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INTEGRATED PROTECTED AREA CO-MANAGEMENT (IPAC)

VOLUME 1: MAIN REPORT

A STUDY OF THE PRINCIPAL MARKETED VALUE CHAINS DERIVED FROM THE SUNDARBANS RESERVED FOREST

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Prepared by:
Dr. K. M. Nabiul Islam
Senior Research Fellow
Bangladesh Institute of Development Studies (BIDS)
E-mail: nabiul@bids.org.bd

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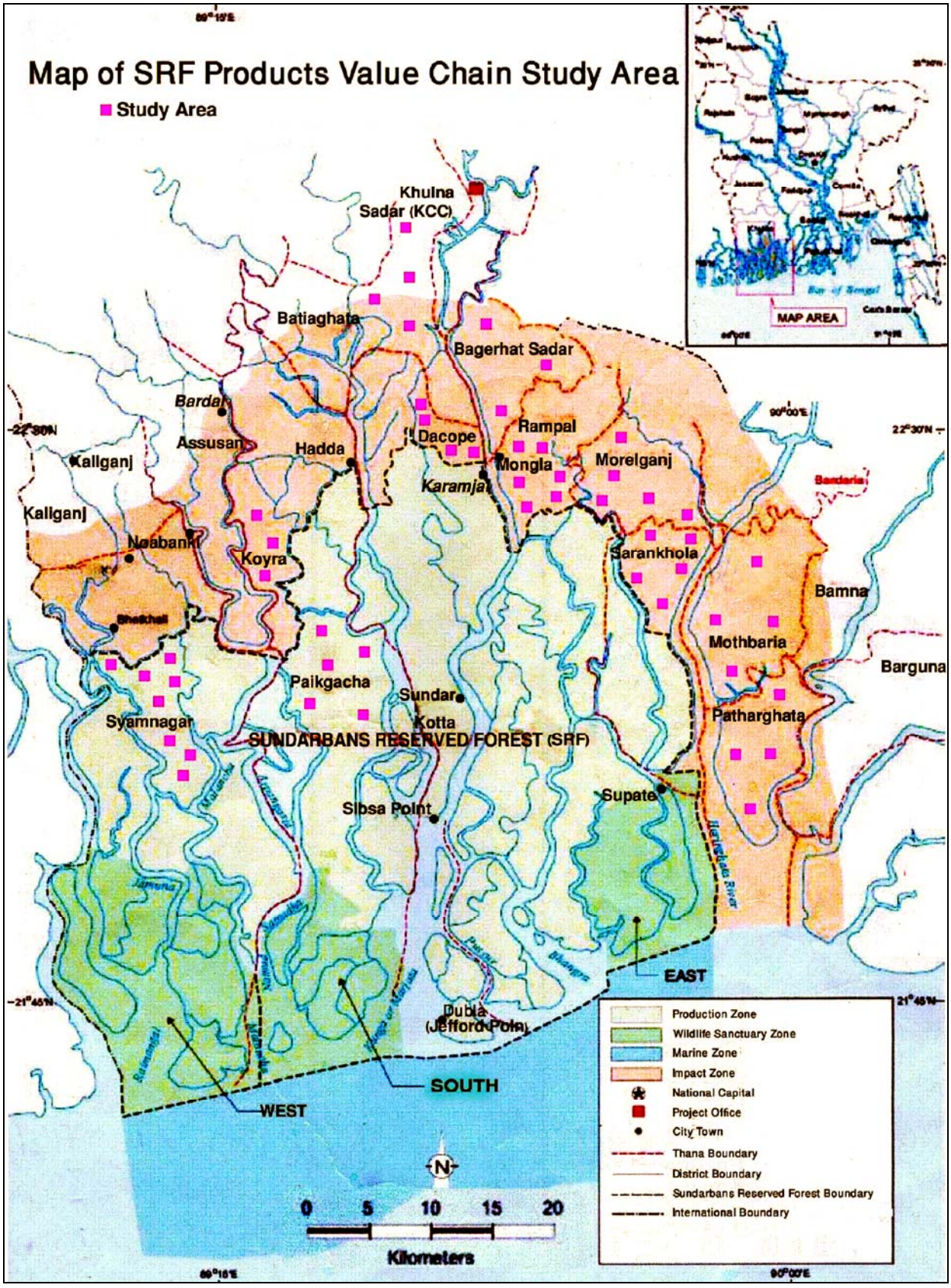
Module Architects, IUB/JU

International Resources Group
12 11 Connecticut Avenue, NW, Suite 700
Washington, DC 20036
202-289-0100 Fax 202-289-7601

www.irgltd.com


Map of SRF Products Value Chain Study Area
Study Area
MAP AREA
Khulna
Sadar (KCC)
Batiaghata
Bagerhat Sadar
Bardal
Assasuni
Hadda
Dacope
Rampal
Mongla
Morelganj
Karamjal
Kaliganj
Kaliganj
Noabanki
Koyra
Sarankhola
Bamna
Bhedkhali
Mothbaria
Barguna
Paikgacha
Sundar
Kotta
Patharghata
Syamnagar
SUNDARBANS RESERVED FOREST (SRF)
Supate
Sibsa Point
EAST
Dubla
(Jefford Poin)
SOUTH
WEST
N
0 5 10 15 20
Kilometers
Production Zone
Wildlife Sanctuary Zone
Marine Zone
Impact Zone
National Capital
Project Office
City Town
Thana Boundary
District Boundary
Sundarbans Reserved Forest Boundary
International Boundary

Preface

This study aims to investigate aspects related to economics of SRF resources extraction, more specifically, value chain analysis of marketed SRF products. This is the final report incorporating comments received from experts and from participants at the workshop held on 10 August at the Forest Department, Dhaka. The report is presented in two volumes: Volume I containing main report and the Volume II containing supporting information, apart from a summary report. This volume is concerned with the main report. The study was carried out by a large research team under my leadership, comprising members as follows:

Assistant Principal Investigators
Tanveer Murshed Khan
Mowdudur Rahman
Md Nazrul Islam

Data Analyst
K M Shahadat Hossain
Ayub Ali Khan

Research Officers/Field Officers
Goutam Mondal
Dilip Kumar Adhikary
Sirazul Islam
Manash Kumar
Dipankar Biswas

I express my gratitude to all of them. The FGDs, Problem Analysis and Case Studies were largely carried out by Tanveer Murshed Khan. Special mention must be made of Md Nazrul Islam who worked extremely hard in assisting me in, among others, the painstaking work of analysis. Mr Mowdudur Rahman of CCEC has provided much needed logistic and intellectual support at various stages of the study.

We have received full support from IPAC and IRG. I must express my gratitude to Drs Robert T. Winterbottom, Philip J. DeCosse, Ram Sharma and Reed Merrill for their intellectual support all through during the study, from the very conceptualization to implementation stage. The logistic and other support from Makhlukur Rahman, Zaid Ahmed, Monika Biswas and other personnel of IPAC has always been helpful. The valuable comments obtained from Dr. M Asaduzzaman, Research Director, BIDS are gratefully acknowledged. We have also received valuable support from the Forest Department, both at the headquarters and at local levels. We are grateful to all of them.

The research was financially supported by USAID, Dhaka. They deserve special thanks for their support on such an important area of research. Finally, I am indebted to the SRF actors and other stakeholders for their cooperation in responding to our queries during the field survey.

This brief study had some limitations. With 65 days-equivalent input of the Principal Investigator, the study was carried out in effectively five to six months time, which was utterly inadequate given the scope, coverage and challenges of investigations. Indeed, it was a difficult task to interview SRF product intermediaries (particularly Mahajans, Aratdars and

money lenders) who were often suspicious of our study aims and investigations and this was one of the major bottlenecks to conducting the fieldwork.

The study, first of its kind, has produced a wealth of data and information on various aspects relating to economics of SRF extractions and SIZ economy, as a whole, which, I believe, would enrich our knowledge-base and encourage our pursuit of follow-up studies in the future, apart from contributing to the revision of IRMP of the SRF, the preparation of which is in progress.

Dr. K. M. Nabiul Islam
Principal Investigator, and
Senior Research Fellow, BIDS

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Acronyms and Abbreviations

ACF	=	Assistant Conservator of Forest
ADB	=	Asian Development Bank
BBS	=	Bangladesh Bureau of Statistics
BCAS	=	Bangladesh Centre for Advanced Studies
BDT	=	Bangladesh Taka
BFRI	=	Bangladesh Fisheries Research Institute
BIDS	=	Bangladesh Institute of Development Studies
BLC	=	Boat License Certificate
BOBP	=	Bay of Bengal Programme
CBN	=	Cost of Basic Needs
CBO	=	Community Based Organization
CCEC	=	Centre for Coastal Environmental Conservation
CCF	=	Chief Conservator of Forest
CDMP	=	Comprehensive Disaster Management Program
CF	=	Conservator of Forest
CODEC	=	Community Development Centre, Chittagong
DAE	=	Department of Agricultural Extension
DANIDA	=	Danish International Development Agency
DCCF	=	Deputy Chief Conservator of Forest
DFID	=	Department for International Development, UK
DFO	=	Divisional Forest Officer
DoF	=	Department of Fisheries
ECOMAC	=	Environmental Conservation Management Consultants Ltd
EU	=	European Union
FAO	=	Food and Agriculture Organization
FD	=	Forest Department
FGD	=	Focus Group Discussion
FY	=	Financial Year
GDP	=	Gross Domestic Product
GM	=	Gross Margin
GoB	=	Government of Bangladesh
GMM	=	Gross Marketing Margin
GRWC	=	Gross Returns over Working Capital
ICLARM	=	International Centre for Living Aquatic Resources Management
ICZMP	=	Integrated Coastal Zone Management Project
IGAs	=	Income Generating Activities
IPAC	=	Integrated Protected Area Co-Management
IRG	=	International Resources Group
IRMP	=	Integrated Resource Management Plan
KCC	=	Khulna City Corporation
MARC	=	Multidisciplinary Action Research Center
MFI	=	Micro-Finance Institution
MoFL	=	Ministry of Fisheries and Livestock, GoB
NGOs	=	Non-Government Organization
NMM	=	Net Marketing Margin
NRI	=	Natural Resources Institute, University of Greenwich, UK
NRWC	=	Net Returns over Working Capital
NTFP	=	Non-Timber Forest Products
PF	=	People's Forum
PL	=	Post-Larvae
PHFRP	=	Post-Harvest Fisheries Research Programme

PRA	=	Participatory Rural Appraisal
RMA	=	Rapid Market Assessment
SBCP	=	Sundarbans Biodiversity Conservation Project
SBMJMCS	=	Small & Medium Enterprises under the Cooperative Society
SEALS	=	Sundarbans Environmental and Livelihoods Security
SIZ	=	Sundarbans Impact Zone
SL	=	Sustainable Livelihoods
SMEs	=	Small and Medium Enterprise
SRF	=	Sundarbans Reserved Forest
SSC	=	Secondary School Certificate
SUFER	=	Support for University Fisheries Education and Research, DFID Funded Project
UNDP	=	United Nations Development Programme
UNESCO	=	United Nations Educational, Scientific and Cultural Organization
USAID	=	United States Agency for International Development
VC	=	Value Chain
VCA	=	Value Chain Analysis
VCF	=	Village Conservation Forum
VO	=	Village Organization
WARPO	=	Water Resources Planning Organization

Glossary

Arat	Generally an office, a store, or a warehouse in a market place from which Aratdar conducts his business.
Aratdar	Main actor in SRF products (e.g. fish) distribution system; either acts as wholesaler or commission agent, or covers both functions at the same time; carries out public auctions, and is the main provider of credit in the marketing chain.
Bahaddar	Owner of fishing boats
Bazaar	Market
Bepari	Middleman in the marketing chain who transports the SRF products to other places; use of term depends on the location; sometimes also used synonymously with retailer.
Crore	Ten million
Dadon	Loan as part of interlocked credit-marketing transactions, whereby, traditionally, the loaner has to sell to/through the loan provider at a discounted price.
Dadondar	Provider of dadon loan; traditionally acts as moneylender cum trader.
Faria	Local trader/agent/intermediary
Lakh	One hundred thousand.
Hat	(Small) market place where market exchanges are carried out either once, twice, or thrice a week, however, not every day.
Jaal	Fishing net (note there is a large number of different types of nets, as described in the text)
Mahajan	Powerful intermediary in value chain - traditional moneylender
Majhi	Captain of boat. Boatman or *majhi* of boat responsible of the trip such as fishing, golpata collection. He leads the team in fishing or collection of SRF products
Mokam	Markets; important markets in often district capitals
Paikar	Middleman in the marketing chain; often covers the assembly function in the chain, acting as dadondar at the same time; depending on the location sometimes also referred to as wholesaler or retailer.
Goons	Peak time of a month related to moon, usually referred to fishing
Bhara goons	Most appropriate time when fish catch is most plentiful, around full moon
Mara goons	Appropriate time (next to *Bhara goons)* when fish catch is plentiful, around new moon
Bagda	Salt water shrimp
Fry	Baby shrimp and prawns
Gher	Ponds inside polders used for the cultivation of fish or shrimp
Galda	Fresh water prawn
Golpata measurement unit/conversion factors	1 Kahon = 16 pon (Approximately 16 maunds) 1 Pon =20 gondas 1 gonda= 4 leaves

Executive Summary

Chapter 1: Introduction, Study Background and Methodology

The Sundarbans has a tremendous impact on the ecosystem of this country, region and the world as a whole. Apart from providing timber and fire wood resources, it is a source of food, crops, fish, medicinal plants, ecotourism and recreation. Besides deriving economic value of directly extracted goods, the Sundarbans serves as coastal protection from cyclones and tidal surges. It provides livelihoods to the local and national economy. That sustainable use of the mangrove forest would yield higher welfare benefits than any other activities towards its development is well documented. A decision to develop Sundarbans Reserve Forest (SRF) would be "extremely damaging, not only to current population's welfare benefits but for the future generations as well"(see, for example, Landell-Mills 1995). This merely highlights the importance of protecting the SRF through its sustainable use.

There are documents and studies (e.g., SBCP-Proposal 2003, Rahman, CNRS 2007) that identified a full range of user group stakeholder categories with an analysis of the extent to which the hundreds of thousands of poor resource users hide other more powerful actors. It has been observed that although the resource users undertook over-extraction the poor users are most exploited by the moneylenders, only to expedite the process of pauperization. There are other studies that have been confined principally to provide general account of the populations and descriptions of the nature and amount of goods extracted in the areas surrounding the SRF. A recent study by Hossain (2007) (financed by USAID's Nishorgo Support Project) mapped out the range of major stakeholder groups that were involved in marketing of forest resources. While the relationships, flows and categories are catalogued in general terms, one has to explore the economic relationships behind, while so far there are few studies addressing economics of SRF extractions.

The present study demonstrates that poverty levels of SIZ areas, compared to non-SIZ areas, are quite high (see Chapter 2 for a comparative analysis) [1]*. Naturally, the issue arises as to why the SIZ population is living in poverty and whether SRF extraction activities have any bearing on this poverty situation. This study is an attempt to explore this through undertaking value chain analysis.*

Objectives of the Study

Following the above background, the major objective of the present study, which is perhaps the first of this kind within SRF, is to understand and, where possible, quantify the economics of extraction and sale of products marketed from the Sundarbans Reserved Forest (SRF). In other words, the study is expected to provide a foundation upon which economic and other interventions can be more efficiently designed and implemented for the SRF and associated Protected Areas upon which economic interventions, climate change actions, and governance interventions can be more efficiently designed and implemented for the SRF and associated Protected Areas, in support of the improved, collaborative management and sustainable use of these resources.

[1] For example, the current study demonstrates that the SIZ upazilas have a much higher extreme poverty rates (0.42) compared to non-SIZ upazilas in Bangladesh (0.26).

In particular, the study is expected to contribute to revision of the Integrated Resources Management Plan (IRMP, 1998-10) of the Sundarbans Reserved Forest, the preparation of which is in progress.

The study will use the framework and language of the value chain analysis. The "VC approach" is also expected to enhance understanding of the constraints and the relationships among actors at each step of the chains, and associated product transformation. The study is expected to identify interventions that can improve the overall total value generated along the chains.

Methodology

Briefly, the methodology includes the following principal tools:

- *The study carries out structured questionnaire survey apart from adopting standard PRA tools and approaches (e.g., FGD, key-informant interviews, community survey, consultations, and case studies.*
- *Spatial sampling is adopted to assist in estimating the number of resource collectors and actors involved in extracting from the Sundarbans. The principal stages implemented by the team include the following:*

Analytical Framework of the Study

The survey area
The periphery of the SRF includes the legally declared "Ecologically Critical Area" assumed to be within a 20 km band surrounding the SRF [2]. This is what can be called the Sundarbans Impact Zone (SIZ)[3]. The SIZ vis-à-vis the study area comprises 5 districts, 10 upazilas, 151 unions/wards and 1,302 villages, which are as follows.

