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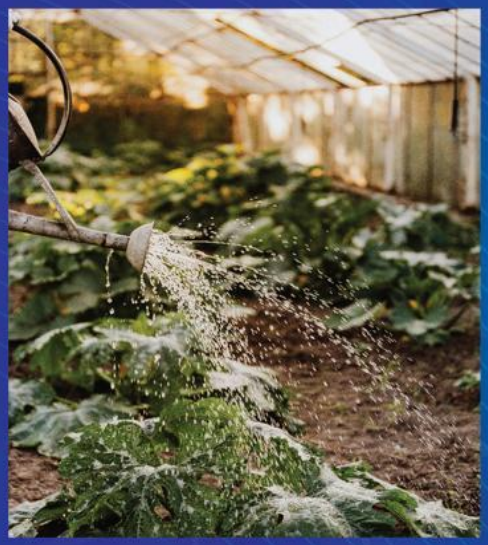

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MUD CRAB (*SCYLLA SERRATA*) VALUE ADDITION ANALYSIS OF DIFFERENT ACTORS IN BANGLADESH

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ABSTRACT

Most of the marketing operators consider the mud crab business to be a profitable and emerging business due to the high demand in the international market. The present study determines value addition at different actors-based activities in the supply chains. The primary data was collected from 100 respondents (40 collectors, 10 fatteners, 20 depot owners, 20 suppliers and 10 exporters) who were selected randomly from Khulna, Satkhira and Dhaka district. The analysis reveals that the value addition of the fatteners was the highest among all other intermediaries which was Tk. 11525 and Tk. 10665 per 100 kg of crab for the grade XXLPD in Khulna and Satkhira district, respectively, whereas the lowest value addition was Tk. 1450 and Tk. 1090 per 100 kg of crab for grade KS3. The highest value addition per 100 kg of crab process among the study areas was Tk. 1191 and 1200 for depot owners and grade FF1 (600-700gm/mud crab), respectively, while lowest value addition was Tk. 691 and Tk.750 per 100 kg of crab for the grade L (500-600gm/mud crab) and M (400-500gm/mud crab), and the suppliers also added Tk. 2918 and 2758 per 100 kg of crab processing for the grade FF1. The range of value addition by exporters for Hong-Kong and Taiwan market was Tk. 260.25 to Tk. 13825 per 100 kg of crab. Value addition for exporting female crab to Taiwan market was greater than Hong-Kong market.

Keywords: *Scylla Serrata*, market, actors and value addition

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INTRODUCTION

The mud crab (*Scylla Serrata*) is a commercially important crustacean aquatic species after tiger shrimp (Penaeusmonodon; Fabricius) in Bangladesh which is locally called as '*Kakra*', '*ShillaKakra*', '*Habbakankra*' (Jahan and Islam, 2016). In Bangladesh, mud crabs are abundant in the tidal rivers of Khulna, Bagerhat, Satkhira, Cox's Bazar as well as Chittagong (DoF, 2017). It is harvested from the coastline of the Bay, in the creeks and canals of the brackish water estuaries (Khan and Alam, 1992). Mud crab is being cultured in pen, cage or even simultaneously in shrimp farms (Chakraborty et al., 2018). Therefore, shrimp farmers are gradually shifting to crab farming since this species is less susceptible to disease, easy to culture, more adaptable to climate change and higher market price in comparison to shrimp (Salam et al., 2012). Crabs are second most exportable crustacean product in Bangladesh (Molla et al., 2009). Crab farming played a crucial role in exporting crab in the 2018-2019 fiscal year, earning approximately $42.93 million (BBS, 2018). Bangladesh has experienced an increasing trend in crabs' export and emerging source of foreign currency over the past five years through the development of hatchery-produced mud crab (BBS, 2018; Shamsuzzaman et al. 2020). Bangladesh recently exported 11,000 tons of crab to overseas markets such as Malaysia, Singapore, China, Japan, Hong Kong, and South Korea (Ahamad, 2019). In South-East Asia, Scylla Serrata, known as mud crab is one of the most popular and proliferates due to suitable agro-ecological conditions, high prices and demand in international markets (Chandra et al. 2012; Pripanapong and Tongdee, 1998).

