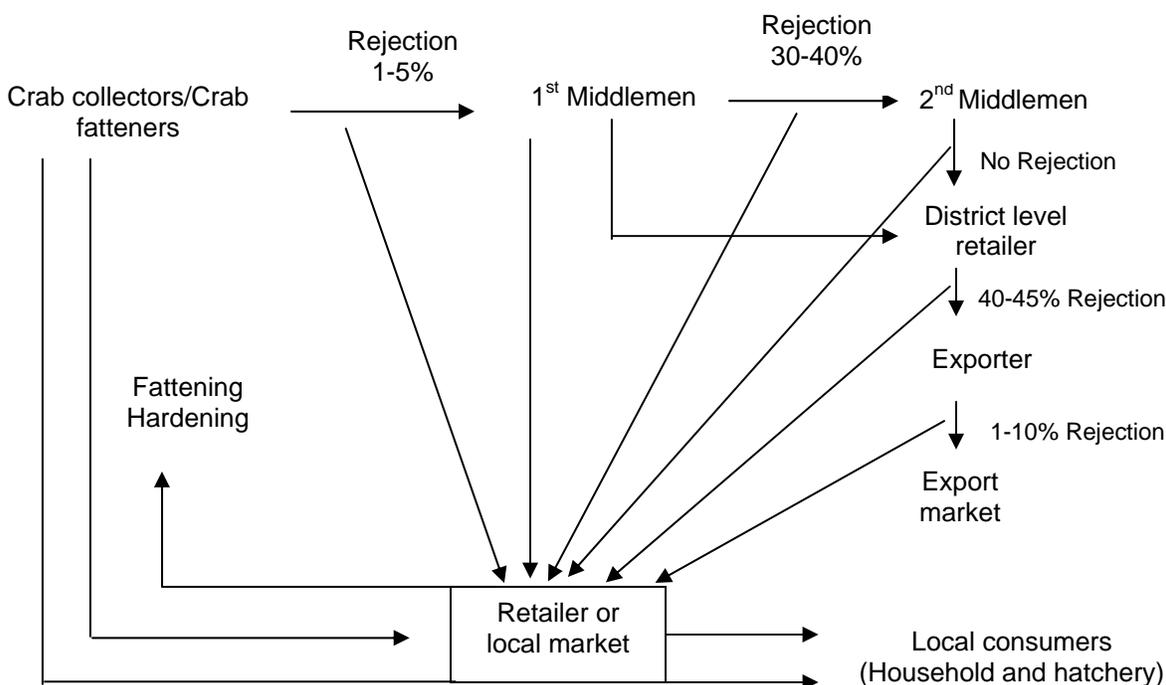


Fig. 1. Marketing channel of mud crab in the southwest region

Socioeconomic conditions of crab fatteners

Age Structure: Highest percentage (40%) of mud crab collectors were belonged to the year class of 31-40, whereas 10%, 22.5%, 22.5% and 5% of them were under the age groups of 11-20, 21-30, 41-50, 51 and above years respectively. Comparatively, 55% crab fatteners were in the age group of 31-40 years, whereas 0%, 20%, 20% and 5% of them were under the age groups of 11-20, 21-30, 41-50, 51 and above years, respectively. Khayruzzaman (2007) conducted a research on livelihood of fish retailers in Jamalpur district where 48% fish retailers were age group of 31-40 years. Rana (1996) also found that 70% pond farmers were in 18-45 years age group in his study in Sirajgonj district.

Table 3. Age structure of the crab collectors and fatteners

Age groups (years)	Crab collectors (n=40)	Crab fatteners (n=40)
11 to 20	4 (10%)	0
21-30	9 (22.5%)	8 (20%)
31-40	16 (40%)	22 (55%)
41-50	9 (22.5%)	8 (20%)
51 and above	2 (5%)	2 (5%)

Sex Ratio: In Khulna and Satkhira district, 80% of the crab collectors were male and the rest (20%) were female, whereas, 95 % of the crab fatteners were male and the rest (5%) were female. The main sources of mud crab were the Sunderban and the rivers far away from the locality. Therefore, the crab collectors had to stay there for 7 to 15 days that was usually impossible for the female crab collectors. Female mainly involved in collecting crab from the adjacent ghers and the bank of rivers. Another reason of less involvements of female in crab collecting activities was the social problems.

