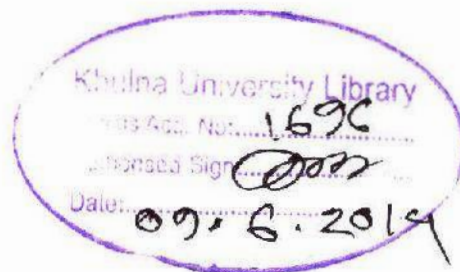


**An Enquiry into the Contribution of the Fish Marketing and  
Distribution System to Economic Indicators in the Khulna City of  
Bangladesh**



A Thesis  
By

**Mohammad Nazmul Ahsan**  
Roll # MS 000602  
Session: 2000-2001

The Thesis submitted to the Fisheries and Marine Resource Technology  
Discipline in partial fulfillment of the requirements for the degree of

**Master of Science**  
**In**  
**Fisheries and Marine resource Technology**

**June, 2003**

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Bangladesh**

**Approved as to style and content**

**By**



A handwritten signature in black ink, appearing to read "Khairul Azam", written over a horizontal line.

**Professor Dr. Khairul Azam**

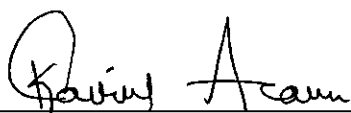
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Khulna, Bangladesh**

## DECLARATION

The results submitted in this thesis are entirely of the candidate's own investigations and no part of the results has been accepted for any degree, nor it is being concurrently submitted for any degree

### Supervisor



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### Candidate



**Mohammad Nazmul Ahsan**

**D**edicated to

---

**My Beloved Parents**  
an unexpressed affection

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**Md. Nazmul Ahsan**

Abstract is too lengthy !!

may be  
Shorten!  
by applying  
Key findings!

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## 1.0 Introduction

The fish market in Bangladesh in a brief to mention is a cluster of disorganized activities and ~~mostly~~ <sup>always</sup> remains in the hands of influential elite of the area, depending on a wide range of social, economic and political factors. The analysis of Bangladesh fish marketing system is important because it is often considered to be a limiting factor to fisheries development. Marketing provides the channel of communication between the producers and consumers and it is the consumer who ultimately determining what is produced. The relationship between traders and fishermen in Bangladesh is tied up with so much debtness. The socio-economic variables, production functions and the end use of the fish, determine the present status of fish marketing system.

The scale of fish marketing is likely to be smallest and the number of trading functionaries seem to be greatest, where fisheries are small in scale and landings are usually made at high dispersed points ~~some distances from some consumers~~. Poor infrastructure especially roads and cold storage facilities, limit the spatial distribution of fish. Generally speaking the lower the level of economic development in fishing, the greater <sup>is</sup> the importance of traditional ~~social~~ structures and the role of the traders and financiers extremely exploiters of small traders as well as the consumers.

The study purpose was "a significant improvement in the supply of quantitative and qualitative information concerning economic distortions and the levels and perceptions of poverty in the fish distribution system, to inform the process of development ~~planning and implementation~~ in the sector". It ~~has done this~~ by the preparation of a spreadsheet model of the subsector in Khulna. The aim was to capture the main building blocks of the fish distribution system in the Khulna region. The research process coincided with an official review of the fisheries sector, and some preliminary results of this research were available to, and were used by, the sector review team. So, in general terms the study purpose was partially achieved as the study evolved. However, the intention of the research is that the approach adopted in this study should have an impact upon research methodology in Bangladesh by setting some benchmarks against which progress in fisheries development might be assessed.

A set of technical, economic and social benchmarks providing a standard of comparison against actual indicators of technical and economic efficiency, the existence of monopolistic or monopsonistic cartels, social deprivation and access to the 5 "SL" capital assets; has been

~~spell out~~  
What is "SL" - ?

As it is a first statement.

How it is written before completion of the work? Practically, this would be cited in Introduction

largely achieved. There is now a significantly greater understanding of technical and economic efficiency issues in the distribution system (as a result of this study). A major focus of the study has been on the examination of monopsonistic and monopolistic cartels in the system. As far as social deprivation and the 5 SL capital assets are concerned, some progress has been made through a limited examination of Sundarban fishermen. The view of the research team is that more research into the production subsector is required for an improved understanding of the impact of the distribution system on the asset structure to which the poor have access (Ellis, 2000).

The effective use of focus group and participatory methodologies to arrive at such benchmarks; the effective use of focus group and participatory methodologies, has been achieved, but has, at the same time, thrown up some important methodological issues, particularly on the question of the validity of "spot" data when attempting an assessment of developments through time.

An analysis of the collusion of players in the marketing system, employing a conceptual framework from the economics theory of collective action, including game theory; the study of collusion is also be included here.

### 1.1 Objective of the study

- Industry background
  - to identify and define all strategic groups.
  - to find out the principal trends of the industry and market.
  - to describe the regulatory environment- concerning authority and cooperative etc.
- The market surveyed
  - to identify as many market for fish in the Khulna city as possible.
  - Costs, returns, supply of what?



Not nicely presented

self defined term ?

Marketing Chain)

- to construct the value chain
  - to determine the main influences on costs at each stages of the value chain
- 
- Produce a mechanisms for obtaining and protecting Economic Value Added (EVA)
  - to assess the collusion in the fish distribution system.

EAV or  
EVA

?

## 2.0 Review of Literature

In addition, some published work has addressed this topic, most but not all with negative findings about aratdars' role. For example the analysis of a specific fish marketing system in Lewis *et al* (1996) was very critical of the anticompetitive activities of aratdars (or arotdars). The fish marketing chain they studied was significantly different from the Khulna's chain. It was in Dinapur zila in north west Bangladesh where captured fish are of negligible importance compared with cultured fish. They found that there were hundreds of small traders who sell to a dozen or so aratdars in Parbatipur: the aratdars were both wealthy and outsiders; and they used their economic power and information to control prices and prevent competition (Lewis *et al*, 1996, p71).

The *arotdar* wholesalers co-operate with each other and meet annually to set prices collectively in an arrangement resembling an informal producers' co-operative, designed to share out trade between its members . . . . The *arotdars* reported that there was no competition for customers between them...(Lewis *et al*, 1996, p75)

The khuchra bepari, i.e. suppliers, are tied to aratdars and are forced to struggle against uneven odds, and are permanently committed to buying on credit from the same aratdar (Lewis *et al*, 1996, p72). High profits were obtained by a number of participants in the chain including aratdars. markets were judged to be highly imperfect, and this advantage was maintained by restrictions on entry of new arottdars into market (Lewis *et al*, 1996, 123-33).

However, it is clear that as well as the product, location, scale and time being different marketing practices are different in Parbatipur and Khulna. According to Lewis *et al* the aratdars purchase (and resell) the fish or seed in Parbatipur while in Khulna they appear to operate entirely on commission. In Parbatipur they also control trade in such a way as to promote equal incomes within the group but there was no evidence of this in Khulna (Lewis *et al*, 1996, p119).

According to Lewis *et al*'s analysis credit is of central importance in maintaining this pattern at every stage of the network, even if there is "a commercial and cultural pride in claiming that deals are struck in cash". Rigorous analysis of market power is handicapped both by the



difficulty in obtaining accurate and detailed information and because “the ‘direction’ of the credit given does not always reflect the relative power of the transactors” (Lewis *et al.*, 1996, p120-21).

This commission agency system is not restricted to fish marketing system. In the marketing systems for many agricultural commodities, wholesaling is controlled by large commission agents (Lewis *et al.*, 1996, p111). Crow and Murshid (1994) describe the marketing system for paddy/rice in two regions of Bangladesh. They distinguish price-fixing and trade-tying loans. Aratdars dominate the provision of loans to the final-borrowing households – supplying 31% of funds directly and a similar or higher proportion indirectly.

In contrast, Coulter and Disney (nd, c1990) identified the key role of aratdars in fish marketing without drawing negative conclusions about their exercise of market power. In fact in their conclusion they suggest that the profits of fish traders are not extraordinarily high and nor can parastatals or co-operatives operate at lower costs.



### 3.0 Materials and Methods

#### 3.1 Study Area

The survey work <sup>was</sup> carried out on various aspects of economic at seven fish market (e.g. retail markets, wholesale markets and landing centres) of Khulna city. During the period of November' 2001 to June' 2002.

#### 3.2 Field visit and Observation

<sup>Rephrase</sup>  
 A number of wholesale and retail fish markets in Khulna were studied on quantitative and qualitative data collected at each. The qualitative data included a description of the market and the traders operating in it, the typical nature of indebtedness, and any associations or co-operatives based at the market. <sup>business,</sup> The quantitative data included information on the number of traders and their costs, business revenues and net incomes. Data were collected by interviewing key informants, on the markets and elsewhere, and individual entrepreneurs. Additional data, for earlier stages in the marketing chain, were obtained in Khulna and in the primary producing areas. Data on fish collecting <sup>on</sup> and transporting <sup>ation</sup> were obtained from operators, landing at Khulna and data on the initial production and sale from fish catchers in the tidal estuary to the south of Khulna and in freshwater beels <sup>at</sup> to the north.

In these fish markets, the following areas were reviewed:

1. Employee/ manpower
2. Number of aratdars/retailer
3. Procedure for starting a business
4. Marketing channels
5. Transportation system
6. Categories of buyer
7. Business transaction system
8. Associations and cooperatives
9. BFDC's/KDA/KCC attitude towards aratdars/retailer ✓
10. Aratdars handling of the labour union
11. Advance procedure (dadan)
12. Aratdar's commission ✓
13. Percentage distribution of money in the marketing channels

14. Repayment procedure (from fishermen to aratdars)
15. Fish carrier cost (marine and river)
16. Other expenses met by traders
17. Specialisation of fish carriers (for Rupsha Ghat)
18. Landing data (fiscal year 2001--2002)
19. Licence fee of the various fishing vessel
20. Average profit per day of a retailer.
21. Volume of sales per day
22. Some species of the market
23. Problems of the market

### 3.3 Data Collection and Data Quality

The fieldwork strategy was to concentrate on the marketing system in Khulna initially. A number of wholesale and retail markets were studied and qualitative and quantitative data collected for each. The qualitative information included a description of the market and its traders and any associations or co-operatives operating at the market. The quantitative data included information on the number of practitioners, and their costs, revenues and income levels. These data were collected by interviewing key informants and individual entrepreneurs and were supplemented by data from the Khulna City Corporation Market Superintendent.

Data on fish <sup>ion</sup>collecting and <sup>ation</sup>transporting were obtained from operators landing at Khulna but in addition fishing villages in the Sundarban to the south of Khulna and beels in the delta to the north were visited and similar quantitative and qualitative data collected. Data relating to fish catching and trading and other characteristics of the industry in Khulna were extracted from official sources.

Inevitably, therefore, much of the data collected by the field research team for this study are essentially "spot" information, typical of the results of participative research. In relation to planned output (b), there <sup>were</sup> <sup>are</sup> problems with this at two levels:

- (a) First, surveys <sup>give</sup> <sup>are</sup> <sup>give</sup> us a good impression of what is happening now. They are not so helpful, however, in telling us what will happen a year or two down the road. They are quite useful at telling us whether fisheries policies were about right a year or so ago but they <sup>give</sup> <sup>have</sup>

us fewer clues as to whether the current circumstances <sup>will</sup> are likely to continue. That depends on having to hand a predictive model which employs well-founded data as an input.

(b) Second, participative information can easily be a victim of "moral hazard" problems. Information is supplied to the researcher which reflects the interests of the respondent and therefore is in danger of offering a distorted view of social reality. Certainly there are techniques for getting round this difficulty, but in the context of this study, which was rapid and wide ranging, it was a source of concern.

This research, therefore, does not claim to be the last word on the fish production and distribution system in the Khulna region. Many of the data used in the model and in the sector description which follows should be regarded as indicative rather than definitive. Nevertheless, the research team is confident that none of the data, quantitative or qualitative, used in the model or in the text of this report is obviously inaccurate. Indeed most of the data offer a useful first attempt at describing and quantifying the key economic and social characteristics of the sector.

### 3.4 Development and Description of the Model

The main aim of the model is the development of indicators. This is effected by utilising linked Excel spreadsheets summarising the key economic parameters of the sector, based on data collected by the Khulna researchers, from which various indicators, reflecting the objectives of the study, <sup>are</sup> ~~are~~ derived. The model is dynamic in that the indicators change as the assumptions made in the model change.

The model operates through data input into a number of interlinked sheets in the attached spreadsheet. They are:

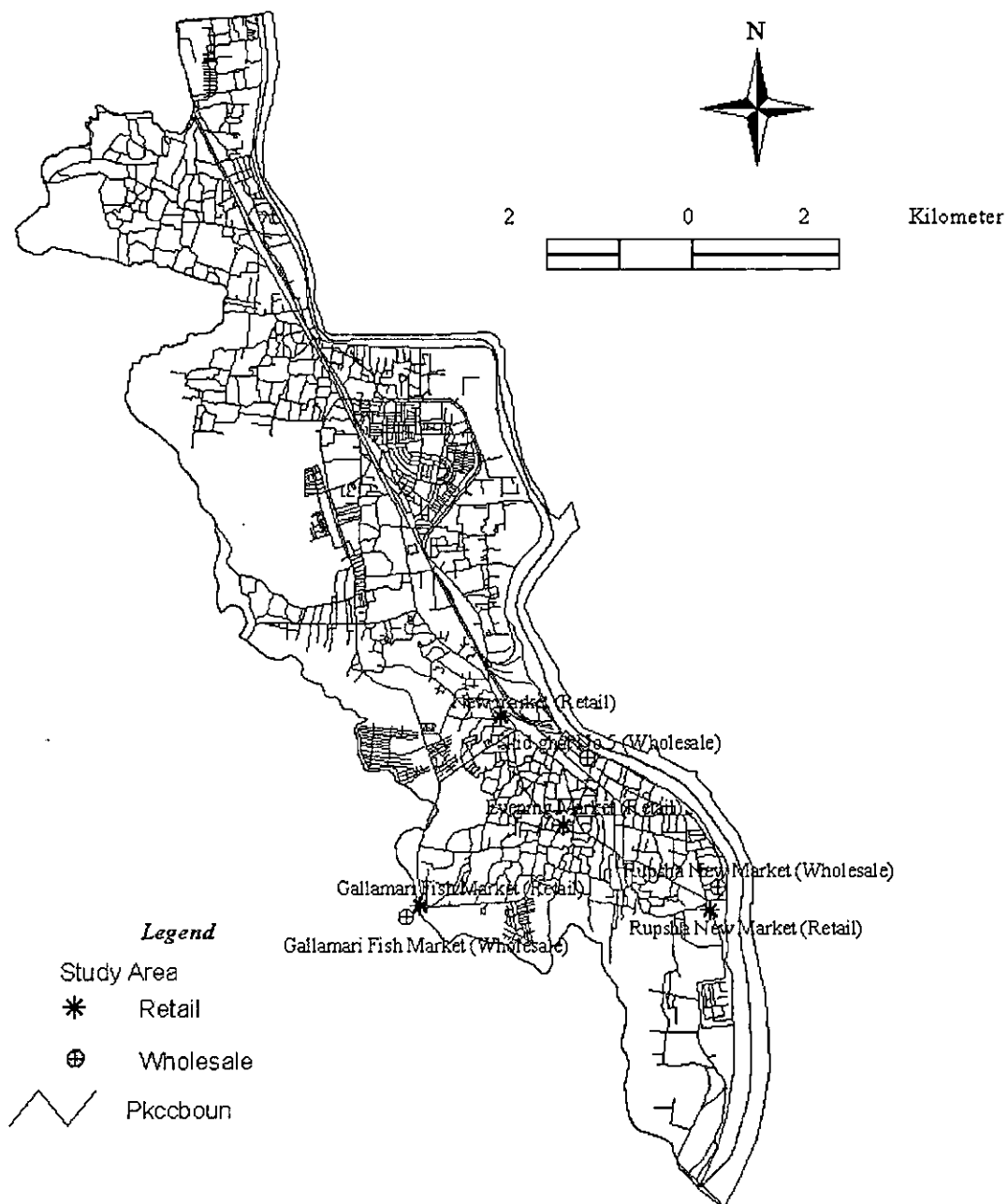
1. Summary. This sheet draws data from the other sheets. ✓
2. Motorised. The capital and running costs of operating a mechanised fishing vessel from Skid Ghat No 5 fish market is recorded, and the EAV or rent at the market estimated. The estimated EAV/vessel is 556,097 taka, EAV/kg 0.56 taka and the total EAV at this market 22,244,000 taka.
3. Farms. The difference between costs and revenues generates an estimated EAV/kg of 11.33.
4. Transport. The costs of fish carrier and non-mechanised fishing operations at Rupsha are identified. EAV/kg values of 28 and -22 were estimated.

EAV or EVA  
page-8  
page-3

5. Arats. Data from Skid Ghat No 5, Rupsha and Gallamari arats are used. The EAV/kg values estimated are -1, 3 and 4 with an average for the three markets of 3 takka.
6. Retail. Cost and revenue data collected at New Market, Rupsha, Gallamari, Bara Bazar, and S Bazar are used to obtain EAV/kg values of 23, 7, 5, 27, and 9 taka (average 16).
7. Sen'vy. The sensitivity of typical EAV/kg values is explored for the Skid Ghat No 5 arat, for a non-motorised vessel and for the New Market retail market.
8. Datasheet. Various data relating to the pond fishery are recorded.

*for what?*  
Some assumptions are necessary. For example, there are two symmetrical ways of looking at the behaviour of the commission agents, one as buyers of fish, for onward sale to other traders or consumers, the other as sellers of fish distribution services. For analytical convenience we choose the former terminology because fish is an input into their economic operations which is then sold on into more competitive markets. This is the way the spreadsheet has been designed. We then estimate the effective price at which they are buying fish from the fishermen from the commission rates applied. But the results of treating commission agents as suppliers of fish selling services, in this case as possibly monopolistic or oligopolistic sellers of the service, would be identical.

Map of Khulna City Corporation



## 4.0 Result and Discussion

### 4.1 Markets profile

#### 4.1.1 Skid Ghat no 5

Skid Ghat No 5 was selected as the starting point because this market plays an important role is not only supplying fish to wholesalers and retailers but also contributing to the profitability of fishermen and aratdars (commission agents).

The *main* fish landing centres for the Khulna region are-

- a. Skid Ghat No-5
- b. Rupsha Fish Market, Khulna
- c. K B Ghat, Bagerhat
- d. Rajair Fish Market, Sarankhola.

From the point of view of predicting the development of the fish distribution system, it is important to realise that these arats compete with one another for supplies, and this brings downward pressure on commission rates.

At the early stage of the study Skid Ghat No-5 and Rupsha Fish Market were selected, because much of the fish of the region are landed in these two markets. According to the Coastal Marine Fisheries Management Strengthening Project (CMFMSP) the ratio of landings between Khulna and Rupsha is about 3 : 5. In the first week, Skid Ghat No-5 were visited and surveyed the market. Information concerning fishing vessels based at this landing place was collected and data were obtained from a sample of fishermen and their skipper in a group interview. Fish landing data recorded from both BFDC and the CMFMSP. Licence fee data, collected by the Ministry of Fisheries and Livestock (MoFL), were obtained in the CMFMSP Regional Office.

#### Employees/ Manpower

##### A typical aratdar's office:

Aratdar, Cashier -1, Clerk (mohuri) -1 or 2, Labourers (on the basis of fish supply they are made available by their union).

##### A typical mechanised fishing vessel based at Skid Ghat No 5:

Owner (may be mahajans and or may be beparis), sardar / vessel's skipper (1), mechanic (1), fishermen (10-12)

### The Aratdars

There are 14 aratdars present in this market. Among them all are registered by the BFDC except two. To become an aratdar, it is essential initially to apply for a place from the Aratdar's Association. When the Association agrees, it forwards the application to the BFDC, which assesses the application. Once the application is passed by the BFDC, theoretically the applicant can find a place for business as an aratdar. The main constraint on increasing the number of aratdars at Skid Ghat No 5 is space for conducting business. This is therefore an exclusion mechanism for participation in the aratdar business, but, as is noted above, *there is competition from other markets*. Thus: apply to the aratdar's Association, be selected by the Association, application forwarded to BFDC, candidate selected by the BFDC. Then the aratdar selected with a licence and due permission (Trade Licence, Permission from the forest department, marketing licence).

### Marketing channels

As shown in Appendix 1 (flow chart)

### The Transportation system

#### Collection of fish

From different water bodies:

Fish from the bay by boats, trawlers, mechanised vessels etc.

Fish from the mangrove and rivers by boats, trawlers, mechanised vessels etc.

#### Distribution of fish

This is a wholesale market and fish are only distributed from this market by trucks, pickups, vans, and rickshaws etc. via adjoining roads.

### Categories of buyer

- Distributors (Export and countrywide)
- Distributors/ wholesalers (Local market)
- Retailers
- Hawkers (who sell the fish by van)

Mixed  
style  
Presentation

**Business transaction system** *fixed?*

*In case of buying: tied supplier (mahajan, bepari)*

*In case of selling: open competitive bidding*

### **Terms and condition for Lending and Borrowing:**

The aratdars provide advances (loans) to mahajans and beparis on the basis of understanding and mutual trust. Despite this the agreement is recorded on a 50 taka stamped paper and duly signed by both parties.

### **Trade Associations**

**Name:** Khulna Fish Aratdars Association

**Registered No:** 563

**Year of Establishment:** 1967

**Year of Registration:** 1978

**Number of members:** 14 (among them two are non-registered)

All the Aratdars are the member of their Association. If anybody other than the members wishes to start a business, then the Association would resist this through the legal system (as they would not have had permission from the BFDC). The Association was established as a general mutual protection organisation, but some specific activities have been developed. These include:

- Arbitration in the event of disagreements ✓
- Social work (within their community, sometime they also provide financial help to the poor or diseased person)
- Supplier of credit ( not practised at present).

### **Objectives of the Aratdars' Association:**

The main objective of the Association is not direct trading but for mutual protection. Though dishonesty/cheating do occur in the fish trade, these problems are not solved directly by the Association. In general these issues are addressed by the individual Aratdar.

There are no other formal or informal trade organisations for aratdars at Skid Ghat No-5 fish market.

### Bangladesh Fisheries Development Corporation (BFDC):

Established: 1964

#### Activities of the Organisation:

- Collect rent (building) *Collection of rent from . . . . .*
- Maintenance of the building *which building?*
- Provide ghat (harbour) facilities *to whom?*
- Collect levy (2%), from the aratdars, but paid from the income of fishing vessels.

The BFDC has no judicial function to ensure the orderly and honest conduct of business. The organisation has a neutral attitude towards the aratdars and their Association. All of the employees of this organisation are Government employees and therefore act in support of Government policy. However the BFDC does not act against the interests of the aratdars. It collects a levy from the aratdars for the State, so it has to have good relations with the aratdars and Table 2.1 provides an example of the sums of money involved. At the same time they maintain records of the amount of fish landed in this market.

Table 4.1.1: Total tax collected by BFDC from Skid Ghat No-5 (in the fiscal year 2001-2002)

| Month     | Total tax (in taka) |
|-----------|---------------------|
| July      | 1,73,216.00         |
| August    | 3,09,983.00         |
| September | 3,93,263.00         |
| October   | 1,71,047.00         |

Source: BFDC, Khulna

**The Labour Union:****Name:** Aratdar Handling Labour Union**Registered No:** 1462**Number of members:** 32 (all are labour)**Recruitment procedure:**

When labour demands arise then the union selects the workers and who are not regarded as problematic by the Union. But no new workers have been added to the membership within the last few years.

**Earning and wages:**

They are paid 3.5 taka per *mound* (about 40 kg) for carrying *fish* ?

This Union does not conduct trading activities and has social work function. It exists for the benefit of the members. They also divide the job uniformly among the available labourers.

**Advance procedure:**

Aratdars engage with representatives of two communities to obtain fish in the auction hall.

These communities are:

**Mahajan:**

Aratdars pay an advance (Dadan) to the Mahajan for fishing. Then the Mahajan engages fishermen (10-12 in number) by paying an advance to the fishermen that varies from 2,000 to 3,000 taka per trip (10-15 days).

**Bepari:**

With an advance given by ~~from~~ the aratdars, beparis buy fish from the independent fishermen. These fishermen carry out fishing in the bay or in the coastal area and in the rivers. Then beparis take the fish to the aratdars.

*It should be noted*

Note that aratdars provide loans to the various communities (like beparis and mahajan) only to get fish in their auction hall.

**Typical percentage distribution of money in the marketing channel of the fish market**

See Appendix 1 for the relevant diagram.

*Where is Appendix 1?*  
*There is no similarity with Appendix*

**Loan repayment procedures**

(Appendix - A, Page - 93 ?)

The total fish landing process in Skid Ghat no.5 is carried out by aratdars with their manpower (labourers) and the expenditure for this is met by aratdars. Aratdars only sell fish and give all the money (collected by selling fish) to the mahajans after taking 7% of the money for their commission and 2% for the BFDC (aratdars pay the BFDC tax not from their own cash but from Mahajans/ fishermen) and 1% for other expenses. About 10% of the value of sales accrues to the aratdars, but this percentage includes a notional interest payment on outstanding loans. Mahajans repay their advance/dadan to the aratdars only when they get 50,000 taka or more. In the case of a 50,000 taka payment they would repay only 5,000 taka. This payment is not included within the aratdars commission. In this way they repay all the advance/ dadan.