A value chain is the full range of activities, from the producer to the final consumer, that involve a combination of physical transformations and the input of various producer services (Kaplinsky, 2000). It focuses on market collaboration amongst various suppliers, producers, processors, and buyers who hold different degree of market power (Mangubhai et al., 2017). Value chain analysis is essential to an understanding of markets, their relationships and the participant of different actors, like collectors, fatteners, wholesalers, depot owners, suppliers and exporters. The existing mud crab value chain is long and unstructured and crab fishers are exploited by middleman and hardly receive any government support (Sanoara, 2018). There have been several studies were conducted on the marketing system and value chain analysis of crab fishery (Chandra et al., 2012, Zafar & Ahsan, 2006; Bain & Mandal, 2017; Sultana et al. 2019; Bhuiyan et al. 2021). The mud crab business has still been a neglected field. Only a scientific study can help to find out objectively the impact of the national and international markets on the production, processing and consumption of crab. No systematic

study has yet been undertaken so far to determine the value addition of natural and cultural crab. Thus, recognizing the significant contribution of crab in the national economy, the present study will determine the value addition of different actors of mud crab in Bangladesh.

MATERIALS AND METHODS

Considering the concentration of mud crab farming and trading, Dacope and Paikgacha upazila in Khulna district, and Samnagar and Kaligonj upazila in Satkhira district were selected purposively in this study. The respondents in the sample frame were the collectors, fatteners, depot owners, suppliers and exporters.

After that, a list of 140 crab collectors, 40 fatteners, 80 depot owners, 40 suppliers were selected from Dacope and Paikgacha upazila in Khulna district; and Samnagar and Kaligonj upazila in Satkhira district; and a list of 40 crab exporters were selected from Dhaka. To select the respondents in this study, the random sampling technique was applied to interview collectors, fatteners, depot owners, suppliers and exporters. Among the four selected Upazila in two districts, 20 crab collectors, 5 fatteners, 10 deport owners, and 10 suppliers were selected randomly from each district, and 10 crab exporters were selected randomly from Dhaka for the study. Total sample size of the study was 100 respondents which included 40 collectors, 10 fatteners, 20 depot owners 20 suppliers.

This analysis considered fixed costs and variable costs (such as labour, baits and mortality loss). Net return was considered by deducting all costs (Variable and fixed costs) from gross return. To achieve one of the objectives of the study a simple cost and returns analysis was used to determine the profitability of the selected collectors and value addition of different level traders. For this purpose, the following equation was used to assess the profitability of the collectors and value addition by different level of traders.

Profit/Net return of crab collector,

$$\boldsymbol{\pi_i = P_{im} * Q_{mi} - \sum TVC_i - \sum TFC_i}$$

Where.

π_i= Profit of ith collectors per day

P_{im} = Per unit price of crab (Tk/kg)

Q_{im} = Quantity of crab (kg/day)

TVC_i=Total variable cost of ith collectors

TFC_i= Total fixed cost of ith collectors

Value addition of different level of traders

$$\text{Value addition} = \text{Gross margin} - \text{Marketing cost}$$

$$\text{Gross margin} = \text{Sale price} - \text{Purchase price}$$

RESULTS AND DISCUSSION

Cost of crab collectors for collection and marketing of mud crab

Collection and marketing costs play an important role in the decision making of the collectors. Here, the costs refer to the total amount of funds used in crab collection and marketing. In the present study, variable and fixed costs were calculated separately. Table 1 presents the total costs per collector per day, which is estimated at Tk. 163 and 161 in Khulna and Satkhira district respectively. Average variable costs per collector per day were estimated at Tk. 118 and Tk. 119, accounted for around 72 per cent (Khulna district) and 74 per cent (Satkhira district) of total cost. Fixed cost per collector per day was calculated at Tk. 45 and Tk. 42 which accounted for 28 and 26 percent of total costs (approximately) in Khulna and Satkhira district, respectively.