Sundarbans Impact Zone Areas

District	*UZ*	*No. of Unions/Wards*	*No. of villages*
Bagerhat	*Sadar, Mongla, Morrelganj, Sarankhola*	*65*	*486*
Khulna	*Dacope, Koyra, Paikgacha*	*37*	*440*
Satkhira	*Shymnagar*	*13*	*216*
Pirojpur	*Mathbaria*	*20*	*94*
Barguna	*Patharghata*	*16*	*66*
ALL (5 Dist)	*10 (UZ)*	*151*	*1,302*

Sectors and products coverage
The SRF products are broadly divided into five major categories: timber, non-timber, fish, aquatic, and non-aquatic resources. The timber category consists of sundri and other trees, followed by non-timbers consisting of goran, golpata, grass and hantal, fish consisting of gura fish, sada (large) fish, hilsha, shrimp, and shrimp fry, aquatic resources consisting of crab and mollusc, and non-aquatic resources consisting of honey. However, for not all the items

[2] Sen, Soham G. (2010). *"Conservation of the Sundarbans in Bangladesh through Sustainable Shrimp Aquaculture,"* Nishorgo Project, Department of Forestry, Bangladesh.

[3] However, the only recently published *Strategic Management Plan for the Sundarbans Reserved Forest* (March 2010) defined SIZ as comprising 17 UZs.

investigations have been carried out in details. Of these, for various reasons, the products such as sundri or goran (banned items), grass, hantal, shutki and mollusc (small sample size) have not been covered for detail level analysis in this report. However, the type of associated actors and flow chains of the above product list are contemplated.

Concentration Areas and Sampling

The study has identified 159 markets, 138 primary centers (landing places) and 21 secondary markets across 5 districts and 10 upazilas for the SRF products. These primary landing places for various SRF products are our sampling units. Appropriate sampling procedure i.e., systematic random sampling method is adopted. In other words, the sampling was adopted considering the following criteria: (1) 5 districts (2) 10 upazilas (3) 5 district towns (4) 45 Primary markets (Landing places) (5) 12 SRF products and (6) 7 Actors. All efforts were taken to make the sampling as representative as possible. The ultimate sample size was 237. A total of 47 FGDs was conducted across upazilas and activities. The sampling method was sort of constrained because of, among others, seasonality characteristic of the activities concerned.

Mapping of Actors and Flows

The following steps are involved in the present analyses:

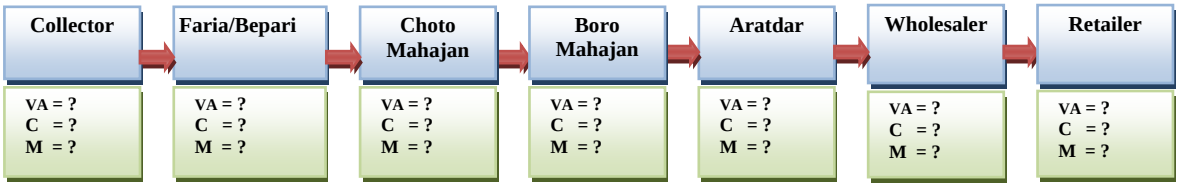
- *Mapping for core steps in a value chain*
- *Mapping for actors*
- *Mapping for number of actors and jobs*
- *Mapping for volume of products*
- *Mapping for geographical flows, and finally*
- *Mapping for the values at different levels of the value chain.*

Thus, apart from value chain analysis, this study entails value chain analysis in its simplest meaning in that the activities centered around SRF products are assessed in terms of value added starting from resource collectors to ultimate consumers. Focus is given, however, on social relationships among actors involved across supply value chain. For simplicity, the study assumes no export activities in the process. In other words, only indigenous and local actors are under the purview of the present investigation.

The basic structure of marketing chains for SRF products is shown in following Figure. However, the actual marketing chains are found to follow multi-dimensional patterns (Annexes B, C).

As mentioned earlier, the theme of the present study is to map the monetary value throughout the chain. In other words, our ultimate output would look like something involving the following steps:

A simplified and typical SRF marketing system and value chain of the actors (% of retail price)



VA = Value addition; C = costs; M = Margin = VA - C

Characteristics of SRF Actors and Plausible Hypotheses regarding the Value Chain

The marketing and distribution system of major SRF products follow a complex system in a unique economic zone. For many of the items, which are dependent to some extent on FD rules and regulations, the number and type of major intermediaries (e.g., Aratdars) are rather limited, causing an oligopolistic behavior to carry out such activities. In this backdrop, concerns with regard to resource control of the leading powerful agents and intermediaries are strongly voiced from time to time. This may give rise to the possibility of inequity and anti-competitive behavior (for example, price manipulation, ownership of productive resources and control of supply in the market, earning extraordinary profit) through a well-coordinated oligopolistic behavior. The present study is an attempt to examine the relevant issues in this context.

Within a complex system, it is hypothesized that the number of important and powerful players in the marketing and distribution system of SRF goods is limited, who can exert the major control over the productive resources allowing for oligopolistic behavior to carry out such activities (Rahman 2007). In other words, it is hypothesized that such network of powerful actors creates unequal income distribution among SIZ populations through widespread exploitations.

Methodological Issues relating to Estimation Procedures

Data generated through various methods are summarized and analyzed to seek estimates of the main research parameters. For example, to get an estimate of the average Gross Marketing Margin, GMM = (Sale Price - Purchase Price) for a particular agent of a specific product, average is made over all the collected/validated sample values. Similarly, agent and product specific Net Marketing Margin NMM= (GMM - Marketing Cost) is estimated. In a similar way, gross and net monthly returns are estimated from GMM and NMM by incorporating average volume of products traded. In normal situations, average selling prices of one actor should be equal to average buying prices of the next actors in the hierarchy in turn. But due to various reasons, this was not true in this study. Consequently, the average selling prices were not used in estimating gross returns as buying prices were different than selling price of the preceding actors. In the case of the original resource collectors, cost of collection includes associated living expenses, or any official and unofficial payments.

The estimates of margins or returns have also to consider investment. Returns over working capital, both in terms of gross returns over working capital (GRWC) and net returns over working capital (NRWC), are estimated to offer an idea about its rate, and to see if such returns are abnormally high or low.

As will be seen in subsequent sections, the marketing chains for the SRF products are complex and multi-dimensional, involving, again, innumerable combinations (see Annex C). As generally applicable for all SRF products, the calculation of value additions, and costs and returns is fraught with the problem in that resource collectors are usually engaged in harvesting multi-products (as high as more than 20 species in sada or gura fish, for example). In particular, it posed problem to estimate returns of some actors (Mahajans and Aratdars, for example) as they also have multiple roles. Some Mahajans were found to act as Aratdars and some Aratdars as Mahajans. Similar was the case with Choto Mahajans, Beparis and even some wholesalers. Over and above, some of the intermediaries in this sector as well are themselves involved with the collection related activities.

Furthermore, the resource collectors or even Beparis or Farias sell their products partly to Mahajans and partly to Aratdars or even wholesalers at different prices. Another limitation is related to costs of collection that are borne or shared by a group of actors, depending on who are involved in organizing the collection trips. Hence, consistent and systematic buying or selling prices (price value additions) and even returns according to hierarchy were not always

to be discerned. Following this, it was not feasible to estimate Value Additions, from economics point of view, particularly for per unit product. Since this study is concerned with marketing chains, in consequence, the price value additions have been taken as proxy to economic value additions. Associated costs calculations and their segregations were complicated when there were advance sales to traders or Mahajans by the collectors in the form of dadons, which was applicable almost to all the cases. Consequently, associated adjustments posed complex, particularly when there were multi-products that were dealt with by a single actor; in such cases, the dominant product is considered and relevant costs are segregated for the product in question.

Some of the problems discussed above could be surmounted if a single combination/set of actors, for a single product, single grade [4], size and quality could be pursued, in accordance with respective origin (source) and destinations so that the values along actual chains could be pursued. This was not feasible for this brief study which dealt with as many as 12 different sub-sectors, and at least 7 actors, spread over as many as 159 primary landing places of 5 districts and 10 upazilas.

Following the above problems, the emphasis in this study is given on estimating gross or net returns of individual actors on a monthly basis so that their relative positions, in terms of income and inequality, for example, are revealed. The value additions for the resource collectors, who largely work for others on wages with associated costs borne by trip organizers, are considered to be merely the price at which the products are sold.

The study makes an attempt to estimate the extent of income concentration at intermediaries level (share of income of top few traders in total income) and also at area level, in order to have an idea about possible market power and income inequality prevailing among SRF actors. Given the multi-dimensional pattern of flows, again, the aggregate estimate of the "number of agents involved"/"number of jobs created" from the Sundarbans would be tentative in this study. The volume of products was estimated at enterprise level only. While it was not feasible for this brief study to contemplate all the chains, the basic, common and dominant chains for the selected SRF products are identified for investigations. In the case of multi-products and multi-grades dealing with by a single actor, the dominant product or grade is considered.

Based on the mapping of flows, volumes and actors, the study attempts to develop an approximate geographical map, however, based on first-stage movement, which may be of particular importance in the context of necessary interventions. Starting from the place of origin (i.e. where it is collected), it was possible to approximately map how and where the product travels, that is, from places of collection, to places of intermediary traders, then to places of wholesalers, retailers and final consumers.

The basis of assessing the product movements in the economy emerged from the assumption that the actors, by and large, were well informed about geographical destinations of SRF products including their end-use. They are also generally knowledgeable about regional origins of their purchases. In other words, presumably, the actors are generally aware of the demand and supply conditions prevailing in different parts of the country [5].

[4] For example, crabs have at least 16 grades; Sada fishes have more than 20 different species types, with various sizes and quality.

[5] During the exploratory trip to study areas and pre-testing of questionnaires, the above assumption was proved largely valid. However, the results are based on first-stage movement, and should be used with caution as the information were not pursued for subsequent stages of movement and, in effect, final and ultimate destinations.

The most difficult problem that had to be encountered is the collection of unofficial and illegal tolls/expenses incurred in the process of undertaking the business, starting from resource collection to final consumers. Some agents (except, perhaps, resource collectors) had the tendency to conceal information, considering this to be a business secret. This was more evident when there is illegal business. In such cases, some triangulation techniques from various informal sources or some judgment had to be applied. Following that the collection of such information is somewhat tricky, one has to be careful in digging out such illegal and unofficial payments including expenses on account of ransoms [6]. In estimating the production costs of collectors, family labor costs are imputed based on prevailing wage rates and considering 50 percent as opportunity costs of labor. Retailers' transport costs were estimated by taking information on total transportation cost of all types of products bought at a time, and then apportioning this for the selected items. This required some standardization of transportation cost, which could have resulted in under or over estimation although this is assumed to be counter balancing.

Given the multi-dimensional pattern of flows, the aggregate estimate of the "number of agents involved"/"jobs created" from the Sundarbans would be tentative in this brief study. A stated ban on timber felling remains in effect for the Sundarbans since1989. Some of the actors associated with timbers have been displaced; some have altogether abandoned the profession. The flows for timber were carried out with the help of some timber traders who used to be in operation in the past. Some reported unofficial logging (e.g., in Patharghata) has been contemplated to capture this. Fortunately, ban on golpata has been withdrawn and during our survey the harvest of golpata was in full swing.

Lack of standardization of SRF products (e.g., crab, sada fish, gura fish, hilsha) in terms of size, quality and grade posed a major difficulty in the investigation of value chains [7]. To surmount this problem, this brief study had little option but to consider an average grade of the products. Seasonality of SRF activities posed another major problem in conducting interviews. Except for fish, different harvests have different time periods (see Figure).

A number of problem analyses were carried out with people, particularly at the bottom layers, that is, collectors of a number of SRF products. The core of the problem was their "low income". The reason for which the study team did the problem analysis or constructed problem trees, was to understand the reasons for the low income of the SRF collectors. The "cause and "effect" relationships of the "low income of the SRF collectors" were elaborated in the problem trees. The analyses were particularly important to upgrade the situation of the bottom layer actors of the value chains. The subsequent objective analysis from the problem tree gave a clear conception regarding potential interventions, some of which are suggested in the final chapter on policy implications.

Structure of the Report

The report is organized in six chapters along the major theme of the study - value chain analysis of SRF extraction activities. Starting with the Chapter 1 presenting the study background and objectives and methodology, Chapter 2 presents SIZ district and upazila profiles. Chapter 3 presents the findings related to various aspects of economics of SRF extraction. Chapter 4 deals with mapping for flows, actors, jobs and volume along the value chains. Chapter 5 deals with the major theme of the study - value chain analyses. Finally, Chapter 6 presents policy implications.

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[6] SRF agents, by and large, became suspicious of the study aims and investigations, particularly so in the case of Mahajans, Aratdars and money lenders.

[7] For example, crabs have at least 16 grades according to sizes and weights.

Chapter 2: SIZ District and Upazila Profile

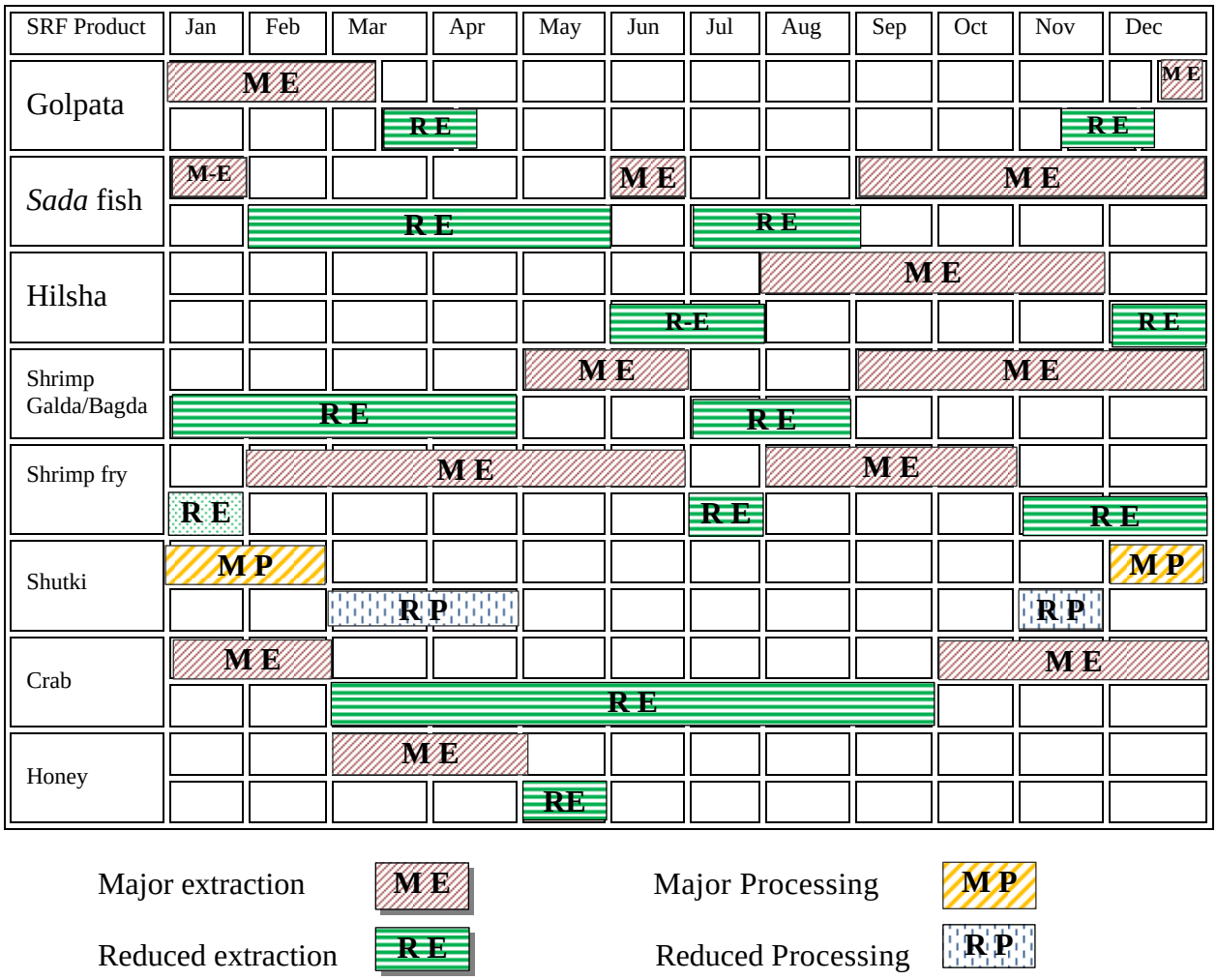
Selected Socio-economic Indicators

The five SIZ districts have an estimated (2009) population of 85.5 lacs which constitute about 6.0 percent of the total Bangladesh population. SIZ districts have an area of about 15,352 sq km which represents 10.4 percent of country's area. The density of population in SIZ districts (557) is far below the national average (966), nearly 58 percent less.

Approximately 49 percent of the total area of five districts lies in SIZ. Khulna has the highest area to lie in SIZ (72.3%), followed by Satkhira (51.0%), Bagerhat (41.4%), Pirojpur (27.0%) and lowest in Barguna (21.1%). In terms of population (estimated for 2009), about 28.1 percent of five-district total population belongs to in the SIZ. The total population belonging to SIZ thus estimates as 0.24 million. The highest percentage of population live in Bagerhat SIZ (56.4%), followed by Khulna (24.1%), Pirojpur (23.6%), Barguna (20.7%) and the lowest in Satkhira SIZ (17.0%).