**Fish carrier cost (marine and river mechanised vessel)****Capital cost of a fully equipped vessel:**

&gt;0.7 million taka (with the low quality wood)

&gt;1 million taka (with the good quality wood)

**Fuel:** 4 – 5 litre /hour**Number of crew:** 12 – 13

**Food for crew:** No specific amount of money but they usually buy rice vegetables, and spices before their journey. They usually take boiled rice in every meal.

**Repairs and maintenance cost:****For gear (net):** 10,000 taka/ season**For vessel:** >20,000 taka/season**Management cost:** 5,000 taka for security.**Vessel hire (if):** 15,000 taka / month.

TK.

Hilsha fish

For permission from Forest Department 1000/ year and for every mound of Ilish they pay 75.00 and 50.00/mound for other fishes to the Forest Department, because most of the areas fished are under the authority of Forest Department.

Note: It has not been possible to collect data for vessels' catch/ day. The researchers were only able to obtain data on fish landings.

### Licence fees of the various fishing vessels

Every application for a licence shall be accompanied by a non-refundable deposit at the Treasury showing the payment of fees mentioned in the table below:

**Table 4.1.2: Licence fees of the various fishing vessels**

| SL. No | Capacity of mechanized fishing vessel (in metric ton) | Licence fee (in taka) |            |
|--------|-------------------------------------------------------|-----------------------|------------|
|        |                                                       | For fin fish          | For shrimp |
| 1      | Not exceeding 10 tons                                 | 750                   | 1000       |
| 2      | Exceeding 10 tons but not exceeding 25 tons           | 1300                  | 1750       |
| 3      | Exceeding 25 tons but not exceeding 40 tons           | 2500                  | 3250       |
| 4      | Exceeding 40 tons but not exceeding 60 tons           | 3750                  | 5000       |
| 5      | Exceeding 60 tons but not exceeding 100 tons          | 7000                  | 10000      |
| 6      | Exceeding 100 tons but not exceeding 200 tons         | 14000                 | 20000      |
| 7      | Exceeding 200 tons but not exceeding 300 tons         | 20000                 | 30000      |
| 8      | Exceeding 300 tons but not exceeding 450 tons         | 30000                 | 40000      |
| 9      | Exceeding 450 tons but not exceeding 600 tons         | 45000                 | 55000      |
| 10     | Exceeding 600 tons                                    | 50000                 | 75000      |

Source: Ministry of Fisheries and Livestock.

### 4.1.3 Major species of this market

| Local name     | Scientific name                 |
|----------------|---------------------------------|
| Hilsha         | <i>Tenualosa ilisha</i>         |
| Chandana ilish | <i>Hilsha tuli</i>              |
| Pangas         | <i>Pangasius pangasius</i>      |
| Rupa chanda    | <i>Stromateus chinensis</i>     |
| Chhuri         | <i>Trichiurus haumela</i>       |
| Rita           | <i>Rita rita</i>                |
| Datina         | <i>Acanthopagrus datina</i>     |
| Koivol (poa)   | <i>Sciaenoides talabonoides</i> |
| Silver pompret | <i>Stromateus cinereus</i>      |
| Koral/ Vedki   | <i>Lates calcarifer</i>         |
| Air            | <i>Arius gagora</i>             |
| Meda           | <i>Kettengus tupus</i>          |

### Problems

Aratdars at Skid Ghat report a decline in utilisation of this landing place and market. This is reported to be because there are many other alternative landing places offering facilities at lower cost than the Skid Ghat arat.

### 4.1.2 Rupsha Nutan Bazar Fish Market (Aratdar)

Rupsha Nutan Bazar is adjacent to one of the launch ghat of Khulna. Here fish are landed by mechanised vessels and sometime by passenger launch. No separate landing station is found for fish and fish merchants and passengers use the same landing area. In Rupsha Nutan Bazar, two different types of fish market (one – for commission agents (aratdar) and other is for retailers and wholesalers) are observed. Until 2001 the market was managed by the Khulna Development Authority (KDA). But very recently KCC (Khulna City Corporation) took over the management from KDA (in 17<sup>th</sup> November, 2001).

**Employees/ Manpower****Aratdar's office**

Aratdar, Clerk (Mohuri) –1, Weigh man –1, Workers- (2-5).

**Carrier Vessel**

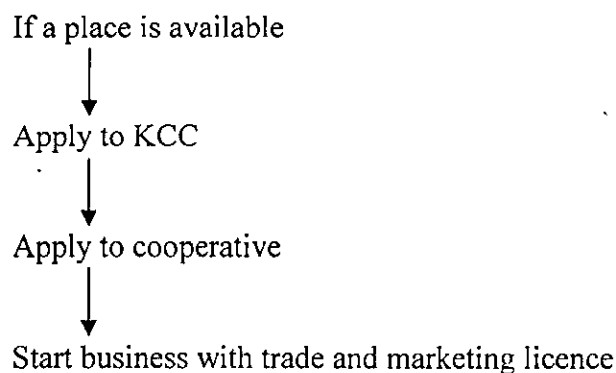
Skipper –1, Clerk (Mohuri) –1, Driver / Mechanic –1, Loskor / Anchormen deck –3, Cook -1

**Number of Aratdars**

There are 30 aratdars present in Rupsha Nutan Bazar wholesale fish market (arat).

**Establishment of an Aratdar**

The market is situated within a corrugated-sheet-roofed house. The places of the aratdars in this market are allotted by the KCC and these are currently all filled. When a newcomer wants to start a business in this market, then firstly he must get a place from the KCC. After that he can start a business. No permission from aratdars' trade association –usually termed a “cooperative”, is needed. But unofficially all the newcomers start their business with the permission of the cooperative. The sequence is:

**Marketing channels**

As shown in Appendix 1 (flow chart)

**Transportation system****Collection of fish****From various water bodies**

- Fish from the bay by mechanised vessels, boats etc.

Where is Appendix - 1 ?

- Fish from the mangrove and river by mechanised vessels, boats, passenger launch etc.

#### **From fish farms, *beels* and others:**

- Fish from fish farms, *beels* and others by truck, pick-up, van, rickshaw etc.

#### ***Distribution of fish***

- Fish are distributed from this market both by road (truck, pick-up, van, rickshaw etc) and waterways (mechanised vessels, boats, passenger launch etc).

#### **Buyer categories**

Beparis (for the processing industry)

- Distributors/ wholesalers (for the local market)
- Retailers
- Hawkers (who sell the fish by van)

In general the buyers collect the fish by credit in that they pay the aratdar after they have sold the fish purchased.

#### **Business transaction system**

The pattern of business transaction system is similar to that observed in Skid Ghat No-5.

**For buying-** suppliers (mahajan, beparies) are often tied by credit

**For selling-** there is open competitive bidding.

#### **Lending and borrowing (terms and condition)**

In general the aratdars provide advances to the mahajans and the beparis on the basis of trust. This is however, written down on a 50 taka stamped paper.

#### **The Trade Association (the Cooperative)**

|                              |                                             |
|------------------------------|---------------------------------------------|
| <b>Name</b>                  | : Rupsha Nutan Bazar Khuchra Aratdar Samity |
| <b>Registered No</b>         | : 801                                       |
| <b>Year of establishment</b> | : 1966                                      |
| <b>Year of registration</b>  | : 1980                                      |
| <b>Number of members</b>     | : 30                                        |

All the aratdars are the member of the cooperative. If anybody other than the members wishes to start a business, then the cooperative successfully protects the existing membership.

If any new aratdar wants to join then he has to pay a joining subscription to the cooperative. Under Bangladeshi traditions 1 taka is always added to the subscription charged, so the price might be 1001 taka. He must obey the rules and regulations of the cooperative. After that he will get membership.

The Aratdars established the cooperative to protect and develop their common interests. With this they also do some special activities, like--

- Arbitration ✓
- Social work (within their community).

Subscription to the Cooperative: 10 Taka/ month

The objective of the cooperative is not related to trade, but for their mutual protection.

Dishonesty or cheating that may occur in this market are solved by the combined activity of the LCC and the cooperative.

No other formal or informal organisations exist in this fish market.

### **Khulna City Corporation (KCC)**

KCC has taken over the management of this market from KDA at 17<sup>th</sup> November, 2001.

#### **Activities of the KCC on the market:**

- Levy collection (5% on the selling price with some compromise)
- Building maintenance
- Providing sanitation facilities
- Providing lighting facilities

#### **No of aratdars registered with the KCC:**

- Regular: 24 – 25
- Irregular: 5 – 6

#### **Relationship between the KCC and the cooperative:**

When some trouble arises in the market then the KCC tries to solve the problem in collaboration with the help of aratdars' cooperative.

**KCC's attitude towards aratdars:** ✓

The KCC shows a neutral stance to the aratdars but sometimes they show a positive attitude also. Actually the KCC is a tax collector and for tax collection they do some work, such as maintenance, building and market management, that is beneficial for the aratdars. With the help of cooperative the market is managed by this KCC.

**Advance procedure**

The aratdars engage two categories of traders to get fish to their auction hall. These communities are –

**Mahajan:**

Aratdars pay an advance (dadan) to the mahajan to supply fish. Then the mahajan engages fishermen (10-12 in number) by paying an advance to them. The advance to the fishermen varies from 2,000 to 3,000 taka. ✓

**Bepari:**

Through the advance supplied by the aratdars, the beparis buy fish from the independent fishermen who is fishing in the bay or in the coastal area and in the river. Then they take the fish to the aratdars. Here beparis only act as fish collectors. ✓

? ~~Note that aratdars supply an advance to the various communities (like beparis and mahajan) only to get fish in their auction hall.~~

**Aratdars' commission**

From independent fishermen/ Bepari/ Mahajan: 2% --3%

From agents in receipt of an advance (dadan)/ Mahajan/ Bepari: 5%

The average profit of an Aratdar is reported as 200 Taka. to 300 Taka. per day.

**Repayment procedure**

The total fish landing process in Rupsha Nutan Bazar Ghat are carried out by aratdars with their own manpower. The expenditure for this is met by aratdars. Aratdars only sell fish and pay the money (collected by selling fish) to the mahajans after cutting 5% of the money for their

commission. Mahajans repay their advance/dadan to the aratdars only when they get the money. The principal of the loan is not included within the aratdars' commission. In this way they repay all the advance.

### **Fish carrier cost (Marine and River mechanised vessel):**

These vessels are only used as carriers, not for fishing.

Capital cost of a fully equipped vessel: 1.6 million to 1.8 million taka

Fuel: 6 Litre / hour (3 Cylinder engine)

3 Litre / hour (2 Cylinder engine)

1 Litre / hour (1 Cylinder engine)

Number of crew:

Captain/ Skipper: 1

Crew: 6

Repairs and maintenance cost: 15,000 taka per year

Management cost: **Salary of**

Captain: 2,250 taka per month

Mohuri : 2,000 taka per month

Loskor / Anchormen: 1,000 taka per month

Cook: 1,000 taka per month

Mechanics: 1,500 taka per month

Food for crew: Supplied by the owner of vessel

Vessel hire (if): 15,000 taka to 18,000 taka per month.

Permission/ Order from Forest Department: 600 taka./ year

Port dues: 300 taka. to 500 taka.

Revenue for Species: *To the forest Dept.?*

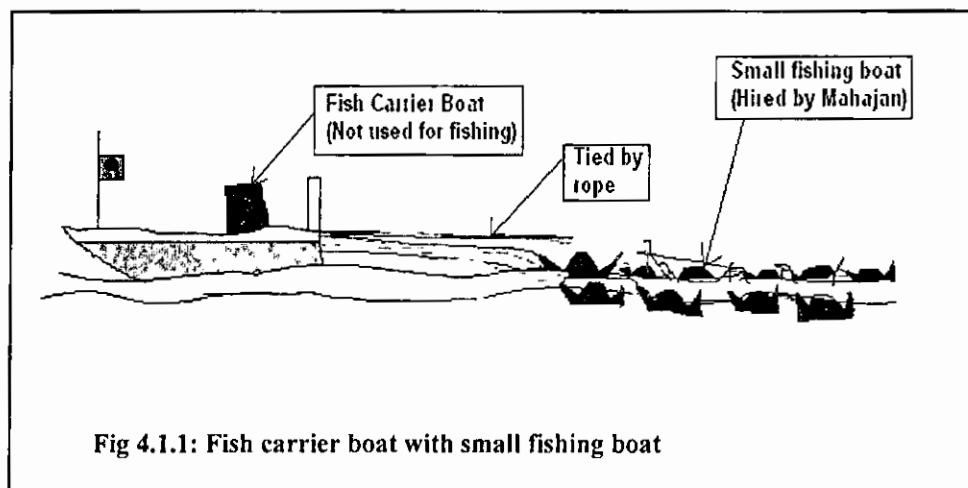
Ilish: 75 taka./ mound

Shrimp: 100 taka./ mound

Other: 50 taka./ mound

### Special characteristics of the fish carrier

Many of the mechanised vessels are used as fish carriers. At Rupsha it was reported to the researchers that each carrier might be associated with up to 300 fishermen with their vessels. 2 or 3 three fishermen use one small boat and they are linked to the carrier. Usually the fishing vessels are non- mechanised but in rare cases they use mechanised vessels. The fish carrier vessel tows these vessels.



In the mangrove forest (Sundarban) fishermen carry out fishing with their vessels and transship all the fish into the carrier vessels. When the vessel becomes full with fish, then it carries all the fish to the ghat (station). We did not find these types of vessels in the Skid Ghat No-5. All the fishing vessels of the Skid Ghat No-5 carry out fishing by their own fishing gear.

### Fish Landing Data (July – October, 2001):

Fiscal year: 2001-2002

Table 4.1.4 Fish Landing Data

| Month     | No of boat (landed) | Total fish (in kg) |
|-----------|---------------------|--------------------|
| July      | 20                  | 16,000             |
| August    | 23                  | 17,570             |
| September | 25                  | 22,100             |
| October   | 20                  | 16,900 ✓           |

Source: Coastal Marine Fisheries Management Project (Regional office, Khulna)

**Price of some species**

This price varies with the supply of fish, demand for fish and season.

- Shrimp (Small-Large) other than *Penaenus* sp and *Macrobrachium* sp.:  
400—1400/1600 taka per mound
- Paisha : 1400—2000/4000 taka per mound
- Ilish : 2000—4000 taka per mound

**Table 4.1.5: Major species of this market**

| Local name     | Scientific name                  |
|----------------|----------------------------------|
| Hilsha         | <i>Tenualosa ilisha</i>          |
| Chandana ilish | <i>Hilsha tuli</i>               |
| Pangas         | <i>Pangasius pangasius</i>       |
| Rupa chanda    | <i>Stromateus chinensis</i>      |
| Churi          | <i>Trichiurus haumela</i>        |
| Rita           | <i>Rita rita</i>                 |
| Datina         | <i>Acanthopagrus datina</i>      |
| Koivol (poa)   | <i>Sciaenoides talabonoides</i>  |
| Silver pompret | <i>Stromateus cinereus</i>       |
| Koral/ Vedki   | <i>Lates calcarifer</i>          |
| Air            | <i>Arius gagora</i>              |
| Meda           | <i>Kettengus tupus</i>           |
| Rui            | <i>Labeo rohita</i>              |
| Catla          | <i>Catla catla</i>               |
| Mrigal         | <i>Chirrhina mrigala</i>         |
| Bagda chingri  | <i>Penaeus monodon</i>           |
| Golda chinri   | <i>Macrobrachium rosenbergii</i> |
| Tengra         | <i>Mystus vittatus</i>           |

**Problems of the market**

- Infrastructure is poor ✓
- Lack of environmental management ✓
- Shortage of water
- No electricity available. ✓

### 4.1.3 Rupsha Nutan Bazar Fish Market (Retailers)

In Rupsha Nutan Bazar, there are two different types of fish market (one – for commission agents (aratdars) and the other is for retailers and wholesalers). In this context wholesalers are distinguished from aratdars because the former buy and sell fish. This market is managed by the Khulna Development Authority (KDA).

#### Types of manpower (Related to fish business):

##### Wholesaler / Retailer:

Basically, the same person carries out these two functions. When a person purchases a large quantity of fish from the commission agent (aratdar) through the open competitive bidding system he is generally termed as a wholesaler. On the other hand, when he sells fish to the consumer by weighing after some bargaining, then he is known as a retailer.

##### Average profit per day of a retailer:

A retailer gets a profit (average) ~~per day~~ <sup>of</sup> is 100 <sup>to</sup> 150 Tk. *per day*.

##### Ice carrier and seller:

In this market, a special type of community is found. The members earn their living by selling ice. The number of ice seller in this market is 5. They collect ice from the nearby ice plant in blocks, and then they break it into small pieces and sell these ice pieces to the retailers for fish preservation.

##### Cost of ice:

An ice seller might collect ice for 100 taka ~~for~~ <sup>a</sup> 2.5 mounds and ~~then break it into small pieces~~ <sup>which is then broken into pieces</sup> and then sell by 50 taka / piece.

##### Basket maker and seller:

Another professional category is also found in this market. 6-8 people carry out this business. They make basket which are used for fish carrying. The wholesalers or retailers buy the basket from them and use the baskets for fish carrying from one market to another. Ice is used in these baskets for short term fish preservation. These operators earn 40—60 taka (Avg.) per day.

**Fish cutter:**

The fish cutters cut large fish which are supplied by the <sup>customers</sup> consumers and consumers pay them some 2-4 taka per kg fish for cutting. Payments can vary according to fish size. Sometime they collect fish from retailers or wholesalers and cut the fish into pieces. Then they sell the cut fish to the consumers according to weight. There are 3 fish cutters in this market.

**Number of wholesalers / retailers**

The total numbers of wholesalers or retailers are more than 100 in Rupsha Nutan Bazar Fish Market (wholesalers / retailers). Two types of wholesalers or retailers are found in this market—

**Permanent:** There are about 60—70 permanent wholesalers or retailers in this market. They carry out their business every day.

**Temporary:** About 35-40 temporary wholesalers or retailers are engaged in this market. Sometime a marginal fisherman sells their catch as a temporary retailer. They come from outside Khulna city.

**Categories of buyer**

All kinds of consumer from lower to higher class people buy fish from this market but the frequency varies from lower to higher. In this market lower class people, lower middle class people are the main customers. <sup>However,</sup> ~~Few~~ <sup>also</sup> numbers of higher middle class and higher class people buy fish from this market.

**Becoming a wholesaler or retailer**

The permanent wholesalers or retailers get a place from the market authority (KDA) to sell their fish. They pay tax for running their business in this market. The temporary retailers first find a place to carry out his business in the fish market area. Then they carry out their business by paying a small levy to the authority (KDA).

**Marketing channels**

As shown in Appendix 1 (flow chart)



**Transportation system****From Rupsha Nutan Bazar Arat:**

Rupsha Nutan Bazar Fish Market (arat) is situated beside the Rupsha Nutan Bazar Retail Fish Market. So the retailers bring the fish from the Arat by themselves. ✓

**From Skid Ghat No-5:**

Normal only hilsha is collected from Skid Ghat No-5. The buyers use vans & rickshaws for transporting fish from Skid Ghat No-5 to this market.

**From others:**

Wholesalers or retailers also collect fish from other places (Fish farms, Gallamari fish market etc.). In this case they use vans and rickshaws for carrying fish to this market.

**Business transaction system**

**In case of buying :** open competing <sup>tion</sup> bidding <sup>by</sup> . . . . . ?

**In case of selling :** Sales by weight (After some bargaining)

**Associations and Cooperatives**

In this market, more than one informal cooperative was found. But the recognized one is the Khulna City Wholesaler Fish Traders Cooperative Ltd (22 Fish Market). This cooperative consists of 22 Fish Markets in Khulna city and the surrounding area. The main office of the cooperative is situated in KDA New Market (Fish Market)<sup>1</sup>. Most of the permanent wholesalers / retailers are members of the cooperative. No branch office room is established here yet.

**KDA (Khulna Development Authority)**

KDA was established: 1961

The market established: 1969

**Activities of the organisation to the market**

- Tax collection (2 or 5 Tk. per place) <sup>seat</sup> ✓
- Conservation (Cleaning, repairing, etc.)
- Building maintenance and security

<sup>1</sup> We have used the fish market within bracket after KDA New Market because a shopping mall beside the fish market bears the same name.

- Providing sanitation facilities ✓
- Providing lighting facilities ✓
- Water supply ✓

Sometime (very rare) dishonesty/ cheating occur in this market, and then KDA solves the problem jointly with the cooperative of the market. ✓

#### KDA attitude towards retailers ✓

Most of the organisation of Khulna city show neutral attitude towards fish market. Their prime objective is to maintain the market through tax collection. KDA also shows the same attitude to this market. But sometime they show a positive attitude also. With the help of cooperatives the market is managed by this organisation. ✓

#### Market management procedure (practised by KDA) ✓

Market superintendent (1), levy collector (1), guard (2), sweeper / cleaner (2) ✓

**Table 4.1.6: The species in the Greatest Demand**

| Local name    | Scientific name         |
|---------------|-------------------------|
| Vetki / Koral | <i>Lates calcarifer</i> |
| Paisha        | <i>Setipinna phasa</i>  |
| Tengra        | <i>Mystus sp.</i>       |

**Table 4.1.7: Other major species of this market:**

| Local name     | Scientific name               |
|----------------|-------------------------------|
| Hilsha         | <i>Tenualosa ilisha</i>       |
| Chandana ilish | <i>Hilsha tuli</i>            |
| Pangas         | <i>Pangasius pangasius</i>    |
| Rupa chanda    | <i>Stromateus chinensis</i> ✓ |
| Churi          | <i>Trichiurus haumela</i>     |
| Rita           | <i>Rita rita</i>              |
| Datina         | <i>Acanthopagrus datina</i> ✓ |

Continued-----

|                |                                  |
|----------------|----------------------------------|
| Koivol (poa)   | <i>Sciaenoides talabonoides</i>  |
| Silver pompret | <i>Stromateus cinereus</i>       |
| Koral/ Vedki   | <i>Lates calcarifer</i>          |
| Air            | <i>Arius gagora</i>              |
| Meda           | <i>Kettengus tupus</i>           |
| Rui            | <i>Labeo rohita</i>              |
| Catla          | <i>Catla catla</i>               |
| Mrigal         | <i>Chirrhina mrigala</i>         |
| Bagda chingri  | <i>Penaeus monodon</i>           |
| Golda chinri   | <i>Macrobrachium rosenbergii</i> |
| Tengra         | <i>Mystus vittatus</i>           |
| Shoal          | <i>Channa marulius</i>           |
| Taki           | <i>Channa punctatus</i>          |
| Koi            | <i>Anabas testudineus</i>        |
| Magur          | <i>Clarius batrachus</i>         |
| Shing          | <i>Heteropneustes fossilis</i>   |
| Puti           | <i>Puntius sp.</i>               |

#### Volume of sales per day in Kg:

200/400/500 → 1600/1700 Kg / day (Approx.)

#### Problem of the market

- Poor infrastructure facilities.
- Lack of conservation (cleaning, repairing etc.)
- Shortage of water
- Unavailability of electricity.

#### 4.1.4 KDA New Market (Fish Market)

New market (Fish market) was established in 1966. It is located at Ward 17 under the KDA in a place of land covering an area of approximately eight kathas. It is just beside the Khulna-Jessore road. This was a potential fish market situated at the centre of the city and as such many buyers of both middle and higher class now come here to purchase fish regularly. Very recently a concrete shade was built up by under a joint venture of the KDA and the cooperative of this market.

#### Types of manpower (Related to fish business):

There are three types of manpower other than fish traders engaged in fish trading; these are—

- Beparis
- Labourers
- Fish cutters

##### Beparis:

There are 5 to 15 beparis in this market. Most of the fish which are sold to the consumers through this market are collected by the traders themselves.

##### Labourers:

We have not found the exact figure for unskilled workers. Some of the labourers are engaged with the fish traders and some are independent.

##### Fish cutter:

At the time of the visit 8—10 fish cutters are observed in the market.

#### KDA employees in this market:

- Market superintendent
- Tax bepari (1)
- Guard (3)
- Sweeper (3)

#### Number of wholesalers / retailers:

There are about 200 fish traders engaged in fish trading. Amongst them, some are permanent and some are temporary. There is no exact figure of temporary fish traders of the market. No of wholesalers / retailers are separately given in below—

- Permanent: 100 ✓
- Temporary: about 100. ✓

### Establishment as a wholesaler or retailer:

The wholesalers or retailers get a place from the market authority (KDA) to sell their fish. They pay a levy for running their business in this market.

### Categories of buyer:

Everyday more than 500 buyers (consumers) gather in this market. There are many categories of buyer but the most abundant are rich (Higher middle class— higher class). The categories of buyers of this market are—

- Lower class
  - Lower middle class
  - **Higher middle class**
  - **Higher class**
- What percentage?*

### Marketing channels

As shown in Appendix 1 (flow chart)

### Transportation system

The wholesalers/ retailers collect fish from Rupsha Nutan Bazar Fish Market, Skid Ghat No-5, Gallamari fish market. Sometimes they collect fish directly from local fish farms (Fish farm). These fishes are mainly transported by van, rickshaw. In some case pick-up is also used to carry fish to this market.