Table 1: Collection and marketing cost of per collector per day in Khulna and Satkhira Districts

Particulars	Khulna District		Satkhira District	
	Amount (TK.)	% of total cost	Amount (TK.)	% of total cost
A. Variable Cost	118.00	72.39	119.00	73.91
a. Labour	45.00	27.06	43.00	26.71
b. Food	30.00	18.40	32.00	19.08
c. Baits	10.00	6.13	8.00	4.97
d. Tax	18.00	11.04	18.00	11.18
e. Transportation Cost	5.00	3.08	6.00	3.73
f. Mortality loss	8.00	4.19	10.00	6.21
g. Miscellaneous	2.00	1.23	2.00	1.24
B. Fixed cost	45.00	27.61	42.00	26.09
a. Tools and equipment costs	30.00	18.10	28.00	17.39
b. Interest on opening capital	15.00	9.20	14.00	8.70
Total Cost (A+B)	163.00	100	161.00	100

Gross return

Gross return, the monetary value of total output, consists of the values of live crab. It was noted that on an average, price of live mud crab received by the traders was Tk. 220, 100, 60, 30, 15, 130, 90, 40 and 15 per kg of crab in Khulna district and Tk. 210, 100, 50, 30, 15, 130,

85, 30, and 15 per kg of crab in Satkhira district for grade XXL, XL, L, M, SM, FF1, F1, F2 and F3 respectively. It is evident from Table 2 that the average gross return was Tk. 338.5 and Tk. 335.9 per day per collector in Khulna and Satkhira district, respectively.

Table 2: Gross return per day per collector in Khulan and Satkhira District

Sex	Grade	Khulna district			Satkhira district		
		Quantity (kg)	Price (Tk/kg)	Gross Return	Quantity (kg)	Price (Tk/kg)	Gross Return
Male	XXL (800-1000gm/crab	0.5	220	110	0.5	210	105
	XL (600-800gm/crab)	0.5	100	50	0.5	100	50
	L (500-600gm/crab)	0.5	60	30	0.5	50	25
	M (300-500gm/crab)	1	30	30	1	30	30
	SM 200-300gm/crab)	1	15	15	1	15	15
Female	FF1 (600-700gm/crab)	0.18	130	23.5	0.18	130	23.1
	F1 (500-600gm/crab)	0.5	90	45	0.5	85	42.5
	F2 (400-500gm/crab)	0.5	40	20	1	30	30
	F3 (300-400gm/crab)	1	15	15	1	15	15
Total		5.68		338.5	6.18		325.9

Gross margin

In this study, gross margin was calculated by deducting variable costs from gross return on account of the business. Table 3 illustrates that the average gross margin per collector per day was estimated at Tk. 220.5 for Khulna and Tk. 216.9 for Satkhira district.

Table 3: Gross margin and net return per day per collector in Khulna and Satkhira district

Particulars	Khulna district	Satkhira district
	Amount (Tk.)	Amount (Tk.)
Gross Return	338.5	335.9
Variable cost	118	119
Total cost	163	161
Gross margin	220.5	216.9
Net return	175.5	174.9

Net return

Net return is defined as the difference between gross returns and total costs. Table 3 depicts that, in Khulna, average net returns for per collector per day were calculated Tk. 175.5, which was Tk. 174.9 for Satkhira,