Based on available information, 25 percent of the households in the SIZ enjoy the electricity connection, which is below that in the coastal zone (31%) or the country as a whole (31%). Similarly, the number of active tube wells per Km^2 in SIZ is 5 compared to 7 in both coastal and national average. The percentage of households enjoying sanitation in SIZ is 44.5, which compares favorably with the national average (36.9%). Child mortality rate for every thousand is estimated at 93, compared to 103 for the coastal district and 90 for Bangladesh as a whole.

Usual calendar of SRF resource extraction



GDP and Livelihoods

Based on available information, the share of agriculture to GDP in SIZ was 29 percent against the national average of 26 percent. The contribution of industries sector was 22 percent, which was same as that of coastal zone but less than that of national average (viz. 25%). The SIZ shares 49 percent to service sector, while it is more or less the same in the case of both coastal and the country, as a whole. Most of the SIZ districts have miserably low level of GDP per unit area, indicating low regional development. An average SIZ district has GDP per sq km of only Tk 8.5 million, compared to Tk 14.4 million in that in coastal zone and Tk 21.8 million in an average district in Bangladesh.

In the SIZ, 30 percent of the people or nearly four times that of the share of national figure earn their living by fishing. Generally, the SIZ has experienced low cropping intensity, 134 percent as a whole. The SIZ agriculture (irrigated) is still far underdeveloped as only 29 percent (approximately) of the SIZ agricultural land came under irrigation as against more than 50 percent in non-SIZ region.

Poverty Situation in SIZ

Head Count Ratios (HCR) for the SIZ districts and upazilas shows an extremely dismal picture. The SIZ upazilas have a much higher extreme poverty rates (0.42) compared to non-SIZ upazilas in Bangladesh (0.26) [8].

The poverty situation in almost all the SIZ upazilas appears to be extremely severe, which have immense policy implications. The HCR for SIZ Bagerhat is estimated as 0.43 as compared with 0.24 for non-SIZ upazilas of Bagerhat, followed by SIZ Khulna (0.41) and non-SIZ Khulna (0.32), and SIZ Satkhira (0.65) and non-SIZ Satkhira (0.45). The only exception is for Barguna (SIZ – 0.36 and non-SIZ -0.43). For Pirojpur, the HCR is almost identical (SIZ – 0.18 and non-SIZ – 0.19). Hence, among the upazilas, the estimated HCRs are relatively higher for Shymnagar (0.65), Dacope (0.60) Morrelganj (0.50), Sarankhola (0.49) and Mongla (0.42). Relatively less worse situation prevails for Mathbaria (0.18), Bagerhat Sadar (0.32), Paikgacha (0.34), Koyra (0.35) and Patharghata (0.36).

The detailed socio-economic profiles of SIZ upazilas are presented in Annex A.

Chapter 3: Findings on Features related to SRF Extractions

Socio-economic Characteristics of Actors

A total of 48 (out of 159) concentration centers were covered in the sample, so as to include all the major SRF products and the major actors who were our respondents. In all, investigations were carried out to 237 actors.

Nearly 13 percent of all actors in the study area have age up to 18 year, while about 87 percent have age above 18 years. Slightly less than 17 percent are illiterate. Collectors constitute highest number of illiterates. As regards origin of the actors, slightly less than three-fifths (59.1%) reported that they were local while slightly higher than two-fifths were non-local operating from outside the jurisdiction of the SRF.

The average land holding size of all SRF actors is miserably low, by any standard; less than one

[8] Based on Cost of Basic Needs (CBN) method, the present study made the estimates incorporating the BBS-2005 data that are yet to be published.

acre (88 decimals) and half an acre (49 decimals) on account of ownership and operation respectively. The collectors are virtually landless. But, on the other hand, land is inequitably distributed among the actors' categories. The higher level actors are relatively richer and wealthier (in terms of land holding) sections of the society (Chi-Squares are significant).

Various Features related to SRF Extraction

Collectors Working for Other Actors

About 60 out of 63 or 95 percent of the collectors work for wages or work/collect for others. Most collectors work for Boro Mahajans (43.4%), followed by Choto Mahajans (38.3%), Aratdars (11.6%) and Farias/Beparis (4.7%).

Catch in Fish Sanctuaries

About 43 percent actors were aware about sanctuaries, while about 54 percent were not. Out of the fisher respondents who were aware of the restricted areas of fishing grounds, only 2.1 percent confessed that they always catch in sanctuaries, 19.1 percent confessed that they practice it often, followed by 38.3 percent who rarely practice and 40.5 percent who never practice. According to perception of the collectors (aquatic resources), the average proportion of total harvest from sanctuaries is estimated as 11.5 percent.

Distance of Harvest Place from Home Village

Economics of SRF extraction is directly related to distance of harvest place from home village. Average distance of harvest place from home village of the respondents is 34.4 km. The distribution of distance by Range shows that the distance is the highest for Khulna Range (38.1 km), followed by Satkhira Range (36.4 km), Sarankhola Range (31.4 km) and Chandpai Range (31.2 km). In terms of products, hilsha fishers have to travel longest distance (67.7 km), followed by golpata collectors (50.3 km), honey (34.8 km), crab (31.2 km) and gura fish collectors (29.5 km).

Distance between Collection Point and Markets

Distance from collection points to markets can be regarded as a proxy of existing marketing facilities. Average distance between collection point and primary (landing) markets is around 41 km and the average distance between primary markets and secondary markets (wholesale) is even further, around 61 km.

Days Spent in Collection of SRF Resources

Like distance of harvest place, costs of harvests are obviously related to days spent in collection of SRF products. Highest time is required in collecting golpata (32 days), followed by for honey (25 days-in several trips together), hantal (19 days), hilsha (12 days), crab (8 days), gura fish (6 days) and sada (white) large fish (5.5 days).

Working Months and Days for SRF Products/Activities

A profile of working months and days for SRF activities (including collection, trade and other ancillary activities) shows that peak months range from 3 to 6 months, except for grass and hantal which is in the range of 9 months. Average peak months considering all the SRF products together amount to around 5 months. Non-peak months (adjusted for number of days worked) range from 2 to 6 months, but most products have non-peak months of 2 to 3 months - the overall average being around 3.7 months. On an average, SRF actors work 23 days in the peak season and 14 days in non-peak months.

Occupation Pattern of SRF Collectors

On an average, the collectors under study together are found to be engaged in collection activities more than half of the time (52.4%) whole year. They are engaged in SRF collection in maximum numbers, during four months such as Poush, Magh, Falgun and Chaitra, to the extent 71, 68, 65 and 68 percent of the time respectively. Besides, the collectors get engaged in SRF related business and other activities to overall extent of 18 percent of the time whole year. The collectors are engaged in such activities in relatively more numbers during the month of Baishak, Jaistha, Ashar and Sraban. As the collectors have hardly any agricultural lands they get engaged in only 2.0 percent of the time whole year; some of them get employed as wage earners, but to the extent of only 6.0 percent of the time. The collectors appear to remain fully unemployed around 16 percent of time of the year, most severe months of which are Ashar, Sraban, Bhadra and Falgun.

Capital Structure of Activities

Fixed capital includes value of land and buildings while working capital includes (which is traditionally called Chalan) expenses such as repair of boats, nets, salary, wage, fuel, transpiration and unofficial expenses, etc to run day-to-day business. The SRF activities are basically working capital oriented. Concentrating on such capital, among the actors, Boro Mahajans appear to employ highest working capital (Tk 512 thousand), followed by Aratdars (Tk 466 thousands), wholesalers (Tk 396 thousand), retailers (Tk 201 thousands) and so on. The small amount of dadons received by collectors can be termed as working capital (Tk 4,365). Averaged over all actors, an actor employs a little more than Tk 169,470 as working capital. On an average, fixed capital constitutes slightly more than one-fourth (27.4%) and working capital constitutes little less than three-fourths (72.6%).

Dadons and Sundarbans Economy

The present study shows that the Sundarbans economy, centering around informal credit arrangement (dadon), is a sort of unique system heavily accessible based on Relationships (social connection), Linkages (business connections) and Trust level (social capital formed among actors community). Our survey findings suggest that the network has created moderate to strong scale of both vertical (between actors along value chains) and horizontal (between actors at the same level of value chains) linkages [9].

Our survey indicates that more than 95 percent of the working capital by SRF collectors are derived from dadons, whereas only 4 percent derived from the NGOs. For all the actors together in the value chains, dadons account for 37 percent, the banks and the NGOs accounting for 4.8 percent and 12.4 percent of total finance respectively. The remaining capital is derived from either own or personal sources [10]*. There are obvious reasons for which SRF actors such as the collectors prefer dadons to all other sources. One of the major reasons is that dadons provide physical security (e.g., from pirates), social security (in lean and hazard periods) and financial securities (fund for running extraction activities) to the collectors, a feature institutional sources seldom can provide. So, the SRF economy is characterized by a unique market and financial system indeed.*

Almost all the actors starting from collectors either receive or offer dadons in this way or that way. The higher level of actors mostly offer dadons but also sometimes receive money (sort of advance) against sales obligation to their clients, which may also be termed as dadons. The Aratdars, for example, consist of Choto Aratdars who receive and Boro Aratdars who offer dadons. They also comprise local and non-local Aratdars. Boro Aratdars also receive advance.

[9] Such features are likely to have enabled the value chain actors to arrive at a more efficient linkage, through reduction of transaction costs, but this needs to be verified through further investigations.

[10] Personal sources are also not always free of costs, at times, offered at some 'invisible' profit and interest.

With a few exceptions with wholesalers, the retailers and wholesalers do not receive any dadons but they carry out business with Aratdars on credits at some enhanced prices of their products. Similar is the case with retailers.

In fact, it is difficult to identify what are dadons and what are credits as there are many ways of repayment - repayment in cash with interest (47.6%) or without interest (4.0%), repayment in goods at market price (16.7%) and repayment at reduced market price (33.3%). Our field survey shows that the collectors have to sell their collected products at a price reduced by up to 22.5 percent compared to prevailing market price, depending on products. Besides, the purchasers also take additional share for the dadons by making pilferage in terms of weights of quantity of the purchased products, especially aquatic products (crab, fish). For the sake of simplicity, the present study considers those credits or advances as dadons against which there is an obligation of selling/purchasing those goods at some market or reduced price.

As the dadon-takers, more often the harvesters usually cannot pay off the debt, the whole cycle is never ending and they remain locked for a long time, sometimes for ever. Some of the dadondars (dadon givers) charge interest (usually 2-10% on a trip basis) on sales. They also take additional share of profit for their investment, apart from making pilferage in terms of weights on the purchased quantity. Our survey findings demonstrate that in a few places the commission is as high as up to 20 percent, in aggregate, on sales. In spite of the above, dadons are preferred to bank or NGO loans as they are easily available in adequate amounts.

Impact of Moratorium on Local Economy

In the process of consultations during our survey in Sundarbans Impact Zone (SIZ), an issue immediately emerged as to how saw mills and furniture units are operating in SIZ area despite that timber products extractions are officially banned for a long time now.

Trend growth rates were estimated. It is observed that there has been tremendous growth of saw mills and furniture units on all counts. The growth in terms of fixed and working capital estimates as 19 and 20 percent respectively (however, at current prices). As regards growth in terms of the number of enterprises, again, there has been a tremendous growth, as high as 24 percent, in respective SIZ locations.

Our analysis shows that trend growth rate of local timbers used by saw mills and furniture units in SIZ estimates as 14 percent. In contrast, timbers as SRF source experienced an overall high negative growth, 24 percent. What the analyses imply that apparently three has been no adverse impact of moratorium on the growth of saw mills and furniture enterprises. In contrast, there has been a tremendous growth of such enterprises, which indicates that local forest cutting has been on sharp increase. The possibility that the entrepreneurs have misreported on the use of SRF timbers in their enterprises, however, cannot be ruled out.

A number of large industries located in Khulna Division and established in the 1960s are heavily dependent on the raw materials (e.g., gewa, sundri and singra) from the SRF for their production. Some of the industries include Khulna Newsprint Mill, Khulna Hardboard Mill and Dada Match Factory. It is reported that these industries have suffered a lot for a long time due to moratorium imposed since 1989.

Ban on Goran

Ban on fuel wood such as goran appears to have adverse impact on the SRF households, particularly at the bottom level who have limited options for securing and/or paying for fuel wood needed for cooking purposes. This has also impacted in that poor communities used to supplement their incomes through fuel wood sales before the ban, which was imposed after Sidr.

Chapter 4: Mapping for Core Steps and Actors in Value Chains

The major aim of the study is related to mapping for flows, actors and volume, and value chain analysis. However, it would be important first to identify the major SRF actors and their functions/roles in the value chains, which is briefly described below (Annex B).

GENERAL ACTORS

Collectors

They collect or produce SRF products and thus constitute the primary link to the marketing chain. Collectors, largely work for wages, usually cannot sell their products directly to the market. Largely illiterate and disadvantaged, they do not own any productive resources, and they are the most exploited groups; socially and economically they belong to the bottom stratum in the value chains. In most cases, collectors work for Mahajans (Choto or Boro) and/or Aratdars, and even for, in a few cases, for wholesalers.

Farias

In the value chain of SRF products, this agent is not found to be common other than in the case of honey and fish in a few cases. Generally, Farias are petty traders operating with small capital and small volume of business compared to other intermediaries. They generally sell products to the Beparis/Aratdars. Sometimes, they work as the agent of Aratdars/Mahajans to buy from the collectors on a commission basis. At times, they act as retailers to vend their products in villages.

Beparis

Beparis are relatively more professional traders who buy a large quantity of the production from collectors or Farias, and sell directly or through Aratdars to wholesalers. They operate in both primary and secondary markets. Sometimes, Beparis also sell to Aratdars on commission basis (in the case of golpata, for example, in Shailmari, Khulna).

Majhi (Boatman)

In a few cases (e.g., fishers or golpata collectors), the group of collectors is led by one boatman, known as Majhi, who is contracted for the harvest by Mahajans or Aratdars or Bahaddars. Sometimes, they themselves act as Mahajans; sometimes, they organize the whole trip and take care of collection. Majhis (Boatmen), however, get double the share of the workers. In a few cases, Majhis (boatmen) acts as Choto Mahajan (Shailmari, Khulna for Golpata, for example).

Choto Mahajan

Choto Mahajans collect forest products commercially by engaging collectors, with investment from their own. They organize, operate and finance resource collections with workers, wages, nets, gears, ropes and boats, and often control trips; and in return buy products at fixed but usually reduced prices. At the end, they sell products to Boro Mahajan or Aratdars. In a few cases, Choto Mahajans get involved in collection process.

Boro Mahajan

Boro Mahajans are also sometimes money lenders, implicitly or explicitly. They undertake commercial collection of SRF resources with higher investment (relative to Choto Mahajan) from their own. They make business out of managing/investing in resource collection in SRF areas Organize collectors, boats and boatmen, and control trips in overall resource collection but usually do not get involved in trips. They are responsible for arranging permits for the workers in their name from the FD. Some of the Boro Mahajans can be termed as Choto Mahajans in the context of scale in broader regions.

In a few cases of fishing, Mahajans lend money to Aratdars (and vice versa) at a monthly interest rate and Aratdars lend money to boatmen (team leader of collectors) for 15 days at a specific interest rate.

Bahaddar

They usually refer to fish processing (Shutki). They are some of the main entrepreneurs who invest and manage the whole process of fishing. A bulk investment is required to procure nets and boats for fishing. The Bahaddars usually belonging to outside SIZ (Chittagong, for example), own a large number of boats, nets and gears. They are responsible for arranging permits from FD. In some cases, they even sell primary products, in part or full, at the collection points, but they largely conduct fish processing.

Aratdars

The Aratdars are generally self-financed, but they require relatively small capital for operating the business as they usually serve as the commission agents. They have their own fixed establishment in their market and operate among Mahajans, Farias, Beparis, Paikars and wholesalers. Aratdars are few in numbers but powerful and apparently highly beneficial group in the value chain. Like Bahaddars, some big Aratdars maintain liaison with various departments, bureaucrats and politicians, and influence to protect their interests often at the costs of SRF. Some Aratdars are also money lenders, implicitly or explicitly, and some take part in auctions of SRF products, especially timbers, golpata and fish. In a few cases, Aratdars directly get involved in the collection process.

Paikars

Paikars, some are small and some are large; usually they operate in fish markets. Small Paikars operate in local markets while the large ones participate in fish auction process at the Arats in landing places. Only registered Paikars or traders can participate in auction before they are sold to wholesalers. They need to pay commission to the Aratdars. In some cases, they bypass the Aratdars to earn higher profits.

Wholesalers

Wholesalers are licensed traders, having fixed business premises in the wholesale market. Their performances vary according to the volume of transactions. They usually buy from Aratdars or Mahajans, and generally sell to the retailers.

Retailers

Retailers, the last marketing channel, buy products from Beparis or wholesalers, and sell to the consumers in open market places. Their volume of business is relatively small and they possess relatively small capital.