Table 4. Sex ratio of the crab collectors and fatteners

Sex ratio	Crab collectors (n= 40)	Crab fatteners (n= 40)
Male	32 (80%)	38 (95%)
Female	8 (20%)	2 (5%)

Marital Status: Inquiries were made to see the marital status of the crab farmer communities. It was found that 75% of the crab collectors and 90% of the crab fatteners were married, while the unmarried crab fatteners were represented by 10% only.

Table 5. Marital status of the crab collectors and fatteners

Marital Status	Crab collectors (n= 40)	Crab fatteners (n= 40)
Married	30 (75%)	36 (90%)
Unmarried	10 (25%)	4 (10%)

Educational Status: In the investigated areas, 45% of the crab collectors were up to SSC pass and only 10% of them can not sign. To the contrary, 70% of the crab fatteners were up to SSC pass and there was no person who can not sign.

Table 6. Educational status of the crab collectors and fatteners

Education status	Crab collectors (n=40)	Crab fatteners (n=40)
Can not sign	4 (10%)	0
Can sign only	2 (5%)	0
Primary	16 (40%)	10 (25%)
Up to SSC	18 (45%)	28 (70%)
Up to HSC	0	2 (5%)
Above	0	0

Family Size: It was observed that 80% of the crab collectors had above 6-10 members in their family, whereas 20% had 2-5 members in their family. In opposition, 55% of the crab fatteners had above 6-10 members in their family, while 35% and 10% of them had 2-5 and 11-15 members in their family, respectively.

Table 7. Family size of the crab collectors and fatteners

Family members	Crab collectors (n= 40)	Crab fatteners (n= 40)
2-5	8 (20%)	14 (35%)
6-10	32 (80%)	22 (55%)
11-15	0	4 (10%)

Religious Status: The crab collectors were dominated by Hindu (70%), whereas only 30% were Muslims, on the other, 60% of the crab fatteners were Hindus, while rest were Muslims. Rahman (2003) observed in his study area in Gazipur district that 74% pond farmers were Muslims and 26% Hindus. Islam (2006) found in his study area in Lalmonirhat sadar upazila that 80% farmers were Muslims and 20% were Hindus. Above findings do not agree with the present findings may be Satkhira and Khulna regions are Hindu dominated area. Other cause may be the aesthetic reasons that the Muslims usually do not eat crabs.

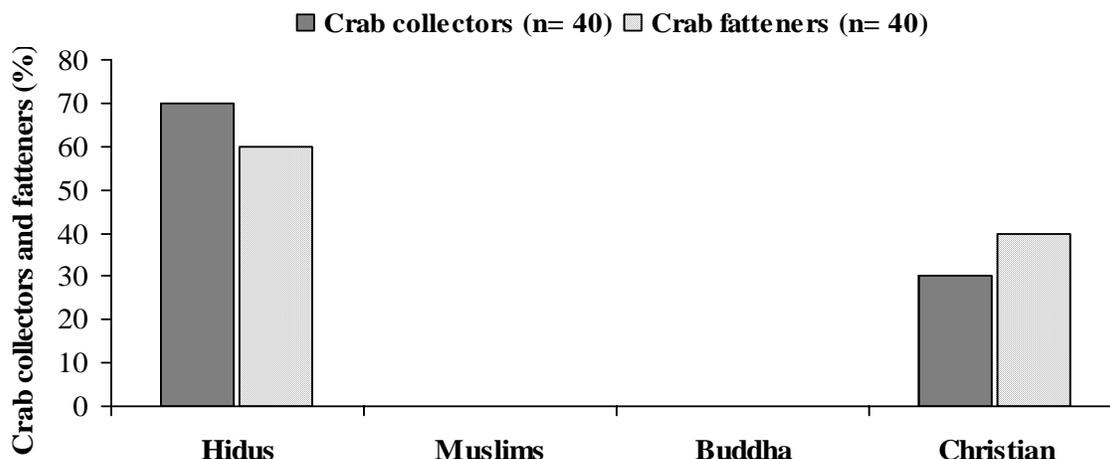


Fig. 2. Religious status of the crab collectors and fatteners

Drinking water facilities: It was found that majority (70%) of the crab collectors used public tube well water, whereas 5%, and 20% used tube well, pond's water directly and from others sources, respectively. By contrast, most of the crab fatteners (65%) used public tube well water, but 30%, and 15% used own tube well, pond water directly and from others sources, respectively.