Value addition analysis of fatteners

Fattening and marketing cost of fatteners

Fattener's function usually includes nursing/fattening, assembling, transportation of crabs, and then selling to *Faria* (local middleman), depot owners and suppliers. The costs involved in performing these services are mainly land rent, labour charge, feed cost, baits cost, other operational cost (Fencing, pond management, harvest etc.), transportation cost and other cost. The marketing and fattening cost of fatteners in Khulna and Satkhira district are shown in Tables 4. The average marketing and fattening costs incurred by fatteners were Tk. 2475, 2075, 2325 and 2040 per 100 kg of crab in Khulna district and Tk. 2335, 1935, 2185, and 1910 per 100 kg of crab in Satkhaira district for grade XXLPD, MPD, KS1 and KS3, respectively. Among cost items, labour cost was the highest standing for 32, 39, 34 and 39 percent of total costs in Khulna district and 32, 39, 35 and 39 percent of total costs in Satkhira district for grade XXLPD, MPD, KS1 and KS3 respectively. The next most expensive cost item was feed cost, followed by other cost items in descending order, like - loss of mortality, land use cost, other operational cost and transportation cost, in Khulna and Satkhira district.

Table 4: Total costs, gross margin and value addition by fatteners in Khulna and Satkhira District

Particulars	Khulna District							Satkhira District						
	Male crab				Female crab			Male crab				Female crab		
	XX LDP	XL DP	L DP	M DP	KS_1	KS_2	KS_3	XX LDP	XL DP	L DP	M DP	KS_1	KS_2	KS_3
Land use cost	250	250	250	250	250	250	250	225	225	225	225	225	225	225
Labour cost	800	800	800	800	800	800	800	750	750	750	750	750	750	750
Transportation cost	75	75	75	75	75	75	75	100	100	100	100	100	100	100
Feed cost	600	600	600	600	600	600	600	500	500	500	500	500	500	500
Mortality cost	500	250	150	100	350	200	75	500	300	185	100	350	185	75
Other operational cost	200	200	200	200	200	200	200	175	175	175	175	175	175	175
Miscellaneous cost	50	50	50	50	50	50	50	55	55	55	55	55	55	55
Total Cost (fattening and marketing cost)	2475	2225	212	2075	2335	2175	2050	2335	2135	2020	1935	2185	2020	1910
Purchase price	10000	5000	3000	2000	7500	4000	15000	10000	5000	3500	2000	7000	3500	1500
Sales price	24000	15000	9000	6000	15000	10000	5000	23000	14000	8000	5000	14000	10000	4500
Gross margin	14000	10000	6000	4000	7500	6000	3500	13000	9000	4500	3000	7000	6500	3000
Value addition	**11525**	**7775**	**3875**	**1925**	**5175**	**3875**	**1450**	**10665**	**6865**	**2488**	**1065**	**4815**	**4480**	**1090**

Note: Grade XXLDP=600-700gm/crab, XLDP=500-600gm/crab, LDP=300-500gm/crab and MDP=Below 300gm/crab, KS1=400-500gm/crab, KS2=250-400gm/crab and KS3=Below 250gm/crab.

Value addition by fatteners

Fatteners purchase undersized or soft shell or eggless crab to fatten those through nursing, and then supply to different types of traders such as *Faria*, depot owners and suppliers. Gross margin of fatteners in both Khulna and Satkhira districts are also shown in Table 4. The average gross margin of fatteners was Tk. 14000, 4000, 7500 and 3500 per 100 kg of crab in khulna district and Tk. 13000, 3000, 7000 and 3000 per 100 kg of crab in Satkhira district for grade XXLPD, MPD, KS1 and KS3 respectively. They incurred marketing and fattening cost of Tk. 2475, 2075, 2325 and2040 per 100 kg of crab in Khulna district for grade XXLPD, MPD, KS1 and KS3 respectively, and for Satkhira District it was Tk. 2335, 1935, 2185 and1910 accordingly. Thus, the value addition (profit) earned by them were Tk. 11525, 1925, 5175 and 1405 per 100 kg of crab in Khulna district and Tk. 10665, 1065, 4815 and1090 per 100kg of crab in Satkhira district for grade XXLPD, MPD, KS1 and KS3 respectively. In Khulna, the highest added value was estimated to be Tk. 11525 per 100 kg of crab for grade XXLDP, the figure was Tk. 10665 for Satkhira. Again, the lowest added value was Tk. 1065 per 100 kg of crab for grade MDP and KS2 in Satkhira. Compared with Satkhira district value addition for crab to Khulna district was found much higher.

