

## Challenges in mud crab production and marketing: A study on Khulna and Satkhira District

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### Abstract

Bangladesh has more than 580 km coastline area which is populated by lower and lower middle class people who are either directly or indirectly involved with coastal economy. Crab cultivation has been treated as one of the dependable sources of livelihood for many years. A majority number of families in that area have chosen crab cultivation as their exclusive source of income. This study was conducted in the southern part of Bangladesh on the crab cultivators and middlemen of Khulna and Satkhira districts. In this study, it was tried to explore the challenges that cultivators face in mud crab production and the challenges conceded by the producers and middlemen in the marketing of mud crab. A total of 40 producers and middlemen were selected for interview with structured questionnaire. Analysis of data shows that mud crab production challenges come from natural disaster, virus attack, lack of training, lack of government loan, low quality crab seeds etc. on the other hand crab marketing fall into challenges of not following proper marketing system, instability in channel and pricing system, unfavorable relationship between middlemen and crab cultivators, unhealthy competition etc. based on the analysis, some recommendations have been suggest that would be helpful to the people and organization who are involved with mud crab production and marketing.

**Keywords:** aquaculture, crab cultivators, crab marketing, crab production, middleman, mud crab

### 1. Introduction

The genus of *Scylla* species can be also termed as mud crab, Indo-Pacific swamp crab, mangrove crab or green crab. There are four specific species of *Scylla*; *S. Serrata*, *S. Tranquebarica*, *S. Olivacea* and *S. Paramamosain* (Keenan *et al.* 1998) <sup>[1]</sup>. It is locally called as “Shilakankra”, “habbakankra” or “kankra”. The demand of mud crab is increasing globally whereas China, Canada and USA are now the major three countries that actually control the global market by producing 70% of crab production but only Asia provided 90-99% of the total mud crab production from 1974 to 2005 (FAO, 2006) <sup>[2]</sup>. So, it has become a great challenge for the Asian countries like Bangladesh, India, Thailand and Philippine along with China to regain the past glory.

Bangladesh can play a vital role to get that opportunity from two points of view: firstly, vast areas of coastlines with extensive resources and secondly, huge number of interested people in the crab production is shifting from shrimp farming (Islam and Wahab 2005, Uddin *et al.* 2013, Hussain 2014) <sup>[3][4][5]</sup>. Marginal farmers are changing their livelihood because the production of agriculture, freshwater fisheries, vegetation is hampered due to salinity problem and natural disaster. Under these circumstances, mud crab production is triggered as the first choice of that people because they can grow in high salinity level (Zafar and Siddiqui 2000, Chandra *et al.* 2012) <sup>[6][7]</sup>. Now, millions of poor farmers, traders, fishers, and transporters are directly or indirectly dependent on crab fishery in Bangladesh (Zafar, 2004, Patterson and Sainuel, 2005) <sup>[8,9]</sup>.

Mud crab farmers do not able to exploit the full advantages of

crab production and marketing. Several problems hinder us to get competitive advantageous and appeared in world competition. Lack of technical knowledge among farmers, inadequate capital to expand their firming and start-up in the international market, failing to collect healthy and hybrid seed, unknown about the proper marketing channel of distribution, negative environmental impact of fattening of crabs and unable to set strategic phenomena for meeting local and global demand are the main culprit not to fasten this sector. So, it is the essence of time to explore the challenges or barriers of mud crab production and marketing.

Most of the study in Bangladesh showed the species identification, distribution and brood stock management of crabs (Islam, 1976; Khan 1992; Obayed, 1998) <sup>[10][11][12]</sup>. There is inadequate number of research regarding the challenges of mud crab production and marketing in Bangladesh faced by the farmers in the field level. This study is trying to unfold the sustainable opportunity of mud crab production and marketing by finding out the problems concerned with these.

### 2. Review of literature

The popularity of mud crab is increasing day-by-day around all over the world especially in China, USA, Australia, Canada, Thailand, India and other countries due to its profitability and good taste (Quinitio *et al.* 2008) <sup>[13]</sup>. In Bangladesh, coastal communities of Khulna and Chittagong regions are showing a great deal of interest in mud crab production (Azam *et al.* 1998) <sup>[14]</sup>. Sarower *et al.* (2012) <sup>[15]</sup> identified two key reasons for its popularity: firstly, it has high

