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Research Article

Mud crab (*Scylla* sp.) marketing system in Bangladesh

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Abstract

The present study has been undertaken to create a better understanding of the current marketing flow and trading practices for mud crab in Bangladesh. A survey was conducted from December to August 2009 through collecting information using a semi-structured questionnaire among the cross section of marketing operators in the southwest part (Khulna, Bagherhat and Sathira regions) of Bangladesh. This paper explores market chain issues for the mud crab (*Scylla* sp.) trade, a high-value export fishery involving nearly 23 countries in the world, with high demand in Malaysia, Singapore and Taiwan. The marketing system passes through a number of channels from crab catchers to exporters. A different grading system is involved for marketing of crabs in Bangladesh. It is varied according to the sex of the crabs and also for the domestic and international marketing. Mud crab marketing was considered as a profitable and feasible business by most of the marketing operators. However, reduced demand in the

domestic market was reported by these operators. The social and religious restriction on consumption of crabs was also reported as a problem that hinders the business and prevents obtaining realistic prices in the domestic market.

Keywords: seafood, international trade, social and religious factors, export value.

Introduction

Following the 1980's, the unregulated boom in intensive penaeid shrimp culture contributed to the spreading of disease, particularly the white spot syndrome virus (WSSV) epidemic, which led to farms seeking alternative species for sustainable aquaculture practices, both economically and environmentally, as a replacement for shrimp. In recent years, there has been increasing interest in crab farming due to growing markets and international demand. Capture and culture of both Chinese mitten crab (*Eriocheir sinensis*) and mud crab have been expanding because of the high economic value of the species and their potential as an export commodity. China, USA, Japan, Korea and Thailand are ranked as the top five biggest consumers of crab [1]. Female crabs especially are playing an important role in marketing, particularly in Asian countries such as Japan, Taiwan, Hong Kong and Singapore [2, 3]. Also, there is a growing market for mud crab meat as a value added product and for frozen soft-shelled mud crab in the USA [2, 4].

In Bangladesh, mud crab is an export fishery that is playing an important role in national and international markets. It can generate employment directly and indirectly in terms of people employed in the production, marketing and other associated business. More than 50,000 fishers, traders, transporters and exporters are found to be involved in this sector [5]. Bangladesh began exporting mud crabs around 1977-8 and since 1982 the value of export earnings has been steadily increasing [6]. In 2002, mud crabs ranked third in terms of frozen food export items [7]. During 2005-2006, Bangladesh earned US\$3,668,000, compared with 2006-2007, when the total export value increased by 65% [8].

Successful development of any fishery not only requires an appropriate natural environment but it also strongly influenced by the market situation. Price fluctuation, lack of buyers and market information, credit problems, high mortality and poor transportation systems in the marketing of crab have been reported by some researchers in Bangladesh [9]. All of these problems have negative effects on the competitive efficiency in both the domestic and international markets. There is a need for adequate information about the marketing system and performance for this export fishery product to increase the volume for local consumption and international export. To achieve an efficient marketing system in a competitive manner it is necessary to identify the existing problems and to correct/improve these wherever they occur in the chain. It will also be useful for the policy makers to identify the existing weaknesses, by providing them with the necessary information for formulating strategies towards improvement of the crab fishery.

In view of this situation, the present study has been undertaken to gain better understanding of the current marketing flow and trading practices in mud crab in the greater south western region of Bangladesh.

Methodology

A survey was conducted from December to August 2009 using a semi-structured questionnaire through interviews among a cross section of people including the mud crab fatteners, crab catchers, depot owners and exporters in the southwest part (Khulna, Bagherhat and Sathira regions) of Bangladesh. The conclusions of this paper are based on these survey results, as well as information collected from some published reports, papers and some official documents and reviews on the existing information on the different aspects of the mud crab marketing system in the southwest region of Bangladesh.

Data collection

A combination of following survey techniques were used for data collection.