Value addition analysis of depot owners

Marketing cost of depot owners

Depot owners directly buy mud crab from collectors and *Faria* and then supply to the suppliers. The marketing costs of depot owners in Khulna and Satkhira districts are shown in Table 5. The average marketing cost incurred by depot owners were Tk. 409, 259, 309, 309 and 259 per 100 kg of crab in Khulna district and Tk. 450, 250, 350, 300 and 250 per 100 kg of crab in Satkhira district for grade XXL, SM, FF1, F1 and F3 respectively. Among cost items loss of mortality was the highest expense representing 49, 26, 32, 32 and 26 percent of total costs in Khulna district and 56, 27, 43, 33 and 27 percent of total costs in Satkhira district for grade XXL, SM, FF1, F1 and F3 respectively. It was followed by labour cost, and then came other cost items such as basket, transportation, entertainment and shop rent.

Value addition by depot owners

Value addition of depot owners in both Khulna and Satkhira district are also shown in Table 5. The average gross margin of depot owners were Tk. 1500, 1000, 1500, 1500 and 1000 per 100 kg of crab in Khulna district and Tk. 1500, 1000, 1500, 1500 and 1000 per 100 kg of crab in Satkhira district for grade XXL, SM, FF1, F1 and F3 respectively. They incurred marketing cost of Tk. 409, 259, 309, 309 and259 per 100 kg of crab in Khulna district and Tk. 450, 250, 350, 300 and 250 per 100 kg of crab in Satkhira district for grade XXL, SM, FF1, F1 and F3 respectively. Thus the value addition (pofit) earned by them were Tk. 1091, 741, 1191, 1191 and 741 per 100 kg of crab in Khulna district and Tk. 1050,750, 1150, 1200 and750 per 100 kg of crab in Satkhira district for grade XXL, SM, FF1, F1and F3 respectively. The highest value addition was Tk. 1200 per 100 kg of crab for grade F1 in Satkhira district.

Table 5: Marketing costs, gross margin and value addition by depot owners in Khulna and Satkhira District

	Khulna District									Satkhira district								
	Male crab					Female crab				Male crab				Female crab				
Particulars	XXL	XL	L	M	SM	FF_1	F_1	F2	F_3	XXL	XL	L	M	SM	FF_1	F_1	F2	F_3
Transportation cost	30	30	30	30	30	30	30	30	30	25	25	25	25	25	25	25	25	25
Labour cost	55	55	55	55	55	55	55	55	55	50	50	50	50	50	50	50	50	50
Bucket	40	40	40	40	40	40	40	40	40	45	45	45	45	45	45	45	45	45
Shop rent	10	10	10	10	10	10	10	10	10	8	8	8	8	8	8	8	8	8
Mobile	30	30	30	30	30	30	30	30	30	35	35	35	35	35	35	35	35	35
Trade license	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Mortality cost	200	150	100	75	50	100	100	75	50	250	200	150	75	50	150	100	75	50
Entertainment	30	30	30	30	30	30	30	30	30	25	25	25	25	25	25	25	25	25
Others	10	10	10	10	10	10	10	10	10	8	8	8	8	8	8	8	8	8
Total Marketing cost	409	359	309	284	259	309	309	284	259	450	400	350	275	250	350	300	275	250
Purchase cost	24000	13000	9000	6000	2000	14000	130000	6000	2000	23000	12000	9000	6500	2000	14000	13500	6000	2000
Sales price	25500	14500	10000	7000	3000	15500	14500	70000	3000	25000	13500	10500	7500	3000	15500	15000	7000	3000
Gross margin	1500	1500	1000	1000	1000	1500	1500	1000	1000	1500	1500	1500	1000	1000	1500	1500	1000	1000
Value addition	**1091**	**1141**	**691**	**716**	**741**	**1191**	**1191**	**976**	**741**	**1050**	**1100**	**1150**	**725**	**750**	**1150**	**1200**	**725**	**750**