PRODUCT SPECIFIC ACTORS

Golpata collectors

Golpata collectors are involved in collection of golpata (Nypa fruticans) and other non-timber products such as goran, hantal (often called Bawails). In non-harvest period, they often become involved in fishing or honey collection but sometimes become involved in illegal felling under the leadership of big Aratdars or urban elites. Sometimes, they cut timber trees (mostly Goran or Sundri) illegally and get it to landing place under the cover of golpata. Sometime they take some extra trees in the name of balancing of boats. As in other collections, at times, golpata collectors become prey to tigers or dacoits.

Sada (large) Fishers

Large fish species such as Rupchanda, Pangas, Poa, Bhetki, Koral and Kawon living in areas next to SRF are known as Sada (white) fish.; some Sada fishers become involved also in fish drying in the dry season and some switch over to hilsha fishing in the monsoon.

Hilsha Fishers

Hilsha fishers are relatively more professional, conducting fishing inside and adjacent water bodies of SRF, in both dry season and monsoon. They are not used to undertake any other resource collection during Hilsha season. Often involved in Jatka collection even when there is bans, reportedly, on the ground that they have little livelihood support during off seasons.

Shrimp Fishers

Shrimp fishers constitute those involving large (galda and bagda) and small (gura chingri) shrimps. In many cases, the collectors also get a small share of profit in this case. The collectors are largely involved in harvesting multiple products: crab, mollusc, and other small fish.

Shrimp fry collectors

Men, women and children mostly from poor households catch shrimp fry; even in some cases, female members of affluent households are also involved in the fry collection. During the collection, reportedly they destroy around 100 other types of aquatic species, resulting in the loss of biodiversity in the region.

Nevertheless, the shrimp fry collectors need little capital but they have few options but to sell their products to intermediary agents (e.g., Mahajans or Aratdars or Depots).

Crab collectors
Mostly from poor fishing communities, they collect crabs, mollusc and shells from SRF; there is usual ban on crab collection in specific months of the year but often not followed. In the off season, the poor crab collectors have few livelihood opportunities. Some crab collectors, however, manage to switch to fishing profession or shrimp fry collection or agricultural wage earning.

Bawails
They are the group involved in the collection of timber or non-timber forest products, especially golpata, goran, hantal and other minor plants through permits during seasons. At times, they become prey to tigers or pirates.

Mawalis
This group is involved in the collection of honey and bee wax through permits during official season. BLC (Boat License Certificate) is granted from FD against boat owner for one year and permit is given to individual collectors for one month. Groups of 6 to 7 Mawalis enter into forests and it takes about a week to get a harvest, which are usually sold to concerned Mahajans/wholesalers or Beparis against dadons taken.

Fish Aratdars
Large fish traders and investors, many have their own boats and gears and organize trips in SRF through Choto and Boro Mahajans. They are also money lenders in the sense that they offer loans/dadons to agents such as Beparis, Mahajans or collectors. This is the most powerful group of actors who control collection and marketing of fish from SRF. They often maintain liaison with FD, various departments, bureaucrats and politicians, and influence to protect their interests often at the costs of SRF.

Timber Aratdars
They used to be most powerful business group of SRF non-fish resources before the moratorium to harvest timbers. Investments are also large – with boats, trawlers and organize trips in SRF through Mahajans. They can exert control over FD, bureaucrats and policy makers for their own business. After the moratorium they tend to have diversified their business.

Millers
Millers, referring mostly to timbers, are involved in processing activities such as log production. In a few cases, millers also perform the functions of wholesalers. In the context of mollusc/shell/oyster, millers constitute major actors who manufacture fishmeal or poultry feed.

Mapping
The major theme of the study is related to mapping for flows, actors, jobs, and volume, and value chain described as follows:

- *Mapping for core steps (flows) in the value chain*
- *Mapping for number of actors*
- *Mapping for number of jobs*
- *Mapping for volume of products*
- *Mapping for geographical flows, and finally*
- *Mapping for the values at different levels of the value chain.*

Mapping Core Steps in the Value Chain
A few common and dominant chains for SRF products are identified as follows:

Timber - Sundri
Chain 1: Collector ⇒ Mahajan ⇒ Aratdar ⇒ Wholesaler ⇒ Retailer
Chain 2: Collector ⇒ Choto Mahajan ⇒ Boro Mahajan ⇒ Aratdar ⇒ Wholesaler ⇒ Retailer

Non-timber

Golpata/Grass (Shon)

Chain 1: Collector ⇒ Mahajan ⇒ Aratdar ⇒ Wholesaler ⇒ Retailer
Chain 2: Collector ⇒ Choto Mahajan ⇒ Boro Mahajan ⇒ Aratdar ⇒ Wholesaler ⇒ Retailer
Chain 3: Collector ⇒ Choto Mahajan ⇒ Boro Mahajan ⇒ Choto Aratdar ⇒Boro Aratdar ⇒ Wholesaler ⇒ Retailer

In a few cases, again, Beparis or Farias also exist along the chain between collectors and Mahajans. It must be noted that sometimes the chains are not systematic as shown above. Although more often collectors sell their products to Choto Mahajans or Boro Mahajans some also sell their products directly to Aratdars or wholesalers depending on from whom they have taken dadons. In other words, some Mahajans are also Aratdars or vice versa.

Fish
Among innumerable combinations, the following marketing chains are most commonly found.

Gura fish
Chain 1: Fisher ⇒ Mahajan ⇒ Aratdar ⇒ Auctioneer ⇒ Wholesaler ⇒ Retailer
Chain 2: Fisher ⇒ Choto Mahajan ⇒ Boro Mahajan ⇒ Aratdar ⇒ Wholesaler ⇒ Retailer
Chain 3: Fisher ⇒ Faria ⇒ Mahajan/Aratdar ⇒ Wholesaler ⇒ Retailer
Chain 4: Fisher ⇒ Mahajan ⇒ Aratdar ⇒ Company/Exporter

Sada (White-Large) fish
Chain 1: Fisher ⇒ Mahajan ⇒ Aratdar ⇒ Auctioneer ⇒ Wholesaler ⇒ Retailer
Chain 2: Fisher ⇒ Choto Mahajan ⇒ Boro Mahajan ⇒ Aratdar ⇒ Wholesaler ⇒ Retailer
Chain 3: Fisher ⇒ Mahajan ⇒ Aratdar ⇒ Auctioneer ⇒ Wholesaler ⇒ Retailer
Chain 4: Fisher ⇒ Mahajan ⇒ Aratdar ⇒ Company/Exporter
Hilsha
Chain 1: Fisher ⇒ Mahajan ⇒ Aratdar ⇒ Auctioneer ⇒ Wholesaler ⇒ Retailer
Chain 2: Fisher ⇒ Bahaddar ⇒ Auctioneer ⇒ Wholesaler ⇒ Retailer
Chain 3: Fisher ⇒ Mahajan ⇒ Aratdar ⇒ LC party /Exporter

Fish (Shrimp) fry (galda and bagda):
Chain 1: Fry collector ⇒ Faria/Bepari ⇒ Mahajan ⇒ Aratdar ⇒ Nursery ⇒ Retailer

Almost in all the cases, Choto Mahajans or Boro Mahajans organize the collection job while the collectors work on only wages to sell their collected products at some fixed or reduced price. As in other cases, collectors sell their products to Choto Mahajans or Boro Mahajans and some also sell their products directly to Aratdars or wholesalers. The basic structure being the same or similar, in the case of exports, Aratdars sell their fish products to exporters.

Aquatic Resources

Crab
Chain: Collector ⇒ Mahajan ⇒ Aratdar/Depot ⇒ Exporter

Mollusc/Shell/Oyster
Chain 1: Collector ⇒ Mahajan ⇒ Miller ⇒ Fishmeal/Poultry Wholesaler ⇒ Retailer

In the case of mollusc/shell/oyster, millers constitute a major actor who manufactures fishmeal or poultry feed.

Non-Aquatic Resources

Honey*:*
Chain 1: Collector ⇒ Faria/Bepari ⇒ Mahajan ⇒ Wholesaler ⇒ Retailer
Chain 1: Collector ⇒ Mahajan ⇒ Wholesaler ⇒ Retailer

Although sometimes honey is also exported such purchases are made directly from wholesalers.

Mapping for Total Number of Actors in SIZ

The total number of collectors is estimated as approximately 10.8 lacs. The estimates refer to whole year, rather than only relevant harvest time. Our survey indicates that an average collector get engaged in 1.8 products in a year. On this bases, the total number of collectors estimates as 6 lacs. As regards the distribution of total number of collectors across districts, Khulna occupies the highest position (48.7%), followed by Bagerhat (22.3%), Barguna (12.7%), Pirojpur (12.3%) and, the lowest, Satkhira (4.1%).

The total number of actors (including collectors) is estimated as 13.37 lacs. On the assumption that one actor deals with 1.8 products whole year, the total number of actors estimates as 7.4 lacs. Product wise distribution shows that the highest number of actors is engaged in shrimp fry (galda) (24.3%), followed by in shrimp fry (bagda) (17.8%).

Mapping for Geographical Flows

The basis of assessing the product movements in the economy emerges from the assumption that the actors, by and large, are well informed about and geographical destinations of SRF products including their end-use.

According to first-stage movement, the SRF products are traded within SIZ upazilas to the extent more than one third (34.1%), while the proportion that are traded in other parts of the country (e.g., Khulna, Chittagong and Dhaka- presumably some for exports, and other parts of the country) estimates as about little less than two-thirds (63.7%). The traded quantity, directly from SIZ to outside the country, is estimated as about only 2.3 percent.

The geographical distribution by SRF products can be seen in text of Chapter 4.

Chapter 5: Value Chain Analysis for SRF Products

A total of 12 SRF products have been included in the value chain analysis. We start with golpata. The major SRF actors and their functions/roles in the value chains are described in Annex B.

Golpata

Value Additions and Returns

Looking at value additions in terms of price, collectors provide the highest value addition (49.8%) of the total price, the price being considered from collectors to consumers. Keeping collectors aside, retailers create the next highest value addition (13.7%), followed by Choto Mahajans (12.7%), Majhis/Beparis (11.2%). Aratdars (6.1%), wholesalers (5.1%) and the lowest for Boro Mahajans (1.5 %).

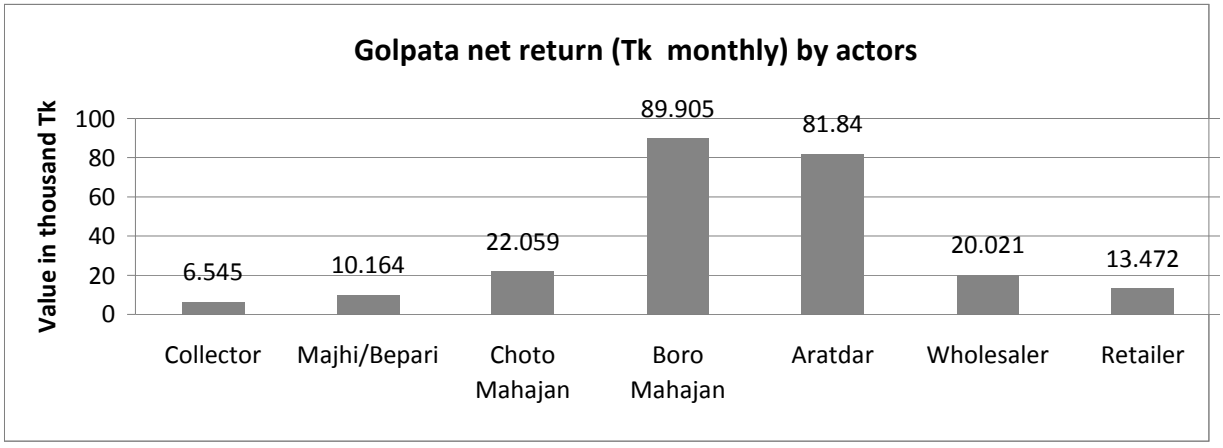
Value Addition and return for golpata

	% of value addition & return for golpata			
	Price Value Addition	Av. Volume (Pon) per month	Net Return (month)	Net Return as % WC
Collector	49.7	0.6	2.7	-
Majhi/Bepari	11.2	3.7	4.2	121.97
Choto Mahajan	12.7	6.6	9.0	22.67
Boro Mahajan	1.5	27.7	36.8	23.31
Aratdar	6.1	40.9	33.5	25.18
Wholesaler	5.1	16.3	8.2	7.51
Retailer	13.7	4.2	5.5	12.67
Total	100.0	100.0	100.0	-

Note: 1 Kaon = 16 Pon, I Pon = 80 pieces. See Table 5.1 (Main Report)

Aratdars carry out the highest volume of trade (40.9%), followed by Boro Mahajans (27.7%), wholesalers (16.3%), retailers (4.2%) and so on. Obviously, bottom layer actors, that is collectors, deal in the lowest quantity of trade, as low as less than one percent (0.6%). Of all the actors, the Boro Mahajans have the highest proportion of net returns (around 37-39%), followed by Aratdars (around 31-34%), Choto Mahajans (around 8-9%),wholesalers (around 8%), retailers (around 6%) and so on. Obviously, collectors have gross or net returns of only around 3 percent. In absolute terms, the Boro Mahajans and Aratdars have net income 13 to 14 times higher compared to that earned by collectors.

Golpata net return (Tk monthly) by actors



Gura Fish

Aratdars carry out the highest volume of trade (72.7%), followed by wholesalers (11.8%), retailers (5.2%) and Choto Mahajans (5.0%) and so on. Obviously, bottom actor types, Farias and collectors, deal in the lowest volume of trade, 4.7 percent and less than one percent (0.6%) respectively.

Value addition and return for gura fish

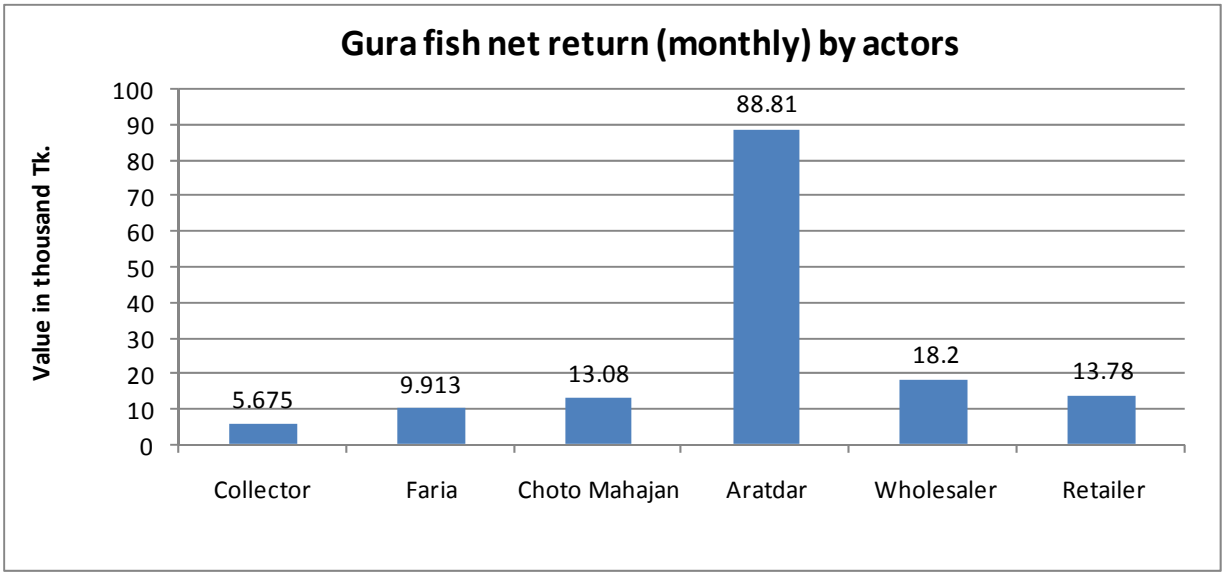
	% of value addition & return for *gura* fish			
	Price Value Addition (%)	Av. volume Per month (Kg)	Net Return (Tk/month)	Net Return as % WC
Collector	64.6	0.6	3.8	72.4
Faria	9.2	4.7	6.6	12.9
Choto Mahajan	1.5	5.0	8.8	10.9
Aratdar	4.6	72.7	59.4	11.1
Wholesaler	7.7	11.8	12.2	9.1
Retailer	12.3	5.2	9.2	78.7
Total	100.0	100.0	100.0	-

Source:Table 5.2.

Gross returns and net returns

Of all the actors, comparatively the Aratdars, again, have the highest gross or net returns (around 59%), followed by wholesalers (around 12-13%), retailers (around 8-9%) and Choto Mahajans (7-8%). Collectors or Beparis have gross or net returns of only around 5 to 6 percent – in absolute terms. The Aratdars have net income 16 times as much compared to that earned by collectors.

Gura fish net return (monthly) by actors



Sada (white) Large Fish

In terms of value additions in prices, collectors, obviously, provide the highest value addition, little less than two-thirds (63%) of the total price. Keeping collectors aside, like in gura fish retailers get the highest value addition (15.5%), followed by Farias (11.5%) (who are also often involved in collection), Aratdars (4.5%), wholesalers (4.0%), and Choto Mahajans (1.0%). As regards traded quantity dealt in by actors, of all the actors, Aratdars carry out the highest volume of trade (41.2%), followed by wholesalers (25.3%) (some of them are Aratdars as well), Boro Mahajans (18.2%), retailers (7.6%), Choto Mahajans (3.8%), and so on. Obviously, bottom actor types, Farias and collectors, deal in lowest quantity of trade, 3.2 percent and less than one percent (0.6%) respectively.