Primary data collection

Questionnaire interviews

Although official figures were unavailable regarding the total number of intermediaries involved in this sector, individuals were selected for questionnaire interviews through cross checking information gathered from the key informants (School teachers, relevant NGOs, Department of Fisheries staff in the field). For questionnaire interviews, a simple random sampling method with the key informants was followed for this research. A total number of 320 marketing intermediaries were selected and were interviewed throughout the period of study. 10 exporters from Dhaka, 20 local agents from exporters, 30 depot owners, 30 collectors (foria), 60 crab catchers, 20 retailers and 150 crab fatteners from different areas in Khulna, Bagerhat and Satkhira were selected randomly for the purpose of this research.

Prior to interviews, the questionnaire was tested in the field during the first phase of the research work. The interviews were focused on the existing marketing system with its future prospects, price, policy involvement and problems faced by the intermediaries.

Participatory Rural Appraisal is (PRA)

Participatory Rural Appraisal is a research technique developed in the late 1970s and 1980s as an alternative to complement conventional sample surveys. Usually it is referred to as Rapid Rural Appraisal [10]. The advantage of this method is the wider participation of the rural community where they are given an opportunity to present their priorities and needs. From different PRA tools, Focus Group Discussion was used in this survey to get the overview of the marketing of crab in Bangladesh. During each focus interview, respondents were asked about the crab marketing in Bangladesh covering different issues such as price, problems, demand and future potential. The FGD consisted of a minimum of seven people and the duration was

approximately 2 hours.

Cross check interviews

Cross-check interviews were conducted with the help of the Upazila Fisheries Officers, relevant Local NGOs, school teachers and local leaders throughout the period of study.

Secondary data collection

Secondary data based on information collected from some published reports, papers and some official documents and reviews the existing information on the different aspects of the crab fishery and marketing in Bangladesh.

Data processing and analysis

At each stage of the survey, data were checked, edited and coded in the field. Data from various sources were coded and entered into a database system using Microsoft Excel software. Preliminary data sheets were compared with the original coding sheets to ensure the accuracy of the data entered. Descriptive method of analysis was used to describe the survey results using means and percentage. Some diagrams were also used for describing the findings.

Result and Discussion

Supply of crab to the market

In its natural environment, the mud crab is a mangrove dweller, inhabiting the muddy bottoms, mangrove marshes and river mouths in estuarine environments [11]. It occurs widely throughout the Indo-West Pacific Ocean including the Bay of Bengal. The mud crab fishery in Bangladesh is totally dependent on the wild catch from swamps, tidal rivers, canals and tide fed traditional shrimp ghers. Supply of mud crabs for export and for domestic consumption is thus mainly dependent on wild sources. About 90% of exported crabs come from natural sources, with the rest being coming from fattening centres [9].

Mud crabs are abundant in the coastal rivers of Cox's Bazaar, Citation, inshore islands of Moheshkhali, Kutubdia, Sandip, Hatia and Dubla, except for Saint Martin [12]. There is a comparatively higher population density of mud crabs Cox's Bazaar, Chittagong, while Khulna, Satkhira and Bagerhat in the Sundarbans are higher than that of Noakhali, Bhola, Potuakhali and Bonsal [12].



Figure 1: Mud crab catchers in the south western region of Bangladesh.

Other sources of mud crab supply to the market are from traditional shrimp gher and from the fattening ponds. Usually mud crab larvae enter into the ponds along with the tidal waters through different channels. In addition, some fatteners collect the lean crabs from the wild catchers and live crabs from different depots which are rejected for export. All of those go for fattening in their ponds for future sale.

The rainy season (April-July) is the major fishing period for almost all areas, particularly in mangrove and shrimp ponds. Crabs caught in the rainy season are larger in size than those caught in winter (Sept-January). During this time, the catch is relatively high, 3 - 4 times more by weight than in winter [12]. Usually the maximum catch is achieved during spring tide and neap tide. The dry season (October to March), is the peak season from the SRF, while June to October is the peak harvesting season from shrimp gher. However, the fishing along the Sundarban East and West Sanctuaries along the sea coast during December to February and May to June is strictly prohibited by the government of Bangladesh to protect the brood mud crabs.