demand in international market (Vinod *et al.* 2016 and Faruque *et al.* 2017) [16, 17] and secondly, mass mortality rate of alternative coastal aquaculture species of shrimp (Leon-Canedo *et al.* 2017 and Lafferty *et al.* 2015) [18, 19]. Beside the economic value of mud crab demand (Malleo, J. 2011, Marschke, M. 2003, Agbayani, R. F. 2001 and Salam *et al.* 2003) [20, 21, 22, 23] it has some identifiable challenges in the area of mud crab production (Gardner *et al.* 2017, Rahman *et al.* 2017 and Rahman, M. M. 2016) [24, 25, 26] and mud crab marketing (Hussain *et al.* 2017 and Adhuri *et al.* 2016) [27, 28]. Ferdoushi and Xiang-guo (2013) [29] finds out twelve (12) important challenges in mud crab production in their study. They selected 150 farmers from three districts in southern Bangladesh named Khulna, Bagrhat and Satkhira into a Focused Group Discussions (FDGs) to find out the challenges of crab fattening and marketing. Insufficient credit (Ferdoushi, Z. 2015 and Nisa, S. E. 2015) [30, 31] lack of proper knowledge (Rahman, M. M. 2016 and Maharajan 2015) [32, 33], high cost for collecting female crabs (He, J., Wu 2014, Simpson 2015 and Pardo 2017) [34, 35, 36], high feeding cost (Tacon 2015 and Petersen *et al.* 2013) [37, 38], water quality deterioration (Liu *et al.* 2013 and Kumar *et al.* 2017) [39, 40], cannibalism (Ballio *et al.* 1981 and Cholik and Hanif 1991) [41, 42], religious constraints (Mirera 2014) [43] and low salinity problems (Shentu 2015 and Dan 2016) [44, 45] are the main challenges of mud crab production in these area. Supporting this study Quintio *et al.* (2008) [13] previously mentioned that high seed production cost, low quality seed, diseases, cannibalism at all stages and decrease in the use of fish in farming are the main challenges of crab production. Cholik and Hanif (1991) [42] stated that the development of mud crab hatchery at commercial level has not yet been widespread in most of the countries. So shortage of seed supply and feed and low survival of the cultured crab are being the fundamental problems for the farmers. High rate of mortality and lower production for escaping of crab are also found as the challenges by some researchers (Gumarto and Rusdi 1993, and Sulaeman *et al.* 1993) [46, 47]. Ferdoushi and Xiang-guo (2013) [29] also mentioned that lack of market information (Zafar *et al.* 2006 and Glaser 2004) [48, 49], price influenced by the marketing operator (Miner 1996) [50] and poor extension

service (Meyer 1991 and Adinya 2009) [51, 52] were the main marketing constraints of crab production. Many researchers have found out challenges of crab marketing as middlemen exploitation (Ferse 2014) [53], problem of price chain and distribution channel (Brindley 2014) [54], lack of good marketing initiatives (Zafar *et al.* 2006) [49] and lack of promotional, training and motivating facilities (Huq 2015) [55].

**3. Objectives**

The study has been basically conducted based on the following objectives:

- a) To explore the challenges of mud crab production
- b) To find out the challenges of mud crab marketing
- c) To reveal the latent potentiality of mud crab production and marketing

**4. Methodology**

In this study, we used both primary and secondary data. Primary data has been collected from 40 crab cultivators of Khulna and Satkhira districts and the secondary data has been collected from different sources like reference books, journals, conference and seminar papers, and websites etc. Data was collected from the crab cultivators by reaching them in person and convenience random sampling techniques was used for sampling. Data processing was done through using the following steps: editing, coding, classification and tabulation (Kothari, 2004; Malhotra, 2013; Zikmund *et al.*, 2014) [56, 57, 58]. The collected data were analyzed by using Statistical Package on Social Science (SPSS). This study is descriptive in nature and we have conducted the research from June to July in 2017. The collected data were coded using Likert scaling technique. The scale was ranging from 1 (minimum) to 5 (maximum) categories. The respondents responded to questions under each variable on five-point scales with 1 = strongly agree, 2 = agree, 3 = neutral, 4 = disagree and 5 = strongly disagree to calculate the notion of the crab farmers.

**5. Results and Discussion**

From the structured survey questionnaire, the responses that were found are shown in Table I. and Table II.