### Business transaction system:

- In case of buying: open competitive bidding ✓
- In case of selling: By weight (After some bargaining) ✓

**Associations and Cooperatives:****The Retail Cooperative** ✓

Name: KDA New market Retail Fish Cooperative Ltd.

Registered No: 181K

Year of establishment: 1997

Year of registration: 1999

Number of members: 100

Not all the sellers of the market are in membership of the cooperative.

**Becoming a member of the cooperative:**

Requirements for membership: ✓

- Permanency in fish selling
- Application to the society.
- The cooperative (cooperative committee) tests them with their own criteria.
- They should <sup>abide by</sup> obey the rules of the cooperative.

No temporary market operator can be admitted into membership.

**Objectives of the Cooperative:**

- To ensure that the permanent fish trades of KDA new market can easily run their trade/business.
- To distribute all the benefits among the fish traders (members) easily.
- To enhance its capabilities and activities by:
  - Arranging meeting rooms.
  - Operating commission agency, dealer etc.
  - Building storage house etc.
  - Imposing rules and regulation against dishonest persons. ✓
  - Preventing weighing dishonesty.
  - Meetings, seminars.
  - Establishment of library. ✓
  - Creating a poor fund.
  - Sanctioning loans.

**Structure:**

The cooperative has an active committee consisting of nine members. All of those are elected post. They are: Chairman (1), Vice Chairman (1), General Secretary (1), Assistant General Secretary (1), Cashier (1), Active members (4).

**Khulna Development Authority (KDA)****Activities of the organisation in the market:**

- Revenue collection (2 or 5 Tk. per place)
- Cleaning, repairs etc. *of market?*
- Building maintenance and security
- Providing sanitation facilities *of the market & adjacent places.*
- Providing lighting facilities
- Water supply

Sometime (very rare) dishonesty/ cheating occur in this market, and then KDA solves the problem by jointly with the Cooperative of the market.

**KDA attitude towards retailers:**

Most of the organisations of Khulna city show a neutral attitude towards fish market. Their prime objective is to maintain the market through the employment of revenue collected. KDA also shows the same attitude to this market. But sometime they show a positive attitude also. With the help of cooperatives the market is managed by this organisation.

**Market management procedure (practised by KDA)**

Market superintendent, revenue collector, guard, sweeper (Cleaner)

**A special type of Arat (commission agency)**

A special type of Arat was observed in KDA New Market (Fish market). This Arat is managed by the Chairman and General Secretary of the cooperative. The main objective for establishment of this Arat is to contribute to the development of poor fish merchants. These fish traders are unable to buy fish in an open competitive bidding

system. They have not enough money for business. To help them develop, the special Arat (commission agency) was established. The poor fish traders collect fish from the Arat by credit. They pay the Arat after selling the whole fish, without payment of commission. The retail commission agent imposes 2—3% of commission on the sellers, not from the wholesalers/ retailers.

In the research interview, the owner / initiator of the Arat said that the Arat was not similar to a normal Arat and does not fulfill the other criteria of a normal Arat. This Arat is an informal Arat, which acts as an Arat but is not recognized as Arat.

#### Marketing channel of the special type of Arat

As shown in app-1 (flow chart)

#### The most abundant species available for buyers:

**Table 4.1.8: Available fish species of this market**

| Local name   | Scientific name                |
|--------------|--------------------------------|
| Hilsha       | <i>Tenualosa ilisha</i>        |
| Pangas       | <i>Pangasius pangasius</i>     |
| Rupa chanda  | <i>Stromateus chinensis</i>    |
| Datina       | <i>Acanthopagrus datina</i>    |
| Koral/ Vedki | <i>Lates calcarifer</i>        |
| Air          | <i>Arius gogora</i>            |
| Rui          | <i>Labeo rohita</i>            |
| Catla        | <i>Catla catla</i>             |
| Mrigal       | <i>Chirrhina mrigala</i>       |
| Tengra       | <i>Mystus sp.</i>              |
| Shoal        | <i>Channa marulius</i>         |
| Taki         | <i>Channa punctatus</i>        |
| Koi          | <i>Anabas testudineus</i>      |
| Magur        | <i>Clarius batrachus</i>       |
| Shing        | <i>Heteropneustes fossilis</i> |

Continued----

|           |                                |
|-----------|--------------------------------|
| Puti      | <i>Puntius sp.</i>             |
| Chapila   | <i>Gudusia chapra</i> ✓        |
| Pabda     | <i>Ompok pabda</i>             |
| Kajoli    | <i>Ailia coila</i>             |
| Foli      | <i>Notopterus notopterus</i> ✓ |
| Tara baim | <i>Macrogathus aculeatus</i> ✓ |
| Paisha    | <i>Setipinna phasa</i> ✓       |

In this market the species in greatest demand are the small indigenous species, such as— Puti, Pabda, Koi, Magur, Shing, Kajoli, Baim, Chapila, Foli etc.

#### Average profit per day of a retailer:

In case of poor fish traders: 70—100 Tk. per day.

In case of rich fish traders: 200—250 Tk. per day. ✓

#### Volume of sales per day:

Lowest (Average): 40—50 mound / day ✓

Highest (Average): 60—70 mound / day

Average: 50—60 mound / day

1 mound is equivalence to 40 kg. Sometime it exceeds 100 mound / day.

#### Peak season of some fish: *availability of*

Small Indigenous Species: June - January

Large species (Carps & others): ~~All~~ the year round

Ilish: June – September. ✓

#### The Cooperative Open to All Fish Traders in Khulna City

Name: Khulna City Wholesaler Fish Traders Cooperative Ltd.

Registration: 10 K

This cooperative was formed for the overall development of the permanent wholesalers / retailers of 22 fish markets (situated in Khulna city and adjacent places). This is not the total number of fish markets in Khulna. Most of the permanent wholesalers / retailers of these markets are the members of the cooperative. This market is also named as 22 Fish market Paikari Samity. The activities of the cooperative are similar to other cooperatives. Sometimes they give loan to poor retailers for their development. If anybody misbehaves to the members then the cooperative helps the members by law or finance. If any new wholesaler/retailer wants to get membership then he has to pay some money like 101 Tk. or 201 Tk. or 301 Tk. so on. He must obey the rules and regulations of the cooperative. After that he will get membership. Actually the objectives are related to trade and for their unity also.

#### 4.1.5 Bara Bazar Fish Market

Bara bazaar is the largest market of Khulna city. This market is for a multitude of products – not just fish - and consists of various wings (i.e., different products sell in different places in the market). The fish market is one of the prominent sections among them. The market is situated on the bank of the river Bhairab. Originally, the market was recognized as Mathor Potty fish market. This market is managed by KCC (Khulna City Corporation).

#### Types of manpower (Related to fish business): ✓

There are seven types of manpower other than fish traders engaged in fish trading; these are—

##### Aratdar:

There are 8 Aratdars ~~are~~ carrying out their business in the fish market. They get 5—6% commission from the Beparies / Fishermen / Fish farm owners.

##### Wholesaler/ Retailer:

Permanent: 125—130

Temporary: 20—30

Average profit per day—

Min: 50 Tk. J

Max: 200 Tk.

**Beparis:**

The exact number of beparis of the market is unknown. This number varies due to fish availability, season etc.

**Fish cutter:**

There are 10 fish cutters in the market. They get 2-3 Tk. per kg. The sum varies according to fish size.

**Ice seller:**

There are 5—10.

**Basket maker and seller:**

7—12 basket makers carry out their business in this market. These people also sell their product in another wing of Bara Bazar market (i.e., vegetables, grocery shop etc). They earn 50-100 Tk/ day.

**Labourers:**

No exact figure of labourers related to the fish business was found. They get 3 Tk/ mound.

**Establishment as aratdar, wholesaler/ retailer**

**In case of aratdar:** If the KCC offers a place, then a man who possesses a trade licence and a market licence can be an aratdar. If he wishes he can then become a member of a cooperative (eg the 22 fish market).

**In case of wholesaler/ retailer:** wholesalers or retailers get a place from the market authority (KDA) to sell their fish. They pay a small levy for running their business in this market.

**Categories of buyer**

Everyday about more than 400 buyers (consumers) gather in this market. There are many categories of buyer but **the most abundant are lower middle class people**. The categories of buyers of this market are—

- **Lower class** *income group*
- **Lower middle class**
- **Higher middle class (rare)**
- **Higher class (Very rare)**

**Marketing channels**

As shown in Appendix 1 (flow chart)

**Transportation system**

The wholesalers/ retailers collect fish mainly from arats where fish are gathered by beparis / beparies or by farm owners. Sometimes they collect fish from Rupsha Nutan Bazar Fish Market (Aratdar), Skid Ghat No-5, Gallamari fish market and local fish farms (Fish farm). These fish mainly are transported by van, rickshaw. In some case pick-up or scooter (Baby taxi) are used to carry fish to this market.

**Business transaction system**

Aratdars are the commission agent. They never buy fish but act as a middle man. They collect 5-6% commission from beparies/ fish farm owners/ fishermen. At a time they pay 2% of total sell to KCC.

For wholesalers/ retailers —

- In case of buying: open *competition* ~~competing~~ bidding

- In case of selling: By weight (After some bargaining)

**Volume of sales per day**

In case of retailer—

Min (average): 10 kg

Max (average): 1.5 mounds\*

In case of Aratdar—

Average: 15-20 mound

When wholesaler collect fish from Aratdar, the mound equivalency are varied.

|       |  |   |          |
|-------|--|---|----------|
| 40 kg |  | → | 1 mound. |
| 42 kg |  |   |          |
| 44 kg |  |   |          |

### Association and Cooperatives

The fish traders of this market are the members of Khulna City Wholesaler Fish Traders Cooperative Ltd (22 fish market). Information on this is supplied in Chapter 5.

Before the war of liberation, during the Pakistan period, a cooperative named "The Khulna Municipality Fish Sellers and Suppliers Cooperative Ltd" was established. The registration number of this cooperative is 09 K. But when some of the charter members of this cooperative died then the activities were halted. Though the cooperative still exists, it is moribund.

There is an informal market committee in this fish market to manage the overall marketing system. Cheating/ dishonesty or misbehaviour with the customer is prevented by the committee. The committee is selected by the wholesalers. This management procedure is an informal process. Sometimes the committee contacts the KCC to develop the market.

### KCC

This fish market is managed by the KCC.

#### Activities of the organisation to the market:

- Tax collection (2% from each Aratdar and 2 taka from each retailer)
- Conservancy (Cleaning, repairing, etc.)
- Building maintenance
- Providing sanitation facilities

#### KCC attitude towards Aratdars:

In general the KCC shows a neutral attitude to the fish traders (Aratdars and retailers). Sometimes it is more encouraging. Actually KCC act as a tax bepari and for tax collection they have to keep good relation with fish traders. With the help of the informal market committee, the market is managed by this organisation.

**Table 4.1.9: Recognized toll rates of KCC**

| Goods/<br>Commodity              | Area          | Daily toll rates |         | Proposed toll rates |         | Comment                                            |
|----------------------------------|---------------|------------------|---------|---------------------|---------|----------------------------------------------------|
|                                  |               | Retailer         | Aratdar | Retailer            | Aratdar |                                                    |
| Fish, Egg,<br>Vegetables<br>etc. | Per<br>Sq ft. | 1.00             | 2%      | 2.00                | 5%      | User's must<br>closed their<br>shop by 8.00<br>PM. |

**The most readily available species to the consumers:**

In this market, fresh water species are abundant. Very few marine species are available here. The species in the greatest demand are Hilsha, Rui, Catla and other carps.

**Table 4.1.10: The following fish Species are abundantly found in this market:**

| Local name   | Scientific name                |
|--------------|--------------------------------|
| Hilsha       | <i>Tenualosa ilisha</i>        |
| Pangas       | <i>Pangasius pangasius</i>     |
| Rupa chanda  | <i>Stromateus chinensis</i>    |
| Koral/ Vedki | <i>Lates calcarifer</i>        |
| Rui          | <i>Labeo rohita</i>            |
| Catla        | <i>Catla catla</i>             |
| Mrigal       | <i>Chirrhina mrigala</i>       |
| Tengra       | <i>Mystus sp.</i>              |
| Shoal        | <i>Channa marulius</i>         |
| Taki         | <i>Channa punctatus</i>        |
| Koi          | <i>Anabas testudineus</i>      |
| Magur        | <i>Clarius batrachus</i>       |
| Shing        | <i>Heteropnuestes fossils</i>  |
| Puti         | <i>Puntius sp.</i>             |
| Chapila      | <i>Gudusia chapra</i>          |
| Pabda        | <i>Ompok pabda</i>             |
| Kajoli       | <i>Ailia coila</i>             |
| Foli         | <i>Notopterus notopterus</i>   |
| Tara baim    | <i>Macragnathus aculeatus</i>  |
| Paisha       | <i>Setipinna phasa</i>         |
| Bele         | <i>Glossogobius guiris</i>     |
| Tilapia      | <i>Oreochromis mossambicus</i> |
| Colisha      | <i>Colisha fasciata</i>        |
| Roina / Vedi | <i>Nandus nandus</i>           |

**Credit agreement/ loan / Dadan**

After some dealing when a relation grows between aratdars and beparis and fishermen/ wholesalers/ retailers, the aratdar may supply an advance. As in other cases this written down on a 50 Tk. stamped paper. There is no systematic procedure for repayment. It depends on what is negotiated. Normally, the borrowers sell their fish through the aratdar. The aratdar get commission from them (5-6% commission).

**Some other costs:**

**Ice:** 60—70 taka/ block (in this market)

**KCC charge:** 1 / 2 taka

**Cooperative charge:** Monthly 10 taka for Cooperative of 22 fish market.

**Electricity bill:** 4 taka/ day for a 100 watt bulb

(Duration: early morning to 10 PM)

**Problems of the market:**

- Disturbances occur in the transportation due to traffic jam.
- The infrastructure of KCC office is very poor. ✓
- No shed / roof on the market. ✓
- Lack of cleanliness in toilets.
- Narrow entry to the market.

**4.1.6 Evening Market (Sandho Bazar)**

The Evening Market is a popular market in Khulna. It is especially well known for its special timetable. This market starts in the evening and continues to midnight. Office personnel are the most common buyers in this market, because they can easily get fresh vegetables and fish after working hours.

Like others, this market also has some problems. But in the case of this market the problem is different from others. This market is situated beside a road. No specific area is allocated for market place. All the merchants use the roadside for their trading.

**Types of manpower (Related to fish business)**

There are two types of employee/manpower, apart from fish traders, engaged in fish trading; these are—

- Fish cutters ✓
- Van-rickshaw pullers (ice carriers) ✓

**Fish cutter:**

Number: 2

Wage: 2 Tk./kg ✓

**Van-Rickshaw Puller:**

All fish traders have a permanent van or rickshaw puller who brings ice for fish preservation when the fish traders requires it.

Wage: 20 Tk. (per day)

**Marketing channels**

As shown in Appendix 1 (flow chart)

**Transportation system**

The fish traders collect all the fish himself, using bus and pickup as transport. Fish traders collect all the fish during day and then sell fish at evening to night.

**Area of each shop**

The traders in this market get 45 sq. inches of area for carrying out their business. But we observed that, more than one also is found within this area. We asked for an explanation. They replied that, when a trader starts trading in this market, at that time they are allocated only 45 sq. inches but sometimes they share the area with relatives and then area becomes smaller. The market has no possibilities to expand.

**Categories of buyer**

From lower to higher class people buy fish from this market.

**Categories of seller**

Two types of sellers are in this market; these are—

Permanent: 53 ✓

Temporary: 17-20 ✓

**Business transaction system**

For wholesalers/ retailers —

- **In case of buying:** Open competitive bidding

- **In case of selling:** By weight (After some bargaining)

**Volume of sales per day**

It varies with the season, supply etc. But average volume of sales per day varies from 2000 to 3000 kg.

**Average profit per day**

**Peak season** (according to good weather and supply): 500 – 1000 Tk. ✓

Average: 250 Tk.

**Association and Cooperatives**

Here only one association was found. With some informal collaboration between traders was noted. These informal organisations acts as a deposit box. All the members of these types of organisations deposit a fixed amount of money on a daily basis. After one year they break it down and distribute the deposit money among the members.

**The formal association**

**Name:** Evening market shop owner's association. ✓

(Sandhobazaar Dokhan Malik Association )

**Registered No:** K 1304

**Number of members:** 250

**Types of members:** All the shop owners (Fish traders and others like vegetables, grocery etc.) are the members of this association.

**Roles/ activities of the Cooperative:**

Mainly the cooperative is established for overall development of the participants. But it does have some specific functions. These are:

- Arbitrate
- Loan supply
- Maintaining the peace in the market.

**KCC (Khulna City Corporation)**

This fish market is managed by KCC (Khulna City Corporation).

**Activities of the organisation to the market:**

- Tax collection (5 taka from each retailer)
- Cleaning, repairing, etc.
- Road maintenance
- Providing sanitation facilities

**KCC attitude towards fish traders:**

KCC act as a tax bepari and for tax collection they have to keep good relation with fish traders. With the help of the association committee, the market is managed by this organisation. But the fish traders claimed that KCC does not perform their activities in timely.

**Other expenses provided by traders**

Though KCC imposes a levy on the traders, it makes no contribution to the welfare of this market.

**Penalties in case of cheating / dishonesty**

The cooperative punishes those traders, who cause trouble (cheating / dishonesty) in this market. The dishonest trader may be required to stop trading for seven days as a punishment.

### Loan facilities

When a traders (either fish or others) face some financial problem then he can get loan from the market committee (the association's governing body). Every trader can obtain a loan. The minimum sanctionable loan is 5,000 taka and the maximum is 10,000 taka. Interest is charged on this loan, and is paid on a daily basis.

### Problem of the market

Because of its situation or location, the market faces some problem. It has no specific areas and boundaries and the authority (KCC) is not helpful to them. They seek a place from the KCC for their trading but till today no suitable place has been found.

No guard, sweeper and other facility provided to them by authority. Authority only imposes a levy (at the rate of 5 tk./ head).

### The most abundant species to the buyers

In this market, both fresh and marine species are available here. Mud crab (*Scylla serata*) and some dried fish species is the special item of this market. The most demanded species by the buyers are Rui, Catla, Vetki, Vhangan and other carps.

**Table 4.1.11: Available dried fish species**

| Local name  | Scientific name             |
|-------------|-----------------------------|
| Rupa chanda | <i>Stromateus chinensis</i> |
| Chela       | <i>Not identified</i>       |
| Loytya      | <i>Harpodon nehereus</i>    |
| Phasa       | <i>Satipinna phasa</i>      |
| Kachki      | ??                          |

Table 4.1.12: Available fish species of this market

| Local name   | Scientific name                |
|--------------|--------------------------------|
| Hilsha       | <i>Tenualosa ilisha</i>        |
| Pangas       | <i>Pangasius pangasius</i>     |
| Rupa chanda  | <i>Stromateus chinensis</i>    |
| Koral/ Vedki | <i>Lates calcarifer</i>        |
| Rui          | <i>Labeo rohita</i>            |
| Catla        | <i>Catla catla</i>             |
| Mrigal       | <i>Chirrhina mrigala</i>       |
| Tengra       | <i>Mystus sp.</i>              |
| Shoal        | <i>Channa marulius</i>         |
| Taki         | <i>Channa punctatus</i>        |
| Koi          | <i>Anabas testudineus</i>      |
| Magur        | <i>Clarius batrachus</i>       |
| Shing        | <i>Heteropnuestes fossils</i>  |
| Puti         | <i>Puntius sp.</i>             |
| Chapila      | <i>Gudusia chapra</i>          |
| Pabda        | <i>Ompok pabda</i>             |
| Kajoli       | <i>Ailia coila</i>             |
| Foli         | <i>Notopterus notopterus</i>   |
| Tara baim    | <i>Macrogathus aculeatus</i>   |
| Paisha       | <i>Setipinna phasa</i>         |
| Bele         | <i>Glossogobius guiris</i>     |
| Tilapia      | <i>Oreochromis mossambicus</i> |
| Colisha      | <i>Colisha fasciata</i>        |
| Roina / Vedi | <i>Nandus nandus</i>           |

#### 4.1.7 Gallamari Fish Market

Gallamari is situated at the bank of river Maiury just beyond the KCC jurisdiction. This market is not under the authority of KCC or KDA. This market is governed by Batiaghata Thana (small unit of administration).

In Gallamari, there are two different types of fish market (one – for commission agent (aratdar) and other is for retailers and wholesalers). Both these two markets start at 5am but the market place is different. The aratdar' market has a particular area beside Khulna-Sathkhira road and is managed by their cooperative with the help of Batiaghata Thana. The retail market takes place at the Khulna- Sathkhira roadside and a market committee manages the retailer's market.

#### Number of fish traders:

##### Aratdars

There are 30 aratdars present in Gallamari Fish market. The aratdar receives a commission of 5%. The average income of an aratdar varies between 250 taka to 1500 taka per day.

##### Retailers:

Permanent: 50-60

Temporary: 15-20

A retailer makes a profit (average) per day of 100—200 taka. The area of a retail shop 3 feet by 4 feet. The temporary retailers mainly are the poor fishermen of surrounding villages near the market.

#### Others manpower involved in the Aratdar fish market:

##### Basket maker and seller

One shop situated in the centre of the market carries out this business. They make baskets, which are used for fish carrying. The wholesalers or retailers buy the baskets from them and use the baskets for fish carrying from one market to another market.

**Sweeper (Cleaner):** Number of sweeper: 1. He gets 40-60 taka from the cooperative.

**Marketing channels**

As shown in Appendix 1 (flow chart)

Here Mahajan and beparis all are termed as party.

**Transportation system****Collection**

**Aratdars market:** Fish are gathered from various places by road (truck, pick-up, bus, van, rickshaw etc).

**Retailers market:** The retailers collect fish mainly from the arat. They carry the fish from the arat to retail market by themselves.

**Distribution**

Parties from other markets are gathered here (Aratdars market) to collect fish. These fish are distributed from this market by road (Truck, Pick-up, Van, Rickshaw etc).

**Categories of buyer****Aratdar market:**

- Distributors/ wholesaler (Country wide)
- Distributors/ wholesaler (Local market)
- Retailers

Most of the buyers collect the fish by credit.

**Retail market:**

All kinds of consumer from lower to higher-class people buy fish from this market but the frequency varies from lower to higher. In this market lower class people, lower middle class people are the main customers. Few numbers of higher middle class and higher-class people buy fish from this market.

**Business transaction system:**

The pattern of business transaction system is similar to other markets.

**Lending and borrowing (terms of condition)**

All the aratdars provide advances to mahajan and beparis on the basis of mutual trust. This is however, written down on a 50 taka stamped paper.

**The cooperative. ✓**

**In the aratdars market**, we observed a cooperative organisation. The cooperative is formed by the aratdars for maintaining the market peacefully. All the aratdars are the member of the cooperative. ✓

Name: Gallamari Matsya Aratdar o Babosae Bohumukhi Samabai Samity  
(Gallamari fish Aratdar and traders multipurpose Cooperative Ltd.) ✓

Registered No: 9-K-94

Date of registration: 24.04.94

Year of establishment: 1994

Number of members: 30

For their overall development of the aratdars established the cooperative. The cooperative makes contacts with Batighata thana to properly manage the market. With this they also do some special activities, like--

- Arbitrate
- Cleaning and sweeping of the aratdars market
- Social work (within their community)

Fee of the Cooperative: 2 Tk/ day

Among the aratdars, if someone faces a problem such as no auction activity, he might be expected to pay a small penalty to the cooperative (10 taka was mentioned). In the retail market, there appeared to be no cooperative organisation and no informal organisations were found.

**Advance and repayment procedure \**

Aratdars pay an advance (Dadan) to parties for cultivate/catch fish. The money is advanced to persuade parties to send fish to the auction. The advance varied from 1000 to 15000 Tk. The parties, who take dadan from the aratdar, gather fish in the aratdars' auction hall and for every lot the aratdar receives 100 to 200 Tk. from the parties as repayment.

**The species in the greatest demand**

According to the retailers the following species are the most demanded by the consumer:

**Table 4.1.13: Demanded species of this market**

| Local name    | Scientific name         |
|---------------|-------------------------|
| Vetki / Koral | <i>Lates calcarifer</i> |
| Paisha        | <i>Setipinna phasa</i>  |
| Tengra        | <i>Mystus sp.</i>       |

**Table 4.1.14: Other major species of this market**

| Local name     | Scientific name                  |
|----------------|----------------------------------|
| Hilsha         | <i>Tenualosa ilisha</i>          |
| Chandana ilish | Hilsha tuli                      |
| Pangas         | <i>Pangasius pangasius</i>       |
| Rupa chanda    | <i>Stromateus chinensis</i>      |
| Churi          | <i>Trichiurus haumela</i>        |
| Rita           | Rita rita                        |
| Datina         | <i>Acanthopagrus datina</i>      |
| Koivol (poa)   | <i>Sciaenoides talabonoides</i>  |
| Silver pompret | <i>Stromateus cinereus</i>       |
| Koral/ Vedki   | <i>Lates calcarifer</i>          |
| Air            | <i>Arius gagora</i>              |
| Meda           | <i>Kettengus tupus</i>           |
| Rui            | <i>Labeo rohita</i>              |
| Catla          | <i>Catla catla</i>               |
| Mrigal         | <i>Chirrhina mrigala</i>         |
| Bagda chingri  | <i>Penaeus monodon</i>           |
| Golda chinri   | <i>Macrobrachium rosenbergii</i> |
| Tengra         | <i>Mystus vittatus</i>           |
| Shoal          | <i>Channa marulius</i>           |
| Taki           | <i>Channa punctatus</i>          |
| Koi            | <i>Anabas testudineus</i>        |
| Magur          | <i>Clarius batrachus</i>         |
| Shing          | <i>Heteropneustes fossilis</i>   |
| Puti           | <i>Puntius sp.</i>               |

**Problems of the market**

Aratdar market : None (according their discussion)

Retailers market: No infrastructure facilities.

