



## **Availibility and Marketig Activities of Kuchia (*M. kuchia*) in South-Western Region of Bangladesh**

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### **Authors' contributions**

*This work was carried out in collaboration between all authors. All authors read and approved the final manuscript.*

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### **ABSTRACT**

The present study was done for creating a better understanding of the current marketing activities and trading practices for kuchia. The study area was Paikgacha Upazila in Khulna district and its two large markets; Paikgacha Kuchia market and Kopilmony Kuchia market. The data were collected over twelve months from January to December, 2012 using semi-structured questionnaire among the cross section of marketing operators at Paikgacha. Data were collected from randomly selected 57 marketing operators where 17 were depot owners, 12 collectors and 28 kuchia catchers. Total availability of live kuchia was 18118 Kg at Paikgacha market and 18140 Kg at Kopilmony market. The marketing chain passes through a number of intermediaries: Kuchia catchers, collectors\ foria, small depots, large depots, local agent from exporter, exporter and finally export to the foreign countries. Kuchia 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 the operators. The social and religious restriction on consumption of kuchia was also reported as a problem that hinders the business and prevents obtaining realistic prices in the domestic market. Most of the kuchia in the domestic market are used as bait for catching crab.

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## 1. INTRODUCTION

*Monopterus kuchia* (Hamilton, 1822) is generally known as kuchia or swamp eel (Synbranchidae: Synbranchiformes), is a fish species with good taste and high market value. The food value of this fish is very high. The average protein content per 100 g of kuchia flesh is 14 g and the caloric value of kuchia flesh is as high as 303 Kcal/100 g compared to 110 Kcal/100 g in other average fishes [1]. It is a carnivorous nocturnal fish, and prefers to small fish, worms and mollusks. Kuchia spends the daytime hiding under crevices, stones, water hyacinth and soft mud [2]. It has developed specialized pharyngeal pouches for bimodal gas exchange [3,4]. It has remarkable ability to distend respiratory air sac for gas exchange [5]. Therefore, it is easy to export in live condition. Kuchia lives in both freshwater and brackishwater. In Bangladesh, kuchia (*M. kuchia*) is an export earning commodity that is playing an important role in national and international markets. Bangladesh is now exporting kuchia to many countries such as China, Hong Kong, Taiwan, Malaysia, Indonesia, Korea etc. It can generate employment directly and indirectly in terms of people employed in the production, marketing and other associated business. A large number of people, many of whom living below the poverty line, find the employment in the domestic fish marketing chain in the form of farmers, processor, traders, intermediaries, day labours and transporters [6-8]. Kuchia is not cultured in our country. It is collected from natural sources such as: shrimp ghers<sup>1</sup>, ponds, derelict ponds, canals, rivers, holes etc. Kuchia remain in these water bodies making hole in the mud. People of the study area catch kuchia from natural source for their income. Therefore, it is becoming vulnerable in Bangladesh due to loss of habitats, changes in habitats and overexploitation [9]. The natural stock of kuchia is decreasing day by day due to over exploitation. Other causes for the reduction of kuchia population is habitat destruction through blockage of water flow, shallow water depth, encroachment by agriculture and aquaculture, indiscriminate use of chemicals like fertilizers and pesticides, development of flood control structures and fishing in breeding season [10]. We need regulations on kuchia catch from the natural habitat. If we can artificially breed and culture them, we will be able to protect them. If we culture and export it, we will earn a lot of foreign currency. For this, we have to improve

the existing export marketing system of kuchia also. By exporting kuchia Bangladesh earned 14.49 US\$ in the FY 2012-13 [11].

Bangladesh exports various fish and fishery products including Kuchia (*Monopterus kuchia*). 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 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 exportable commodity to increase the volume for 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 kuchia marketing. In view of this situation, the present study has been undertaken to create a better understanding of the current marketing activities and trading practices for kuchia at Paikgacha upazila in Khulna. This will help to gain better understanding of the current marketing flow and trading practices of kuchia in the south-western region of Bangladesh.