**Table 1:** Frequency distribution for the challenges in mud crab production in Bangladesh.

Variables	Crab Production			
	Options	Frequency	Percentage (%)	Cumulative Percentage
Do you think natural disasters like flood, erosion are one of the biggest challenge in crab fattening?	Strongly agree	24	60	60
	Agree	14	35	95
	Neutral	02	05	100
	Disagree	0	0	100
	Strongly disagree	0	0	100
	Total	40	100	
Do you think over dependency on natural wild seed has been an obstacle in crab farming?	Strongly agree	26	65	65
	Agree	12	30	95
	Neutral	02	05	100
	Disagree	0	0	100
	Strongly disagree	0	0	100
	Total	40	100	
Do you think theft problem, aggression of musclemen is one of the major threats against crab fatteners?	Strongly agree	18	45	45
	Agree	14	35	80
	Neutral	04	10	90

	Disagree	04	10	100
	Strongly disagree	0	0	100
	Total	40	100	
Do you think that the crab cultivation is seriously hampered by the presence of virus and other diseases?	Strongly agree	28	70	70
	Agree	10	25	95
	Neutral	02	05	100
	Disagree	0	0	100
	Strongly disagree	0	0	100
	Total	40	100	
There is sufficient availability of quality mud crab seed for commercial cultivation in firms.	Strongly agree	0	0	0
	Agree	0	0	0
	Neutral	02	05	05
	Disagree	10	25	30
	Strongly disagree	28	70	100
	Total	40	100	
Financial and non-financial government supports are less in mud crab sector than the other sectors like shrimps.	Strongly agree	32	80	80
	Agree	06	15	95
	Neutral	02	05	100
	Disagree	0	0	100
	Strongly disagree	0	0	100
	Total	40	100	
Improper stocking rate, water quality and feeding management hampers the profitability of the crab fatteners.	Strongly agree	16	40	40
	Agree	16	40	80
	Neutral	04	10	90
	Disagree	04	10	100
	Strongly disagree	0	0	100
	Total	40	100	
Lack of training facilities has been a major drawback for the development of the sector.	Strongly agree	20	50	50
	Agree	16	40	90
	Neutral	04	10	100
	Disagree	0	0	100
	Strongly disagree	0	0	100
	Total	40	100	
Is it still a socio-religious issue for the cultivator to be involved in mud crab cultivation?	Strongly agree	02	05	05
	Agree	12	30	35
	Neutral	02	05	40
	Disagree	12	30	70
	Strongly disagree	12	30	100
	Total	40	100	

From the analyzed data, it is found that crab production and marketing have some challenges and crab farmers are quite concerned about those. Natural disaster is one of the challenges that is a cause of headache for many of the farmers. Over dependency on natural wild seed is an obstacle for the farmers as the others sources are either limited or less fertile. Respondents were agreed with symptoms of virus and other diseases created impediment to desired level of production.

Crab cultivators also think that theft and men made hazards are also responsible for less production. Farmers also believe that expected development in this sector is hampered by lack of training and loan facilities from government. Some farmers still perceive crab involvement as a social issue specially the Muslims community. Most of the farmers have acknowledged the fact that improper stocking rate, water quality and feeding management are yet to improve.

**Table 2:** Frequency distribution for the challenges in mud crab marketing in Bangladesh.

Crab Marketing				
Variables	Options	Frequency	Percentage (%)	Cumulative Percentage
Injecting formalin, illegally increasing weight and false grading etc. are hampering the image of Bangladeshi crab industry.	Strongly agree	08	20	20
	Agree	20	50	70
	Neutral	04	10	80
	Disagree	04	10	90
	Strongly disagree	04	10	100
	Total	40	100	
Crab industry is suffered by lack of proper implementation of marketing system.	Strongly agree	24	60	60
	Agree	12	30	90
	Neutral	04	10	100