## 4.2 Fish Farm (Adjacent to Khulna)

The common fish farming systems in Bangladesh are—

- Extensive:
  1. traditional
  2. improved traditional
- Semi-intensive

During the survey two different types of culture system in the Khulna region were noted; these are—

- Shrimp with carp polyculture (improved traditional)
- Tilapia monoculture (traditional)

All the produced fish are gathered into the Khulna fish markets. Sometime beparies and sometime the owner transport the fish to arat. It was only possible to survey a farm close to Khulna city because of limited time.

### 4.2.1 Shrimp with carp (Improved traditional):

**Name of owner:** Mr. Hamid

**Area of pond:** 20 *bigha* (1 *bigha* is equal to 33 decimal)

**Stocking:** 30,000 fry (per annum) / *0.1 bigha ??*

**Table 4.2.1: Stocked species**

| Local name  | Scientific name                    |
|-------------|------------------------------------|
| Rui         | <i>Labeo rohita</i>                |
| Catla       | <i>Catla catla</i>                 |
| Thai punti  | <i>Puntius gonionotus</i>          |
| Silver carp | <i>Hypophthalmichthys molitrix</i> |
| Grass carp  | <i>Ctenopharyngodon idella</i>     |

**Price of fry:** See later (in hatchery chapter)

**Feed:**

- Boiled rice
- Rice polish ----- 7 Tk/ kg
- Meat of snail ----- 8 Tk/ kg
- Readymade fish feed (Saudi – Bangla Feed)

**Fertilizer:** None**No of labour:** 6**Salary (each):** 1800 Tk/ month

**Profit:** There have no written documents on profit. They stocking fry once a year and sold them daily at the end of the year. Each day they sold 60 pieces of fish (average) and get 4000 to 6000 Tk from that.

**4.2.2 Shrimp with carp (Improved traditional):****Name of owner:** Mr. Ashok Roy**Area of pond:** 52 decimal**Table 4.2.2: Stocked species with number**

| Local name  | Scientific name                    | Stocking |
|-------------|------------------------------------|----------|
| Catla       | <i>Catla catla</i>                 | 50       |
| Silver carp | <i>Hypophthalmichthys molitrix</i> | 1000     |

**Feed:**

- Boiled rice
- Rice polish ----- 7 Tk/ kg
- Meat of snail ----- 8 Tk/ kg
- Boiled wheat

**Fertilizer:** Urea**Profit (reported):** 100 % (ie 1 taka profit for every taka of cost)

### 4.2.3 Tilapia mono culture (Traditional)

**Name of owner:** Mr. Khokon

**Area of pond:** 40 decimal

**Stocking:** 1 mound (40 kg)

**Fry size (each):** 3 inches fry

**No of labour:** 1

**Labour wage:** No salary is paid. Owner only provides his feed and accommodation.

### 4.2.4 Hatchery cost (Jessore):

Most of the hatcheries in this Khulna region are situated in Jessore. These hatcheries also provide fry/fingerlings to the fish farms situated in north Bengal. For brief description on hatchery we also visited a hatchery situated in Jessore.

Now we give a description of an ideal carp hatchery.

**Area:** 15 decimal

**Produced species:**

- Carp species
- Bata
- Pangus (Cat fish)

Among them *catla* and grass carp sell for the higher prices.

**Production (per annum):** 700-800 kg

**Price:**

Maximum: 3,000Tk (Average)

Minimum: 1,000Tk (Average), sometimes falling as low as 700-800 taka.

N.B: The hatchery only sells fry to intermediaries for stocking in nursery ponds for ongoing rearing to the fingerling stage.

**Price of fingerlings:** 1,100-1,200/mound (1 mound = 37.33kg)

**Fertilizer:** Cow dung (100tk/Barrel)

**Feed:**

| <u>Ingredients</u> | <u>Price</u> |
|--------------------|--------------|
| Oil cake (Soya)    | 9Tk/kg       |
| Oil cake (Sesamum) | 8Tk/kg       |

**Manpower:**

Labour: No. --- 3-4

Wage: 1,500-3,000 (Batch/month only in production period)

**Supervisor:** No. --- 1

Wage/Salary: 2,500---3,000/month (Experienced)



### 4.3 Institutions in Khulna

#### 4.3.1 BFDC (Bangladesh Fisheries Development Corporation):

Established: 1964

##### Activities of the Organisation:

- Collection of rents (buildings)
- Maintenance of the building
- Provide *ghat* facilities
- Collection of levy (2%)

The BFDC makes no contribution in the prevention of cheating and dishonesty. The organisation shows a neutral attitude towards the aratdars and their association. All of the employees of the BFDC work for the State therefore act on its behalf of the State. However there is no evidence of confrontational activities towards the aratdars by the employees of the BFDC. They collect the levy from the aratdars for the Government, and for this they need to maintain good relations with the aratdars. At the same time they keep a record of the amount of fish landed in this market.

#### 4.3.2 KCC (Khulna City Corporation):

##### Activities of the organisation towards the market

- Levy collection (officially this is supposed to be 2% on the sales of aratdars, but in practice the levy is small)
- Cleaning and repairs etc.
- Building maintenance
- Providing sanitation facilities
- Providing lighting facilities

##### Relationship with the Cooperatives

The KCC maintains an ongoing relationship with cooperatives and associations. When problems arise in the markets under its jurisdiction then the KCC attempts to resolve it with the help of aratdars' cooperatives.

**KCC attitude towards Aratdars and Retailers:**

In general the KCC shows a neutral attitude to the aratdars and retailers but sometimes they show positive attitude also. Actually KCC act as a tax bepari and for tax collection they do some jobs that are good for the aratdars and retailers. With the support of the cooperatives all the markets under the authority of the KCC is managed by this organisation.

**Table 4.3.1: Official levy rates of KCC**

| Goods/<br>Commodity              | Daily toll rates     |                | Proposed toll rates  |                | Comment                                          |
|----------------------------------|----------------------|----------------|----------------------|----------------|--------------------------------------------------|
|                                  | Retailer             | Aratdar        | Retailer             | Aratdar        |                                                  |
| Fish, Egg,<br>Vegetables<br>etc. | 1.00 tk<br>per sq ft | 2% of<br>sales | 2.00 tk<br>per sq ft | 5% of<br>sales | Users must<br>close their<br>shop by 8.00<br>pm. |

**Fish Markets under the Authority of Khulna City Corporation:****RETAIL FISH & VEGETABLES MARKET:**

- |                           |                                |
|---------------------------|--------------------------------|
| • Khulna Bazar - L        | • Jorakal Bazar - S            |
| • Daulatpur Bazar - L     | • Alamnagar Bazar - S          |
| • Phulbarigate Bazar - L  | • Chitralli Bazar - M          |
| • Railygate Bazar - S     | • Labanchoor Bazar - S         |
| • Maheswar pasa Bazar - S | • Chanmari Bazar - S           |
| • Boyra Bazar - S         | • Makbul Bazar - S             |
| • Rayermahal Bazar - S    | • Joragate Bazar - S           |
| • Baikali Bazar - S       | • Rupsha sandho Bazar - S      |
| • Mistripara Bazar - M    | • Tarerpukur Sandho bazzar - L |
| • Sheikhpara Bazar - L    |                                |

**LEGENDS:**

S = Small  
M = Middle  
L = Large

**ARATDAR MARKETS:**

- Rupsha Matsya Aratdar Bazar (Rupsha Aratdar Market)
- Rupsha Nutan Bazar Matsya Arat Market
- Raermahal Aratdar Market
- Daulatpur Aratdar Market

The average number of the retailers is reported to be about 80 in every market under the authority of the KCC.

**4.3.3 DoF (Department of Fisheries)****Objectives and activities:**

- To conserve and enhance the production of the existing fisheries resources (fresh and marine) by proper management.
- To activate extension work.
- To expand the appropriate technology through Government hatcheries and fish farms to general public.
- To operate training and give suggestions on aquaculture and management.
- Give support to the fishermen community for getting loans from funding agencies.
- To assess the stock.
- Implementation of legal steps related to fisheries.
- Fisheries project implementation and evaluation.
- Take steps for the upliftment of socio-economic condition of fishermen community.
- To certify frozen fish for export.
- Improve fisheries rules and implement fisheries laws.

**4.3.4 Coastal Marine Fisheries Management Strengthening Project (CMFMSP)**

**Name:** Coastal Marine Fisheries Management Strengthening Project.

**Starting:** July 1997

**Ending:** June 2002

**Budget:** 7 crore taka (70 million).

**Source of funding:** Bangladesh Government

**Manpower:** 71 person (16 in Khulna region)

**Implementing agency:** DoF

**Aim (long run):**

1. To conserve and enhance the production of the existing fisheries resources (Marine) by proper management.
2. To develop the socio-economic condition of the coastal fishermen community.

**Aim (short run):**

1. To enhance and give support to the DoF.
2. To implement the Marine Ordinance of 1983 by training and extension.

**Project Activities (translated version from CMFMSP documents).**

1. To list all the fishing vessels (mechanised and non-mechanised), to identify those vessels which are currently licensed, and to encourage to licensing of unlicensed vessels
2. To supply data on coastal fish exploitation
3. To conduct training for coastal fishermen
4. To protect coastal fisheries resources from hazards
5. Control pollution and conserve environment
6. To implement Marine Fisheries Ordinance/1983 and the Fish Law/1983
7. To ensure the logical exploitation of fish in the Sundarbans
8. To strengthen the manpower of Department of Fisheries
9. To built-up a coordination within Forest Department, Bangladesh Navy, Coast Guard and other related organisations
10. To give an identity card to the coastal fishermen
11. Take some initiative for socio-economic development of coastal fishermen.
12. To implement order for disaster management and supply life saving equipment to the fishermen.

### 4.3.5 New Market Cooperative

Name: KDA New Market Retail Fish Cooperative Ltd.

Registered No: 181K

Year of establishment: 1997

Year of registration: 1999

Number of members: 100

Not all the sellers of the New Market are in membership of the cooperative.

#### Becoming an member of the Cooperative:

Requirements for membership:

- Permanence in fish selling.
- Application to the society.
- The cooperative (cooperative committee) tests them against their own unpublished criteria.
- Members should follow the ordinance for the cooperative.

No temporary merchants qualify for membership.

#### Roles/ activities of the Cooperative

Mainly cooperatives are established for overall development of the fish industry communities.

But have some specific activities. These are:

- Arbitration
- Loan supply
- Establishment of education centres
- Health protection measures etc.

#### Objectives of the Cooperative

- To ensure that the permanent fish trades of KDA new market can easily run their trade/ business.
- To distribute all the benefits among the fish traders (members) easily.
- To enhance its capabilities and activities by:

- Arranging a room for meetings.
- Operating commission agency, dealer etc.
- Building storage house etc.
- Imposing rules and regulation against dishonest persons.
- Preventing weighing dishonesty.
- Meetings, seminar.
- Establishment of library.
- Creating a poor fund.
- Sanctioning loans.

#### **Organogram:**

The cooperative has an active committee consisting of nine members. All of these are elected posts. These are: Chairman (1), Vice Chairman (1), General Secretary (1), Asst. General Secretary (1), Cashier (1), Active members (4)

#### **4.3.6 Twenty two (22) Fish Market of Khulna Cooperation**

Name: Khulna City Wholesaler Fish Traders Cooperative Ltd.

Registration no: 10 K

This cooperative was formed for the overall development of the permanent wholesalers / retailers of 22 fish markets (situated in Khulna city and adjacent locations). Most of the permanent wholesalers / retailers of these markets are members of the cooperative. This market is also named as 22 Fish Market *Paikari Samity*. The activities of the cooperative are close to other cooperatives. Sometime they supply loans to poor retailers for their development. If anybody misbehaves to the members then the cooperative helps the members by law or finance. If any new wholesaler/retailer wants to become membership then he has to pay a sum by agreement with the committee. The sum is invariably an odd number (eg 101 taka) by tradition. He must agree to obey the rules and regulations of the cooperative. After that he will become a member. Although some of the stated objectives of the cooperative are related to trade, the organisation may also have political and social objectives.

#### 4.4 Collusion in the Fish Distribution System

##### 4.4.1 The Economic Theory of Monopsony as Applied to Fisheries

One of the main objectives of this study is the assessment of collusion in the fish distribution system.

Traditional economic theory has regarded monopsony as a source of resource misallocation. The general argument is that in equating the marginal costs of inputs with their corresponding marginal revenue product, monopsony results in lower output than would be the case under competitive conditions and the returns accruing to the suppliers of inputs (in this case the fishermen) are lower than they might be under more competitive arrangements. The reason for this is that a monopsonist is the sole buyer of an input, and therefore he bids up the price against himself when he attempts to expand the purchases of the inputs he requires. So the theory is that it is, in general, in his interests to keep production at a lower level than it would be under competitive conditions to ensure that the prices he pays for inputs are kept low and he can maximise his profits<sup>2</sup>.

In practice a monopsonist cannot pass higher costs on to the final buyers of the fish because the output price is determined under competitive conditions and follows the law of one price<sup>3</sup>. The output price is only what the market will bear, so it is the suppliers of inputs who bear the burden of this type market failure. Thus the monopsonistic supplier of fish selling services charges the fishermen a higher commission than would a supplier of the same services under competitive conditions. To illustrate from the case of fish marketing in Khulna, if there are several aratdars (the commission agents who run the wholesale markets) then monopsonistic practices are only possible if the aratdars collude to ensure that their commission rate is higher than it would be under competitive conditions.

In Bangladesh a second area that also needs to be investigated is the supply of credit. It may be that collusion enables the aratdars, acting as suppliers of credit, to charge a higher price (therefore act as collusive monopolists) than would be charged under competitive conditions. In this case the commission agents sell credit and the price of credit is the rate of interest together

<sup>2</sup> Some economists have argued that monopsony in the fisheries sector can have a beneficial impact because the profit-maximising sole buyer of fish has an interest in appropriating resource rents for himself and therefore ensuring sustainability (Crutchfield and Pontecorvo, 1969, Copes, 1972, Clark and Munro, 1980, Schworm, 1983).

with any onerous repayment conditions that may be imposed. This is an emerging issue which warrants further investigation, but we have not been able in this study to examine in depth. However, it would be very unwise to assume that credit should be subsidised, when problems, such as they are, might be due more to "low-quality" borrowers rather than an uncompetitive market for loans. For example, if the policy objective is to increase the supply of credit to credit-worthy, low-income borrowers, it might make more sense to step-up lender protection through various mechanisms rather than to offer subsidised loans (Cressy, 2002).

The economics of these circumstances are that the monopolist (or the monopolistic cartel) extracts a surplus from the suppliers equal to the difference between the profits that he would have received under competitive conditions and the earnings he actually gains. In this study this surplus called the "economic added value" or EAV. This points to a variety of possible indices of monopsony power such as EAV per kg, EAV per person employed, or, adapting, for the purposes of this study, the traditional "Lerner" index of monopoly power (Martin 1993, Schmalensee and Willig, 1989). EAV per kg divided by the effective price paid for the input in question. Thus the larger the EAV relative to the effective price paid for the fish, the inference is that monopsony power is greater.

#### 4.4.2 Applications of Theory of Collective Action

The question of how collective action might influence resource allocation generally was first explored by Mancur Olson (1965). The use of game theory, or *the theory of interdependent decision-making*, to study fisheries problems, has become well known. Palfreman (2001) reviews some of its applications, for example, how different game structures can produce different outcomes in the management of common property resources<sup>4</sup>. See also Chapter 5 of Baland and Platteau (1996) which follows a similar route. The fish industry abounds in situations where the choice for individual businesses is to compete or collaborate, or a mixture of the two. Indeed, it has become increasingly difficult to analyse these situations without some informal recourse to game-theoretic concepts, through the use of such ideas as the "zero-sum game" or "win-win" collaboration.

<sup>3</sup> The monopolist-monopsonist, the single supplier of outputs as well as the single buyer of inputs, can also be employed as an analytical model, but is not relevant to this case.

<sup>4</sup> The theory of clubs, which pre-dates the application of game theory to economic problems, shows how resource allocation can be improved without government intervention.

A scan of the literature on game theory reveals the vast number of different interactions that have now been modelled by the specialists. However, there are certain basic structures, such as the most commonly quoted game, *The Prisoner's Dilemma* (or PD)<sup>5</sup>, which are often generally sufficient to analyse many social and economic interactions in practice. Having said that, when using game theory as a tool of analysis, it is extremely important *not* to assume automatically that the rules followed are one of these more common forms. Rather, in social analysis, game theory is a heuristic device which enables the analyst to focus on certain features of a situation of observed strategic interdependence between players. Changing the rules, the incentive structure of the game, or the delivery system of the benefits to players, can alter the predicted equilibrium outcome of the game.

#### 4.4.3 Game Theory in Strategic Analysis

To make *practical* use of game theory to analyse business strategies four fundamental issues must be addressed.

(1) First, the rules of the game have to be known by the participants if the collective action is going to be sustainable. These rules must include: (a) an exclusion mechanism if economic added values (EAVs)<sup>6</sup> are going to be realised; (b) provisions for appropriation of EAVs by participants; (c) provisions for contributions to be made by participants.

(2) Because collective gains can arise in a variety of different ways<sup>7</sup> so the economics of collective action requires the benefit delivery mechanism to be explicit. Businesses will not participate on the strength of vague promises of some gains in the future, which might (or might not) accrue to them. They want to know with some precision how the collective agreement is going to deliver benefits to them as individual businesses.

(3) The third key element is the magnitude of the expected benefits. Minor gains are not likely to induce much enthusiasm among potential participants.

<sup>5</sup> In this game, two criminals guilty of one crime and suspected of another are separated and each is encouraged to incriminate the other player by the offer of being let off the first crime. The conceptual extension of the game to *n* persons is achieved by analysing the options of each player in turn as he competes against the remaining players.

<sup>6</sup> Economic added value denotes the concept of economic rent, or surplus over and above the opportunity costs (including normal profit) of the business.

<sup>7</sup> In fisheries a frequent assumption is that the more people who participate in collective action the greater the benefits, but in some cases this is not so. For example the food safety record of Bangladesh shrimp exports depends on the conditions in the worst exporter, thus the "weakest link" characterisation of public supply, rather than "summation" is appropriate.

(4) The fourth issue concerns risk and uncertainty. Expected gains from collective action may be substantial but if outcomes are uncertain they lose their value to participants, especially if the time horizons of participants are short.

How do these four basic design rules translate into criteria for the analysis of the business practices of enterprises and therefore into significant indicators of the potential for collusion? Let us illustrate by reference to the aratdars at Skid Ghat No 5 wholesale market (Section 4.5.3).

(1) The group may be accustomed to working together already - a condition evidently met among the aratdars of Skid Ghat where they are in daily contact and renting their facilities from a single supplier of the building (the BFDC). It pays them to work together over a wide variety of issues - for example landing rules, market cleansing, negotiations with the BFDC and rates of commission.<sup>8</sup>

(2) Information is fundamental. It enables potential collaborators to assess the benefits of cooperating in a collective endeavour or, alternatively, going their own individual way. The more good quality cost and benefit information flowing back to them the better, from their point of view. Given that the aratdars are all operating in the same limited space it is not difficult to see that this condition is achieved.

(3) Technological development can be a problem. In fisheries, technological change has both positive and negative effects on the gains from collaboration. It increases short-term productivity but can also lead to more over-fishing. Thus it may also turn out to be a problem for the aratdars, if catch rates decline due to technological change, and the scale of the benefits from collusion decline as a result. To put the point another way, higher catch rates under a more effective fisheries management regime would present the conditions for monopsonists to reap potential benefits from collusion and would therefore wish to secure barriers to entry.

(4) The relatively small number of aratdars at Skid Ghat No 5 is an enabling factor. When collective arrangements are being contemplated, the smaller the number of participants, the more positive and transparent is the margin of benefit from collaboration.

<sup>8</sup> There is a well-known quotation from Adam Smith which reinforces the point. "People of the same trade seldom meet together, even for merriment and diversion, but the conversation ends in a conspiracy against the public, or in some contrivance to raise prices." *Wealth of Nations* (1776) bk I, ch.II.

(5) Collaborative behaviour is encouraged if one or more participants can assume a leadership role because this helps to reinforce the rules. Once the leaders have assembled a critical number of participants, a bandwagon effect may take over as nonparticipants worry about being out of step with others.

(6) The presence of member-specific or localised benefits can also be supportive of cooperation. Those who reap the greatest benefits resulting from collective efforts may be willing to subsidise (possibly implicitly) others from their own gains to persuade the non-participants to conform to the collective rules.

#### 4.4.4 Accumulating Economic Added Value

The conventional assumption in neoclassical economics is that, in general, surpluses above the associated opportunity costs are undesirable, for reasons outlined in Section 4.4.1. They are seen as excessive profits accumulated because of market distortions and often result in unwished for results for production and income distribution. This, however, is not necessarily the whole story because frequently sustainable success is due to business ability. Sometimes businesses are able to earn EAV because of entrepreneurial ability. The analysis here follows Kay (1993) as adapted for the fisheries sector by Palfreman (1999), building on the idea that running a business is a game in which non-cooperative relationships dominated by defection can be converted into long-term collaborative sustainable relationships. One way of establishing sustainable profitability is to invest in social capital through the construction of a "win-win" relationship with users of the service.<sup>9</sup>

#### 4.4.5 Defining the Market and Identifying Market Power

To assess the extent of collusion in a market the extent of the market must be established. For a definitive discussion the market should be wholly self-contained or autarkic. Of course, this is unrealistic in practice but it is appropriate to ask if the sector under investigation has the potential for collusion. Are the market conditions such that members of a cartel could protect a price advantage from competition? One response is to exercise judgement about the sector on

<sup>9</sup> The starting point for this way of understanding a business is to identify *Distinctive Capabilities* deep within the commercial entity, such as an aratdar, a fishing skipper, or any other player within the economic system. The idea is then that these agents convert distinctive capabilities into EAV through combining them into low-cost sources of competitive advantage.

the basis of anecdotal knowledge. But if a more objective determination is required – albeit one that still depends on the exercise of judgement - two quantitative tests based on criteria used in the USA Department of Justice/Federal Trade Commission antitrust guidelines (Zajac, 1995) can be used. They are: (i) to estimate if the sellers in a market could protect a 5% price premium and (ii) to judge if new entrants could join an industry within 24 months in response to a 5% price premium.

These tests are devised for use in a capitalist industrial economy where business information is relatively readily available and where there is strong anti-collusion legislation. The market structures in the Khulna fish distribution system are, of course, very different. But our judgement is that most of the markets in the system are competitive. It is worthwhile considering the evidence with regard to the wholesaling stage in Khulna.

The wholesaling stage in the Khulna marketing chain is relatively but not entirely self contained or autarkic. Although the two main landing places in the Khulna urban area, Skid Ghat No 5 and Rupsha, have very high landings, large quantities of fish are landed at other places and marketed through other arats in the Khulna Division especially at Bagerhat and Sarankola further south in the delta. Conversely retailers are supplied by sources other than Khulna aratdars. Nevertheless the Khulna arats are a very significant focal point for fish wholesaling.

The question remains, though, as to whether the arats of Khulna city should be taken as a whole or each one regarded as a separate market. The ease of entry test is easily passed (not surprisingly as discussed above) at every arat studied in Khulna except one. Aratdars enter and leave arats at most of the markets with ease, indeed there are some part time aratdars. The few personal histories we established suggest that there were no social constraints and aratdars come from a variety of personal backgrounds.

The exception is at Skid Ghat No 5 where the number of aratdars is limited by the standards set by the landlords, the BFDC. There almost certainly is a price premium received by aratdars at Skid Ghat No 5 (the commission level being higher), and entry is not possible because of space restrictions. This market is, no doubt, able to protect its advantage because of its ideal location adjacent to one of the leading landing sites in Khulna.