Table 8. Drinking water facilities of the crab collectors and fatteners

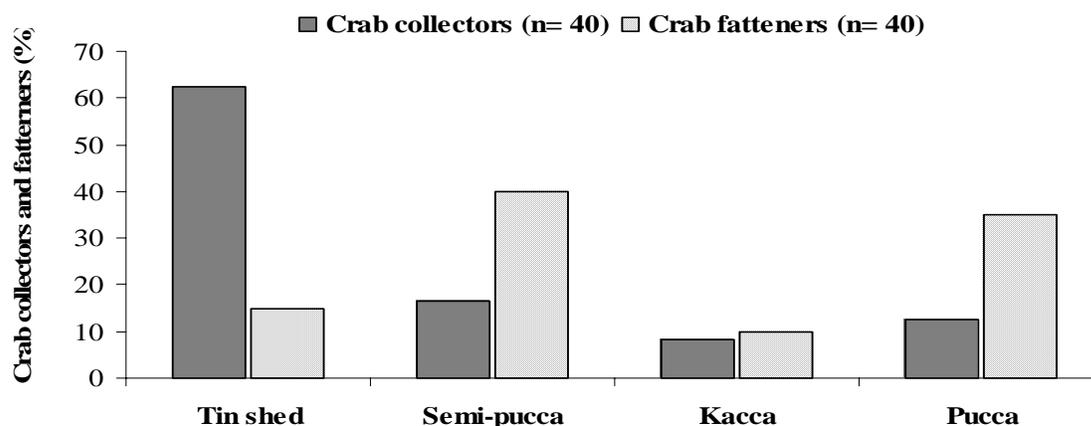
	Crab collectors (n= 40)	Crab fatteners (n= 40)
Public tube well	28 (70%)	26 (65%)
Own tube well	2 (5%)	12 (30%)
Pond's water	8 (20%)	2 (5%)
Other sources	2 (5%)	0

Ownership of Land: The results showed that about 35% of the crab collectors had very few land (0-50 decimal), while 30%, 10% and 20% of them had 51-100, 101-150 and more than 151 decimal lands, respectively. It was also investigated that 45% of the crab fatteners had 151 decimals and above land, but 20%, 25% and 10% of them had 0-50, 51-100 and 101-150 decimal lands, respectively and poor people lived in the khas land.

Table 9. Land ownership of the crab collectors and fatteners

Land (decimal)	Crab collectors (n=40)	Crab fatteners (n=40)
0-50	14 (35%)	8 (20%)
51-100	12 (30%)	10 (25%)
101-150	4 (10%)	4 (10%)
151 and above	10 (25%)	18 (45%)

Housing Condition: The crab 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 crab collectors (62.50%) lived in tin shed houses, whereas 12.50%, 16.67% and 8.33%, crab collectors lived in mud walled with golpata shed, semi-pucca and pucca houses, respectively. On the contrary, the highest percentage of the crab fatteners (40%) lived in semi pucca house, while 35%, 15% and 10% lived in mud walled with golpata shed, tin shed and pucca houses, respectively.

**Fig. 3. Housing condition of the crab collectors and fatteners**

Rana (1996) observed that 53% were tin shed and 22% were katcha. Ahmed (2003) also found 62% of katcha housing structure of prawn farmers in Mymensingh area. Islam (2006) also found that 16% housing structure were katcha, 24% were semi-pucca, 6% were pucca and 54% were tinshed which more or less similar to the working areas.

Sanitation Facilities: The crab collectors and crab fatteners used two types of toilet such as (i) pucca toilet and (ii) bamboo walled, ring slave with good drainage system. In the study area, 10% of the collectors used safety toilet, whereas 77.5% of them used semi pucca toilet. Inversely, 30% of the fatteners used safety toilet, while 67.5% of them used semi pucca toilet.

Table 10. Sanitation facilities of the crab collectors and fatteners

Latrine types	Crab collectors (n= 40)	Crab fatteners (n= 40)
Kacca	5 (12.5%)	1 (2.5%)
Semi-pucca	31 (77.5%)	27 (67.5%)
Pucca	4 (10%)	12 (30%)

Medical Facilities: Most of the crab collectors (60%) availed themselves with the treatment facilities like services from quacks (village doctors), whereas 35% and 5% depended on hospitals and private clinics, while most crab fatteners (55%) took treatment facilities like services from quacks, the rest 15% and 30% depended on hospitals and private clinics in the southwest regions.