	Disagree	0	0	100
	Strongly disagree	0	0	100
	Total	40	100	
Do you think that the crab cultivator-distributor relationship is supportive to each other in this industry?	Strongly agree	04	10	10
	Agree	06	15	25
	Neutral	04	10	35
	Disagree	08	20	55
	Strongly disagree	18	45	100
	Total	40	100	
Do you think promotion of mud crab has been taken properly both in country and outside the country?	Strongly agree	0	0	0
	Agree	0	0	0
	Neutral	0	0	0
	Disagree	16	40	40
	Strongly disagree	24	60	100
	Total	40	100	
Do you think middlemen exploit the crab cultivators and deprive them in many ways?	Strongly agree	32	80	80
	Agree	08	20	100
	Neutral	0	0	100
	Disagree	0	0	100
	Strongly disagree	0	0	100
	Total	40	100	
Occasional fluctuation of price of salable mud crab is a barrier for the mud crab fatteners.	Strongly agree	34	85	85
	Agree	06	15	100
	Neutral	0	0	100
	Disagree	0	0	100
	Strongly disagree	0	0	100
	Total	40	100	
Mud crab price is dominantly determined by local Foria and Dalal over the crab fatteners?	Strongly agree	30	75	75
	Agree	08	20	95
	Neutral	0	0	95
	Disagree	02	05	100
	Strongly disagree	0	0	100
	Total	40	100	
The price of the mud crab seed is relatively high.	Strongly agree	08	20	20
	Agree	14	35	55
	Neutral	10	25	80
	Disagree	08	20	100
	Strongly disagree	0	0	100
	Total	40	100	
The rate of increasing cost of production is higher than the rate of price of mud crab.	Strongly agree	28	70	70
	Agree	08	20	90
	Neutral	04	10	100
	Disagree	0	0	100
	Strongly disagree	0	0	100
	Total	40	100	
Do you think the grading system pricing of crab is more beneficiary for the middlemen than the farmers?	Strongly agree	30	75	75
	Agree	08	20	95
	Neutral	02	05	100
	Disagree	0	0	100
	Strongly disagree	0	0	100
	Total	40	100	

Miscellaneous				
How do you manage your capital?	Bank loan	08	20	20
	Own capital	28	70	90
	Others	04	10	100
	Total	40	100	
Who are the buyers of your products?	Depot	24	60	60
	Foria	14	35	95
	Local market	02	05	100
	Total	40	100	
How did you gather knowledge about mud crab fattening?	Govt. training	0	0	0
	Non-govt. training	08	20	20

	No training	32	80	100
	Total	40	100	

From the collected data it is seen that 90% of the farmers think that crab participants are losing in long run because of lack of implementing Proper marketing system. Most of the farmers think lack of good relationship between middlemen and them have worsen the total marketing system. False weighting and grading, injecting chemicals are the main cause of losing image in the national and international market. Majority of the farmers think that frequent change in mud crab price is one of the most responsible causes of loss of the producers. This problem intensifies when that price is set mostly by the Foria and Dalal. The crab cultivators think that the rate of increasing cost of production is higher than the rate of price of mud crab. 75% cultivators are largely unhappy with the grading system pricing as the majority amount of the product fail to get the higher grade. Most of the farmers think lack of govt. loan and training are the cause of slow development in this sector. Crab production and marketing are facing challenges for the above-mentioned reasons.

## 6. Recommendations

On the basis of the results the major findings are given below:

1. Crab production and marketing has been operating in ancient method which is the main impediment in the development of this sector. To have well developed crab sector it is better to set up a national plan and implement that plan in each and every sector in Bangladesh.
2. Since the farmers are following the ancient method of production system so the rate of production has not been satisfactory at all. So, there should have some training facilities for the farmers from government to introduce them with modern production system.
3. Natural calamity like flood, erosion etc. sometimes create threats to the farmers so steps should be taken to save the farmers from those kinds of natural calamity and compensation should be given if necessary.
4. Virus and the related diseases are sometimes regarded as the main cause of loss to the farmers. Little consciousness can erase the possibility of those hazards in many forth. Only training, publicity and awareness creating programs can solve these kinds of problems.
5. The relationships among the crab farmers associations were not cooperative. So, the middlemen somehow got the chance to abuse the ill motive. Therefore, crab farmers relationship can be strengthened by building crab farmer's cooperative society.
6. Quality seeds are required to expand crab farming among the crab cultivators in theses area.
7. By creating a learning environment with comprehensive training facilities among all level of crab farmers are essential.
8. Technological support system should be developed for crab production and marketing.
9. Entrepreneurial support should be enhanced to make this sector more lucrative for both local and global markets.

## 7. Conclusion

Mud crab farming has been concentrated as the heart of

alternative livelihoods or sometimes the main income source in the southeast and southwest part of Bangladesh due to increasing demand and its profitability both in local market and global market. Nonetheless this sector exhibits poor facilities and poor incentive program to expand the crab culture in this region. Without identifying the core problem related with crab production and crab marketing, it is hard to believe that this sector can achieve competitive advantages and satisfactory growth of potential farming. It can be concluded that government, nongovernmental organization, new and dynamic entrepreneurs, researchers should come forwards to make this sector more sustainable. In addition, good training facilities, capital support, other logistic support, and adequate and proper market information can also motivate the crab farmers to compete with their limitation and to survive in dynamic environment.

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