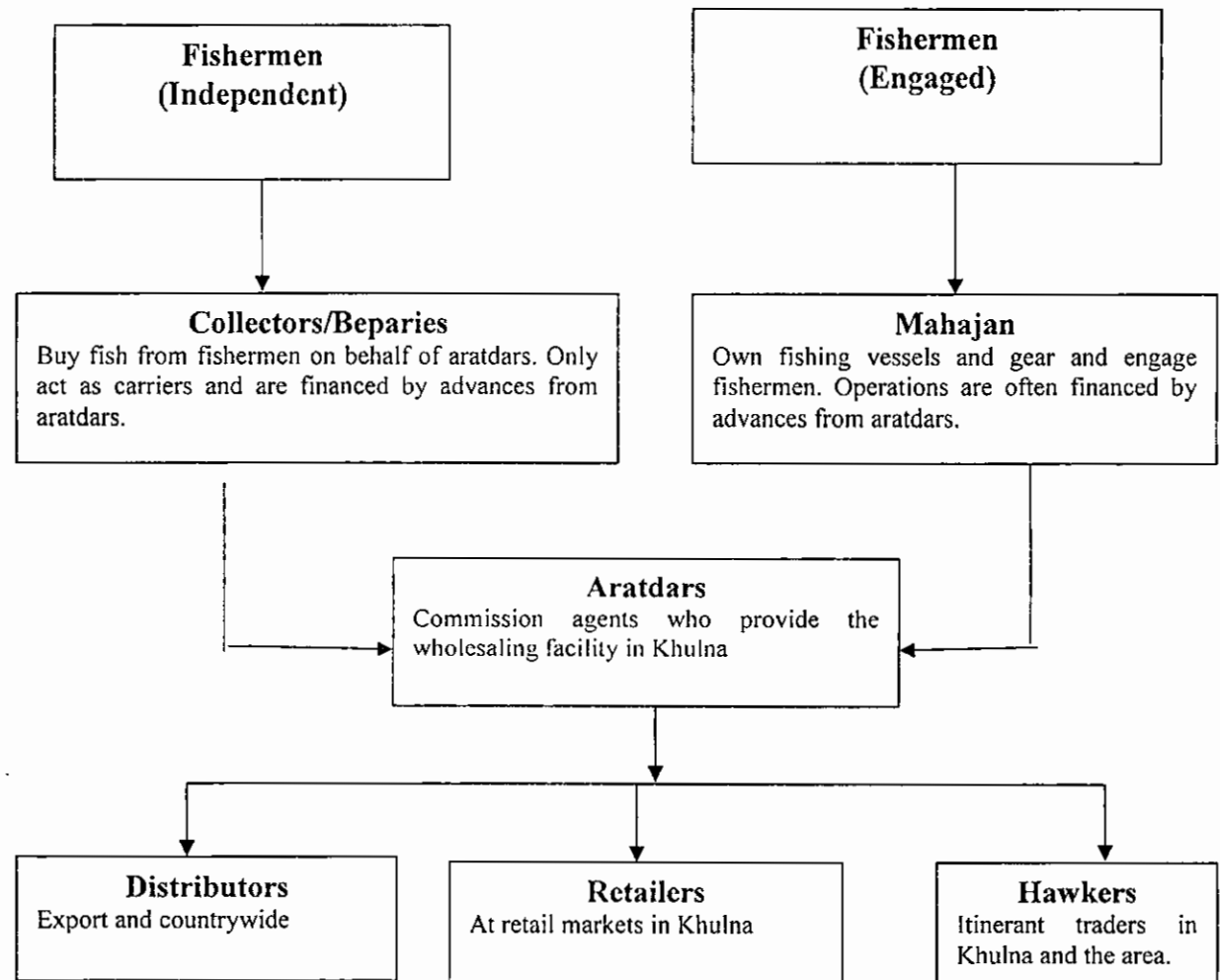


#### 4.5 The Fish Marketing Chain in Khulna

The system is briefly described in the diagram below. In brief the main stages in the system are:

- (1) fish catching (or fish culturing)
- (2) fish collecting/assembling
- (3) fish wholesaling in arats and
- (4) fish retailing

**Figure. Marketing channels**



But there is a great deal of variation and some individual participants by-pass certain links in the chain. At the extreme some fishermen sell their own produce on retail markets.

#### 4.5.1 Fish catchers

Fishermen operate both independently and as agents of mahajans. Although our focus was on the marketing chain the Khulna researchers undertook some exploratory research into the production subsector, and produced some suggestive results.

It is clear that these participants have few of the advantages which would permit them to exercise a dominant role in the markets for freshly caught fish. They are very numerous. We came across no first hand evidence of an organisation (e.g. co-operative or association) powerful enough to formalise collaborative activities. Most have much less access to information about prices in the markets in Khulna than other participants in the chain (most are based at some distance from Khulna, e.g. in the Sunderbans and live in villages or hamlets where timely and reliable price data are not available). Most are poor and do not have ready access to financial capital. At the same time their work does not seem to be constrained by non-market forces.

Our assessment of their position in the market place is that they do not exercise undue influence in the market (no local commentator would suggest that they do) but nor are they disadvantaged by restrictive practices of the participants they sell to. The evidence for this is based on the quantitative data on prices and costs collected in Khulna and incorporated in the Excel model and contact with Sunderban fishermen who seem not to see themselves as exploited by the collectors.

Although the data are limited, the view of the team is that they are very useful for the main objective of this study - indicator development - but need to be supplemented by further research on a number of different fronts to create an adequate understanding of the subsector. For example, the researchers came across examples of capital accumulation among the Sundarban fishermen, but this would need a wider survey to validate. They also came across participative evidence of negative externalities as a result of the shrimp fry collection business (which was not the focus of our work), but quantitative estimates of the impact would clearly depend on further research. However, what we can say from the analysis is that there does appear to be very little rent (EAV) accruing to the catching sector at present - not surprising in

view of the largely open-access character of the fishery. It also suggests that the returns to improvements in fisheries management could be substantial because a significant improvement in the catch per vessel is aggregated over the entire fishery. If, for example, we were to assume that the catch of fish per vessel in the hilsa season might be increased from 6 to 10 tonnes without any increase in opportunity costs, according to the model, the aggregate impact would be an increase in EAV to the national economy of over 100 million taka (\$ 1.76 million). The point here is not the exact magnitudes, but the fact that the effects of improvements in the net returns to fishing vessels through improved fisheries management can be expected to be large.

**Table 4.5.1: The Sensitivity of Indicators to the Summer Catch Volume (t) by Motorised Fishing Vessels**

| Summer Volume (t) per vessel | EAV/kg | Earnings/ crew/d | Aggrgte Impact m.taka |
|------------------------------|--------|------------------|-----------------------|
| 6                            | -22    | 27               | 297                   |
| 7                            | -18    | 30               | 334                   |
| 8                            | -15    | 32               | 365                   |
| 9                            | -12    | 35               | 391                   |
| 10                           | -10    | 38               | 413                   |
| 20                           | 3      | 66               | 533                   |

**The Inland Fisheries Subsector** Examples of fish from farms, baors and beels from around the Khulna region have been included in the spreadsheet model, but the supplies from these sources constitute only a small proportion of the fish supplies reaching the city. There are clearly collective action issues for these sources of supply. Many of these have been the subjects of research in other regions of Bangladesh and the present study could not possibly emulate this excellent work (for example, Hossain et al.1999, Sultana and Thomson, 2000,Thomson et al., 2000). However, in this study we have tried to do something, which has, apparently, not been attempted elsewhere, namely the construction of a value chain and its evaluation to test for monopsony and collusion. Extending the study to the inland subsector, perhaps elsewhere in Bangladesh, would be valuable.

#### 4.5.2 Collectors

Two types of participants perform the function of bulking up the fish and transporting it to the Khulna market: mahajans and beparies (other names are used to indicate similar roles). Mahajans are independent traders most of whom either own the vessels and gear used by fishermen or lend to them. They negotiate a price with the fish catchers who are contracted to them and with non-contracted fishermen. Beparies are contracted by aratdars to purchase fish from independent fishermen and transport to Khulna.

This stage in the marketing chain offers more opportunity for restrictive practices. Mahajans, in particular, are fewer in number (and collusion is therefore easier) and have considerable capital resources. Nevertheless we found no evidence of collective action. Fishermen were not irrevocably tied to a single mahajan and, although our data are slight, there is probably an element of genuine bargaining between fishermen and mahajan. Nor was being indebted to a mahajan necessarily seen as an undesirable situation for a fisherman. We came across no evidence of a formal or informal group among mahajans in this study.

#### 4.5.3 Aratdars (Commission Agents)

Aratdars organise the wholesale marketing of the fish and secure their income from commission charged to sellers and interest on loans made to suppliers. Although our research examined all stages in the fish marketing chain in Khulna for a number of reasons we were prompted to focus on the role of the aratdars.

#### Conventional wisdom

The strongly held popular view in Khulna is that aratdars have a dominant position in the market which they exercise to their advantage, i.e. they manipulate prices to secure high returns for themselves. And it may well be that over a longer historical time scale aratdars have exercised their market strength to exploit other participants – there is a long history in South Asia of the poor landless and uneducated being tied in knots by people with capital.

#### Discussion

Aratdars are certainly in a stronger position to exploit the other participants in the marketing chain than the other businesses. Since they are fewer in number collusion is easier and in

addition many belong to market based aratdar co-operatives. They also have access to greater financial capital resources and other participants in the marketing chain, both sellers and buyers, borrow from them. Finally, aratdars are, in general, financially/commercially well rewarded.

Nevertheless, the data we collected did not suggest that aratdars exercised excessive market power. For a start, conditions are less favourable to collusion than appears initially. Although they are relatively few in number, compared with other participants, aratdars are not few in absolute terms. Although there are co-operatives at all or most wholesale markets not all aratdars are members and membership seems to be genuinely optional. At most markets new entrants are permitted. Although aratdars lend to both sellers and buyers loans represent short term commitments not a long term restriction of competition.

Aratdars do receive high incomes, although their income range overlaps with higher income retailers. And their income includes elements for both the marketing service they offer and the money lending service. Aratdars charge a commission of 2% or more on sales by independent customers, but 5%-7% on sales by borrowers. Thus the interest charged on advances is very high - but this is usual with unsecured creditors.

Whatever the historical or contemporary role of the aratdar system two questions relating to its efficiency need to be asked:

(a) Is there a better alternative in the sense of improving resource allocation? The reality is that the alternatives, such as provision by NGOs or commercial banks, may not be sustainable and this implies no credit at all rather than credit at high rates of interest, and thus worse resource misallocation.

(b) Is the system becoming more or less competitive? It may well be moving towards stronger competition. Aratdars are faced with inelastic supply of fish and present the case for offering credit to fishermen as an inducement to them to supply fish. These are not the circumstances in which the supplier has no choice but to go to one source of credit, or one outlet for his product. Moreover, in the Khulna region there are many places where fishermen can market their fish. It follows that the market appears to be quite competitive.

The analysis of the distribution system shows that the EAV accruing to Aratdars is very sensitive to changes in commission rates (Table 4.5.2.). This is because they deal in large volumes of fish, and a small change in the percentage commission can make a lot of difference to the income they receive. But, in terms of its impact on the distribution system as a whole the scope for economic distortion due to variable commission rates is actually quite slight. Typically aratdars reported to researchers that their commission was 7%, consisting of a commission on sales of 4%, plus a further 3% charged to loanees to cover the interest payments on advances. So additional 3% is already included as part of the revenue received by aratdars. As noted above, the EAV per kg is not great, supporting the argument that within limits the consequences for resource misallocation in the system as a whole as a result of an aratdars' cartel, is not great. However, naturally the size of the commission has a significant impact on the income of the aratdar, reflect in the sensitivity of the EAV/capita/day column. This is not surprising because of the relatively large volumes of fish handled by the aratdars. The index of market power used here is noted in Section 4.5 below. It is the ratio of the EAV per kg to the estimated price per kg paid to the fishermen. As is evident from the table, to get large figures in this column the EAV relative to the price paid has to be large. This is not the case here- the differences between the various markets as well as the sensitivity to changes in commission rates are trivially small - so, on the basis of this index, it is not easy to substantiate an argument for a cartelised monopsony. On the other hand the EAV data offered suggests a considerable incentive to establish one if competitive conditions allowed.

**Table 4.5.2: The Sensitivity of Indicators to Changes in Commission Rates at Skid Ghat No 5, Khulna**

| Intermediaries (arats) ✓           | Commission | EAV/kg | EAV/c/day (taka) | Index/mkt power |
|------------------------------------|------------|--------|------------------|-----------------|
| Skid Ghat No 5 (motorised vessels) | 4.0%       | -1     | -49              | -0.01           |
|                                    | 5.0%       | 0      | 1                | 0.00            |
|                                    | 6.0%       | 1      | 50               | 0.01            |
|                                    | 7.0%       | 1      | 100              | 0.02            |
|                                    | 8.0%       | 2      | 149              | 0.03            |

#### 4.5.4 Retailers

Retailers are very numerous and very varied in their scale of operation and their income. There are a number of local market based co-operatives and one city wide co-operative, the Khulna City Wholesale Fish Traders Co-operative Ltd (to which both wholesalers and retailers belong). Only at the New Market fish market is there a co-operative with enough power to bargain effectively with other parties and in this case it is the landlord not the aratdars.

Under the current institutional arrangements in Khulna it not difficult to become a small-scale fish retailer. To take up the profession on a permanent basis the only condition appears to be the payment of a small rental charge to the operator of the market in question. There is also, apparently, considerable scope for people to operate as temporary retailers. This is a useful possibility for small-scale or subsistence fishermen with catch surpluses to dispose of. The effect of this flexibility in the retail markets is that fish retailing, together with the associated additional employment of people such as fish cutters, suppliers of ice, basket makers, rickshaw operators, is a significant source of employment and income for poor people. The spreadsheet estimates that each 4.6 tonnes of fish annually through a retail market is associated with one job. The rationale for a high employment multiplier at the retail level is that barriers to entry in one capacity or another are quite low, so a higher catch quickly attracts newcomers with a low opportunity wage. Conversely, a falling supply will quickly reduce a range of employment possibilities in retail markets.

The spreadsheet analysis of the data from retail markets (although the sample is too small for statistical validation) also points to higher incomes in retail markets where retail prices are higher. The policy indication in this context is that an improvement in output prices can be predicted to have a positive impact on the surpluses generated by retailers (EAV/kg) and their incomes. This is supported by the evidence that the incomes of retailers at the Sandho Bazar Evening Market in Khulna, where retail prices are a shade higher than elsewhere, probably induced by a more prosperous clientele, are somewhat higher than in other markets. However, given the fluidity of the labour market, including low entry barriers into the retail subsector, it is also possible that the predicted increase in income might end up being spread across a larger workforce, resulting in wage levels little better than before.

**Table 4.5.3: Example of the Sensitivity of EAV/kg and Retailer Incomes to Changes in Retail Prices at the New Market, Khulna**

| Average output price<br>(tk/kg) | EAV/kg | Income per day for the retailer<br>(taka/day) |
|---------------------------------|--------|-----------------------------------------------|
| 80                              | 3      | 129                                           |
| 85                              | 8      | 184                                           |
| 90                              | 13     | 239                                           |
| 100                             | 23     | 349                                           |



A number of issues arise when considering retail markets. These quantitative indicators are the final result of policy initiatives, which improve fish marketing. All fall under the general heading of possible failures to optimise on the use of facilities. Issues mentioned in the field work generally concern the physical infrastructure, such as the unavailability of potable water, congestion around markets, poor cleaning of facilities, absence of electricity, sanitation and water supply problems, lighting and electricity problems, and a poor state of repair of the buildings. So the emphasis of the market participants is on physical features of markets rather than weaknesses in the custom and practice of buying and selling. However, these physical concerns remain examples of collective failure. The fundamental problem is referred to at 4.5.3 above. Public provision of fish markets is suboptimal because of an absence of the right structure of incentives. As a result the market facilities are under-resourced or poorly managed, leading to the various difficulties noted by respondents. ✓

Other concerns which are not so immediately obvious to participants, but may, nevertheless, be policy issues for retail markets, include the transparency of buying and selling systems, hygiene and handling standards, the scope for monopoly/monopsony/cartel control, ice quality and availability, the substitutability between export and domestic markets, training of personnel in business and hygiene practices, product traceability and access to new entrants.

The question of how the system impacts on the poor is important - the supply of small fish for low-income people is one issue for example. Another issue might be whether facilities offer opportunities to the poor or producer groups to enter the business.

#### 4.6 Identification and Mensuration of Indicators

Sometimes a distinction is drawn between indicators on the basis of the purpose they serve. A typical range is "process, impact, leading". This practice is not followed here because it seems to us that most, if not all, indicators can serve all three purposes, depending on the explanatory context in which they are employed.

Nevertheless, it is useful to note that the indicators we propose here can be grouped in a number of ways including the aspect of the sector they address, the source of data used, and whether they are quantitative or qualitative in nature.

The kinds of indicator we discuss include both measures which address the economic efficiency of the sector in general (e.g. Socio-economic NPV and labour productivity) and evidence of a potential for collective action in particular (barriers to entry, Herfindhal-Hirshman Index). Not that there is a dichotomy between those measures, rather we propose is a continuum of measures all of which have some relevance to market power. Most of the indicators are quantified/validated by reference to Khulna data, some of which may be drawn from secondary statistics but most of which rely on data collected by the researchers. In most cases a quantitative measure is proposed, but in some a non-quantifiable (either in principle or because of the paucity of the data) judgement is used.

The main conclusions of this study are presented in tabular form - see Tables below. As the study progressed it became evident that we could not, within the time scale allotted, cover the whole ground of poverty indicators. The results presented, therefore, relate specifically to the workings of the fish distribution system in the Khulna region, which was more or less as we expected at the outset.

##### 4.6.1 Indicators in Principle

In this section we will outline some of the potential indicators of economic efficiency in general and collusive behaviour in particular. Table 4.6.1 introduces and assesses a number of quantitative economic indicators. In table 4.6.2 qualitative indicators of collective action are introduced. The indicators in both of these tables can be used to benchmark the sub-sectors, to make contemporaneous comparisons and to trace changes over time. Some indicators of the efficient management of fish markets (both institutional and physical requirements are

discussed) are listed in table 4.6.3. While the development applications are implied in the indicators in tables 4.6.1 and 4.6.2, those in table 4.6.3 are directly relevant to development issues. Finally, table 4.6.4 lists some additional indicators not examined in detail elsewhere.

**Table 4.6.1 Examples of Quantitative Economic Indicators**

| Name               | Description                            | Formula                                                                         | Unit  | Source                                      | Method                                | Commentary                                                                                                                                                                                                                                                         |
|--------------------|----------------------------------------|---------------------------------------------------------------------------------|-------|---------------------------------------------|---------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EAV                | Annualised measure of economic surplus | Operating profits less depreciation & return on capital                         | Taka  | Interview                                   | Inspect operating statement           | The EAV is the fundamental component of the value chain at each stage in the system.                                                                                                                                                                               |
| EAV/costs          | Standardised economic surplus          | EAV/costs                                                                       | Ratio | Interview                                   | Calculation from operating statements | Permits comparisons between businesses of different sizes, and therefore assessments of scale economies/diseconomies                                                                                                                                               |
| EAV/kg             | Standardised economic surplus          | EAV/output                                                                      | Taka  | Interview                                   | Calculation from operating statements | Permits comparisons between businesses of different sizes, and therefore assessments of scale economies/diseconomies                                                                                                                                               |
| Socio-economic NPV | Social returns to investment           | Discounted cash flow adjusted for environmental and resource costs and benefits | Ratio | Interview and operating statement modelling | Inspection and calculation            | Studying returns to investment over time is important because it incorporates sustainability criteria. However, the exercise is of limited value from a policy point of view unless adjustments are made to the predicted cost and benefit streams <sup>10</sup> . |

<sup>10</sup> See Dasgupta (2001) for a convincing justification for the inclusion of this. This is included because of the great importance of improved economic analysis of the mutual and unidirectional adverse externalities evident in the coastal regions of Bangladesh.

| Labour product-ivity       | Output per person                          | Physical output/ labour input           | Kg or tonne s | Official statistics/ labour estimates | Calculation from sources | Measure of technical efficiency                                                                                                                        |
|----------------------------|--------------------------------------------|-----------------------------------------|---------------|---------------------------------------|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| Number of economi c agents |                                            |                                         | No.           | Interview                             |                          | Small numbers increase the possibility of monopolistic or monopsonistic collusion because each individual EAV relative to the collective is increased. |
| Compara-tive numbers       | Measure of relative size of sub-sectors    | Larger group divided by smaller         | Ratio         | Interview                             | Calculation              | Higher ratio indicates stronger dominance of the chain.                                                                                                |
| Employ-ment                |                                            |                                         | No.           | Official sources and local estimates  |                          | The high employment multiplier at the retail level is indicated at 4.4.4 for the stated rationale                                                      |
| Index of monop-sony        | Annualised measure of buyers' market power | (EAV per kg)/(price paid to suppliers)- | Index         | Interview                             | Calculation from sources | As market power increases, the EAV per kg relative to the price paid is also expected to rise                                                          |

Table 4.6.1(Continued). Examples of Quantitative Economic Indicators

| Name                                               | Description                                         | Formula                                                            | Unit       | Source                                  | Method                           | Commentary                                                                                                                                                                                        |
|----------------------------------------------------|-----------------------------------------------------|--------------------------------------------------------------------|------------|-----------------------------------------|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| N-firm concentration ratio                         | Annualised measure of buyers' market power          | Ratio of market share of largest N businesses (eg 4) to the market | Index      | Interview and official statistics       | Calculation from sources         | Traditional measure of market power, not easy to see application in Bangladesh                                                                                                                    |
| Comparative incomes                                | Measure of business returns                         | Higher group average income divided by lower                       | Ratio      | Interview                               | Calculation                      | Higher incomes may indicate collusion in the market                                                                                                                                               |
| Forward tied trade                                 | Measure of restriction on competition for customers |                                                                    | Percentage | Interview                               | Calculation                      | Higher percentage tied indicates lower competition.                                                                                                                                               |
| Backward tied trade                                | Measure of restriction on competition for suppliers |                                                                    | Percentage | Interview                               | Calculation                      | Higher percentage tied indicates lower competition.                                                                                                                                               |
| Membership of association                          | Measure of strength of association                  |                                                                    | Percentage | Interview                               | Calculation                      | Higher percentage indicates greater readiness to work together.                                                                                                                                   |
| Herfindahl-Hirschman Index                         | Measure of market concentration                     | Sum of squares of market shares.                                   | Index      | Interview and official statistics       | Calculation from sources         | The greater the degree of concentration, the higher the index. Relevant to Khulna if the aratdars are colluding to the extent that they are regarded as a single business or very few businesses. |
| Average remuneration of the subsector participants | Estimated annual income per year                    |                                                                    | Taka       | Interviews/focus groups, also estimates | Responses validated by estimates | Periodic assessment of income accruing to the various sector participants (low and high income) is fundamental to assessing poverty impacts                                                       |

Table 4.6.2 Qualitative Collective Action Indicators

| <p>General criteria: (1) First, the rules of the game have to be known by the participants: these rules need: (a) an exclusion mechanism if EAVs are going to be realised; (b) provisions for appropriation of EAVs by participants; (c) provisions for contributions to be made by participants.</p> <p>(2) Because collective gains can arise in a variety of different ways so the economics of collective action requires the benefit delivery mechanism to be explicit.</p> <p>(3) The magnitude of the expected benefits should be known.</p> <p>(4) Risk and uncertainty should be minimised.</p> |                                            |                              |                                                                                                                            |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| Name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Source                                     | Method                       | Commentary                                                                                                                 |
| Entrepreneurial innovation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Observation                                |                              | Profits protected by restrictive practices not innovation in a non-competitive market.                                     |
| Ease of entry                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Interview                                  |                              | A central characteristic of un competitive activity.                                                                       |
| Active association or co-operative                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                            |                              | The existence of an active (legitimate) institution may facilitate the mutual trust required for collusive practices       |
| Social architecture                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Market users                               | Participative methods        | Frequent formal and informal contacts imply a "repeated game", in which players can see the evident gains from cooperation |
| Information                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Variety of official and unofficial         | Various                      | Information reduces the risk spectrum of the potential outcomes from collaboration                                         |
| Technological change                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Variety of official and unofficial sources | Various                      | Analysis of the impact on EAVs and collective action required from policy makers                                           |
| Social factors enabling one business to assume a leadership role                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Social observation                         | Social analysis              | Factors to be identified are those which enable the aratdars to act more as one, rather than several competing businesses  |
| Localised EAV                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Social and economic observation            | Social and economic analysis | One collaborator reaping significant benefits may be prepared to subsidise others to ensure that the collaboration holds   |

Table 4.6.3 Indicators for the Efficient Management of Fish Markets

| Fish Markets - Indicators                                                                                                 | Commentary                                                                                                                                   |
|---------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| Barriers to entry                                                                                                         | It should be <u>easy</u> for anyone who wishes to trade to do so, <u>subject only</u> to considerations of congestion and hygiene            |
| Market transparency                                                                                                       | Information on all aspects of the market operation should be freely available to ensure that their absence is not an obstacle to competition |
| Traceability of product                                                                                                   | Important for exports. Substitutability between domestic and export production likely to be beneficial                                       |
| Application of hygiene, including cleaning regime for the market generally, in particular washing and sanitary facilities | Bound to become increasingly important for domestic consumption as well as for exports.                                                      |
| Good quality management                                                                                                   | Typical weaknesses include inadequate collective provisions for repairs and maintenance as well as new infrastructure                        |
| Ice availability                                                                                                          | <u>Apparently</u> generally available in the Khulna district                                                                                 |
| Organisation of traffic                                                                                                   | Often a problem at fish markets, <del>acute</del> in developing countries where speed of movement is important                               |
| Availability of potable water                                                                                             | Heavy requirement for fish processing and selling, reported to be a problem at some Khulna fish markets ✓                                    |

Table 4.6.4 Additional Indicators

**Additional indicators include:****Asset Accumulation**

The study uncovered some asset accumulation by Sundarban fishermen in the form of investments -mainly vessels, gear and land - and other savings.