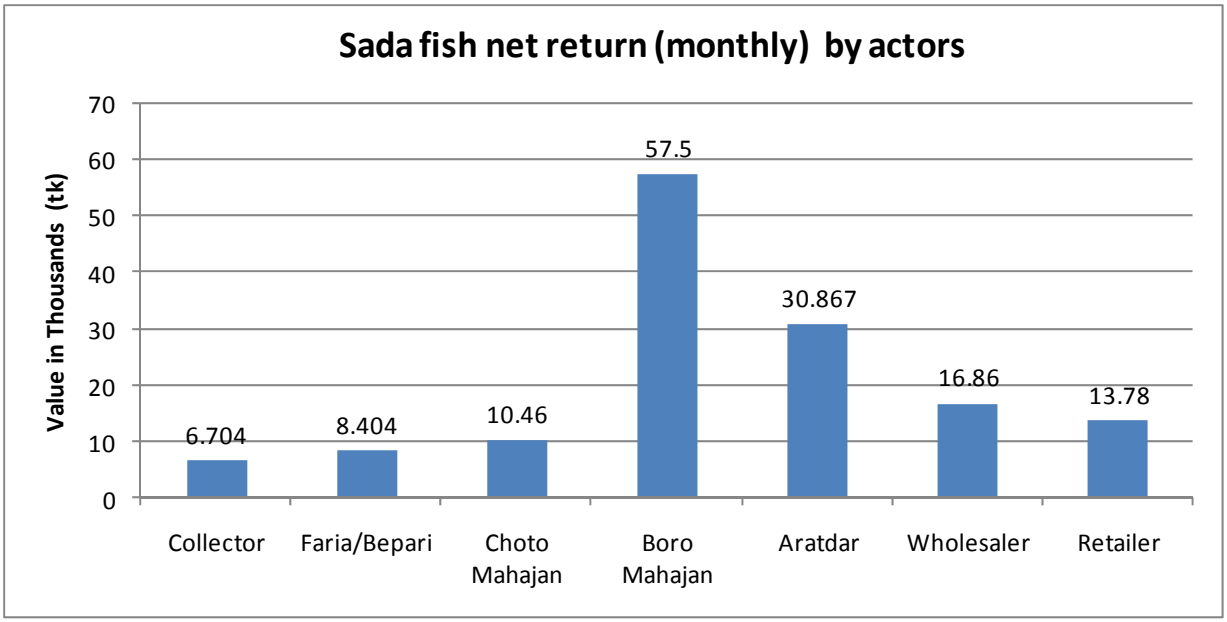
Value addition and return for *sada* (large) fish

	% of value addition & return for *sada* (large) fish			
	Price Value Addition (%)	Av. volume Per month (Kg)	Net Return (Tk/month)	Net Return as % of WC
Collector	62.5	0.63	4.6	239.4
Fariha/Bepari	11.5	3.2	5.8	56.0
Choto Mahajan	1.0	3.8	7.2	66.6
Boro Mahajan	1.0	18.2	39.8	45.4
Aratdar	4.0	41.2	21.4	6.4
Wholesaler	4.5	25.3	11.7	12.0
Retailer	15.5	7.6	9.5	103.4
Total	100.0	100.0	100.0	-

Source : Table 5.3(Main Report)

In terms of proportions, the Boro Mahajans, again, have the highest gross or net returns (around 31-39%). For the Aratdars, as usual, the proportions are also high, gross and net returns being in the range of 21 to 23 percent, followed by wholesalers (around 12-15%), retailers (around 9-14%) and Choto Mahajans (6-7%). In proportional terms, collectors or Beparis have gross or net returns of only around 5 to 6 percent. In absolute terms, the Aratdars have net income 16 times as much compared to that earned by collectors.

Sada fish net return (monthly) by actors



Hilsha

Collectors provide the highest value addition, a little less than two-thirds (63%) of the total price. Retailers create the next highest value addition (12.3%), followed by Majhis/Farias (10.0%), Choto Mahajans (8.3), Aratdars (2.7%), wholesalers (2.3%) and so on. Aratdars trade in highest volume of products (e.g., more than half of total transaction, 50.5%), followed by wholesalers (19.9%), Boro Mahajans (17.0%) and so on. Obviously, bottom actor types, Farias and collectors, deal in lowest quantity of trade, 4.0 percent and less than one percent (0.5%) respectively.

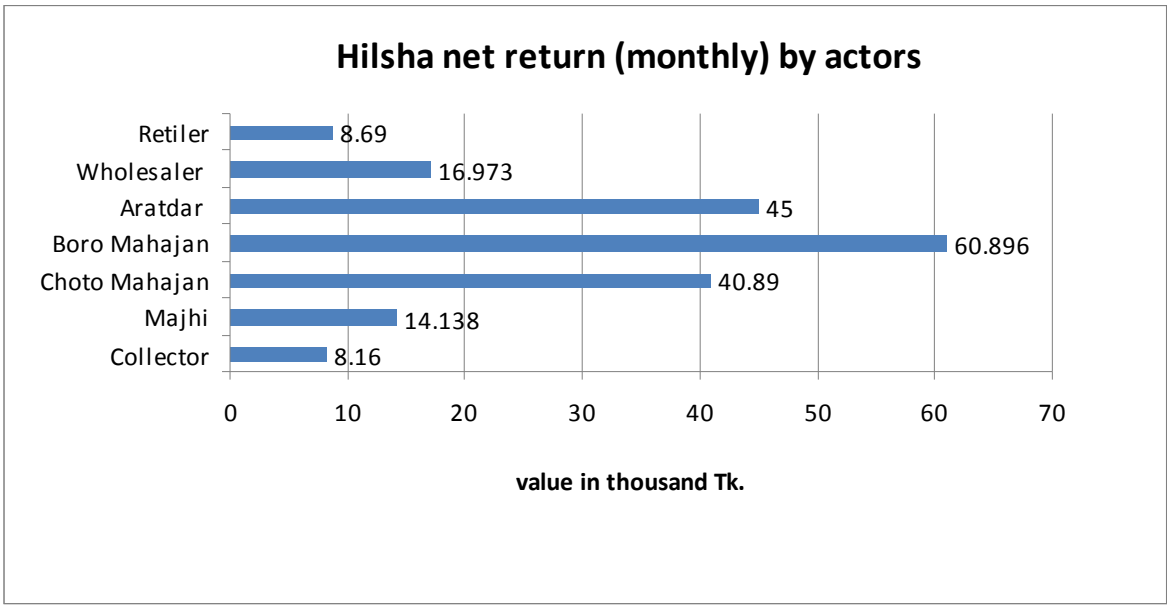
Value addition and return for hilsha

	% of value addition & return for hilsha			
	Price Value Addition (%)	Av. volume Per month (Kg)	Net Return (Tk/month)	Net Return as % of WC
Collector	63.3	0.47	4.2	-
Majhi	10.0	4.6	7.3	91.2
Choto Mahajan	8.3	5.5	21.0	59.8
Boro Mahajan	1.0	17.0	31.3	21.3
Aratdar	2.7	50.5	23.1	12.3
Wholesaler	2.3	19.9	8.7	NA
Retailer	12.3	2.0	4.5	NA
Total	100.0	(100.0)	(100.0)	-

Source: Table 5.4

In terms of proportions, again, Boro Mahajans (28.5%), Aratdars (27.1%) and Choto Mahajans (18.0) are the highest beneficiaries. Collectors or Beparis have net returns of only around 4 to 6 percent.

Hilsha net return (monthly) by actors



Shrimp Large (galda)

Value addiction in terms of price shows that collectors as usual provide the highest value addition, about three-fourths (75.0%) of the total price. Keeping collectors aside, retailers create the next highest value addition (8.7%), followed by Majhis/Beparis (5.0%), Choto and Boro Mahajans (both 3.3%), Aratdars (2.5%) and wholesalers (2.2%).

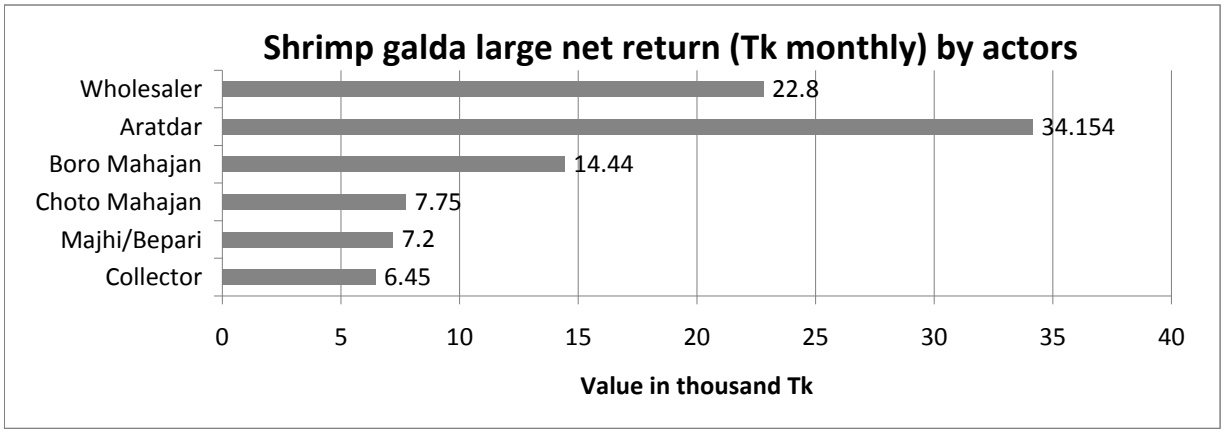
Value addition and return for shrimp large (galda)

	% of value addition & return for shrimp (galda)		
	Price Value Addition (%)	Av. volume Per month	N. Return
Collector	75.0	0.31	6.1
Majhi/Bepari	5.0	5.1	6.8
Choto Mahajan	3.3	8.2	7.4
Boro Mahajan	3.3	13.4	13.7
Aratdar	2.5	40.2	32.4
Wholesaler	2.2	28.9	21.7
Retailer	8.7	3.9	11.9
Total	100.0	100.0	100.0

Source : Table 5.5.

Aratdars, again, have the highest proportion of gross or net returns (around 31-32%), followed by wholesalers (around 20-21%), Boro Mahajans (around 14%) and Choto Mahajans (7-8%). As usual, collectors have the lowest proportions of both gross and net returns (6-7%). In absolute terms, the Aratdars have net income more than 5 times as much compared to that earned by collectors.

Shrimp galda large net return (Tk monthly) by actors



Shrimp Large (bagda)

More than two-thirds of value addition in terms of price is made by collectors. After the collectors, retailers create the next highest value addition (11.1%), followed by Majhis/Beparis (6.7%), Choto and Boro Mahajans (both 4.4%), Aratdars (3.6%) and wholesalers (3.1%).

Value addition and return for shrimp large (bagda)

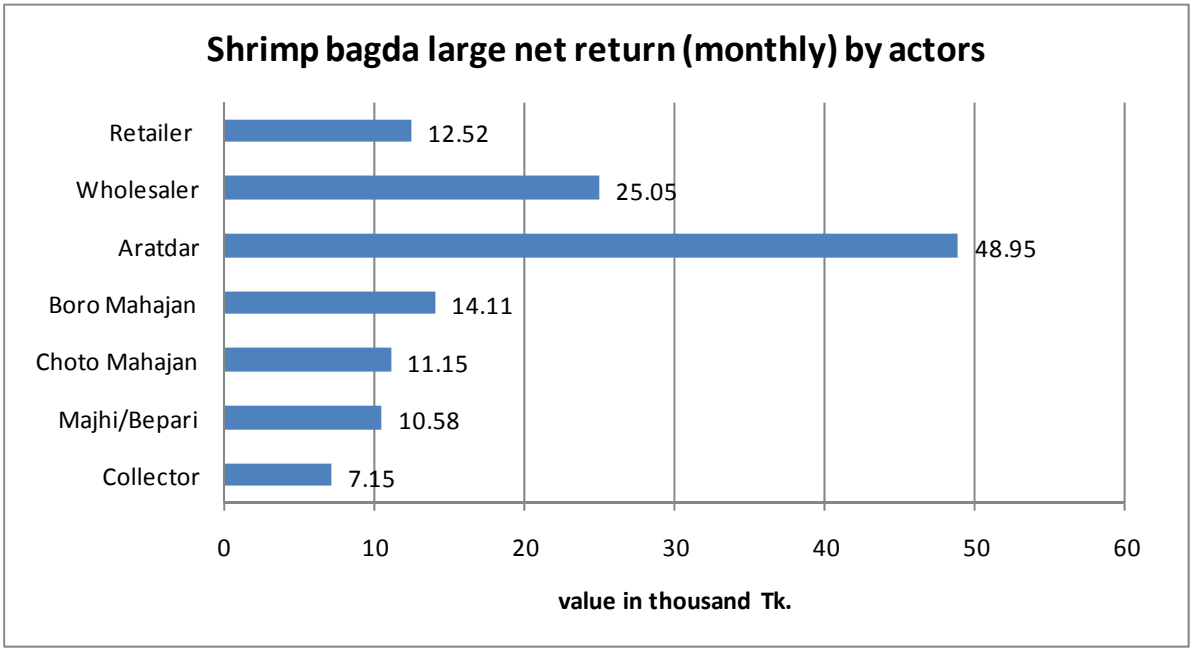
	% of value addition & return for shrimp (bagda)		
	Price Value Addition (%)	Av. volume Per month	N. Return
Collector	66.7	0.42	5.5
Majhi/Bepari	6.7	5.6	8.2
Choto Mahajan	4.4	8.8	8.6
Boro Mahajan	4.4	11.0	10.9
Aratdar	3.6	44.6	37.8

Wholesaler	3.1	26.1	19.3
Retailer	11.1	3.5	9.7
Total	100.0	100.0	100.0

Source: Table 5.6.

Aratdars, again, have the highest proportion of gross or net returns (around 36-38%), followed by wholesalers (around 19%), Boro Mahajans (around 11%) and Choto Mahajans (9%). As usual, collectors have the least gross or net returns (6%). In absolute terms, the Aratdars have net income more than 7 times as much compared to that earned by collectors.

Shrimp bagda (large) net return (monthly) by actors



ShrimpFry (galda and bagda)

The shrimp value chain is relatively more complex, more than any other products, with a variety of actors and intermediaries at each node of the chain. Although there is said to be a ban on fry catching, fry collectors appear to have continued to operate, however, at the risk of further insecurity and the increased level of unofficial payments that they are required to pay to local officials.

Considering value addiction in terms of price, the collectors of shrimp fry (galda and bagda) provide the highest value addition, around 57 to 64 percent of the total price.

As regards the traded quantity dealt in by actors, of all the actors, Aratdars of both fry types carry out the highest volume of trade (65-69%), followed by Beparis (around 27-33%). Obviously, bottom actor type, collectors, deals in low quantity of trade, only around 2-4 percent.

Value addition and return for shrimp fry (galda)

	% of value addition & return for shrimp fry (galda)			
	Price Value Addition (%)	Av. volume Per month (piece)	Net Return (Tk/month)	Net Return as %of WC
Collector	57.1	2.0	6.4	-
Bepari	18.6	32.7	30.0	70.42
Aratdar	24.3	65.3	63.6	31.60

Total	100.0	100.0	100.0	-

Source: Table 5.9.