Post harvest handling

Crabs can survive in air for about 4 to 5 days using improved packaging. Post harvest handling has a significant effect on profit, particularly since crabs are sold live. Due to their territorial nature, harvested crabs are tied with coarse twine to avoid injury to handlers and physical damage to themselves. This helps to reduce mortality during transportation.

Grading

After reaching the depot, all the collected crabs from different sources are first weighed and examined through light checking. Different grading systems are involved for marketing of crabs in Bangladesh. Grading may vary due to sex and also for the domestic and international markets. Tables 1 and 2 show the different grading for domestic and international markets. Females weighing more than 120 gm and males more than 200 gm are considered for export. Generally the soft shell male crab (locally called PD or water crab) and the eggless female

(locally called KS) are rejected for export. Also, any crabs having physical damage such as broken legs or claws are rejected for export. All of these rejected crabs come to the local market for domestic consumption or go to the fattening ponds. Figure 2 shows the grading of crabs in the local depot.

Table 1. Grading of mud crabs for the domestic market.

Male	Grade	Weight	Claw Condition	Shell Condition
	XL	>400	Full of meat	Hard
	L	>300	Full of meat	Hard
	WXL	>400	Partial development	Soft
	WL	>300	Partial development	Soft
	M	>250	Full of meat	Hard
	SM	>200	Full of meat	Hard
Female	Grade	Weight	Gonad Condition	Shell Condition
	F1	>180	Full Gonad	Hard
	KS1	>180	Partial Gonad	Hard
	F2	>150	Partial Gonad	Hard
	F3	>120	Immature Gonad	Hard

Table 2. Grading of mud crabs for the international market.

Male	Grade	Weight	Claw Condition	Shell Condition
	XXL	>500	Full of meat	Hard
	XL	>400	Full of meat	Hard
	L	>300	Full of meat	Hard
	M	>250	Full of meat	Hard
	SM	>200	Full of meat	Hard
Female	Grade	Weight	Gonad Condition	Shell Condition
	FF1	>200	Full Gonad	Hard
	F1	>180	Full Gonad	Hard
	KS1	>180	Partial Gonad	Hard
	F2	>150	Full Gonad	Hard
	F3	>120	Full Gonad	Hard
	KS3	>120	Immature Gonad	Hard



Figure 2. Grading of male and female mud crabs through weighing and light checking in a local depot.

Mode of payment

Mutual understanding is the major factor upon which the mode of payment was found to depend in the case of purchasing and selling of mud crabs in the research area. The payment was found to be generally 50% immediate or advance (Dadon) and 50% provided later, usually ranging from 1 to 7 days. It is similar for all marketing operators in mud crab trading, from catchers to local agents.

Transportation

Crabs are easy to keep alive for several days if they are kept under cool and moist conditions. From Bangladesh only live crabs are exported. They do not need any refrigeration or other sophisticated facilities during transportation. The crab catchers, collectors or middle men keep the harvested crabs in plastic bags or bamboo baskets during transportation and to avoid mortality they keep their crabs moist by spraying water over them. At first crabs are carried to the local depot by wooden boats, bicycle or by van. Following this, all collected crabs from different small and local depots are transported to Dhaka by truck or pick up van usually at night. For local transportation different grades of crab are kept in the same bamboo basket and covered with gunny bags. Betel-nut leaf is placed in the bottom to prevent dehydration and to keep the temperature low.

For exporting crabs to different countries, various types of container are used for transportation, usually specified by the importers, such as plastic baskets, styrofoam cartons and bamboo baskets (Figure 3). The weight of each box varies from 14 to 20 kg of crabs. Sometimes they keep a long tube, made of bamboo, in the centre of the plastic boxes to prolong the shelf life of the exported crabs.



Figure 3: Different types of containers using for exporting mud crab.