**Access to Credit**

Participants in the sector have access to credit, through well-established systems. It has not been possible in this study to assess the efficiency of the system.

**Access to Natural Capital**

The comment by fishermen that fry collection was seen as a problem is indicative of weaknesses in the social capital, and the likely presence of damaging resource and crowding externalities. Further work is required to validate and quantify this.

**Education**

The state of literacy and school attendance was reported. ✓

**4.6.2 Mensuration of Indicators in the Khulna Fish Marketing System**

Selected indicators are quantified or qualified in table 6.5. Notes on the calculations and data accuracy follow the table.

Table 4.6.5 Exemplar Values of Selected Indicators

|                                        | Range                      |               | Interpretation                                                                    | Exemplar Values in Khulna                                        |
|----------------------------------------|----------------------------|---------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------|
|                                        | Low                        | High          |                                                                                   |                                                                  |
| Quantitative Indicators from table 6.1 |                            |               |                                                                                   |                                                                  |
| EAV/costs                              | Minu<br>s<br>infinite<br>y | Infinite<br>y | High value may indicate collusion                                                 | Motorised vessels = 1.6<br>Transport = -0.4<br>Rupsha arat = 2.5 |
| EAV/kg                                 | Minu<br>s<br>infinite<br>y | Infinite<br>y | High value may indicate collusion                                                 | Retail markets = c 16 taka<br>Arats = c 3 taka                   |
| Number of economic agents              | 1                          | Infinite<br>y | 1 = Monopoly or monopsony (I.e. low value indicates high potential for collusion) | Aratdars (Khulna) = 145<br>Aratdars (Skid Ghat No 5) = 14        |

— 2

|                                              |             |         |                                                                                         |                                                                                                                                           |
|----------------------------------------------|-------------|---------|-----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| Comparative numbers                          | 1           | Infinit | High value indicates high potential for collusion                                       | Retailers: Aratdars = 6.9                                                                                                                 |
| Comparative Incomes                          | 1           | Infinit | High value may indicate collusion in the market.                                        | Aratdars: Retailers = 2.4                                                                                                                 |
| Forward tied trade                           | 0           | 100     | 100 = all participants tied (I.e. high value indicates high potential for collusion)    | Aratdars = c 10-40%<br>✓                                                                                                                  |
| Backward tied trade                          | 0           | 100     | 100 = all participants tied (I.e. high value indicates high potential for collusion)    | Aratdars = c 50-70%<br>✓                                                                                                                  |
| Membership association                       | of 0        | 100     | High membership may indicate high potential for collusion                               | Retailers (New Market) = c 95%<br>Fishermen = 0%<br>Aratdars (Skid Ghat No 5) = 100%                                                      |
| Herfindahl-Hirschman Index                   | >0          | 10,000  | 10,000 = Monopoly or monopsony (I.e. high value indicates high potential for collusion) | Aratdars (Khulna) = c 100-200<br>Aratdars (Skid Ghat No 5) = c 800<br>✓                                                                   |
| <b>Qualitative Indicators from table 6.2</b> |             |         |                                                                                         |                                                                                                                                           |
| Entrepreneurial innovation                   | Qualitative |         | High level of innovation may indicate a competitive market                              | Some evidence of innovation.                                                                                                              |
| Ease of entry                                | Qualitative |         | Greater difficulty indicates high potential for collusion                               | Aratdars (Skid Ghat No 5) = Very difficult<br>All other participants = Easy                                                               |
| Active formal association                    | Qualitative |         | Actively functioning indicates high potential for collusion                             | Retailers (New Market) = Very active.<br>Aratdars (Skid Ghat No 5) = Active<br>Most other associations or co-operatives = Not very active |

#### 4.6.2.1 Economic Added Value

Economic Added Value is the measure of the extent to which actors in the chain receive incomes which exceed what would be expected under competitive conditions. Individual participants may receive EAV or rent because of their greater skill but if a sector benefit in this way – and the EAV is permanent – there is a possibility that market power is used to secure this. This measure is, therefore, the most sensitive one in identifying monopsonistic collusion. Unfortunately, since it depends on a series of linked calculations in the spreadsheet model, it is very susceptible to errors in the input data.

Economic Value Added/Costs is a measure of economic surplus or economic rent which suggests where extra-normal profits are being earned relative to the costs of purchasing the inputs needed to create it. Unfortunately by itself it is not able to demonstrate that the cause of the surplus is collusive action. High values may indicate collusion. There may indeed be some small-scale collusion, but relative to the bigger picture, summarised in the cost of inputs, including fish, the values were very low (the Rupsha arat had a value of 2.5). This is a conclusion of fundamental importance because it shows that to the extent that there are distortions in the fish catching and distribution system in the Khulna region, the impact of the distributors on the distortions is, at most, slight.

Economic Value Added/kg is a second measure of economic surplus or economic rent is interpreted in the same way. The retail markets in Khulna have an aggregate value of 16 taka per kg, the arats 3 taka per kg. Much of this difference may be linked to the volume of product handled.

#### 4.6.2.2 Number of economic agents

A low value indicates high potential for collusion (at the extreme a monopoly or monopsony will have a value of 1). On the other hand a high value indicates greater organisational difficulty in colluding and hence greater likelihood of competitive situation existing.

Number of aratdars (Khulna) = 145

Number of aratdars (Skid Ghat No 5) = 14

#### 4.6.2.3 Comparative numbers

A high ratio of retailers to aratdars suggests that aratdars have greater power in the market (if only because they are larger enterprises and more able to withstand shocks) and hence there is a greater opportunity to dominate retailers (1 indicates equal numbers of aratdars and retailers). There are approximately 1000-1100 retailers in Khulna and 145 aratdars.

Ratio (Khulna) = 6.9

#### 4.6.2.4 Comparative Incomes

Higher values of the ratio of aratdars' income to retailers' income may result from uncompetitive restrictive practices associated with market dominance. Both, of course, have expenses but aratdars commit much higher levels of financial capital to the industry and part of their higher incomes are a return for unsecured loans. The data used are rough estimates and it should be noted that the range of incomes such that income of higher income retailers is greater than income of lower income aratdars.

$$C\ 600(\text{takka per day})/c\ 250(\text{takka per day}) = c\ 2.4$$

#### 4.6.2.5 Forward and backward tied trade

Tying trade by the aratdars is intended to commit other actors in the marketing chain to a specific enterprise. It is therefore a restrictive practice, which is intentionally anti-competitive. Unfortunately we did not establish the extent of the indebtedness but it is almost certain that the aratdars' linkages forward into retailing and backward into collecting are different in frequency, size and duration – and different in their anti-competitive implications. Loans to retailers are relatively small scale and short term, lasting the length of the trading day from the early morning auction to the end of the day's retail activity. Our judgement is that they do not seriously distort the market and retailers are generally able to buy from the cheapest source.

The loans to collectors are, at least potentially, more anti-competitive. Beparis are largely, probably entirely, financed by aratdars. Indeed it may be that they are better regarded as employees of the aratdar rather than separate enterprises. In other words beparies are strongly tied to the aratdars and this link is restrictive of competitive trade. Mahajans are typically much wealthier individuals who often act as moneylenders to their suppliers but some do appear to borrow from aratdars. Typically the loans are short term (say 7-10 days) but for large amounts and potentially distort a competitive market. The permanence of the links is not known but beparis and mahajans are probably only committed to a specific aratdar for a single trip.

Although the rates of interest charged on the loans are extremely high – probably in the order of 3% for a 7-10 day loan, which is about 200-350% per annum – the loan is very high risk. It is unsecured and unrecoverable. Although the contract is given some weight by being recorded in writing over a 50 taka stamp, both parties no doubt appreciate that the debt is not recoverable

by legal process. Nor, since the borrowers and lenders do not share membership of a close knit social group, is community pressure an effective way of bringing debtors into line.

The data used are rough estimates.

Forward linkages into retailing: c 10-40%

Backward linkages into collecting: c 50-70%

#### 4.6.2.6 Membership of association

There are a number of co-operatives in the sector. The largest is the Khulna City Wholesaler Fish Traders Cooperative Ltd which has retailer and aratdar members at all the markets in Khulna. Membership of co-operatives offers advantages in terms of access to loans and support in times of difficulty and probably over two thirds of traders are members. Other co-operatives are more limited in scope. The KDA New Market Retail Fish Cooperative Ltd, for example, has a membership comprising most but not all the retailers at New Market. The Khulna Fish Aratdars Association has a membership of 14 – all the aratdars at Skid Ghat No 5 arat.

Membership of association (Skid Ghat No 5) = 100%

#### 4.6.2.7 Herfindahl-Hirschman Index

This index, like the criteria for defining a market, is derived from the antitrust procedures in the USA. It was developed for use in an industrial economy where enterprises are much larger but its application in this situation permits comparison with outside standards. The Herfindahl-Hirschman Index is the sum of squared percentages of each enterprise's market share. The maximum value is, therefore, 10,000 (the square of 100% in a monopoly situation) and the minimum value approaches zero (when there are an infinitely large number of enterprises in the industry). In the USA an Herfindahl-Hirschman Index of less than 1000 is taken to show no anti-competitive concentration of market power; a value of more than 1800 shows a concentration which is assumed to be against the public interest. Industries with Herfindahl-Hirschman Indices between 1000 and 1800 are assessed on their individual merits.

If the 14 aratdars at Skid Ghat No 5 market are equal in size (i.e. each has 7.1% of the market) the Herfindahl-Hirschman Index is 714 ( $7.1\%^2 \times 14$ ). The turnover of the 14 aratdars at Skid Ghat No 5 is not known but even allowing for some inequality (which increases the Herfindahl-

Hirschman Index) the Index is likely to be substantially less than 1000. Taking Khulna as a whole as the market the Herfindhal-Hirschman Index is higher than 69.0 ( $0.7\%^2 \times 145$ )

Herfindhal-Hirschman Index (Skid Ghat No 5) = c 800

Herfindhal-Hirschman Index (Khulna as a whole) = c 100-200

#### 4.6.2.8 Entrepreneurial innovation

High level of innovation may indicate a competitive market and, anecdotally since the time scale of the study was not sufficient to contemporaneous changes, there are some, if modest, signs of change in the sector.

#### 4.6.2.9 Ease of entry

Only at the arat at Skid Ghat No 5 were there signs of restrictions on entry into the sector. There the controlling factor was the environmental standards set by the landlord, the Bangladesh Fisheries Development Corporation rather than collusion by the established traders. Otherwise at all stages in the chain entry appeared easy.

#### 4.6.2.10 Active formal association

By itself membership of co-operatives and associations is not a restrictive practice, especially since the organisations we came across did not explicitly set out to control competition (at least their formal constitutions did not acknowledge this as an objective). If an association is active that indicates that it exercises its power in some respects and facilitates the use of commercial might in other areas. The Retailers Co-operative at New Market has demonstrated the power that can come with collaborative action, but against its landlords, the Khulna Development Association, not the wholesalers or customers.

## 5.0 Recommendations and Conclusion

The work is not complete and recommends further work on the model, refining and strengthening its structure, and further testing of the indicators. Nevertheless feel that some of the tools developed here are ready for application in the context of decision making about development strategies.

### 5.1 Developing the spreadsheet model

Although think that the insights on the distribution system are significant, further refinement and substantial expansion of the model, even if it remains restricted to the Khulna region, would increase its usefulness as a practical tool of policy analysis. Here shown that a spreadsheet model of the subsector can be developed. The researcher thinks that the approach can yield helpful insights in support of sector reviews because it permits "what-if?" analysis. It would, therefore, be useful to have to hand similar tools covering the entire country. For example Alauddin and Hossain (2001) have produced a useful historical review of the fisheries sector, but its contribution to policy dialogue would be enhanced with the ability to test hypothetically the impact of various policy initiatives.

As presently specified the model seriously understates the complexity of fish production and the modelling of this important subsector should be developed. At present the model does not address the existence of EAV in the natural asset base of the fishery. In view of the reputed pressure on fish stocks this is potentially very important (in the shrimp fry fishery even more than finfish harvesting - see comment below).

In addition researcher feel that the work on the poverty implications of the system remains superficial. Researcher would like to investigate the consequences of changes in the system for the asset structure of the poor in much greater depth than has been possible.

At the same time extension of the approach to the entire fisheries sector in Bangladesh would test the model. The focus on the finfish trade in Khulna inevitably sidelined the



economically important and dynamic shrimp fry fisheries in the region. These fisheries are perceived by fishermen as generating adverse externalities. Biological and economic validation and quantification of these is required. This points to the need to expand the quantitative understanding of the shrimp subsector, so that well-informed policy decisions can be taken.

## 5.2 Data sources and non-model based indicators

More work needs to be done to establish the relative efficiency of the indicators in terms of the information they provide in relation to the cost and difficulty in collecting that information. If they are to have widespread application timely and inexpensive data sources, whether primary or secondary, are desirable. The best data sources will, no doubt, be specific to the fishery under investigation and will have to be determined on a case-by-case basis.

Nevertheless researcher confident that the indicators are sufficiently developed to be further tested on different fisheries by collection of more field data and desk work on existing data.

## 5.3 Applications to development planning

It is pleasing that the results of the research have already been taken account of in the sector review. Some lessons are clear enough for this to be realistic. However, the advantages of refining the tools to meet specific strategic needs must be noted. For example, the often controversial issue of savings and credit is not fully addressed, but could be with further work on the model. Issues that require further analysis include (a) an analysis of whether production possibilities, as well as incomes of the poor could be expanded by credit schemes better adapted to the realities of fishing. (b) the design of credit schemes such that the supply of credit to good quality clients is increased.

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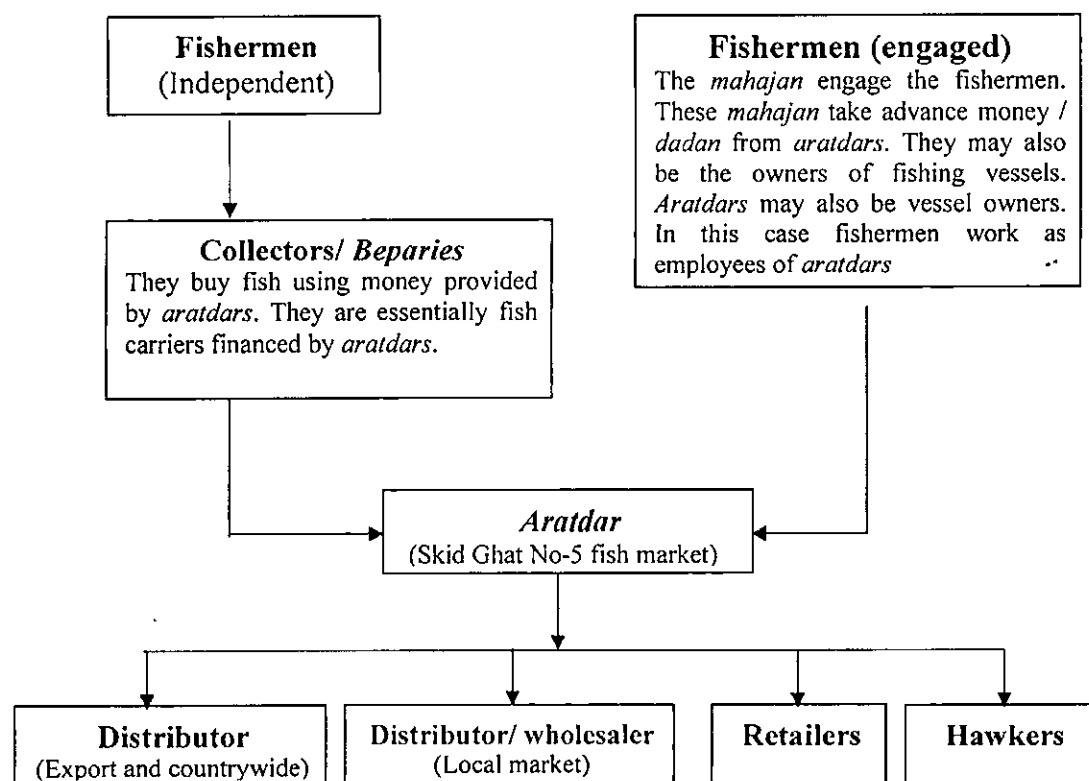
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A-2,  
A-3,  
A-4,  
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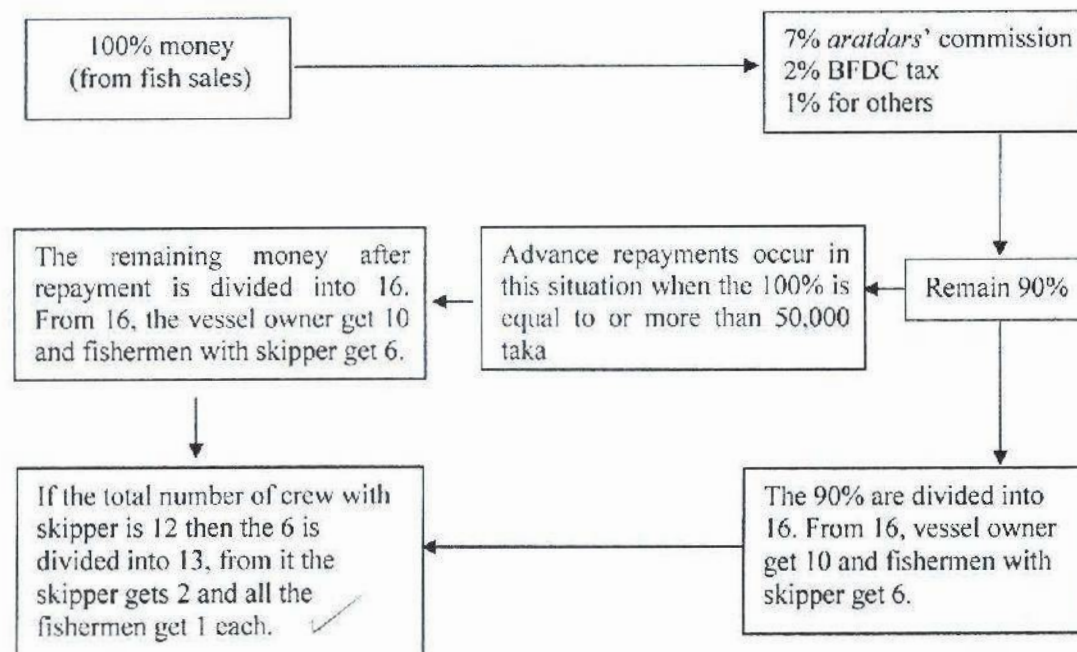
Appendix-A