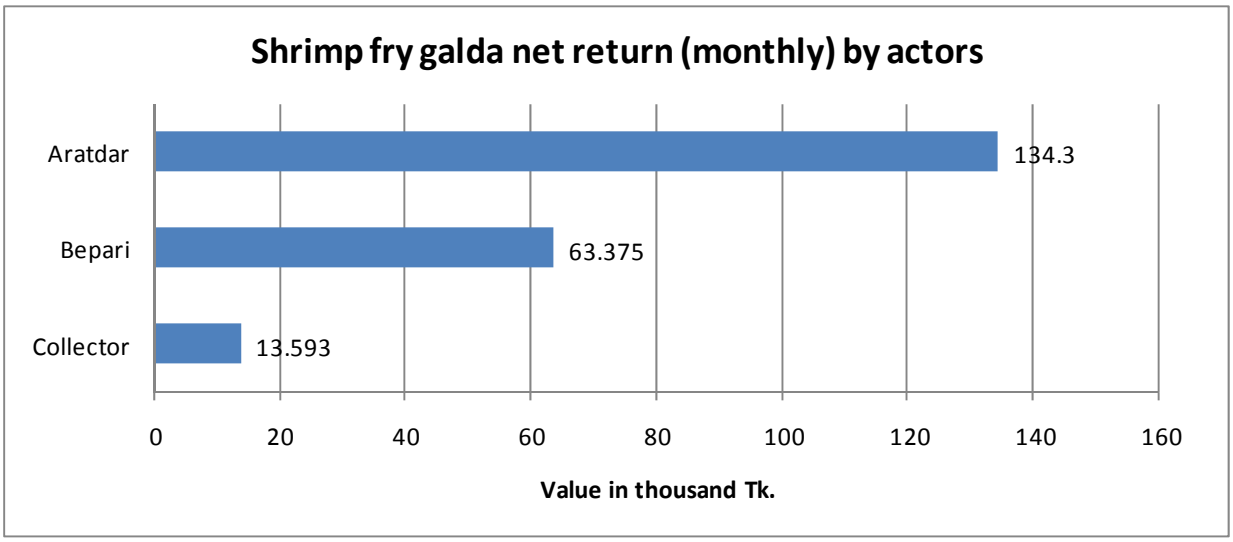
Value addition and return for **s**hrimp fry (bagda)

	% of value addition & return for **s**hrimp fry (bagda)			
	Price Value Addition (%)	Av. volume Per month (piece)	Net Return (Tk/month)	Net Return as % WC
Collector	64.1	4.0	16.8	-
Bepari	19.2	26.7	22.1	20.9
Aratdar	16.7	69.3	61.1	3.8
Total	100.0	100.0	100.0	-

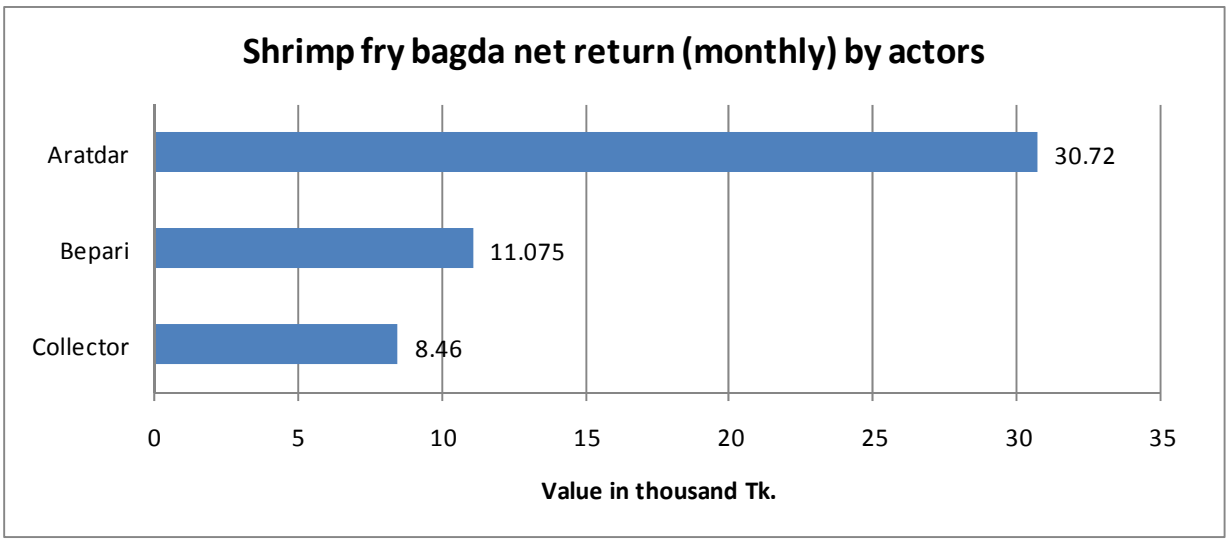
Source: Table 5.10.

Aratdars have net income nearly 10 times as much compared to that earned by collectors. In contrast, the income level for bagda fry has been relatively low. For example, monthly net returns for bagda fry estimate as Tk 30,720 and Tk 11,075 for Aratdars and Beparis respectively.

Shrimp fry galda net return (monthly) by actors



Shrimp fry bagda net return (monthly) by actors



Crab

Crab collectors provide the highest value addition, a half (50%) of the total price. Majhi/Farias create the next highest value addition (17.6%), followed by Choto Mahajans (13.8%), Aratdars (8.3%), Boro Mahajans (6.9%), wholesalers (3.4%) and so on. In contrast to relatively lower price value addition, Aratdars, compared to other actors, trade in highest volume of products (37.1%), followed by Boro Mahajans (28.8%), wholesalers (19.3%), Choto Mahajans (10.6%) and so on. Obviously, bottom actor types, Farias and collectors, deal in lowest quantity of trade, 3.5 percent and less than one percent (0.64%) respectively.

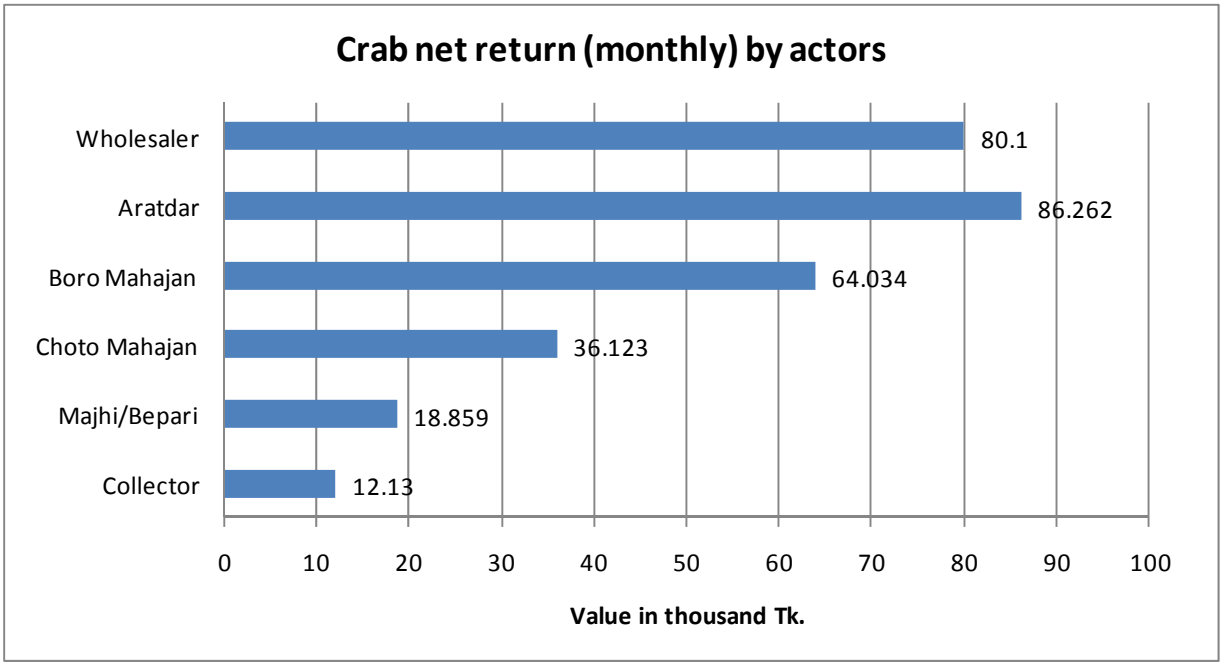
Value addition and return for crab

	% of value addition & return for crab			
	Price Value Addition (%)	Av. volume Per month (Kg)	Net Return (Tk/month)	Net Return as % of WC
Collector	50.0	0.64	4.1	158.2
Majhi/Faria	17.6	3.5	6.3	27.0
Choto Mahajan	13.8	10.6	12.1	17.6
Boro Mahajan	6.9	28.8	21.5	4.6
Aratdar	8.3	37.1	29.0	24.6
Wholesaler	3.4	19.3	26.9	5.3
Total	100.0	100.0	100.0	-

Source : Table 5.11.

In absolute terms, the Aratdars have net income more than 7 times as much compared to that earned by collectors.

Crab net return (monthly) by actors



Honey

Value Addition

Value addition in terms of price shows that collectors as usual provide the highest value addition, about three-fifths (60.0%) of the total price. Retailers create the next highest value addition (16.7%), followed by Majhis/Beparis (12.0%), Boro Mahajans (6.7%), wholesalers (3.3%) and Choto Mahajans (1.3%). No Aratdars appear to exist in honey value chain but most usually wholesalers act as Aratdars.

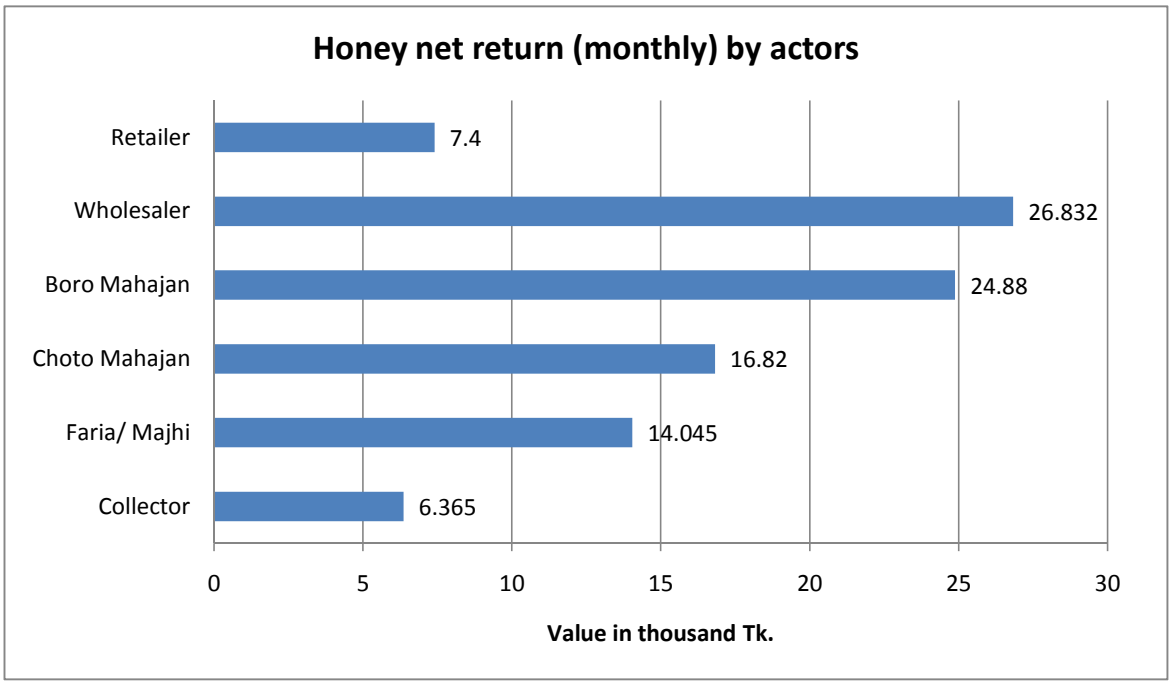
Value addition and return for honey

	% of value addition & return for honey			
	Price Value Addition (%)	Av. Volume (Kg) per month	Net Return (Tk/month)	Net Return as % of WC
Collector	60.0	1.1	6.7	119.35
Faria/Majhi	12.0	7.3	12.9	64.82
Choto Mahajan	1.3	8.7	17.8	29.25
Boro Mahajan	6.7	25.3	26.3	12.44
Wholesaler	3.3	54.4	28.4	8.94
Retailer	16.7	3.2	7.8	18.50
Total	100.0	100.0	100.0	-

Source: Table 5.12.

Relatively the wholesalers have the highest proportion of gross or net returns (around 27-28%), followed by Boro Mahajans (around 25-26%) and Choto Mahajans (around 17-18%). As usual, collectors have the lowest proportions of both gross and net returns (6-10%).

Honey net return (monthly) by actors

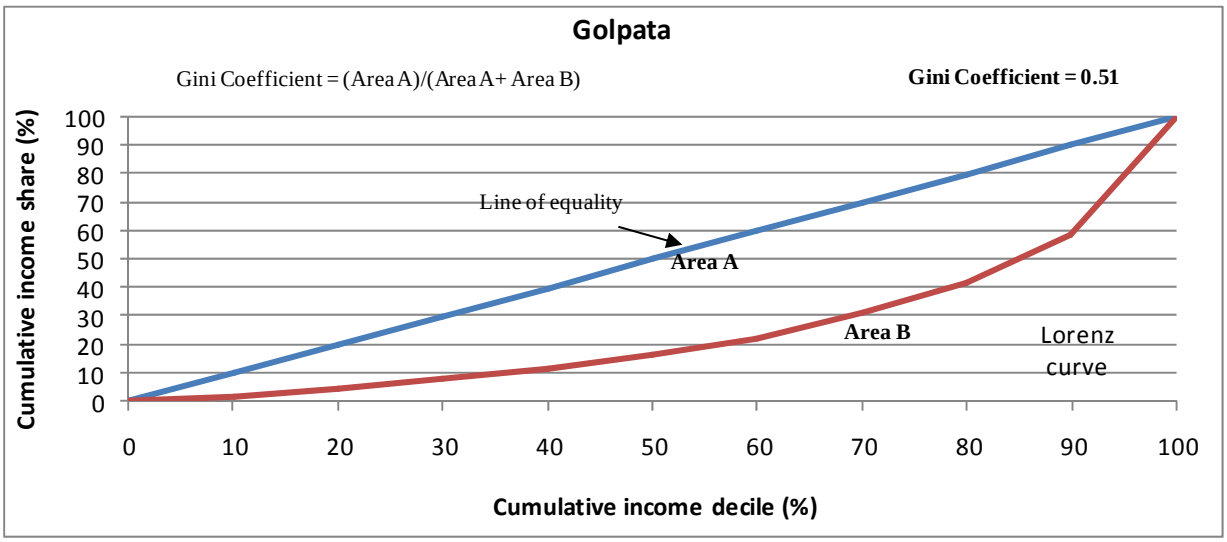


Distribution of Actors Income – Income Inequality

Golpata

The degree of inequality is quite high in that the average annual income earned by the collector category is found to be more than 16 times as less as earned by an Aratdar (Table 5.13). In terms of deciles distribution, the top 10 percent of the actors earn 20.5 times as much income as the bottom 10 per cent (1:21). Gini coefficient, measuring income inequality, for golpata estimates as 0.51, which is quite high.

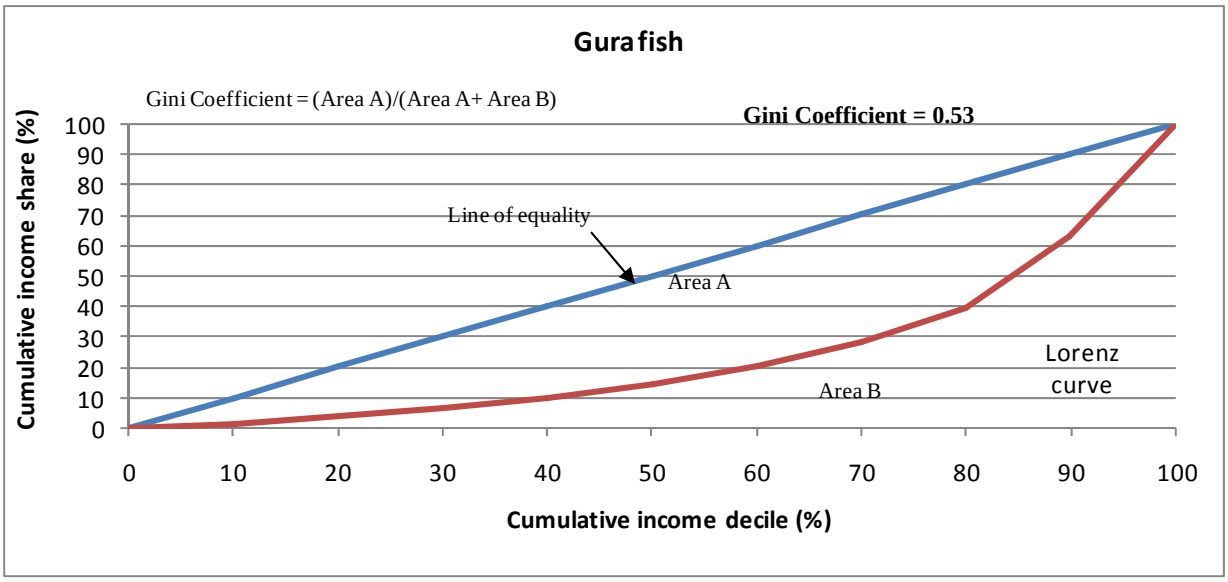
Lorenz curve: Golpata



Gura (Small) Fish

The average annual income earned by the collectors, for example, estimates 13 times as less as earned by an Aratdar. In terms of deciles distribution, the top 10 percent of the actors earn as high as 34 times as much income as the bottom 10 percent (i.e.,1:34). Gini coefficient for gura fish estimates as 0.53, which is again quite high.