## 2. MATERIALS AND METHODS

A preliminary survey was conducted at kuchia markets in different upazilas such as: Shamnogor, Kaliganj, Paikgacha, Koirā, Kachua, Fokirhat etc. of south-western region of Bangladesh. Finally decision was taken for the study at Paikgacha upazila in Khulna district and its two large markets; Paikgacha Kuchia market and Kopilmony Kuchia market. Based on the prospect in kuchia marketing, this study area was considered for the study. The study area covers a large water bodies producing a huge amount of different types of fisheries organism. The site of the study is in coastal region. Kuchia was found in shrimp ghers of this area. Kuchia from different upazilas of Khulna and Satkhira districts were coming to the kuchia markets of the study area. Data were collected during the period from

January to December, 2012. Existing marketing data were collected twice in a month to fulfill the requirement of the research objective. The entire study period was divided into four different seasons as: Winter (Dec-Feb), Summer (Mar-May), Rainy season (Jun-Aug), Autumn (Sep-Nov).

### 2.1 Data Collection Method

Data were collected on availability and supply of kuchia to the market, price fluctuation with seasonality, transportation, rejection, marketing, existing marketing channel, receiving and selling prices of kuchia etc. Relevant data were collected by direct visiting and interviewing. The basic method for primary data collection was survey, interview and cross-check interview. Data were collected from randomly selected 60 marketing operators where 17 were depot owners, 18 collectors and 25 kuchia catchers and were interviewed throughout the period of study. Cross-check interviews were conducted with key informants such as Senior Upazila Fisheries Officers, Chief Scientific Officer of Bangladesh Fisheries Research Institute, school teachers, local leaders, service holders both private and government and relevant GO & NGO officers and staffs throughout the period of study. The accuracy of the data obviously depends on the answers of the interviewees.

### 2.2 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. All the data were statistically analyzed by Microsoft Excel and SPSS (Statistical Package for Social Science) software.

## 3. RESULTS AND DISCUSSION

### 3.1 Availability and Supply of Kuchia to the Market

Kuchia is not cultured in our country. It is collected from natural sources. At Paikgacha Upazila it is collected from natural sources, mainly from shrimp gher. Kuchia is also collected from ponds, derelict ponds, beels, canals, rivers holes etc. Kuchia remain in these water bodies making hole in the mud. Here these was naturally is reported by the marketing operators.

Winter was found to be the peak catching period. Because, in winter, water level becomes low and many gher were dried up, therefore kuchia catching from mud becomes easy and availability increase. Therefore both in Tables 3 and 4 the highest supply of kuchia was in February. Then dead and unsold kuchia was dried and salted for future preservation. The monthly amount and price of dry and salted kuchia at Paikgacha market is shown in Table 1. At Kopilmony market only live kuchia was available.

**Table 1. The monthly variation and price of dry and salted Kuchia at Paikgacha market**

Month	Dry Kuchia		Salted Kuchia	
	Kg	Price (tk/kg)	Kg	Price (tk/kg)
January	44	210-225	47	55-60
February	51	220-230	58	45-55
March	57	225-235	45	55-60
April	50	230-240	27	55-65
May	23	230-240	13	60-65
June	6	240-250	8	70-75
July	-	250	10	70-75
August	-	250	12	60-70
September	-	250	30	55-65
October	-	250	42	55-60
November	-	250	56	50-60
December	31	215-225	61	50-55

During rainy season, heavy rainfall occurs and water level of water bodies rises, therefore catching of kuchia was becoming hard and availability of kuchia decreases. Therefore both in Tables 3 and 4 the lowest supply of kuchia was in June. Total availability of live kuchia was 18118 Kg at Paikgacha market (Table 2) and 18140 Kg at Kopilmony market (Table 3).

At Kopilmony market only live Kuchia are available. Therefore, monthly amount and price of live Kuchia at Kopilmony market were given Table 3.

Monthly variation in the availability (Kg) of live Kuchia at Paikgacha and Kopilmony market is shown in Table 4. Monthly variation in the availability (Kg) of live Kuchia was similar at both markets.

Price varies with the availability of Kuchia. When supply increases then price decreases. Monthly variation in the price of live Kuchia at Paikgacha and Kopilmony market is shown in Table 5.

**Table 2. Amount of live Kuchia (Kg) received by depot at Paikgacha market**

Sl. no. of depot	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
1	800	1000	850	450	120	70	60	60	200	400	500	700	5210
2	600	800	650	350	100	30	50	70	100	200	300	500	3750
3	150	200	130	50	30	3	3	5	7	15	80	100	773
4	350	400	300	150	50	30	30	40	60	80	100	200	1790
5	100	150	120	100	-	-	-	-	-	60	80	90	700
6	110	140	120	70	-	-	-	-	-	60	70	90	660
7	80	85	90	-	-	-	-	-	-	-	80	85	420
8	80	100	80	60	20	-	-	-	-	50	60	70	520
9	100	200	70	50	-	-	-	-	-	50	80	100	650
10	110	200	130	100	-	-	-	-	-	60	80	100	780
11	350	400	380	250	40	20	20	40	60	120	200	300	2180
12	90	115	90	80	60	-	-	-	40	60	70	80	685
Total	2920	3790	3010	1710	420	153	163	215	467	1155	1700	2415	18118