### Marketing channel – Skid Ghat No 5



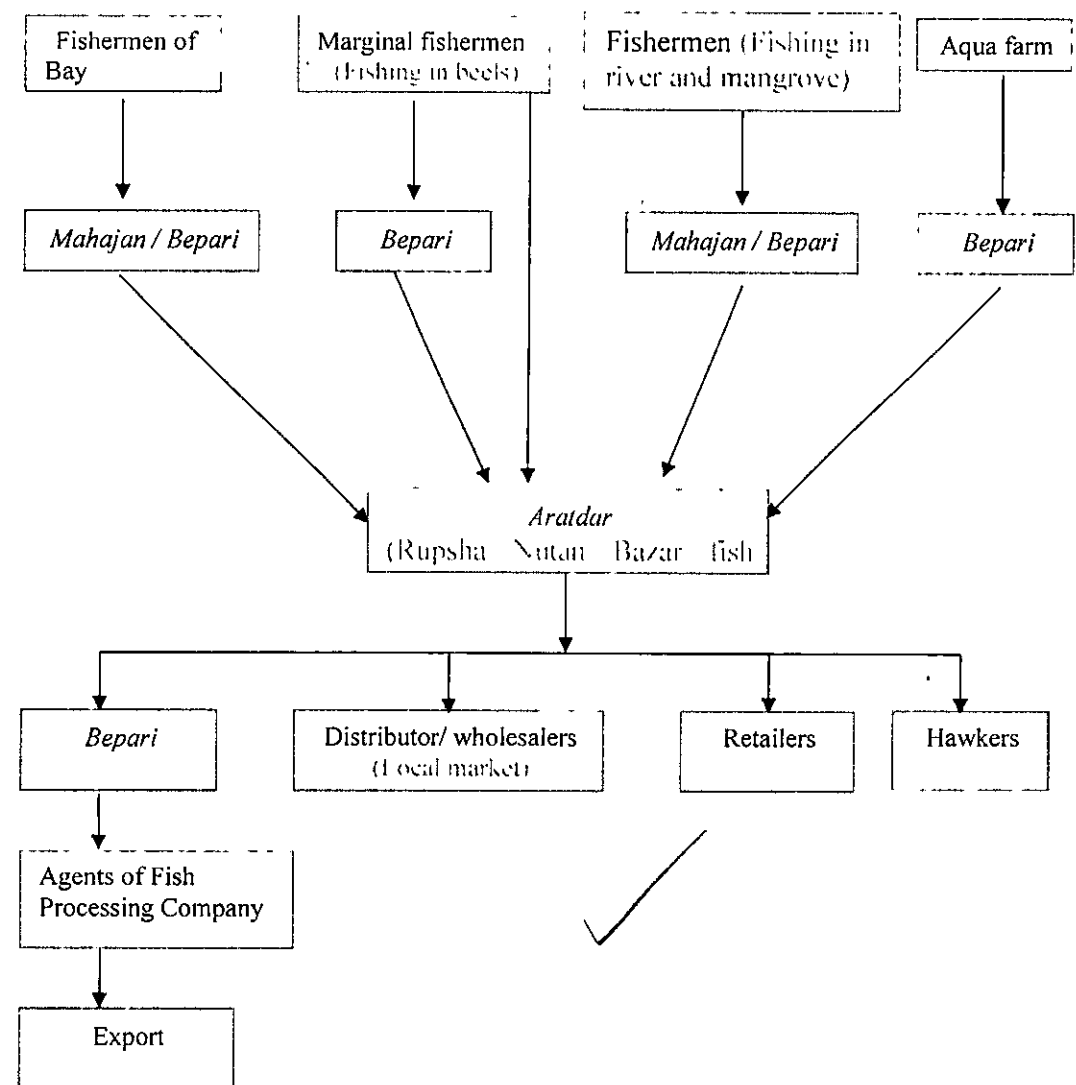
Appendix-1 ? ? ?  
A-2

**Typical percentage distribution of money in the marketing channel of the Skid Ghat No 5 Fish Market**



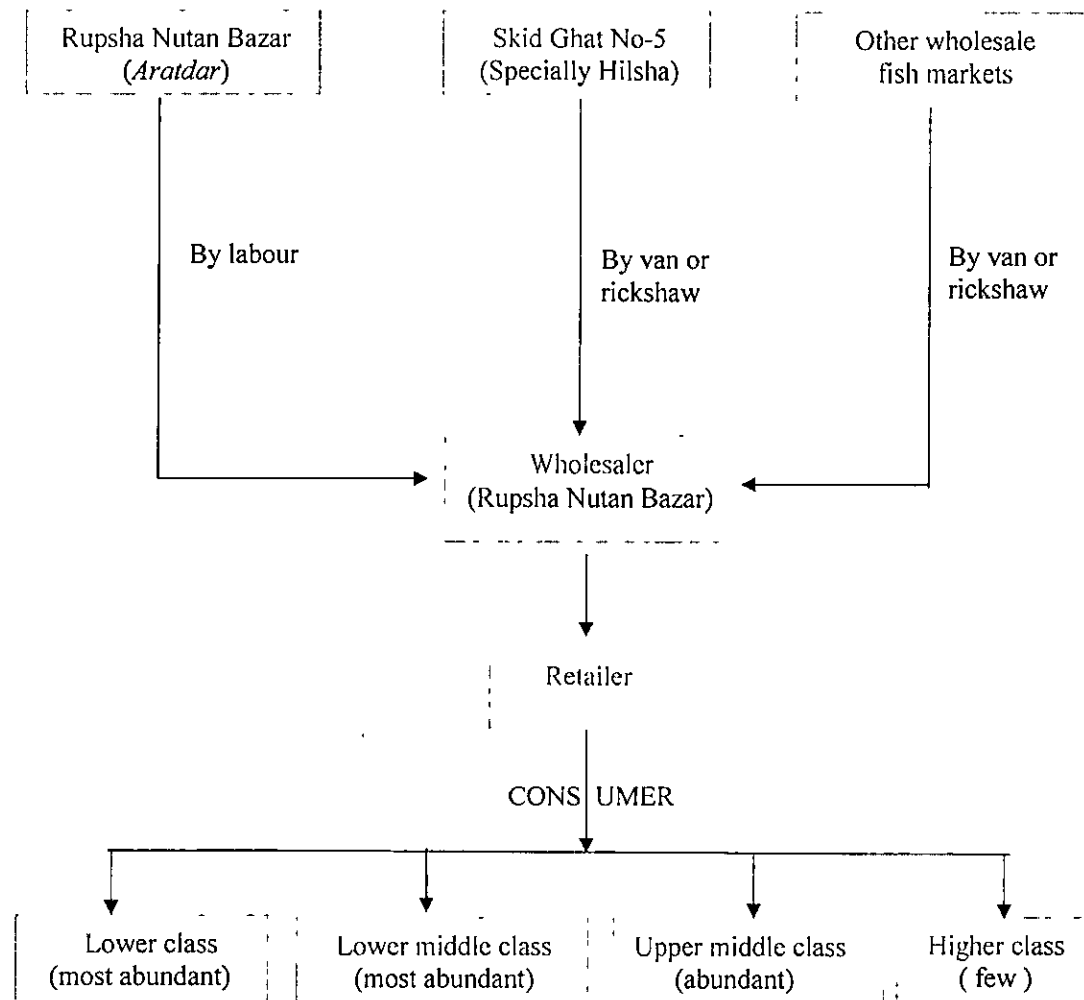
A-3

# Marketing channels for Rupsha Nutan Bazar (Aratdar Fish Market)



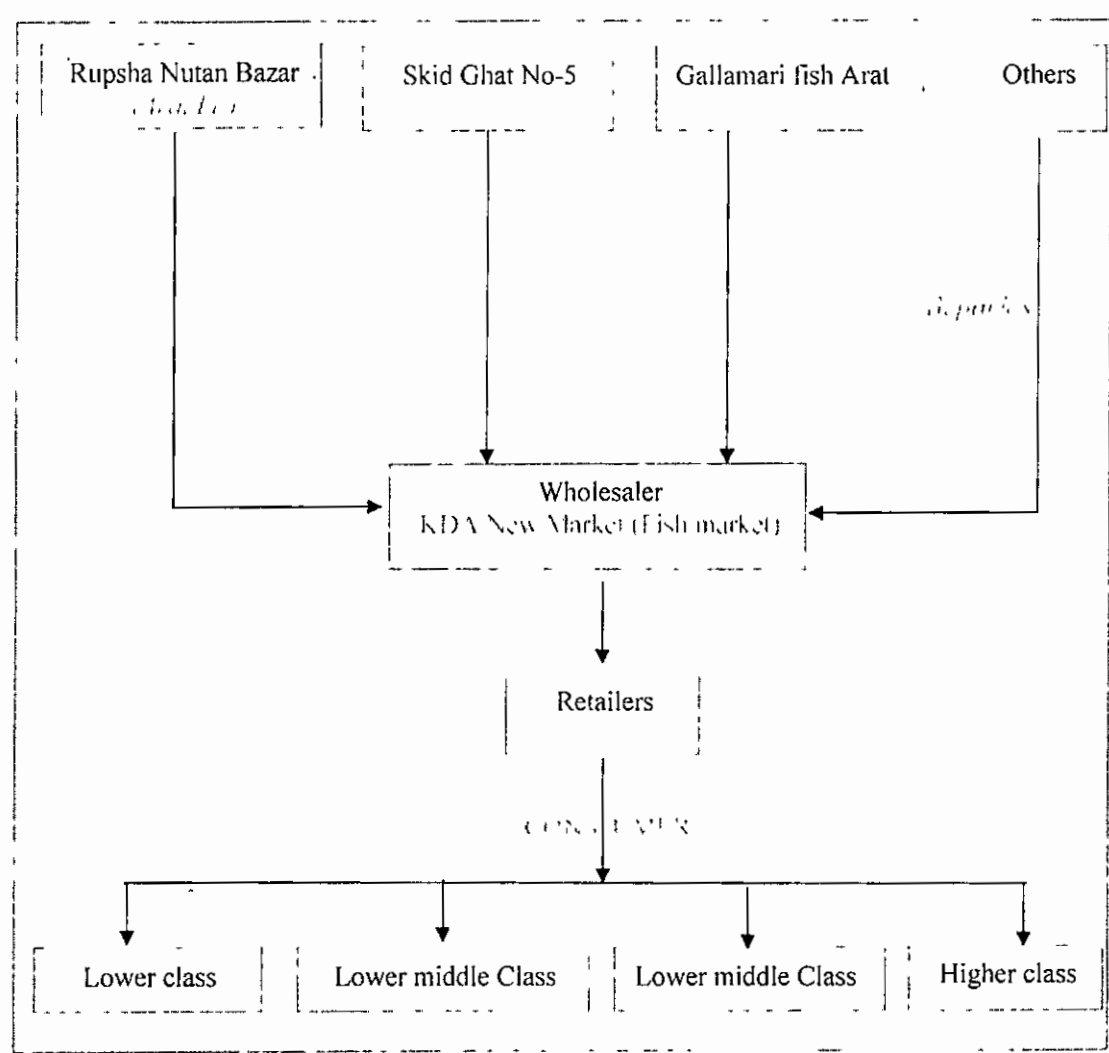
A-4

### Marketing channels for Rupsha Nutan Bazar (Retail Fish Market)



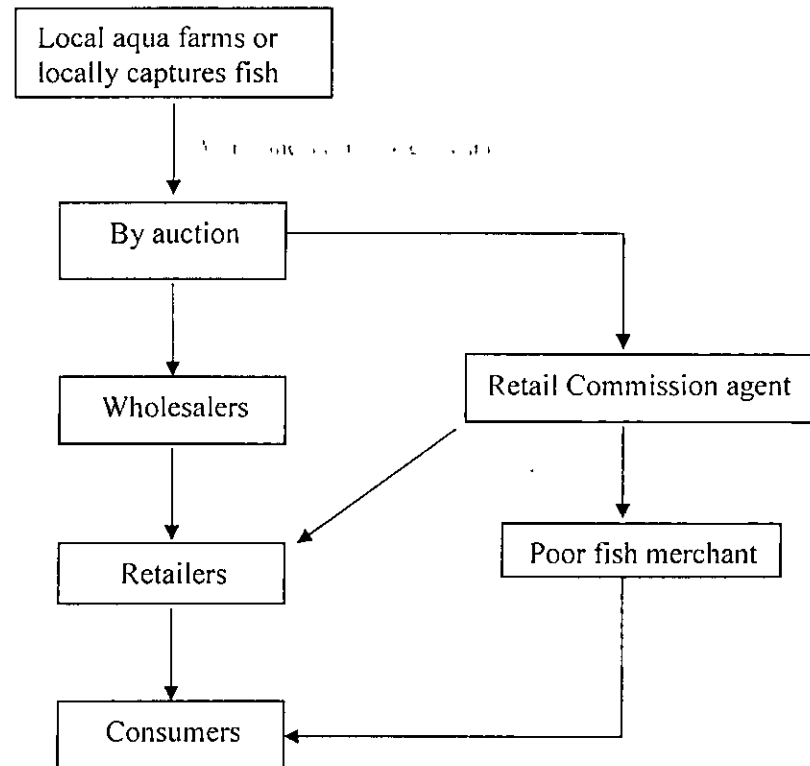
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Marketing channels KDA New Market (Fish market)



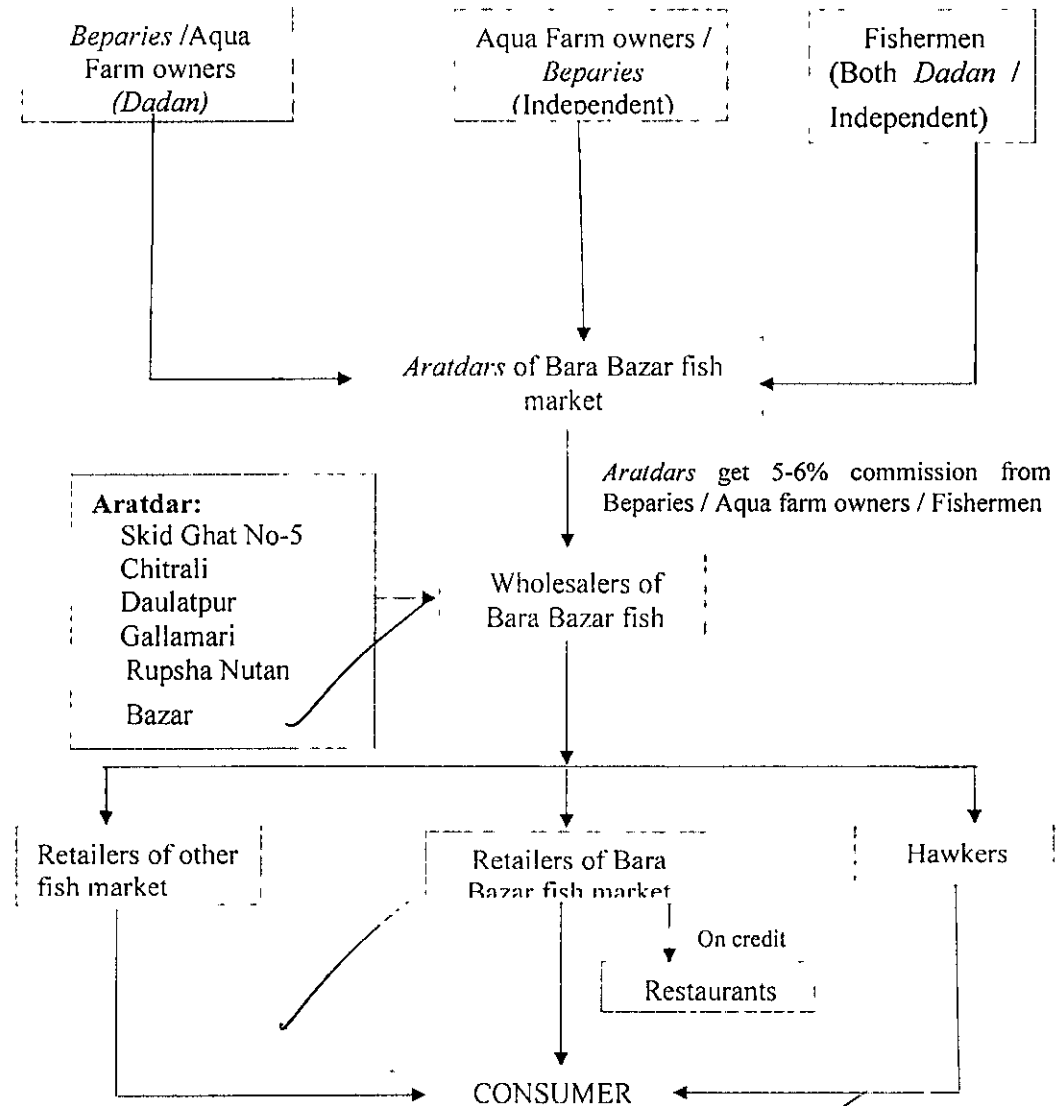
A-6

**Marketing channel of the special type of Arat at New Market (Fish Market)**

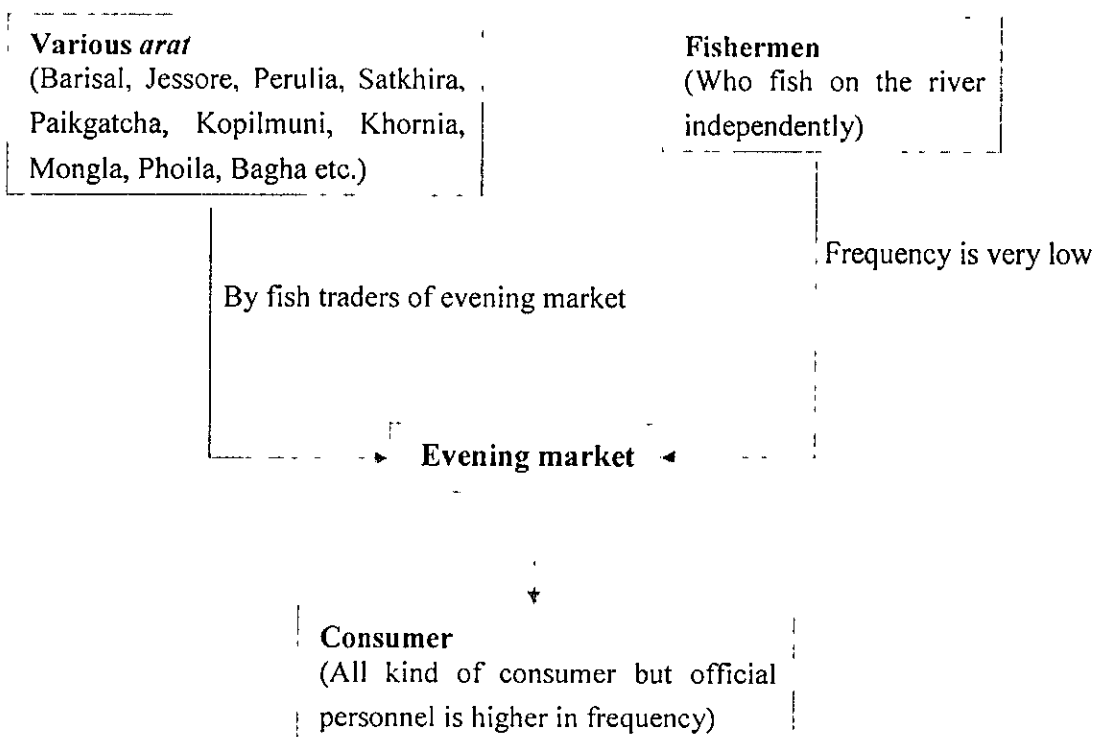


A-7

# Marketing channels for Bara Bazar

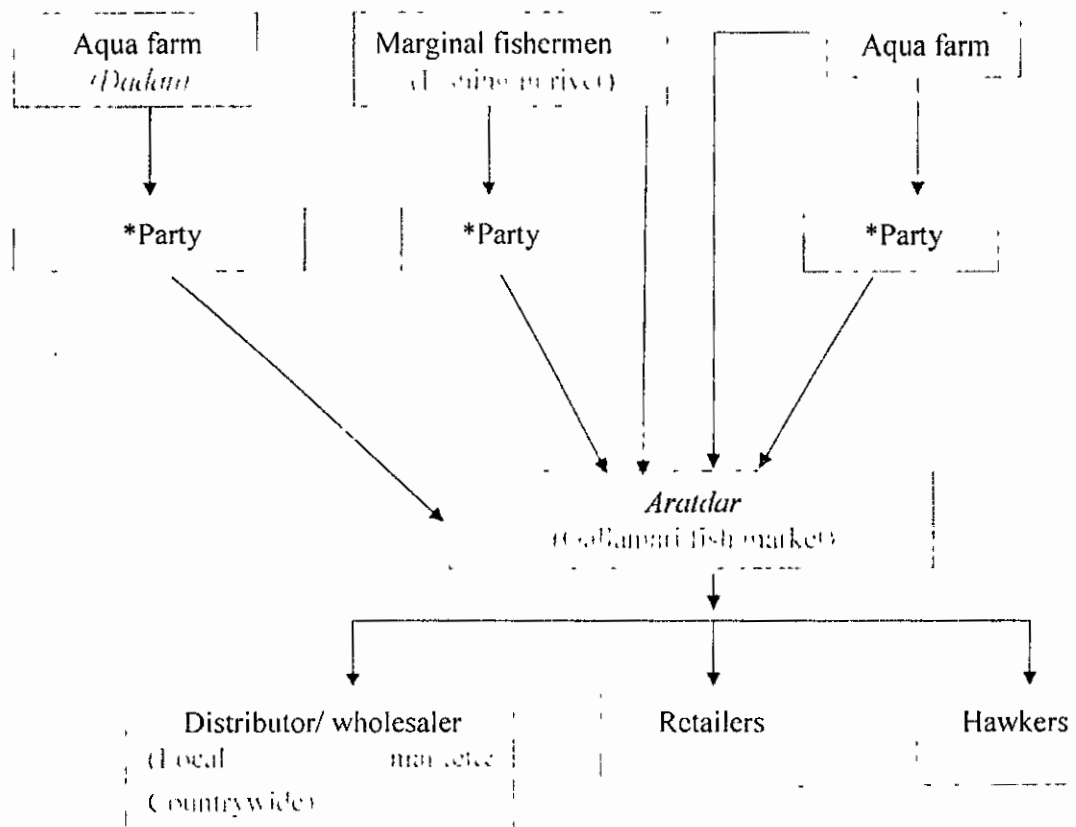


## Marketing channels for the Evening Market

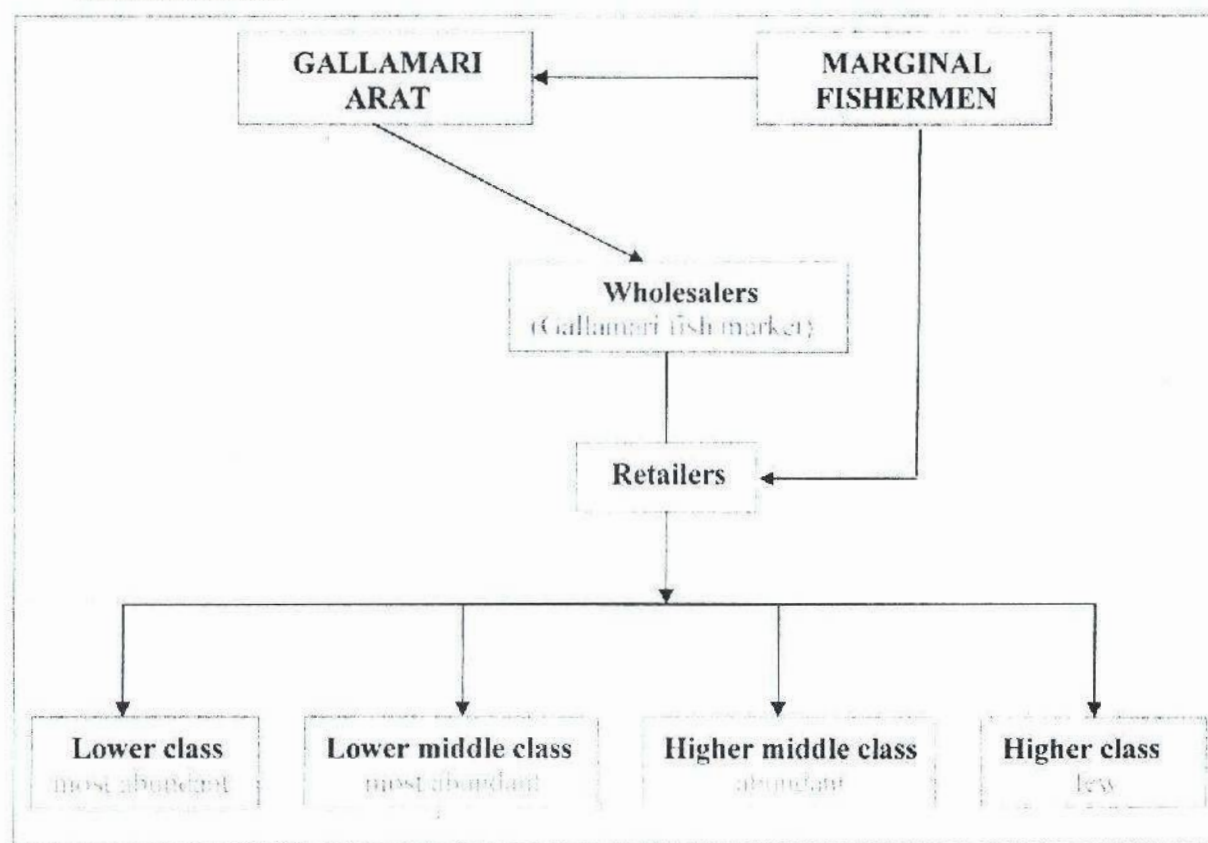


## Marketing channels for the Gallamari Fish Market

### (I) Aratdars market



**\*Here Mahajan and beparis all are termed as party)**

*Retailers market*

Supplies

Avg Wage

Summary Sheet  
 Number of fishermen in Khulna region  
 No. motorised vessels  
 No non-motor vsls  
 Fish landings (t)  
 Ice plant  
 Ice production (t)  
 Price ice/t

11000  
 505  
 3118  
 1148  
 61  
 104000  
 1500

| Volume | Value (ktak) | Avg value | EAV (ktaka) | EAV/kg | low income direct per day | employment |
|--------|--------------|-----------|-------------|--------|---------------------------|------------|
| 803    | 52195        | 65        | 2116        | 3      | 129                       | 215        |
| 657    | 49275        | 75        | 4588        | 7      | 222                       | 122        |
| 289    | 21681        | 75        | 1357        | 5      | 152                       | 72         |
| 1110   | 88768        | 80        | 7252        | 7      | 231                       | 267        |
| 913    | 73000        | 80        | 7796        | 9      | 401                       | 135        |
| 3771   | 284919       | 76        | 23109       | 6      | 206                       | 811        |

Khulna retail markets identified

New market  
 Rupsha retail market  
 Gollamari retail market  
 Bara Bazar fish market  
 Evening market  
 Total accounted for

Intermediaries (arats)

Skid Ghat No 5  
 Rupsha  
 Gallamari  
 Total

Supplies

Motorised (Skid Ghat)  
 Non-motorised with transport (Rupsha)  
 Gallamari  
 Fish farms, boars, beels

| Percent | Volume   | Value | EAV   | EAV/kg | Employer output/man | Productivity |
|---------|----------|-------|-------|--------|---------------------|--------------|
| 1148    | 82761604 | 72    | 46187 | 1      | 173                 |              |
| 603     | 43306772 | 72    | -6786 | -11    | 27                  |              |
| 603     | 43306772 | 72    | na    | na     | na                  |              |
| na      | na       | na    | na    | 11     | 100                 |              |

Catching and transport

|                              |      |       |         |       |
|------------------------------|------|-------|---------|-------|
| Non-motorised with transport | 40%  | 7200  | 430005  | -6786 |
| Motorised                    | 50%  | 9000  | 537506  | 46187 |
| Fish farms, boars. beels     | 10%  | 1800  | 107501  | 60    |
|                              | 100% | 18000 | 1075011 | 60    |

#### Key assumptions

#### Retail Markets

Retail price quality premium

Wholesale Markets (Arats)

**Opportunity cost of aratdars' loan services (eg borrowing to finance loans to fishermen)**

Average size of advance financed by aratdars

Average number of advances

Annual interest rate (opportunity cost of capital)

**Lending by aratdars**

Skid Ghat Sales Commission

Skid Ghat Supplementary Sales Commission

Rupsha Sales Commission

Rupsha Supplementary Sales Commission

Gallamari Sales Commission

Gallamari Supplementary Sales Commission

Risk:percentage loss of commission through loan failure

Supplies

# Appendix-B

## Market assessment of Khulr Per capita Estimated annual consumption (t)

| Population              | Volume   | Employment | Value     | Low incomes | tk/day | Employment |
|-------------------------|----------|------------|-----------|-------------|--------|------------|
| Met by                  | 1500000  | 12         | 18000     | kg          |        |            |
| New Market              | 803000   |            | 52195000  | EAV/kg      | 3      | 129        |
| Rupsha retail market    | 657000   |            | 49275000  |             | 7      | 222        |
| Gollamari retail market | 289080   |            | 21681000  |             | 5      | 152        |
| Bara Bazar fish market  | 1109600  |            | 88768000  |             | 7      | 231        |
| Evening market          | 912500   |            | 73000000  |             | 9      | 401        |
| Total accounted for     | 3771180  |            | 284919000 |             | 6      | 206        |
| Other                   | 14228820 |            | #####     |             |        | 811        |

|                           |                     |                           |                         |         |           |          |           |       |
|---------------------------|---------------------|---------------------------|-------------------------|---------|-----------|----------|-----------|-------|
| New Market (retail)       | 80                  | Qpremium                  | Adjusted price          | Aratdar | Assembler | Cut shop | Rickshaws | Total |
| Assumed retail price/kg   | 65                  | 1                         | 80                      |         |           |          |           |       |
| Assumed purchase price/kg | 95%                 |                           |                         |         |           |          |           |       |
| Proportion of permanents  | Permanent retailers | Temporary retailers       |                         |         |           |          |           |       |
|                           | Volume              | Value                     |                         |         |           |          |           |       |
| Number of retailers       | 803000              | 64240000 (includes temps) | 100                     |         | 1         | 7        | 33        | 215   |
| Sales (vol data reported) | na                  |                           |                         |         |           |          |           |       |
| Auto-consumption          |                     |                           |                         |         |           |          |           |       |
| Costs                     | 803000              | 52195000                  |                         |         |           |          |           |       |
| Fish purchases            |                     |                           |                         |         |           |          |           |       |
| Ice                       | 146000              |                           | 2                       |         |           |          |           |       |
| KDA charge                | 173375              |                           | 5                       |         |           |          |           |       |
| Cooperative subscription  | 1460000             |                           | 20 per retailer per day |         |           |          |           |       |
| Transport costs           | 730000              |                           | 10 per day              |         |           |          |           |       |
| Polythene bags            | 120000              |                           | 50 per month            |         |           |          |           |       |
| Baskets                   |                     |                           |                         |         |           |          |           |       |
| Balance                   | 54824375            |                           |                         |         |           |          |           |       |
| Total costs               | 9415625             |                           |                         |         |           |          |           |       |
| Net revenue               |                     |                           |                         |         |           |          |           |       |
| Other opportunity costs   | 7300000             |                           |                         |         |           |          |           |       |