Marketing

Domestic

In comparison with other fish or fishery products, the demand for mud crabs in Bangladesh for domestic consumption is less. Generally, rejected underweight crabs for export and damaged crabs come to the local rural and urban markets for domestic consumption. Table 1 shows the different grades of available mud crab in the domestic market used for local consumption.

Two types of domestic market so far have been reported by Ahmed, [13]. One is nearer to local markets in the vicinity of the fishing village and another one is the consumer markets away from fishing areas. The non-Muslim and tribal people are the main consumers of crabs in Bangladesh. The market price varies with the grade and with the season and the selling price is normally fixed through bargaining between the seller and consumers.

International

Product types

From 1977, Bangladesh started to export crab. Besides live crab, many East Asian and South East Asian countries export different forms of crab and crab products throughout the world. However, in Bangladesh, only live crab is exported (Figure 4). From the survey, about 100% of exporters were found to be involved in exporting live crab.



Figure 4. Live crabs for export from Bangladesh.

Grading for international market

The grading system for the international market varies from the grading system for the domestic market (see Table 2). Generally males with hard carapace and full meat are considered for export, while for females, hard carapace with eggs is considered best, although some exporters were also found to export small size females with partial gonad development.

Export value and quantity

Figure 5 shows the total export value of mud crab from 1997 to 2007. By comparing with 2002-2003, the total export quantity increased by more than 6 times during 2007-2008 (4283.27 MT), while during 2008-2009 the export quantity decreased from 4283.27 MT to 3264.62 MT [8]. This might be due to over exploitation and less production or damage caused by cyclone Aila which hit the south-west coast of Bangladesh on 25 May 2009.

From 1997-1998 to 2006-2007 Bangladesh earned US\$21,064,000 (excluding local sales) by exporting crabs to 23 countries around the world [8]. More than 96% of total export earnings came from Asian countries. Among them, the East Asian and South East Asian countries are playing significant role in the foreign export earning for Bangladesh. Figure 6 shows the percentage of export value from South East Asian and East Asian countries from 1997-98 to 2006-2007. Taiwan and Malaysia were found to be biggest consumers of mud crab from Bangladesh. The country earned about US\$ 6,280,000 and US\$ 6,286,000 from Taiwan and Malaysia respectively, which together constituted more than 60% of the total export value earned from Asian countries from 1997-98 to 2006-07 (Figure 6) [8].

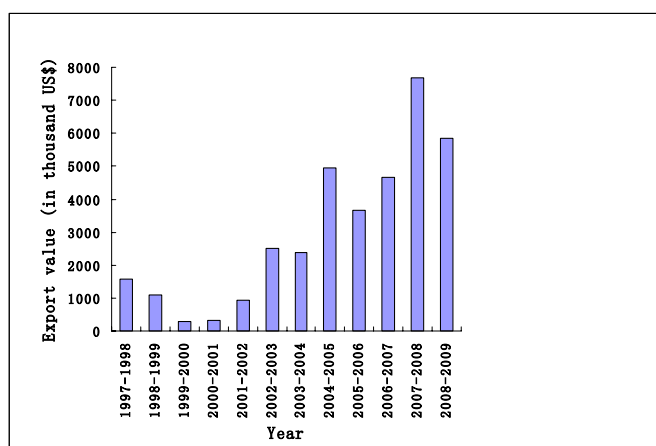


Figure 5. Export value of mud crab from 1997-98 to 2008-09 [8].