**Table 3. Amount of live Kuchia (Kg) received by depot at Paikgacha market**

SL No.	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
1.	1200	1500	1000	400	200	70	70	80	80	400	800	1000	6800
2.	460	600	300	150	-	-	-	-	-	-	250	350	2110
3.	800	900	800	700	150	60	60	100	350	500	650	700	5770
4.	400	500	380	320	30	15	15	20	30	180	250	300	2440
5.	200	250	160	100	-	-	-	-	-	70	90	150	1020
Total	3060	3750	2640	1670	380	145	145	200	460	1150	2040	2500	18140

### 3.2 Price Fluctuation with Seasonality

There are many factors affecting the price of kuchia in both the domestic and international markets, particularly as the supply of kuchia is mainly dependent on wild sources. Supplies of exported kuchia 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 kuchia in the international market (Table 6). Traders also reported that they can earn higher profits especially during this time. 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.

**Table 4. Monthly variation in the availability (Kg) of live Kuchia at Paikgacha and Kopilmony market**

Month	Paikgacha	Kopilmony
Jan-Feb	6710	6810
Mar-Apr	4720	4310
May-Jun	573	525
July-Aug	378	345
Sep-Oct	1622	1610
Nov-Dec	4115	3550

### 3.3 Transportation

Kuchia is easy to keep alive for several days if they are kept in water under cool and moist conditions. From Bangladesh only live kuchia are exported. They do not need any refrigeration or other sophisticated facilities during transportation. The kuchia catchers, collectors or middle men keep the harvested kuchia in plastic bags during transportation and to avoid mortality they were keeping their kuchia in water. Some use bamboo baskets for short time transportation. At first kuchia was carried to the local depot by wooden boats, bicycle or by van. Following this, all collected kuchia from different small and local depots were transported to Dhaka by truck or pick up van usually at night. For exporting kuchia to different countries, various types of container were used for transportation, usually specified by the importers, such as plastic baskets, plastic barrel, plastic cartons etc. The weight of each barrel varies

from 80 to 100 kg of kuchia. Sometimes they give aeration in the plastic boxes to prolong the shelf life of the exported kuchia.

**Table 5. Monthly variation in the price of live Kuchia at Paikgacha and Kopilmony market**

Month	Paikgacha	Kopilmony
Jan-Feb	60-70	160-170
Mar-Apr	70-80	165-175
May-Jun	75-85	175-185
July-Aug	85-95	180-190
Sep-Oct	70-80	170-180
Nov-Dec	65-75	165-175

### 3.4 Rejection

Generally dead kuchia were rejected from export by the depot owners. 18-22% mortality of kuchia was reported by the marketing operators at Paikgacha. On the average 20-24% of the kuchia was rejected from each depot.

#### 3.4.1 Marketing

##### 3.4.1.1 Domestic marketing

When a company's product of one specific country is marketed efficiently in her own market is called domestic marketing.

In comparison with other fish or fishery products, the demand for kuchia in Bangladesh for domestic consumption is very less. The non-Muslim and tribal people were the main consumers of kuchia in Bangladesh. Generally, kuchia was mainly used to catch crab. The market price varied with the season and the selling price is normally fixed through bargaining between the seller and consumers.

##### 3.4.1.2 Export marketing

When a company's product of one specific country is marketed efficiently in foreign market is called export marketing.

### 3.5 Marketing Channel

From Bangladesh only the live Kuchia was exported. Kuchia marketing channels in particular were complicated like crab marketing channels, since market operators may perform more than one marketing function [12]. The marketing channel of Kuchia in Bangladesh

had started from the wild catchers and passed through a number of intermediaries such as catchers, middlemen, depot owners, local agents

from exporter and finally from the exporter to the foreign countries. The general flow through the marketing channel is shown in Fig. 1.