Vol based on research - daily est. maunds/day, all year  
Rickshaw employment: based on assumption of 400  
employed for 1 hour of a 12 hour day

negible

129 per person per day

100 taka per person per day

|                                     |         |                              |                |                              |                                |               |
|-------------------------------------|---------|------------------------------|----------------|------------------------------|--------------------------------|---------------|
| Own labour                          | na      | Included in payment for fish |                |                              |                                |               |
| Working capital                     | 2115625 |                              |                |                              |                                |               |
| Economic added value                | 3       |                              |                |                              |                                |               |
| EAV/kg                              |         |                              |                |                              |                                |               |
| <u>Rupsha retail market</u>         |         |                              |                |                              |                                |               |
| Assumed sales price/kg              | 75      | Qpremium                     | Adjusted price |                              |                                |               |
| Assumed purchase price/kg           | 60      | 1                            | 75             |                              |                                |               |
|                                     |         | Temporary retailers          |                | Aratdar                      | Basket mak Ice carrier a Total |               |
|                                     | Volume  | Value                        |                |                              | Assembler                      | Cut shop      |
| Number of retailers                 | 65      |                              | 38             |                              | 0                              | 3             |
| Sales per year                      | 657000  | 49275000                     |                |                              |                                | 7             |
| Costs                               | 657000  | 39420000                     |                |                              |                                | 9             |
| Fish purchases                      | 9855    | 985500                       | 20             |                              |                                | 122           |
| Ice (block)                         |         | 75190                        | 2              |                              |                                |               |
| KDA charge                          |         | no local coop                |                |                              |                                |               |
| Cooperative subscription            |         | 9000                         |                |                              |                                |               |
| Transport costs                     |         | 375950                       | 10             |                              |                                |               |
| Polybags                            |         | 61800                        | 50             | per month                    |                                |               |
| Baskets                             |         |                              |                |                              |                                |               |
| Other                               |         | 40927440                     | 0              |                              |                                |               |
| Total costs                         |         | 8347560                      | 222            |                              |                                |               |
| Net revenue                         |         |                              |                |                              |                                |               |
| Other opportunity costs             |         | 3759500                      | 100            | per person per day           |                                |               |
| Own labour                          | na      |                              |                | included in payment for fish |                                |               |
| Working capital                     |         | 4588060                      |                |                              |                                |               |
| Economic added value                |         | 7                            |                |                              |                                |               |
| EAV/kg                              |         |                              |                |                              |                                |               |
| <u>Gollamari retail fish market</u> |         |                              |                |                              |                                |               |
| Assumed retail price                | 75      | Qpremium                     | Adjusted price |                              |                                |               |
| Assumed purchase price              | 60      | 1                            | 75             |                              |                                |               |
|                                     |         | Temporary retailers          |                | Aratdar                      | Basket mak Total               |               |
|                                     | Volume  | Value                        |                |                              | Assemblers                     | Cut shop      |
| Number of retailers                 | 55      |                              | 17             |                              | Party                          | for 2 markets |
| Sales                               | 289080  | 21681000                     |                |                              | 0                              | 0             |
| Costs                               | 289080  | 17344800                     |                |                              |                                | 0.1           |
|                                     |         |                              |                |                              |                                | 72            |

|                                   | 0 | 0 | 0 |
|-----------------------------------|---|---|---|
| Fish purchases                    |   |   |   |
| Ice                               |   |   |   |
| labour                            |   |   |   |
| KDA/KCC charge                    |   |   |   |
| Payment to sweeper etc            |   |   |   |
| Payment to mosque                 |   |   |   |
| Transport costs                   |   |   |   |
| Polythene bags                    |   |   |   |
| Baskets                           |   |   |   |
| other (specify)                   |   |   |   |
| Total costs                       |   |   |   |
| Net revenue                       |   |   |   |
| Other opportunity costs           |   |   |   |
| Own labour                        |   |   |   |
| Working capital                   |   |   |   |
| Economic value added              |   |   |   |
| EVA/unit of fish                  |   |   |   |
| Bara Bazar                        |   |   |   |
| Retail price                      |   |   |   |
| Assumed purchase price            |   |   |   |
| Number of retailers               |   |   |   |
| Sales/day                         |   |   |   |
| Sales                             |   |   |   |
| Costs                             |   |   |   |
| Fish purchases                    |   |   |   |
| Ice                               |   |   |   |
| labour                            |   |   |   |
| KCC charge                        |   |   |   |
| Cooperative subscription (22 mkt) |   |   |   |
| Electricity                       |   |   |   |
| Transport costs                   |   |   |   |
| Polythene bags                    |   |   |   |
| Baskets                           |   |   |   |
| other (specify)                   |   |   |   |



| Arats                             |               |                 |                                                     | Appendix-B    |                    |
|-----------------------------------|---------------|-----------------|-----------------------------------------------------|---------------|--------------------|
| <b>Skid Ghat Summary</b>          | <b>Tonnes</b> | <b>Value</b>    | <b>Employment</b>                                   |               |                    |
| Sales                             | 1148          | 84276367        | 32                                                  |               |                    |
| Costs (Commission etc.)           |               | 1514764         |                                                     |               |                    |
| Paid to vessels                   |               | 82761604        |                                                     |               |                    |
| EAV                               |               | 5058793         |                                                     |               |                    |
| EAV/kg                            |               | 4               |                                                     |               |                    |
| <b>Rupsha Summary</b>             |               |                 |                                                     |               |                    |
| Sales                             | 603           | 45198759        | (included in retail numbers)                        |               |                    |
| Costs (Commission etc.)           |               | 1891988         |                                                     |               |                    |
| Paid to vessels                   |               | 43306772        |                                                     |               |                    |
| EAV                               |               | -536025         |                                                     |               |                    |
| EAV/kg                            |               | -1              |                                                     |               |                    |
| <b>Gallamari</b>                  |               |                 |                                                     |               |                    |
| Sales                             | 603           | 45198759        | (included in retail numbers)                        |               |                    |
| Costs                             |               | 1891988         |                                                     |               |                    |
| Paid to vessels                   |               | 43306772        |                                                     |               |                    |
| EAV                               |               | -536025         |                                                     |               |                    |
| EAV/kg                            |               | -1              |                                                     |               |                    |
| <b>Total</b>                      | <b>603</b>    | <b>47090747</b> | <b>Avge price paid to suppliers</b><br><b>78139</b> |               |                    |
| <b>Total from 3 locations</b>     | <b>2353</b>   | <b>2</b>        |                                                     |               |                    |
| <b>Other Sources</b>              | <b>16249</b>  |                 |                                                     |               |                    |
| <b>Skid Ghat No 5 Fish Market</b> |               |                 |                                                     |               |                    |
| <b>Number aratdars</b>            | <b>14</b>     |                 |                                                     |               |                    |
|                                   | <b>Month</b>  | <b>Volume</b>   | <b>Volume</b>                                       | <b>Others</b> | <b>Total</b>       |
|                                   |               | <b>Hilsa</b>    | <b>Pangash</b>                                      |               | <b>sales value</b> |
| Sales                             | July          | 78315           | na                                                  | 5370          | 83685              |
|                                   | August        | 200965          | na                                                  | 14783         | 215748             |
|                                   | September     | 297213          | na                                                  | 8966          | 306179             |
|                                   | October       | 114503          | na                                                  | 27828         | 142331             |
|                                   | November      | 58360           | 1277                                                | 53871         | 113508             |
|                                   | December      | 28180           | 0                                                   | 44035         | 72215              |
|                                   | January       | 14269           | 0                                                   | 22986         | 37255              |
|                                   | February      | 7876            | 0                                                   | 25496         | 33372              |
|                                   |               |                 |                                                     |               | 55                 |
|                                   |               |                 |                                                     |               | 1835460            |

|                                                                    |           |        |                       |                 |             |               |                   |
|--------------------------------------------------------------------|-----------|--------|-----------------------|-----------------|-------------|---------------|-------------------|
|                                                                    | March     | 25060  | 0                     | 17364           | 42424       | 58            | 2460592           |
|                                                                    | April     | 7556   | 27                    | 4757            | 12340       | 60            | 740400            |
|                                                                    | May       | 29406  | 108                   | 981             | 30495       | 160           | 4879200           |
|                                                                    | June      | 57400  | 40                    | 913             | 58353       | 165           | 9628245           |
|                                                                    | Total     | 919103 | 1452                  | 227350          | 1147905     |               | 84276367          |
| Costs                                                              |           |        |                       |                 |             |               |                   |
| BFDC Commission                                                    |           |        |                       |                 | 2.00%       |               | 1685527           |
| Labour (not BFDC)                                                  |           |        |                       |                 | 1.00%       |               | 842764            |
| OC/finance extended to                                             |           |        |                       | Annual interest | Cost/aratar |               | 672000            |
|                                                                    |           | 20000  | 20                    | 12%             | 48000       |               |                   |
| Total costs                                                        |           |        |                       |                 |             |               | 1514764           |
| Revenue                                                            |           |        |                       |                 |             |               |                   |
| Commission                                                         |           |        |                       |                 | 3.00%       |               | 2528291           |
| Revenue for financial transactions                                 |           | 4.00%  | Percent loss for risk |                 | 5.00%       |               | 3202502           |
| Total income                                                       |           |        |                       |                 |             |               | 5730793           |
| Economic added value (EAV) (gross profit less opportunity costs)   |           |        |                       |                 |             |               | 5058793           |
| Economic surplus (gross profit less opportunity costs)/kg (EAV/kg) |           |        |                       |                 |             |               | 4                 |
| Rupsha Arat (30 members)                                           |           |        |                       |                 |             |               |                   |
| Number                                                             |           | 30     |                       |                 |             |               |                   |
|                                                                    | Month     | Volume | Volume                | Others          | Total       | Average price | Total sales value |
| Sales                                                              | July      | na     | Pangash               | na              | 16000       | 75            | 1200000           |
|                                                                    | August    | na     | na                    | na              | 17750       | 75            | 1331250           |
|                                                                    | September | na     | na                    | na              | 22100       | 75            | 1657500           |
|                                                                    | October   | na     | na                    | na              | 16900       | 75            | 1267500           |
| Remainder of year                                                  | November  |        |                       |                 |             |               |                   |
|                                                                    | December  |        |                       |                 |             |               |                   |
|                                                                    | January   |        |                       |                 |             |               |                   |
|                                                                    | February  |        |                       |                 |             |               |                   |
|                                                                    | March     |        |                       |                 |             |               |                   |
|                                                                    | April     |        |                       |                 |             |               |                   |
|                                                                    | May       |        |                       |                 |             |               |                   |
|                                                                    | June      |        |                       |                 |             |               |                   |
|                                                                    | %/total   | 52.50% |                       |                 |             |               |                   |
|                                                                    | Total     | 0      | 0                     | 0               | 603         | 75            | 45198759          |



| Fish carrier costs and non-mechanised costs (Rupsha)    |             |            |             |              |  | Appendix-B<br>1000000 |
|---------------------------------------------------------|-------------|------------|-------------|--------------|--|-----------------------|
| Capital cost: fully equip                               | Days/year   | hrs/day    | litres/hr   | tk/litre     |  |                       |
|                                                         | 250         | 12         | 5           | 17           |  | 255000                |
| Fuel                                                    | months/yr   | tk/mth     | Number      |              |  |                       |
|                                                         | 365         | 12         | 2250        | 1            |  | 27000                 |
| Captain                                                 | 365         | 12         | 2000        | 1            |  | 24000                 |
| Mohuri                                                  | 365         | 12         | 1000        | 3            |  | 36000                 |
| Loskor/anchorman                                        | 365         | 12         | 1500        | 1            |  | 18000                 |
| Mechanic                                                | 365         | 12         | 1000        | 1            |  | 12000                 |
| Cook                                                    |             |            |             | Number       |  |                       |
|                                                         |             | 12         | 3000        |              |  | 36000                 |
| Food                                                    |             |            |             | % cap. cost  |  |                       |
|                                                         |             |            |             | 5%           |  | 15000                 |
| Repairs and Maint.                                      | Trips/month | months/yr  | Tonnes/trip | tk/tonne     |  |                       |
|                                                         | 7           | 9          | 0.5         | 1000         |  | 31500                 |
| Ice                                                     |             |            |             |              |  | 600                   |
| Entrance fee per yr to forest from Forest Dept          |             |            |             | 75 per mound |  | 178125                |
| Payment to Forest Dept                                  |             |            |             |              |  | 400                   |
| Port dues                                               |             |            |             |              |  | 750                   |
| Licence fee                                             |             |            |             | 15000        |  | 180000                |
| Vessel hire (covers depreciation and financial charges) |             |            |             |              |  | 633225                |
| Operating costs                                         |             |            |             |              |  |                       |
| Earnings                                                | Tonnes      | Waste      | Tk/tonne    |              |  |                       |
|                                                         | 95          | 5%         | 78139       |              |  | 7423247               |
| Sales                                                   | 100         |            | 35000       |              |  | 3500000               |
| Purchases                                               |             |            |             |              |  | 3923247               |
| Gross profit                                            |             |            |             |              |  | 3290022               |
| Net profit (=EAV)                                       |             |            |             |              |  | 6332                  |
| Costs/tonne                                             |             |            |             |              |  | 33                    |
| Net profit (EAV)/kg                                     |             |            |             |              |  |                       |
| 1 Non-motorised fishing vessel                          |             |            |             |              |  |                       |
| Abundant season                                         |             | Volume (t) | Value       | Value/tonne  |  |                       |
| June-Nov                                                |             | 6          | 210000      | 35000        |  |                       |
| Winter season                                           |             | 4          | 140000      | 35000        |  |                       |
| Dec-May                                                 |             |            |             |              |  | 350000                |
| Annual gross revenue                                    |             |            |             |              |  | 218750                |
| Vessel (10/16)                                          |             |            |             |              |  | 131250                |
| Crew share (6/16)                                       |             |            |             |              |  | 750                   |
| Licence fee                                             |             |            |             |              |  | 20000                 |
| Net replacement and repairs                             |             |            |             |              |  | 110500                |
| Net vessel share                                        |             |            |             |              |  | 3600                  |
| Loan interest (imputed)                                 |             |            |             |              |  | 127650                |
| Net crew share                                          |             |            |             |              |  | 12765                 |
| Crew share/tonne                                        |             |            |             |              |  | 19638                 |
| Skipper earnings (2/13)                                 |             |            |             |              |  | 9819                  |
| Earnings per crew member (1/13)                         |             |            |             |              |  | 27                    |
| Earnings per crew member per day                        |             |            |             |              |  | 100                   |
| Opportunity cost of labour per person                   |             |            |             |              |  | 438000                |
| Total opportunity cost of labour                        |             |            |             |              |  | 1251.43               |
| Opportunity cost of labour/kg                           |             |            |             |              |  | 791600                |

|                         |         |
|-------------------------|---------|
| Total opportunity costs | -441600 |
| EAV                     | -44.16  |
| EAV/kg                  | -11     |
| Joint EAV/kg            |         |

**Mechanised Fishing Vessel (Skid Ghat No 5)**

40

All vessels at Skid Ghat

|                                                              |             |           |             |              |        |  |              |
|--------------------------------------------------------------|-------------|-----------|-------------|--------------|--------|--|--------------|
| 1 vessel landing at Skid Ghat                                |             |           |             |              |        |  | 2106909      |
| Landings at Skid Ghat divided by number of vessels           |             |           |             |              |        |  |              |
| Share                                                        |             |           |             |              | 10/16  |  | 1316818      |
| Vessel                                                       |             |           |             |              | 6/16   |  | 790091       |
| Crew                                                         |             |           |             |              |        |  |              |
| Costs                                                        | Days/year   | hrs/day   | litres/hr   | tk/litre     |        |  |              |
|                                                              | 300         | 12        | 5           | 17           |        |  | 306000       |
| Fuel                                                         |             |           |             | Number       |        |  |              |
|                                                              |             | 12        | 3000        |              |        |  | 36000        |
| Food                                                         |             |           |             | % cap. cost  |        |  |              |
|                                                              |             |           |             | 5.00%        |        |  | 15000        |
| Repairs and Maint.                                           | Trips/month | months/yr | Tonnes/trip | tk/tonne     |        |  |              |
|                                                              | 7           | 9         | 0.5         | 1000         |        |  | 31500        |
| Ice                                                          |             |           |             |              |        |  | 600          |
| Entrance fee per yr to forest from Forest Dept               |             |           |             | 75 per mound |        |  | 107616       |
| Payment to Forest Dept                                       |             |           |             |              |        |  | 400          |
| Port dues                                                    |             |           |             |              |        |  | 750          |
| Licence fee                                                  |             |           |             |              |        |  | 496716       |
| Operating costs                                              |             |           |             |              |        |  | 820102       |
| Net vessel returns before depreciation and financial charges |             |           |             |              |        |  | 1000000      |
| Capital cost: fully equipped vessel                          |             |           |             | %cap costs   |        |  |              |
|                                                              |             |           |             | 10.00%       |        |  | 100000       |
| Depreciation                                                 |             |           |             |              |        |  | 1216818      |
| Net profit after depreciation                                |             |           |             |              | 20.00% |  | 238523       |
| Capital charges (interest plus amortisation)                 |             |           |             |              |        |  | 978295       |
| Net profit (vessel share) after capital charges              |             |           |             |              |        |  | 34.09        |
| Net profit/kg                                                |             |           |             |              |        |  | 97.83%       |
| Net profit as a percentag                                    | Of which    |           |             | Per day      |        |  |              |
| Crew shares                                                  | Skipper     | 1/6       | 121552      | 333          |        |  |              |
|                                                              | Crew        | 5/6       | 693933      | 173          |        |  |              |
| Opportunity cost adjustments                                 |             |           |             |              |        |  | 835239       |
| Operating costs, depreciation and amortisation               |             |           |             |              |        |  | 117000       |
| Labour costs (as for motorised transport)                    |             |           |             |              |        |  | 952239       |
| Total opportunity costs                                      |             |           |             |              |        |  | 1154670      |
| <b>EAV/vessel</b>                                            |             |           |             |              |        |  | <b>1.01</b>  |
| <b>EAV/kg</b>                                                |             |           |             |              |        |  | <b>46187</b> |
| <b>Skid Ghat EAV (ktaka)</b>                                 |             |           |             |              |        |  |              |

## Appendix-B

|                |            |      |       |
|----------------|------------|------|-------|
| Fish farms     |            |      |       |
|                | 2-2.5kg/ha |      |       |
| 1" fingerlings | 8000       | 2    | 16000 |
| Preparation    |            |      | 0     |
| Rotenone &lime |            |      |       |
| Fertiliser     |            |      | 1000  |
| Feed           |            |      |       |
| Lease          | 24000      | 1000 | 24700 |
| Labour (days)  | 3          | 100  | 300   |
| Total          |            |      | 42000 |
| Sales          | 2250       | 30   | 67500 |
| EAV/kg         |            |      | 11.33 |

# Appendix-B

## Data sheets

### The characteristics of fry transportation vessels

| Characteristic          | Patil     | Drum    |
|-------------------------|-----------|---------|
| Manoeuvrability         | good      | poor    |
| Volume (litres)         | 5-15      | 200     |
| Surface area volume     | 1:30      | 1:1.180 |
| Seed capacity per unit  | 2-6kg     | 15-22kg |
| Seed capacity per litre | <500gm    | <150gm  |
| Other uses              | various   | none    |
| Insulation              | clay,good | poor    |
| Floor space used        | 1m2       | 1m2     |
| Availability            | good      | good    |

### Wild hatchling prices (1989)

|              | Tk        | per |
|--------------|-----------|-----|
| Early season | 1000-1100 | kg  |
| Mid season   | 700-800   | kg  |
| Late season  | 200-300   | kg  |

### 1 kg wild hatchlings equiv 200k fish

### Hatchery hatchling prices

| Species     | Jessore | Bogra |
|-------------|---------|-------|
| Silver carp | 3750    | 4000  |
| Rui/mrigal  | 2000    | 3000  |
| Catla       | 7500    | 8000  |
| Grass carp  | 8000    | na    |

### Fingerling prices 1989

| Rui/mrigal/catla | local | station | Jessore |
|------------------|-------|---------|---------|
| fry/kg - 3000    |       |         |         |
| 1"/kg            | 250   | 318     |         |
| 2"/kg            | 150   | 115     | 80      |
| 3"/kg            | 150   | 100     |         |
| Silver carp      |       |         |         |
| fry/kg - 3000    |       |         |         |
| 1"/1000          | 200   | 150     | 100     |
| 2"/1000          | 250   | 164     | 120     |

[illegible]

# Pond Culture Budgets per Hectare Under Different Assumptions

|                              | Price  | Uncultured |     | Stage 1 |       | Stage 2 |       | Stage 3 |       |
|------------------------------|--------|------------|-----|---------|-------|---------|-------|---------|-------|
|                              |        | kg         | tk  | kg      | tk    | kg      | tk    | kg      | tk    |
| Revenue at                   |        | 80         | 250 | 20000   | 625   | 50000   | 1250  | 100000  | 2500  |
| Lime                         |        | 5          | 0   | 0       | 37.5  | 187.5   | 75    | 375     | 150   |
| Urea                         |        | 5          | 0   | 0       | 25    | 125     | 55    | 275     | 112.5 |
| TSP                          |        | 5          | 0   | 0       | 50    | 250     | 112.5 | 562.5   | 225   |
| Potash                       |        | 5          | 0   | 0       | 0     | 0       | 5     | 25      | 12.5  |
| Mustard oil cake             |        | 4.5        | 0   | 0       | 125   | 562.5   | 250   | 1125    | 500   |
| Wheat/rice bran              |        | 3          | 0   | 0       | 187.5 | 562.5   | 375   | 1125    | 750   |
| Rotenone                     |        | 90         | 0   | 0       | 0     | 0       | 0     | 0       | 50    |
| Fingerlings/k                |        | 1000       | 0   | 0       | 3750  | 3750    | 7500  | 7500    | 7500  |
| Labour/day                   |        | 50         | 0   | 0       | 5     | 250     | 10    | 500     | 15    |
| Pond maintenance and feeding |        | 50         | 2.5 | 125     | 7.5   | 375     | 25    | 1250    | 37.5  |
| Incidental                   |        | 0          | 0   | 0       | 0     | 625     | 25    | 1250    | 2500  |
| Fishing (days)               |        | 50         | 2.5 | 5000    | 12.5  | 12500   | 25    | 25000   | 37.5  |
| Rent (lease)                 |        | 0          | 0   | 0       | 2500  | 0       | 7500  | 0       | 7500  |
| T.op costs                   |        |            |     | 5125    |       | 19187.5 |       | 38987.5 |       |
| Op profit                    |        |            |     | 14875   |       | 30812.5 |       | 61012.5 |       |
| Interest                     |        |            |     | 15      |       | 802.5   |       | 1678.5  |       |
| Profit                       | 12.00% |            |     | 14860   |       | 30010   |       | 59334   |       |

**Some Data related to population of Khulna City**

- Total population: 12,27,239
- Total Family: 2,66,147
- Family size: 4.6
- Sex Ratio (Male: Female): 111.8:100

These data were collected from fourth national census. This fourth national census is carried out during 23<sup>rd</sup> to 27<sup>th</sup> January.2001.

Semi-structured questionnaire**For market place manger/cooperative officials etc.:**

1. How many buyers and sellers in the market?
2. What roles/specialism/activities/
3. How are business transactions conducted?  
 Buying and selling-open competitive bidding/tied suppliers/  
 Lending and borrowing-what terms and conditions?
4. Are there any associations/cooperatives?  
 Why were they formed?  
 What are their objectives?  
 Objectives related to social work?  
 What does this mean? Who benefits?  
 Any informal/undocumented/unofficial objectives?  
 Are they official/registered (When registered?)?  
 How many members?  
 What percentage of all traders/participants?  
 If not 100%, why not?  
 If 100%, how enforced?  
 Does dishonesty/cheating occur often?  
 Are the groups effective in preventing dishonesty/cheating?
5. Are there any informal organizations?

**For fish traders/fish catcher:**

1. What products are traded?  
 Quantities traded (per day or per week)?  
 Value of products traded (per day or per week)?
2. Methods of buying and selling, whether public auction, individual bargaining?  
 Whether competitive or tied?
3. Does the trader/catcher have any credit agreements/loans etc. with  
 fishermen/assembler/traders/mahajans?  
 If so what are the terms and conditions?  
 Amount of loan?  
 What proportion of working capital requirements? (% of Loan)  
 Other elements in the agreement, like payment in case of accident?  
 Are these formally specified or implied?  
 Repayment terms?  
 Price of fish (compared with free market price)?  
 Whether permanent or temporary?  
 Single season/several years/other time period  
 Whether borrowers switch between lenders, how readily?  
 What are the benefits for the lender and the borrower?  
 Which party most wants the relationship?-which benefits most?  
 Has the trader/catcher been treated dishonestly or cheated?

4. Is the trader/catcher a member of a group/cooperative?

If not member, why not?

If member, why? what benefits?

**For Institutions:**

1. Individual operators in the market

a) Roles

b) Number

c) Activities

d) Business transactions

-Buying (open market/tied suppliers?)

-Lending (note terms and conditions)

-Selling

-Borrowing

2. Associations/cooperatives

Official/registered (when?why?)

Informal organizations

Number of members

Percentage of all traders-if not 100% why not

If 100% how enforced

Objectives

-related to trade (plus "social work")

-any informal/undocumented/unofficial objectives

**For Processes:**

Credit agreements/loans etc between fishermen/assemblers/aratdars/mahajans

Terms and conditions (Triangulations!)

Amount of loan

Price of fish paid

How repayment made

Permanent or temporary

▪ Single season/several years

▪ Whether borrowers switch between lenders

Which party most wants the relationship?-which benefits most?

Cheating, effectiveness of cooperatives in preventing.