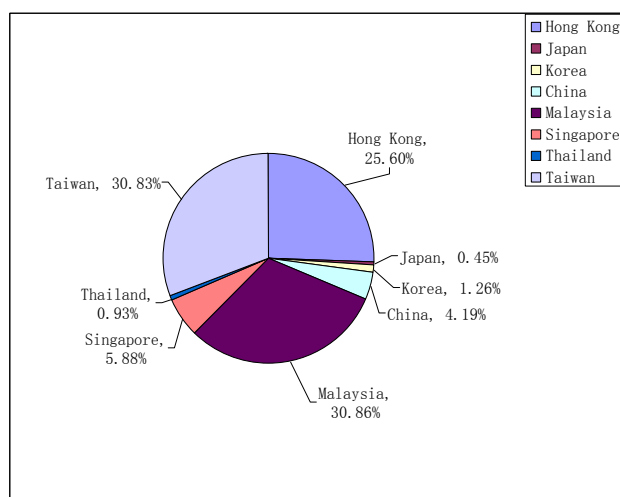


Figure 6. Percentage of total export earnings from East Asian and South East Asian countries through mud crab exports from 1997-98 to 2006-07 [8].

Role of major operators in marketing

There are no official figures available on the total number of intermediaries involved in mud crab farming and marketing in Bangladesh. However, the number has clearly increased in the past few years due to increasing demand in the international market.

The following major marketing operators are involved in the marketing of crabs in Bangladesh:

Mud crab catchers

As the mangrove forest in Bangladesh is the main source of mud crabs for marketing, the crab catcher's role in these areas has been vital to the supply of crabs to the market. Most of the catchers live in remote areas and, for religious reasons, mostly Hindus are involved in this occupation. From the survey it was found that 83.3% of crab catchers were Hindu, while only

16.7% were Muslim. Very few women (16.7%) were found to be involved in this profession. Usually the crab catchers harvest the crabs from the Sundarban Reserve Forest throughout the year. About 58.3% of catchers were found to catch crab from the forest, while 21.7% of catchers said that they collect the crabs from the forest, banks of river and from gher. Only 20% were found to catch crabs from gher and riverbanks. Most of the women crab catchers were involved in catching crab from the gher and banks of the river. They reported it is very risky for them to go fishing in the forest.

Mud crab catchers with small boats usually stay out 7 to 10 days on each fishing trip. They use very simple type of traps and bait for catching crabs. Their marketing activity is also quite simple. Most of them had a verbal agreement with collectors or with the depot owner in which they would sell their catch to that particular man on return. According to their reports, the collector or depot owner provided loans and equipment to them for catching crab. As it is impossible for them to get loans from banks and other sources due to their informal status (no property, operating without permit or un-registered and no credit history), as well as being difficult and expensive for them to reach the nearest cities for selling their catch, most of them are bound to sell their product directly to collectors/depot owners and get a fixed price, usually lower than the market price. A small part of their catch comes to the retail market and also goes to the fattening ponds.

Collector or middle man (Foria)

Middlemen or collectors provide the main link between wild mud crabs and the market. They are locally called Foria. They buy the crabs from the catchers and sometimes also from the fatteners. Most of the collectors were located in villages nearer to the forest, doing business on a daily basis. About 73.33% of collectors reported that they usually buy crabs from the wild catchers and only 26.67% said they collect crab both from the wild catchers and from the farmers. From the study results, about 45% of them were found to be involved in a contact with the depot owner, having a similar verbal contact to the catchers through a loan system and bound to sell their crabs to the depot owner.

Fatteners

Farmers collect the soft shell crabs (water crab) and lean crabs from different depots and sometimes directly from the middleman and catchers and fatten them for 10 to 21 days. After this period, all of these previously rejected crabs come again to the landing centre and go to the local market for domestic consumption.

Depot owners

Depot owners play an important role in mud crab marketing in Bangladesh, not only by being the key link between catchers and fatteners, but also through financing the initial stages of the market chain directly to the catchers and to the middlemen. All of the surveyed depot owners conduct privately owned businesses. Among them 23.3% were joint ownership and 76.7% found to have single ownership. About 90% were found to also have a lending business.

All of them have contracted crab catchers or foria. Along with some of the real crab fatteners, most of the depot owners (100%) were found to have fattening ponds where they kept their underweight, grade rejected crabs. From the survey, 80% of depot owners reported that they sell their product through the local agent to exporters, while 20% of depot owners sell their crabs directly to the exporter.