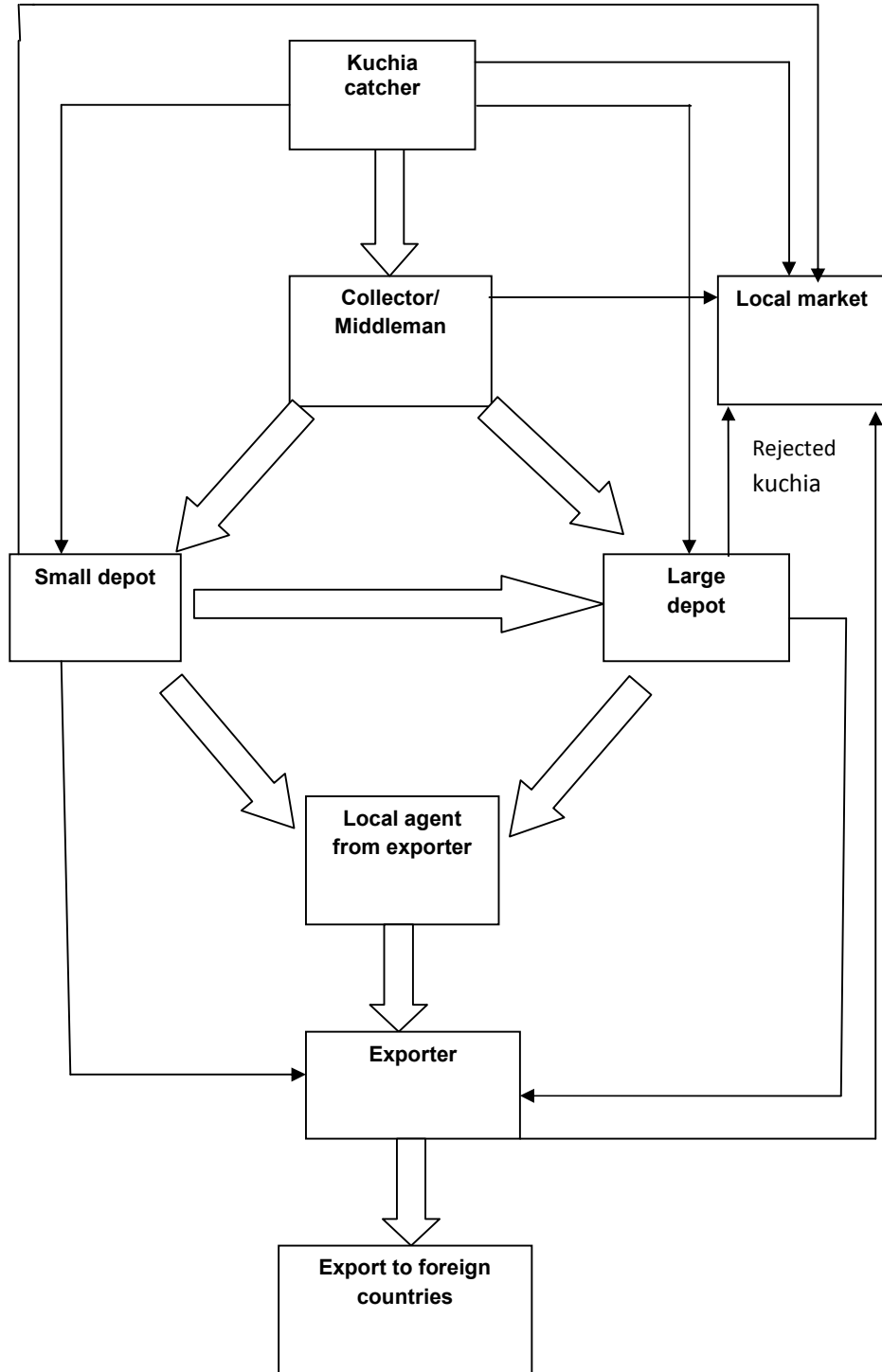


Fig. 1. Marketing channel of Kuchia

**Table 6. Seasonal variation of demand and supply of Kuchia at Paikgacha according to the interviewees**

Month	Demand	Supply	Price	Factors
Winter	High	Good	High	Happy new year, taste, winter festivals abroad, Drying ghers, increasing availability of Kuchia.
Summer	Moderate	Moderate	Moderate	Fewer available in ghers, beels, ponds, rivers etc.
Rainy season	Moderate	Low	Low	Rainy season, heavy rainfall, fewer available in ghers, beels, ponds, rivers etc.
Autumn	Moderate	Moderate	Moderate	Fewer available in ghers, beels, ponds, rivers etc.

### **3.5.1 Role of major operators in marketing**

There were no official figures available on the total number of intermediaries involved in kuchia marketing at Paikgacha upazila. However, the number has clearly increased in the past two years due to increasing demand in the international market.