Value addition analysis of suppliers

Marketing cost of suppliers

Suppliers bought exportable crabs directly from the collectors, *Faria* and depot owners, and performed the marketing activities, and then sold it to the exporters. The marketing cost of suppliers in both Khulna district and Satkhira district are shown in Table 6. The average marketing cost the suppliers had to invest were Tk. 920, 520,820, 720 and 520 per 100 kg of crab in Khulna district and Tk. 862,612, 742, 712 and 637 per 100 kg of crab in Satkhira district for grade XXL, SM, FF1, F1 and F3 respectively. Among the cost items, the loss of mortality was the highest representing 54, 29, 49, 42 and 19 percent of total cost in Khulna district and 52, 33, 45, 40 and 35 percent of total cost in Satkhira district for grade XXL, SM, FF1, F1 and F3, respectively. The second highest cost item was labour cost, and other cost items in descending order were transportation, basket, mobile, entertainment as well as shop rent etc.

Value addition by suppliers

The functions of suppliers include purchasing exportable crab and supplying those to the different types of exporters. Gross marketing margin of suppliers in both Khulna and Satkhira districts are shown in Table 6.8 and Table 6.9. Based on the crab grade such as XXL, SM, FF1, F1 and F3, respectively the average gross margin of suppliers were Tk. 2500, 1500, 3000, 2500 and 1500 per 100 kg of crab in Khulna district, and Tk. 3000, 1500, 3500, 3000 and1500 per 100 kg of crab in Satkhira district. They expended marketing cost of Tk. 920, 520,820, 720 and 520 per 100 kg of crab in Khulna district and Tk. 862, 612, 742, 712 and 637 per 100 kg of crab in Satkhira district for grade XXL, SM, FF1, F1 and F3 respectively. Thus, the value addition (profit) earned by them were Tk. 1580, 980, 2918, 1780 and 980 per 100 kg in Khulna district and Tk. 2138, 888, 2758, 2288 and 865 per 100 kg of crab in Satkhira district for grade XXL, SM, FF1, F1 and F3 respectively. The highest added value was Tk. 2288 per 100 kg of crab for grade F1 in Satkhira district and the lowest added value was Tk. 865 per 100 kg of crab for grade F3 in Satkhira district.

Table 6: Marketing cost, gross margin and value addition by suppliers in Khulna and Satkhira district

(Tk. Per 100 kg)

	Khulna District									Satkhira district								
	Male crab					Female crab				Male crab					Female crab			
Particulars	XXL	XL	L	M	SM	FF_1	F_1	F2	F_3	XXL	XL	L	M	SM	FF_1	F_1	F2	F_3
Transportation cost	100	100	100	100	100	100	100	100	100	110	110	110	110	110	110	110	110	110
Labour cost	120	120	120	120	120	120	120	120	120	115	115	115	115	115	115	115	115	115
Bucket	60	60	60	60	60	60	60	60	60	65	65	65	65	65	65	65	65	65
Shop rent	15	15	15	15	15	15	15	15	15	12	12	12	12	12	12	12	12	12
Mobile	60	60	60	60	60	60	60	60	60	50	50	50	50	50	50	50	50	50
Trade license	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Mortality cost	500	400	300	200	100	400	300	200	100	450	400	300	250	200	330	300	275	225
Entertainment	50	50	50	50	50	50	50	50	50	45	45	45	45	45	45	45	45	45
Others	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Total Marketing cost	920	828	720	620	520	820	720	620	520	862	812	712	662	612	742	712	687	637
Purchase cost	25500	14500	10000	7000	3000	15500	14500	70000	3000	25000	13500	10500	7500	3000	15500	15000	7000	3000
Sales price	28000	17500	12000	9000	4500	18500	17000	9000	4500	28000	16000	12500	9500	4500	19000	18000	9000	4500
Gross margin	2500	2500	2000	2000	1500	3000	2500	2000	1500	3000	2500	2000	2000	1500	3500	3000	2000	1500
Value addition	**1580**	**1672**	**1280**	**1380**	**980**	**2180**	**1780**	**1380**	**980**	**2138**	**1688**	**1288**	**1338**	**888**	**2758**	**2288**	**1313**	**865**