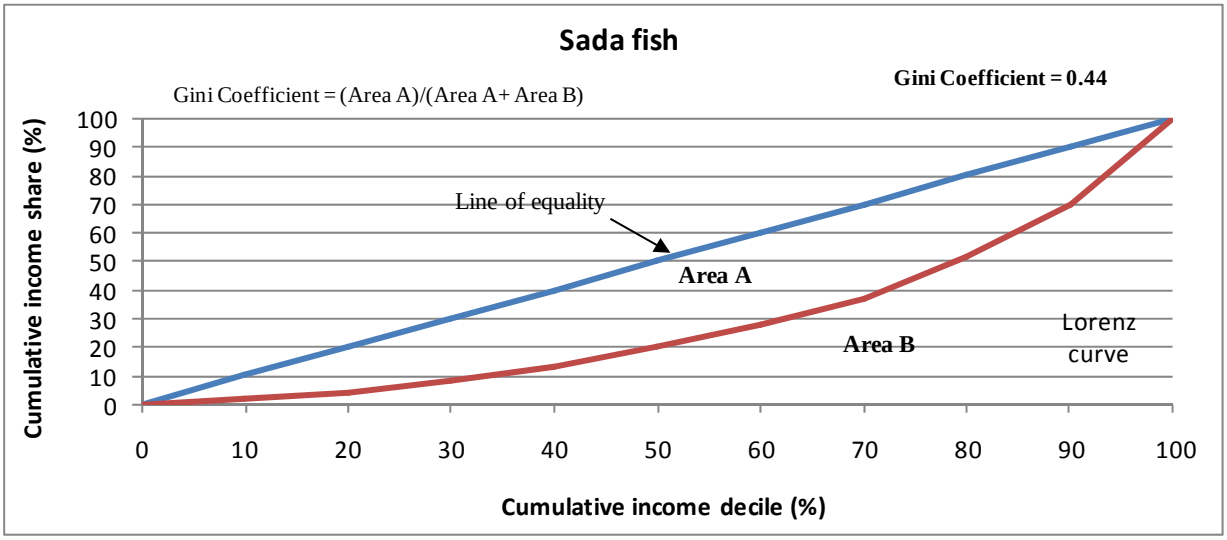
Lorenz curve: Gura fish



Sada (large) Fish

The degree of inequality in the value chain appears to be quite high in that the average annual income earned by the collectors, for example, estimates as more than 10 times as less as earned by an Aratdar. In terms of deciles distribution of income, top 10 percent of the actors earn as high as 19 times as much income as the bottom 10 percent (i.e., 1:19) (See Figures 5.61 and 5.62. Gini coefficient for Sada (large) fish estimates as 0.44, which is a bit lower compared to most other SRF products.

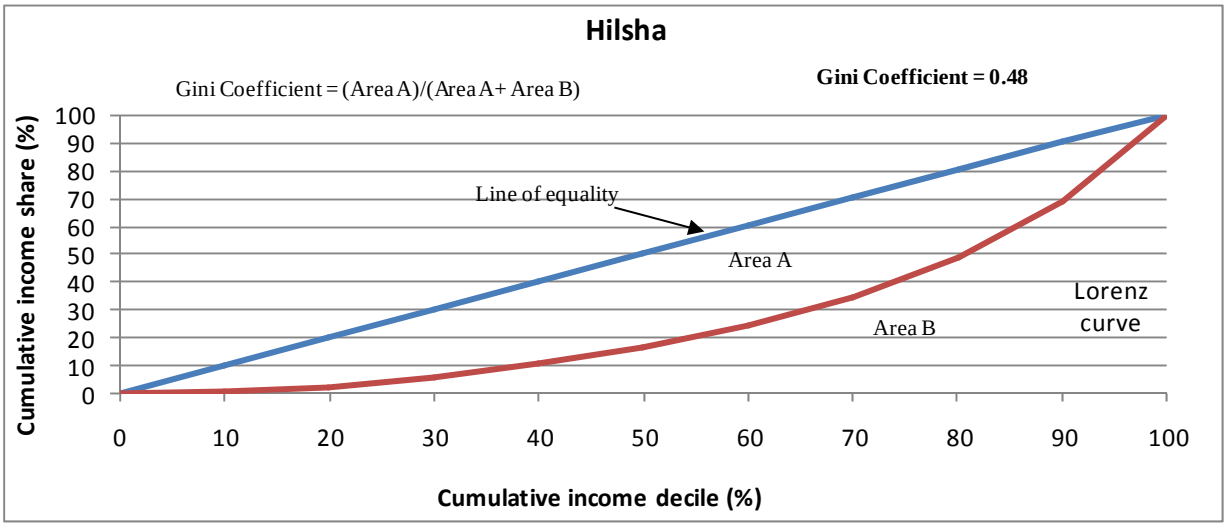
Lorenz curve: Sada fish



Hilsha

The average annual income earned by the collectors, for example, estimates as nearly 8 times as less as earned by a Boro Mahajan. Considering two deciles, the top 10 percent of the actors earn as high as 42 times as much income as the bottom 10 percent (i.e.,1:43). Gini coefficient for hilsha fish estimates as 0.48, which is a bit lower compared to gura and sada fish.

Lorenz curve: Hilsha



Shrimp Large (galda and bagda)

The degree of inequality in the value chain appears to be quite high in that the average annual income earned by the collectors, for example, estimates as more than 5 to 7 times as less as earned by an Aratdar.

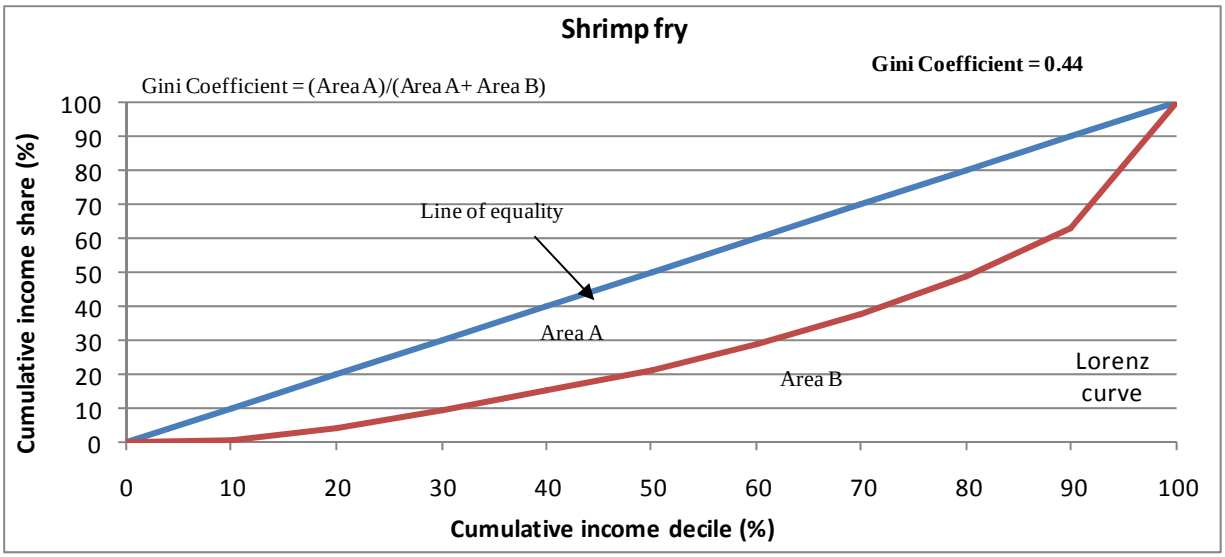
Shrimp Small (galda and bagda)

The degree of inequality in the value chain appears to be quite high in that the average annual income earned by the collectors, for example, estimates as more than 7 to 8 times as less as earned by a Boro Mahajan for galda and bagda shrimp respectively.

Shrimp Fry (galda and bagda)

The degree of inequality in the value chain appears to be quite high in that the average annual income earned by the collectors, for example, estimates as more than 9 times and 2.5 times as less as earned by an Aratdar for galda and bagda respectively. Gini coefficient for shrimp fry estimates as 0.44, which is a bit lower compared to those of most other SRF products.

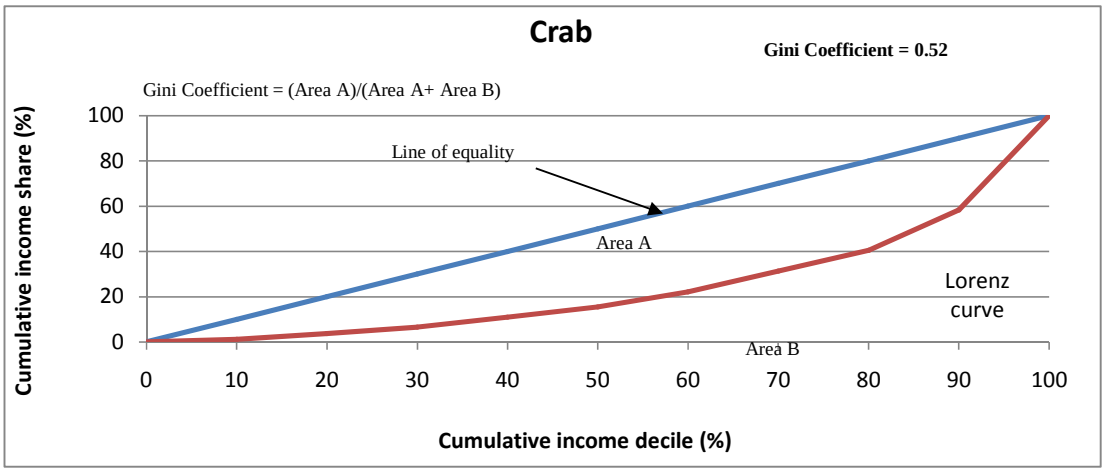
Lorenz curve: Shrimp fry



Crab

Like in most other products, Aratdars in this value chain earn the highest amount of income. The degree of inequality appears to be high in that the average annual income earned by the collectors, for example, estimates as more than 9 times as less as earned by an Aratdar. In terms of distribution by deciles, the income distribution appears to be much skewed (Table 5.29). Considering two deciles, Decile 1 for the bottom-ranking actors and Decile 10 for the top-ranking actors, it can be seen that the top 10 percent of the actors earn as high as 35 times as much income as the bottom Decile 1 (i.e., 1 : 35). Gini coefficient for crab estimates as high as 0.52.

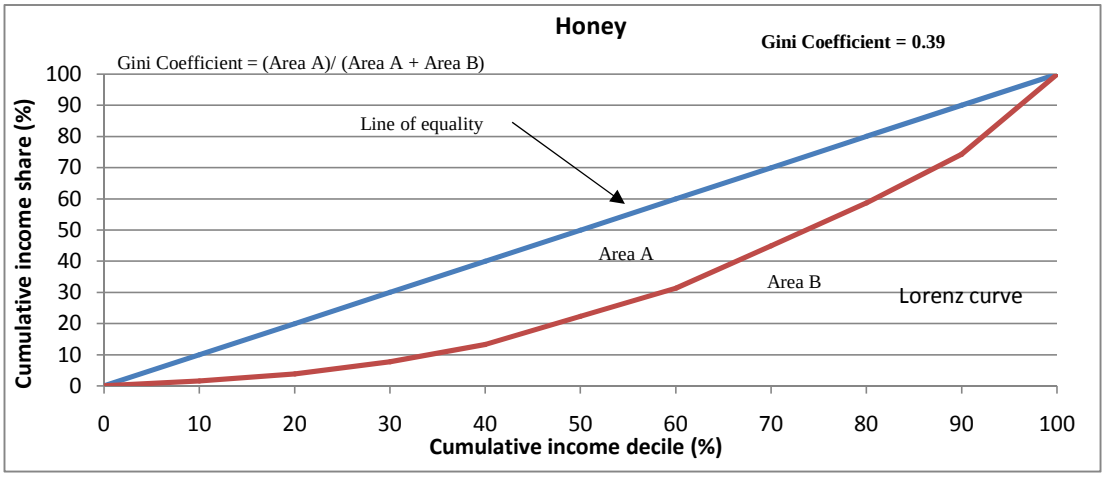
Lorenz curve: Crab



Honey

The degree of inequality in the value chain appears to be relatively less in that the average annual income earned by the collectors, for example, estimates 4 times as less as earned by a wholesaler. In terms of distribution by deciles, the top 10 percent of the actors earn as 17 times as much income as the bottom Decile 1 (1 : 17). Gini coefficient estimates as 0.40 among the SRF products, which is *a bit lower compared to those of other SRF products.*

Lorenz curve: Honey



<u>*Summary*</u>

Ironically, the sample collectors earn net returns in the range of only 3 to 7 percent while they create price value additions by as high as 50 to 75 percent, depending on the products. Intuitively, given the existing economic situation, SRF extraction is deepening poverty levels, which may help widen the income gap between rich and poor.

The degree of inequality has been worse in some activities than the others. Taking all SRF products together, the average income earned by an Aratdar or a Mahajan is found to be nearly 5 to 7 times as much as earned by a collector. Inequality is demonstrated in that the income of a collector constitutes, in terms of total income of all actors, only 4.9 percent, followed by

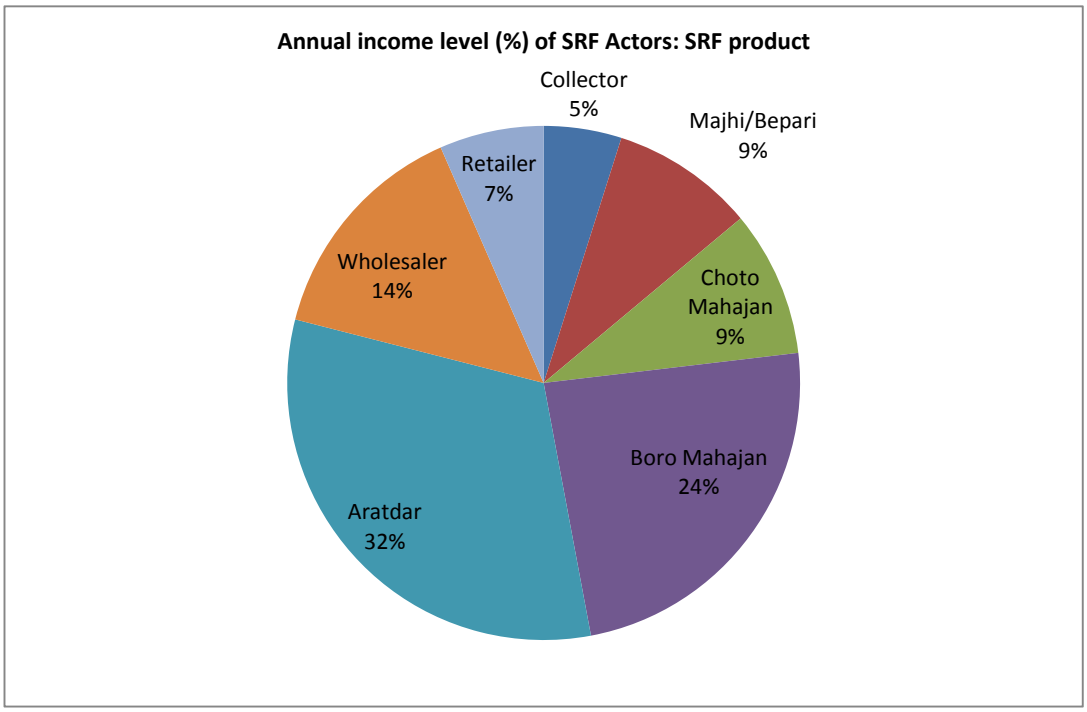
Majhis/Beparis (9.5 %), Choto Mahajans (9.2 %), Boro Mahajans (23.9 %), Aratdars (31.9 %), wholesalers (14.5 %) and retailers (6.6 %).

Annual income level of SRF Actors: All products

Actors	Annual Income (SRF product)	%
Collector	53632	4.90
Majhi/Bepari	98936	9.05
Choto Mahajan	100361	9.18
Boro Mahajan	261664	23.92
Aratdar	349197	31.93
Wholesaler	158195	14.46
Retailer	71813	6.57
Total	1093799	100.00

Note: Non-peak months are standardized with corresponding number of days worked.