Table 11. Treatment facilities of the crab collectors and fatteners

Treatment facilities	Crab collectors (n= 40)	Crab fatteners (n= 40)
Hospital	14 (35%)	6 (15%)
Quack doctor	24 (60%)	22 (55%)
Private clinic	2 (5%)	12 (30%)

Primary occupation and secondary occupation: The main occupation of crab collectors was crab collection for uphold their livelihood. The fatteners collected crabs from local market that were rejected and had no demand in foreign market. The highest percentage of crab collectors' (30%) secondary occupation were agriculture, whereas the rest were engaged in fishing (25%), crab fattening (10%), wood collection (10%) from the Sundarban, shrimp culture (10%), furniture making (5%) and day laborers (10%). Secondary occupation of the most crab fatteners (50%) were agriculture, whereas the rest were engaged in fishing (15%), service (5%), business (25%) and (5%) day laborers, respectively. Rana (1996) observed in his study area in Sirajgonj district that 28% related to agriculture, 35% related to business and 17% related to business and 17% related to fish culture as their main occupation. Now a day's, crab collectors and fatteners have changed their occupations due to lack of crab availability in the southwest region of Bangladesh. The availability of mud crab is reduced due to high fishing pressures, water pollutions using of insecticides, pesticides and fertilizers in crops, shrimp farming, natural disasters and industrial pollutions.

Table 12. Secondary occupations of the crab collectors and fatteners

Secondary occupation	Crab collectors (n= 40)	Crab fatteners (n= 40)
Fishing	10 (25%)	6 (15%)
Shrimp culture	4 (10%)	0
Wood collection	4 (10%)	2 (5%)
Services	2 (5%)	2 (5%)
Business	4 (10%)	10 (25%)
Day labour	12 (30%)	2 (5%)
Agriculture	12 (30%)	20 (50%)
Furniture making	2 (5%)	0

Credit facilities and loan: In Khulna and Satkhira district, 70% of the crab collectors did not take any loan or *dadon*, whereas (25%) took loan or *dadon* from NGOs and only 5% loan from money lender. Moreover, 52.5% of the crab fatteners did not take money, only 4.17% took loan from Bank and 33.33% took loan from NGOs and only 10% loan from money lender. In our country, most of the crab collectors are very poor. So, they have to rely upon credit facilities, which are not also available from any sources. The crab collectors and fatteners did not get any credit facility from any sources. Higher rate of interest was the main constrain for their socio-economic developments. Government organization could play a vital role to promote the socio-economic condition of crab fatteners and crab collectors by providing low interest of credit. Due to natural disasters in every year or season, they can not escape from laon or *dadon*.