Local agent for the exporter

These agents collect all the live crabs from small and large depots through depot owner and send them to Dhaka, from where they will go to the final destination.

Exporters

Most of the exporters are residing in the capital. From the survey results all of their businesses were found to be privately owned, commonly with an average experience of 8.7 years. About 30% of the exporters were found to run their trading with joint ownership. About 80% reported to export only live crabs. In addition to crabs, 20% of them were also found to be involved in exporting other live products such as eel fish.

Retailers

Generally the retailers collect the under grade and rejected crabs (which are rejected for export) from different depots and sell in the local market for domestic consumption. They also sell the crabs door to door. Out of 20 retailers from different survey areas, about 25% were also found to have fattening ponds. About 60% reported they usually buy from the depot and 40% of them said that they collect crabs from both the depots and from fattening ponds. According to their responses, as the non-Muslim and tribal people are the main consumers and the quality of the crab in the domestic market is not so good (mostly broken legs), they are not getting the higher profit. Lack of interest in consuming crabs in Bangladesh is the main cause of their low profit.

Marketing Channel

From Bangladesh mostly the live crab is exported. Mud crab marketing channels in particular were complicated, since market operators may perform more than one marketing function. The marketing channel of mud crab in Bangladesh starts from the wild catchers and passes through a number of intermediaries such as catchers, farmers, middlemen, depot owners, local agents for the exporter and finally from the exporter to the foreign countries. Figure 7 shows the general flow through the marketing channel.

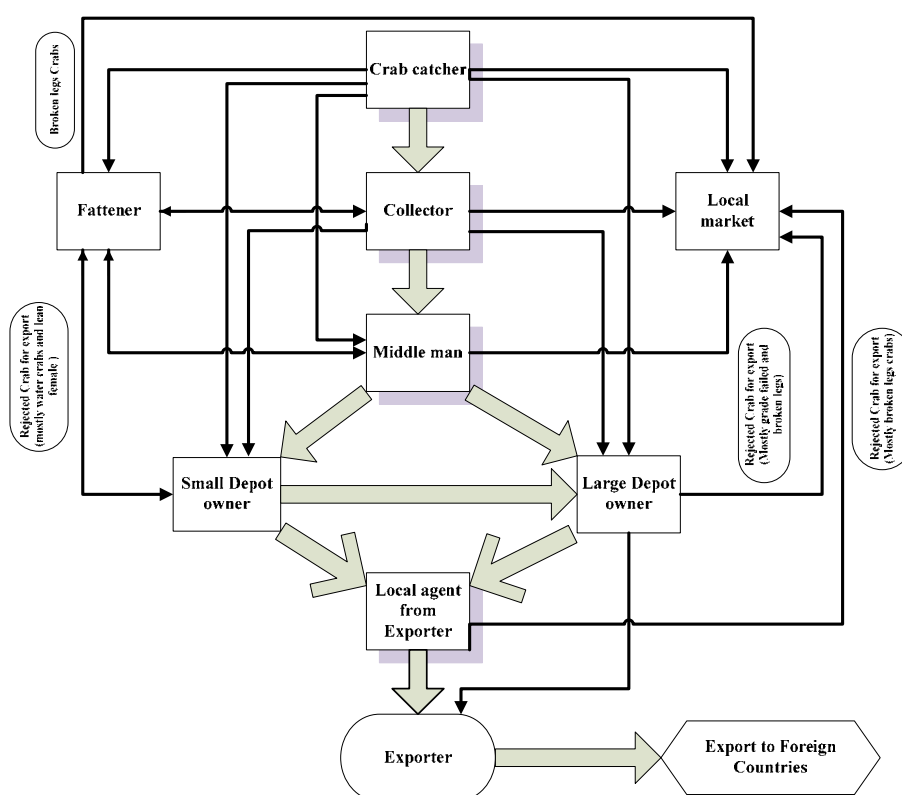


Figure 7. General Mud Crab (*Scylla* sp.) Marketing Flow in Bangladesh.