The following major marketing operators are involved in the marketing of kuchia at Paikgacha upazila:

#### ***3.5.1.1 Kuchia catcher***

Kuchia catchers were catching kuchia from the water bodies like gher, beels, ponds, canals etc. and finally they were selling their catches either to collectors or middlemen. Kuchia catcher's role in these areas had been vital to the supply of kuchia to the market. Kuchia catchers marketing activity was also quite simple. Most of them were selling their catch to foria or depot owner. A small part of their catch were coming to the retail market.

#### ***3.5.1.2 Collector or middleman (Foria)***

Middlemen or collectors provide the main link between wild kuchia and the market. They were locally called Foria. They were buying the kuchia from the catchers and were selling these to depot owners.

#### ***3.5.1.3 Depot owners***

In depot, kuchia was sold beside mud crab. Depot owners were playing an important role in kuchia marketing at Paikgacha, 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. Most of the depot owners (74%) were selling mud crabs only. Some of them (26%) sell kuchia also (Table 7). But the number of kuchia seller has been increasing day by day with increasing demand of kuchia in the international market.

From the survey, 80% of depot owners reported that they sell their kuchia through the local agent to exporters, while 20% of depot owners sell their kuchia directly to the exporter.

### **3.6 Local Agent for the Exporter**

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

#### **3.6.1 Exporters**

Exporters are those who export kuchia to the foreign countries. Most of the exporters were residing in the capital. All of their businesses were privately owned.

#### **3.6.2 Retailers**

Generally the retailers were collecting the rejected kuchia (which are rejected from export) from different depots and selling in the local market for use as bait or domestic consumption. According to their responses, as the non-Muslim and tribal people were the main consumers and the quality of the kuchia in the domestic market was not so good and they were not getting the higher profit. Lack of interest in consuming kuchia in Bangladesh was the main cause of their low profit. Retailers were collecting mainly dead kuchia as dead kuchia was rejected for export. They were either drying or salting these kuchia and sell them to crab catcher which are used as bait for catching crab.

**Table 7. Distribution of Kuchia depots in the study area**

District	Thana	Name of market	Number of total depot	Number of Kuchia depot
Khulna	Paikgacha	Paikgacha market	40	12
		kopilmoni market	25	5

**Table 8. Problems reported by Kuchia marketing operators at Paikgacha**

<b>Kuchia catchers</b>	Overexploitation, low price from middlemen, lower rate, not available throughout the year, lack of money, by catch morality of Kuchia by fishermen using achra, iron rod etc., climate change.
<b>Middlemen</b>	Transportation, price controlled by exporter agents, lack of supply during high demand, lack of market information.
<b>Depot owners</b>	Fluctuation in price, insufficient supply, transportation harassment, lack of credit facility, information accessibility, price controlled by exporter agents, by-catch morality of Kuchia by fishermen.
<b>Supplier</b>	Fluctuation in price, lack of credit facility, Exporter influence over price, insufficient supply.
<b>Retailers</b>	Lower price, lack of demand in domestic market.

Kuchia marketing operators at Paikgacha face some problems which are listed in Table 8 (above).

#### 4. SOME RECOMMENDATIONS

- Closer relationship among stakeholders should be maintained.
- Price fixing is better to be done through discussing among stakeholders
- Overexploitation should be prohibited
- Research on habitat, feeding, breeding biology, induce breeding of Kuchia should be done.
- Culture technique of Kuchia should be developed.
- Information (export market demand, price, etc) via mobile, media, etc. should be accessible.
- Special ferry system should be provided for Kuchia transporting vehicles.
- Harassment (Police, terrorist etc.) free high way transportation should be ensured.
- Quality improvement
- Trade license system should be available.
- Training for stakeholders should be provided.
- Depot handling and sanitation, good hygienic practices in handling, packaging, and transportation should be ensured.

#### 5. CONCLUSION

Kuchia marketing was considered as a profitable and feasible business by most of the marketing

operators. Demand for kuchia in market remains throughout the year, but it is not supplied in market throughout the year because supply of kuchia is completely nature dependent till now. If kuchia come to the market throughout the year not only from natural source but also from culture, therefore not only marketing business will be developed and export earnings will be increased but also natural stock will be maintained. Considering the total export earnings from kuchia, 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 kuchia farming and marketing in Bangladesh.

#### COMPETING INTERESTS

Authors have declared that no competing interests exist.

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