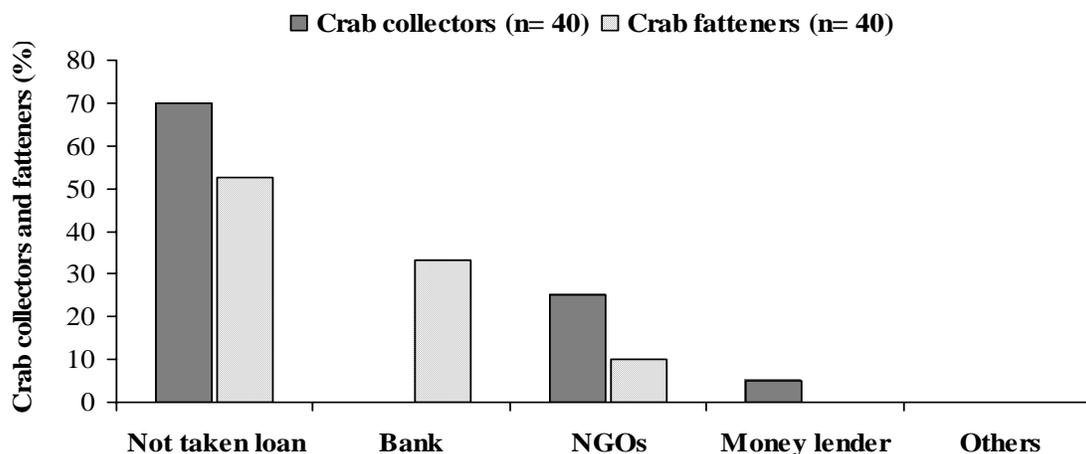


Fig. 4. Different sources of loan taken by crab collectors and fatteners

Annual income and expenditure: In Khulna and Satkhira districts, annual income of most of the crab collectors (75%) were less than Tk.90,000, while 25% of them earned Tk.90,000-150,000, respectively. The lowest annual income (45%) of the crab fatteners were Tk. 90,000-150,000, whereas 15% of them earned greater Tk. 250,000. Similarly, annual expenditures of most of the crab collectors (70%) were up to Tk.70,000, whereas only 30% of the crab collectors' expenditure ranged Tk.710,00-100,000 only. Annual expenditure of the crab fatteners (5%) were Tk.70,000, while 15% of the crab fatteners' annual expenditure Tk. was greater than Tk.200,000. DoF (1993) stated average income of the fishermen was Tk.15,000/year.

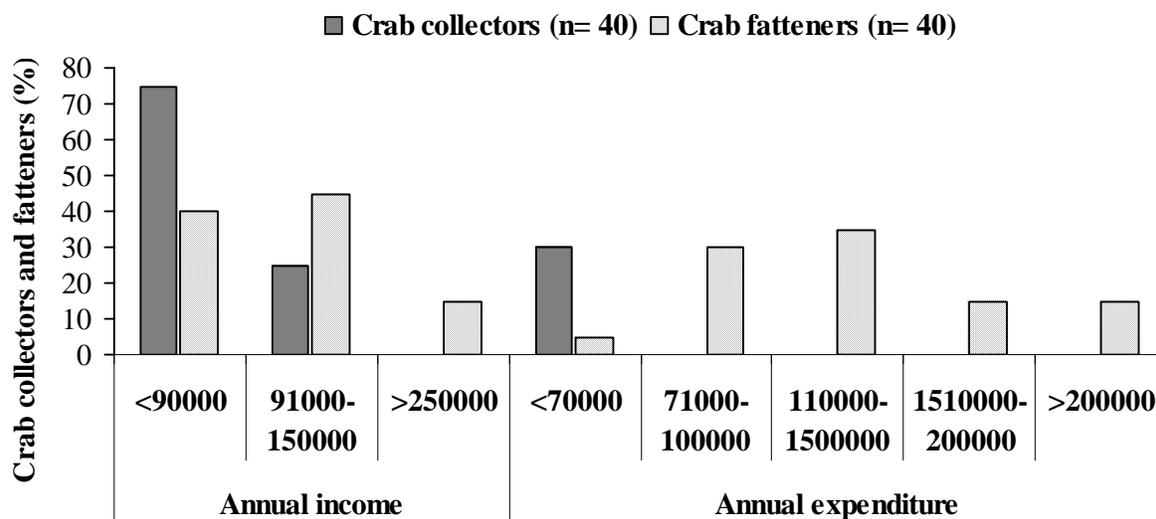


Fig. 5. Annual income and expenditure of the crab collectors and fatteners

Constraints of crab collections and crab fatteners

From the present study a number of constraints were found such as natural disasters like flood, drought, cyclone, difficult to get pass without bribe to enter into the Sundarbans for crab collection, musclemen, theft, piracy, marketing problem, lack of money, higher production costs, lower market price, and poor quality of crab seed and lack of technical knowledge. Rahman (2003) stated in his report that the major constraints of carp farming were lack of money and production cost. Khan *et al.* (1998) also identified that the lack of knowledge about fish culture was one of the most important problems.

Conclusion

The physical, chemical and biological parameters are also suitable for crab culture in the southwest region of Bangladesh. As there is a potential future for crab culture so training on mud crab biology, ecology, collection techniques and culture technologies should be provided to the crab collectors and crab fatteners to increase production. Government should take immediate steps to improve the infrastructures and domestic markets for mud crab in live, frozen and cooked conditions. Besides these, micro-credit facilities should be assured at low or no interest. A policy and strategy should be developed to improve their living condition in the southwest region, where crab could be an alternative source of income and sustainable livelihood.

Acknowledgements

The authors are thankful to the crab collectors and crab fatteners in Koira and Paikgacha Upazilas under the district of Khulna and in Shymnagar and Kaligonj Upazila under the district of Satkhira who participated in the field trial.

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