The catchers are the most disadvantaged group. From the survey results, about 63.3% of the crab catchers were found to sell their crabs to the collectors and 36.7% sell their catch directly to the depot owner due to the verbal agreement with the catchers and the depot owner. For this reason the crab catchers are often bound to sell their catch to them which prevents them from getting the actual market price. A small part of their catch goes for local consumption (mostly broken legs and small crabs) and 8.3% were found to have fattening ponds. According to their reports, sometimes they sell a small part of their catch directly to the fatteners. Most of the mud crab supplied from the catching sector was traded at first hand by the collector or foria, who distributed it to other market operators, usually the depot owner. The collectors buy the crabs from the catchers and sell them to the depot owner with a large profit. It was also revealed from the survey that the depot owner invests money through a lending system to the catchers and the collectors (foria) with a verbal contract that they have to sell their collected crab to them.

Some depot owners also take loans from the exporter with similar contact arrangements. A similar finding was also reported by Zafar and Ahsan [9].

Local agents for the exporter collect crabs from all small and large depots through the depot owners. About 90% of the total supplied from different sources goes to Dhaka for export. On the other hand, some part of the rejected crab with broken legs and other physical damage go to

the rural and urban market for domestic consumption, whereas some of the poorly graded ones are collected by the fatteners. From the survey, 86.7% of depot owners were found to have fattening ponds.

Price Influence and Seasonality

There are many factors affecting the price of mud crab in both the domestic and international markets, particularly as the supply of crab is mainly dependent on wild sources. The supply is affected by the season which is defined by the government of Bangladesh. During December to February and May to June, crab fishing is banned in order to save the broodstock and prevent overexploitation. Supplies of exported crabs were also reported by some traders to experience some sort of seasonality during Chinese New Year and Christmas time when the international consumption increases greatly, which ultimately affects the price of the crabs in the international market. Traders and the fatteners also reported that they can earn higher profits especially during this time.

On the other hand, demand in the local or domestic market is seen as steady throughout the year. Sometimes the price is also related to fluctuations on the international market, especially for male crabs and gravid female crabs. Any price increase in the international market will ultimately increase the price in the domestic market.

In addition, when the interviewees were asked about the influence of marketing operations over the price, the majority of the collectors and farmers claimed their depot owner had the most influence over price, while conversely, the depot owners felt that suppliers and exporters had the greatest influence over the price paid.

Perceptions on Economic Improvement

From Figure 8 it can be seen that the highest perception of positive responses was from the exporters, local agents and the depot owners. On the other hand, a greater proportion of retailers showed negative response. They again claimed that low demand in the local market might be the major cause and poor quality of the product prevents them from getting reasonable profit. About half of the crab catchers (48.3%) believed that they improve their economic life while, 20% said that there was no change in their economic circumstances through crab catching. This is probably due to the small share in benefits they receive through the crab marketing system. Some fatteners also reported some negative performance. Most of their business is small scale and the fatteners also suggested that the seed cost the highest expense in fattening. They are still struggling with the learning curve and finding most difficulties in covering costs.

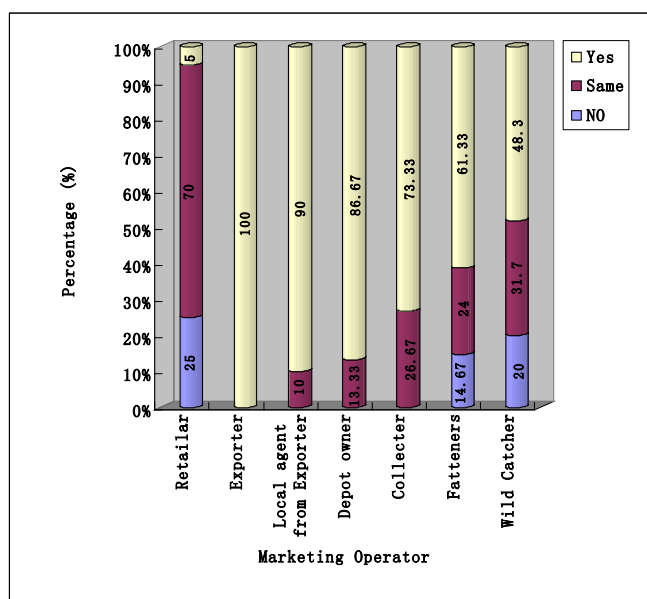


Figure 8. Level of perception on economic development through crab trading among different marketing operators.