Value addition analysis of exporters

Marketing cost of exporters

The marketing cost of different types of exporters depends on foreign destination, amount of exportable crab per shipment, conditions of consignment etc. Especially, marketing cost varied for different foreign destinations of the world. However, in the present study, marketing cost was calculated for sending crab to the following destinations.

i) Hong-Kong

ii) Taiwan

Marketing cost of exporters included the cost of packet/basket, carrying, clearing and washing, grading, and packaging, airfreight, salary and wages, office and godown charge, telephone, fax, talex, quarantine, terminal and handling charges, export license and other miscellaneous (e.g. subscription, bribe etc). Air freight charge was the major marketing cost of different exporters. It varied from one foreign market to another and for one airline to another.

Marketing cost for Hong-Kong market

Hong-Kong is one of the largest common markets in the world. The marketing cost of mud crab has been calculated in Tk. per 100 kg basis. The marketing cost of exporters for Hong-Kong market is shown in Table 6. The average estimated marketing cost incurred for exporting crab to Hong-Kong market was Tk. 11975, 10275, 11975, 11175 and 10275 for grade XXL, SM, FF1, F, and F3 respectively. Among all the cost items airfreight charge was the highest; Tk. 8500 per 100 kg for all grade of crab and it represents 71, 81, 71, 76 and 83 percent of total costs for grade XXL, SM, FF1, F, and F3 respectively. The next cost item was mortality loss, and it represents 17, 3, 17, 11 and 3 percent of total costs for grade XXL, SM, FF1, F, and F3 respectively.

Marketing cost for Taiwan market

Taiwan market is also one of the largest common markets in the world. The marketing cost incurred by exporters was Tk. 9475, Tk. 7775, Tk. 9475, Tk. 8675 and Tk. 7775 per 100 kg of crab exported for grade XXL, SM, FF1, F1 and F3 respectively (Table 7). Among all cost items airfreight charge accounted for the highest cost amounting to Tk. 6000 per 100 kg for all grade of crab (63.32 per cent, 77.17 per cent, 63.32 per cent, 69.16 per cent, 39 per cent and 77.17 per cent of total costs for grade XXL, SM, FF1, F, and F3 respectively). Mortality loss was the second highest cost item which accounted for 21 per cent, 4 per cent, 21 per cent, 14 per cent and 4 per cent of total marketing cost for grade XXL, SM, FF1, F, and F3 respectively.

Note:

1. Each basket/contains 20 kg, then 5 baskets are needed for 100 kg, cost

of basket was @ Tk. 40 per basket.

2. Clearing, grading and packaging cost was of Tk. 200 per 100 kg.

3. Quarantine charge included Government tax, tariff, VAT etc.

Quarantine charge was Tk. 3 per kg.

4. Average airfreight charge for Hong-Kong was Tk. 85 per kg and

Taiwan was Tk. 60 per kg.