Factors Hindering the Mud Crab Trade in Bangladesh

According to the focus group discussion with fatteners and traders, several factors as reported by them are hindering crab trading in Bangladesh. Factors considered to be hindering the trade also varied among the marketing operators. Table 3 showing the major problems faced by the marketing operators in mud crab business in Bangladesh.

Besides lower profit, catchers reported the overexploitation of juveniles and the environmental degradation as major problems for achieving a higher catch. In addition to this, the fatteners and the catchers also reported the illegal export of under-weight crabs to the international market to be detrimental to the industry. This leads to over-fishing of juvenile crabs from the natural sources which in turn endangers the sustainability of the industry. Another common issue reported by all respondents is the lack of capital or credit support from the government or nongovernmental banks for crab farming or trading, while there exists sufficient credit facilities for shrimp farming. However, loan facilities for crab fatteners, fishers and traders from commercial or government banks is not available.

Low demand in the domestic market was also reported by the marketing operators as being a major factor discouraging growth of the industry. In Bangladesh, the social and religious restrictions on the consumption of crab is hindering the business and prevents the operators from obtaining realistic prices in the domestic market.

Table 3. Problems reported by crab marketing operators in Bangladesh.

Marketing operators	Problems
Crab catchers	Overexploitation Low price from middlemen Lack of market information
Fatteners	Low price from middlemen Lack of demand in domestic market Lack of credit facility from banks Lack of market information
Middlemen	Lack of supply during high demand Influence of suppliers over price Lack of market information
Depot owners	Lack of supply Lack of credit facility Supplier/Exporter influence over price
Suppliers	Lack of credit facility Insufficient supply Exporter influence over price
Exporters	Insufficient supply during high demand Depot owner influence over supply Insufficient shipment facilities
Retailers	Lack of demand in domestic market

Main Factors for Promoting Farming and Marketing in Bangladesh

There is a growing interest among farmers for fattening. The main factor for promoting the farming of crabs and the business is the increasing demand for crab in the international market. After the outbreak of shrimp and prawn diseases, many farmers diverted from shrimp farming to crab fattening. According to their responses, they can get higher profit within a shorter time and with lower investment required compared to shrimp. The Fisheries Research Institute in Khulna is playing a significant role by providing different training programs for the farmers and establishing model farms for disseminating modern aquaculture techniques. Various non-government organizations in the southwest of Bangladesh (Caritas, Shushilan) are also encouraging the crab fatteners and working with the fishers on sustainable farming practices and for adopting new technology through different development programs.

Conclusions

Mud crab marketing was considered as a profitable and feasible business by most of the marketing operators. However, the catchers and the fatteners suggested that the government should pay some attention to this sector to prevent overexploitation of the species and to prevent environmental degradation affecting their habitat.

From the survey it was found that the price is strongly affected by various factors including seasonality. The most important season is the Chinese New Year when the price increases in average up to 40-50% in most markets. Export of mud crabs from Bangladesh is expected to rise as domestic production (farming) continues to increase. Critical to this is the catching sector remaining constant and preventing overexploitation. Domestic demand needs to increase through increasing social awareness and promoting awareness of the nutritive value of this export oriented species.

Considering the total export earnings from mud crabs, the fishery shows future potential. To achieve this, development and support from government and different nongovernmental organizations needs to be greater and perceptions regarding the activity needs to improve for more sustainable mud crab farming and marketing in Bangladesh.

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