5. Terminal and handling charges (THC): Tk. 2 per kg.

Value addition by exporters for Hong-Kong market

Different types of exporters purchased exportable crab from suppliers, Dokandars (shop owners/ grocers/ retail sellers) and commission agents. Then supply these to different foreign buyers of different places of the world. The gross' marketing margin of exporters is depicted in Table 7. The average gross margin of exporters were Tk. 14000, Tk. 11500, Tk. 25000, Tk. 25000 and Tk. 12500 per 100 kg of crab for grade XXL, SM, FF1, F1 and F3 respectively. Thus the value addition (Profit) earned by them were Tk. 2025, Tk. 1225, Tk. 13025, Tk. 13825 and Tk. 2225 per 100 kg of crab for grade XXL, SM, FF1, F1 and F3 respectively

Value addition by exporters for Taiwan market

The value addition of exporters for Taiwan market is shown in Table 6.11. The average gross margin of exporters were Tk. 11500, 9000, 35500, 29000 and 11500 per 100 kg of crab for grade XXL, SM, FF1, F1, F2 and F3 respectively. Thus, the value addition (profit) earned by them were Tk. 2025, 1225, 26025, 20325 and 7325 per 100 kg of crab for grade XXL, SM, FF1, F1 and F3 respectively. The value addition from exporting female crab of Taiwan was much greater than compared to Hong-Kong market of this product.

Table 7: Marketing cost, gross margin and value addition by exporters for Hong-Kong and Taiwan market

	Hong-Kong Market									Taiwan market								
	Male crab					Female crab				Male crab					Female crab			
Particulars	XXL	XL	L	M	SM	FF_1	F_1	F2	F_3	XXL	XL	L	M	SM	FF_1	F_1	F2	F_3
Basket cost	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
Cleaning, grading and Packaging	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
Carrying from Exporter go down to airport	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45

Terminal and handling charges	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
Quarantine	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300
Telephone Fax, Talex	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Airfreight charge	8500	8500	8500	8500	8500	8500	8500	8500	8500	6000	6000	6000	6000	6000	6000	6000	6000	6000
Office and go down rent	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Salary and wages	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
Export license	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
Mortality loss	2000	1800	1000	700	300	2000	1200	700	300	2000	1800	1000	700	300	2000	1200	700	300
Entertainment	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Miscellaneous	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Total marketing cost	11975	11475	10975	10975	10275	11975	11175	10675	10275	9475	8975	10975	81753	7775	9475	8675	8175	7775
Purchase price	28000	17500	12000	12000	4500	18500	17000	9000	4500	28000	17500	12000	9000	4500	18500	17000	9000	4500
Sales price	42000	30800	24500	21500	16000	43500	42000	22500	17000	39500	28000	24500	91000	13500	54000	46000	22000	16000
Gross margin	14000	13300	12500	12500	11500	25000	2500	13500	12500	11500	10500	12500	10000	9000	35500	29000	13000	11500
Value addition	**2025**	**1825**	**1525**	**1825**	**1225**	**13025**	**13825**	**2825**	**2225**	**2025**	**1520**	**1525**	**1825**	**1225**	**26025**	**20325**	**4825**	**3725**

CONCLUSIONS

Mud crab is a valuable and expensive sea product. Despite the high profitability of mud crab farming, the sidelined actors' livelihood engaged in the marketing channel is poorly understood. The value chain begins with crab collector, farmer, moving through various intermediate trading and processing steps like *faria*, depot owner, *fatteners*, supplier towards

the exporter where the maximum catch is taken to them before send back the under grade catch to domestic market. The study reveals that the value addition of exporters was higher than that of other intermediaries (collectors, fatteners, depot owners, suppliers). The mud crab is a highly profitable business sector as an export commodity. One way to bring more profit is by reducing operating costs as much as possible. This can be achieved through scientific, biological and technological mechanisms, such as: reducing mortality loss, transportation cost, labour cost and other operational cost. Moreover, a large number of people are involved in the marketing of crab. So, the crab collectors and intermediaries could certainly be benefited financially if marketing system of crab is well developed and it could be a more attractive commercial enterprise and would gain highest position among all exportable items.

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