Annual income level (%) of SRF actors: All products



Income distribution and income inequality in SIZ area

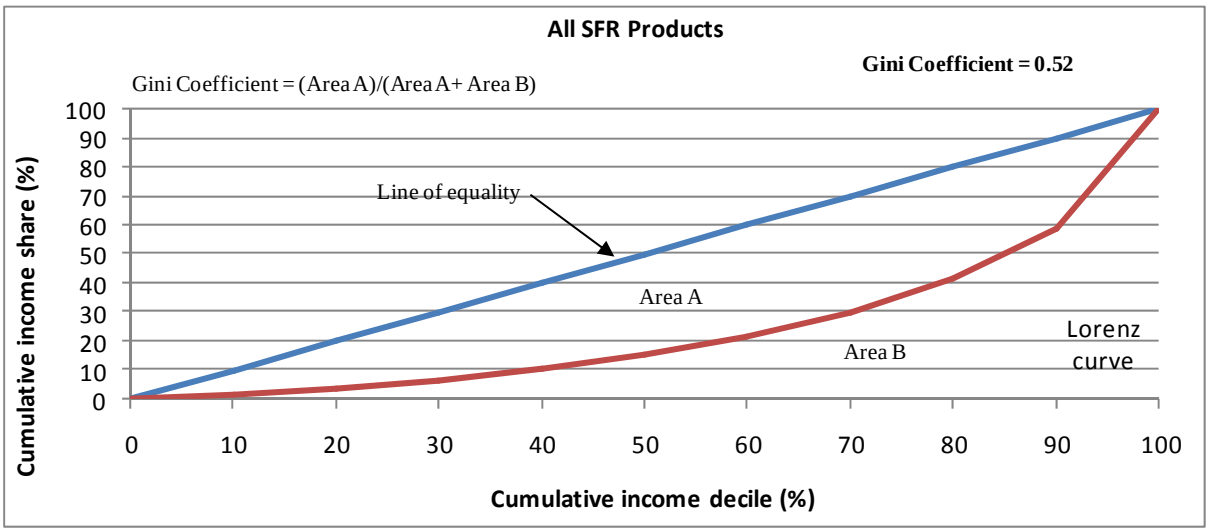
SRF Products	Proportion of income (%) at		Proportion of Deciles 1 to 10	Gini coefficient
	Bottom half (Deciles 1 to 5)	Top half (Deciles 6 to 10)		
Golpata	16.6	83.4	1 : 21	0.51
Gura fish	14.2	85.8	1 : 34	0.53
Sada (white) large fish	20.3	79.7	1 : 19	0.44

SRF Products	Proportion of income (%) at		Proportion of Deciles 1 to 10	Gini coefficient
	Bottom half (Deciles 1 to 5)	Top half (Deciles 6 to 10)		
Hilsha	16.4	83.6	1 : 43	0.48
Shrimp large (galda)	NA	NA	NA	NA
Shrimp large (bagda)	NA	NA	NA	NA
Shrimp small (Galda)	NA	NA	NA	NA
Shrimp small (bagda)	NA	NA	NA	NA
Shrimp fry (galda and bagda)	21.5	78.5	1 : 41	0.44
Crab	15.5	84.5	1 : 35	0.52
Honey	22.2	77.8	1 : 17.1	0.40
All products	15.5	84.5	1 : 29.3	0.52

The income distribution appears to be highly skewed in the SIZ area. While the bottom half (Deciles 1 to 5) of the actors have 15.4 percent of the total income, the top half (Deciles 6 to 10) of the actors accounted for as much as 84.5 percent of the total income. The proportion of decile1 to decile10 is as high as 1:29.

The Gini coefficient, measuring income inequality, for the SIZ area as a whole is estimated as 0.52. As was evident from previous section, the Gini coefficients for individual products are estimated in the range of 0.40 to 0.53. One can mention, in this context, findings from a study conducted by BIDS. It was found that in the coastal districts the Gini coefficients vary from 0.19 to 0.36. In no cases, Gini coefficients for any of the coastal districts are higher than or close to that in the SIZ area. In fact, the coefficients in the SIZ estimate much higher, indicating that so far the SRF actors' income is concerned the SIZ area is characterized by severe inequality in income.

Lorenz curve: All SRF products



Chapter 6: Concluding Remarks and Policy Implications

This concluding chapter summarizes and reviews the major findings obtained from the previous chapters, and relates them to a few major issues. These issues may be crucial to the improvement

of value chains, in terms of return and equity, conservation and co-management, and overall improvement of the quality of life of the people involved with SRF resource collection. Where possible, it also suggests policy implications and discusses some relevant interventions [11].

Above all, the local people, involved as actors in the value chains, gave reflection on the importance of strong and favorable policies necessary to devising a pro-poor value chain and uplifting the income situation of the SRF collectors.

Pressure on SRF and Poverty Situation

The increased population with few alternative livelihood opportunities poses a serious threat to the Sundarbans which is the main cause of mangrove destruction. Moreover, dependence of local people on the forest is high (28% of the population in the impact zone are dependent on the forest) and in future this dependence will increase, which is likely to aggravate the existing pressure on the government mechanisms for forest management and protection.

The present study suggests that there are more than one million people directly involved with the resources extraction from the SRF [12]. *The pressure on SRF for resources extraction has increased tremendously as the number of collectors has increased many fold over the last decades, resulting in huge reduction in per capita resource collection from the SRF* [13]. *With the high increase in living cost added to that scenario, the people and the community, especially that of the bottom layer actors in the value chains, tend to fall in the process of pauperization.*

Income and Poverty in SIZ

The present study demonstrates a very dismal picture on poverty levels in the region. The SIZ upazilas have a much higher (extreme) poverty rates (0.42) compared to an average non-SIZ upazilas in Bangladesh (0.26). In fact, nine out of ten SIZ-upazilas (except Patharghata, Barguna), have a much higher extreme poverty levels than the corresponding non-SIZ upazilas of five SIZ districts, in terms of Head Count Ratio (HCR) [14].

Income inequality

The average monthly income of the SRF harvesters is in the range of Tk 5,000 to 6000 only during harvest seasons. There are months when they have hardly any income at all. The study demonstrates huge income inequality among actors. The empirical evidence also suggests that the top 10 percent of the SRF actors earn as high as up to 43 times as much income as the bottom 10 percent (Estimated Gini coefficients for various SRF products range from 0.42 to 0.53, which are on a much higher side in Bangladesh context). Thus, the poverty situations in the SIZ appear to be severe, which have immense policy implications.

[11] The identified interventions may not all be feasible and implementable in the short run, but reported here only to reflect the views of the respondents of the study surveys, FGDs, Case Studies and Problem Analyses. .

[12] The involvement of more than one million people (1.07 million) in various SRF extractions over the whole year, however, comprises overlaps across extraction of various products, a large majority of which are fishers including about 2 lacs of shrimp fry fishers. If it is assumed that on an average a collector harvests 1.8 products over the whole year then the number of SRF collectors estimates as about 0.59 million (Chapter 4).

[13] This is true especially for fishers following that the extraction of other products is highly seasonal and the pressure on the fishery sector is becoming more and more acute.

[14] Based on Cost of Basic Needs (CBN) method, the present study made the estimates incorporating BBS-2005 data that are yet to be published.

The foremost policy, therefore, will be to address the poverty of the bottom layer forest resource actors which will effectively help the management and conservation of the SRF. To sum up, as the Problem Analysis demonstrates, this demands a special attention because of the following:

- *The SRF collection quantity has significantly declined. Some of the species are getting rarer. This is more so in fishery sector [15] and that is why the fishery sector demands a special focus.*
- *Number of harvesters (e.g., fishermen or golpata collectors) increased many fold (present study estimates over 0.9 million fish collectors, most of which are fisher laborers; other actors in the fish sector estimates as more than 0.2 million in this sector, most of whom are Farias/Beparis.*
- *Because of gradual displacement from agriculture due to increased salinity more number of people are pouring into SIZ as collectors. Most SRF extractions are merely seasonal and consequently there is high pressure on the fishery sector for subsistence and per capita collection has been reduced to a large extent.*
- *The major income share of the harvesters is taken away by the higher level intermediaries such as the Mahajans or the Aratdars due to dadons. Dadons and poverty operate in a vicious circle.*
- *Transportation cost, especially for the fishers, is very high. And the time needed for the transportation/collection is also long to render the collectors more vulnerable.*
- *One of the major extraction costs is due to ransom to the pirates, and unofficial payments to officials of various departments.*

Keeping the above in perspectives, some of the policy interventions are discussed below.

Improving the Value Chains and Poverty Situations of SRF Actors

Credit and Financial Support

Access to capital has been the most crucial issue, especially among the collectors. Although dadon is a source of exploitation for the collectors hardly they are left with other choices. There are two major reasons for which they take dadons; (1) dadons are easily accessible and available in adequate amounts and (2) dadons provide immense support during lean periods. Dadons act as physical, social and financial safety.

However, the bottom layer SRF actors such as harvesters and Farias are locked into contracts that perpetuate this cycle of debt. A pertinent question is how to break or whether to break the system. Nevertheless, as it is difficult to break the deep-rooted dadon system the positive and negative sides to this business need to be considered when planning new interventions geared at improving value chains.

Access to Capital - Setting up of Specialized Banks and Specialized Programs

Government should recognize Sundarbans Reserved Forest (SRF) as a separate and important economic sector, just as Agriculture or Industries, as SIZ consists of more than 9 million people. Specialized banks or specialized micro-credit organizations are to be set up to save the harvesters of the Sundarbans. Like agriculture loans, share cropper loans and SME loans programs some credit programs need to be lunched where SRF actors should be given a special attention. The central bank can take initiatives in this respect ***[16]****.*

[15] In fact, so far as BBS (*Fisheries Statistical Yearbook of Bangladesh, 2007-08)* is concerned, fish production has increased (at the rate of 6.3% for SRF and 6.5% for the country as a whole, per year, based on data for 1998-99 to 2007-08. But due to increased pressure on the fishery sector per capita catch has declined.

[16] Only recently, the Central Bank launched several credit programs to support agriculture, in general, and share croppers in particular. A discussion of the author with the Bangladesh Bank Governor, who is very

Service Centers and Financial Support

Pending the establishment of the Specialized Bank, a few selected public and private banks in the SIZ should be requested to set up SRF service centers/SRF cells to channel funds to the SRF sector and to cater the special needs of the SRF actors, especially the harvesters in a better way and on softer terms. Collateral free loans should be considered for the collectors. Even the Mahajans or similar other actors should be encouraged to access credits with boats/nets kept as collaterals, the impacts of which are expected to be trickled down to collectors.

Targeting Programs

The banks should fully consider the issues and realities of the harvesters and set their policy and procedures accordingly. They should target programs to providing social securities and safety-nets to the collectors, along with adequate amount of credits for the collectors on favorable terms. The banks can also help promote the effort of conservation while sanctioning loans. Repayment schedules and horizons should be flexible and reflect the likely cash flow of the activities in question. At the first stage, some priority sectors can be taken up for the purpose on a pilot basis. At the same time, appropriate authority should take safety net programs for the SRF actors, particularly the collectors, and extend support during lean periods or at the time of crisis such as natural hazards. Like what was taken up with SMEs, Bangladesh Bank can take the initiatives in this respect through, for example, launching refinancing schemes.

Improving Terms of Trade and Marketing System

Our field survey shows there are many ways of debt repayment in practice - repayment in cash with interest (47.6%) or without interest (4.0%), repayment in goods at market price (16.7%) and repayment at reduced market price (33.3%) (see Chapter 3). Our investigation reveals that the collectors have to sell their collected products at a price reduced by up to 22.5 percent compared to prevailing market price, depending on the products under study. There can be several ways of improving terms of trade and marketing systems for the SRF products.

Transportation and Storage/Depot Facilities

One important way to minimize transportation costs is to foster and expand spot markets and auctions, which will also ensure offering lower level actors higher prices [17]*. Increasing the number of depots and landing places could also minimize the transaction costs and the time for transportation to ensure that the returns are evenly distributed. This would help particularly fishery and crab sectors. The Department of Fisheries (DoF) needs to identify regions lacking depots and arrange accordingly.*

Enhancing Bargaining Power of the Collectors

The harvesters particularly the fishermen and crab fishers cannot negotiate price as the fish products are purchased by the Aratdars through Mahajans or Paikars. Enhancing bargaining power of the harvesters is imperative.

Access to Market Information

Better access to the current market information has to be ensured. Barriers to entry, poor infrastructure, inadequate communications, and high transaction and transport costs make the markets in favor of buyers.

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proactive in launching pro-poor programs, indicates that the Bank might consider similar credit programs for the lower level SRF actors in a short span of time.

[17] This was also suggested by a study, USAID (2006).

Form Collectors' Organization

In order to safeguarding the rights of the collectors and capacity of the collectors to negotiate selling prices, it is important to form collectors' organizations, similar to that of the higher level intermediaries such as Aratdars.

SRF Actors Groups/Cooperatives/Associations

One way of reducing vulnerability of the lower layer actors of value chains is to organize Groups or Cooperatives. This would help create storage, post-harvest processing, refrigeration facilities, and encourage shared transportation on a collective basis. Not only these cooperatives will prove beneficial in income generation, but also will contribute to their confidence building, empowerment, awareness and overall sustainable harvest management of the SRF and in coping with natural disasters.

Improving the Socio-economic Conditions of Bottom Layer Actors

Improving the socio-economic conditions of these vast bottom-layer actors should be a major policy concern. A range of options may be available to improving the socio-economic conditions of bottom layer.

Food subsistence to the poor collectors

Rationing system for foods for collectors will be beneficial. Designing VGD, VGF or Food for Employment during lean seasons may be good initiatives to benefit the marginal collectors. Obviously, this will also facilitate sustainable resource management of SRF.

Work Opportunities and IGAs

The per capita collection quantity from the SRF has tremendously declined over the last few years following increased number of actors and extinction of some species. Efforts should be made to enable collectors to switch over to other economic activities. Less investment oriented activities may include closed fisheries, handicrafts, closed crab culture, crab fattening, fish feed production, hogla and mat making, bee-keeping, coir industry, tree plantation, horticulture, tailoring, knitting, livestock, small and medium industries (SMEs) and social forestry for the bottom layer actors. Developing a welfare fund for the collectors of various products would be a step forward.

In this context, mention may be made of this year's (20109-10) harvest of honey which has fallen by 16 percent as per the BLCs issued this year compared to last year [18]*. One of the reasons is that the Mawalis have chosen to be employed in repair works of Sidr and Aila affected embankments, which has just started in this honey seasons. This gives a clear message that Mawalis or Bawalis would not exert pressure on the SRF, providing they get alternative opportunities for employment and income.*

Fishing by trawling ship

The process, through which the trawling ships undertake catching fishes, needs serious consideration in the light of conservation and reproduction. The exploitation of jatka fish and use of 'current' nets in fishing have no option asserted by fisher collectors themselves as they have little income support during lean periods.

Leasing Canals/Khals

Some khals or canals are leased out to big companies who use trawling ships. Some of them use medicines and poisonous (chemical) substances to catch fishes which kill all the living beings in

[18] This estimate is based on data supplied by DFO, West Division, as of today (15 September). Number of BLC issued by FD (West) this year FY 2009-10 is 210, as compared to 250 in the previous year.

those leased-out canals. There should be strict regulations to check these types of activities so that the reproduction of the fishes or other species is not hampered.

Co-management and Conservation of the SRF

That co-management relates to integrating the value of conservation with benefits reaching the poor appears to be generally not within the knowledge of the SRF actors, particularly the lower level actors. Not many people have much interest in it. Given their poverty conditions, they have one and only one concern in front of them, that is, their concern of livelihood.

Some of those who know about it admit that the co-management approach is likely to equip the poor to resist pressure from the powerful who destroy the natural resource base more often for personal benefit. On the other hand, some appear to be a bit critical about co-management as, according to them, this would not give direct benefits to people at large but this might ultimately benefit a group of political and powerful section instead. The stakeholders asserted that the refutation culture of a present government's activities by the following new government in turn may not be helpful for co-management. Hence, as the SRF actors observed, the formation of forums, such as Co-management Council and Committee, People's Forum (PF), Village Conservation Forum (VCF), needs to be made with utmost care. Nevertheless, the concept of co-management is appreciated by some of the SRF actors – the only major issue to those who knew about it was their skepticism about its appropriate implementation and sustainability.

That sustainable use of the mangrove forest would yield higher welfare benefits than any other activities towards its development is well documented. A decision to develop SRF would be "extremely damaging, not only to current population's welfare but for the future generations as well"[19]. This merely highlights the importance of protecting the SRF. While IPAC has enthusiastically initiated the process of protecting the environment through co-management, further mobilization of the grass-root level people is necessary for the success of the approach. The effective integration of the interests and priorities of the local people into forest management and above all, coordinated efforts appear to be important. More importantly, the stakeholders, particularly the bottom layer actors have to be offered adequate compensation and livelihoods.

People, by and large, are also aware that the gradual depletion over the years has resulted in the degradation of the Sundarbans. The SRF actors observed that increased population, loss of aquatic and other species, increased pressure on the Sundarbans, demand for fuel woods, climate change and disasters and lack of coordination of the government bodies have made the conservation a very complex job. These need to be taken in perspectives while designing co-management. While more than two-fifths of the population are in extreme poverty, of all the issues, then the poverty situation needs to be tackled first for the success of co-management.

<u>Role of local institutions</u>

The local government institutions (LGIs) such as Union Parishad and Upazila Parishad need to be strengthened as their role is very crucial both in protecting the forest and improving the situation of the collectors. The SRF actors are in the opinion that politicization and lack of integrity of these institutions are the major bottlenecks to managing and conserving the forest. Without strong participation of the LGIs, the conservation of the SRF through co-management may not be successful and sustainable. Strong policies are also necessary for the UPs to function independently apart from enhancing their capacities.

[19] See, for example, Landell-Mills (1995).

Natural hazards

The extreme poverty situation is further deteriorated by the incidence of natural calamities. The destruction by natural calamities inevitably makes the poor hungry, only to make them angry and get involved in indiscriminate extraction from the SRF, often illegally. So, addressing the issue of destruction due to natural calamities should also be integrated with forest co-management.

Alternative livelihood means for fish fry collectors

It is important to provide allowance or alternative livelihood means (e.g., interest-free micro-credit provision, skill development training) for those engaged in collecting fish fries to reduce dependency on fishing. A provision of special allowance for education of children involved in shrimp fry collection would also be helpful. Issuing permits and licenses to fry catcher would allow only the seasonal capture of fry.

Social Forestry Issues

The beneficiaries of the social forestry programs should include only those who take part in plantation and nurture them from the time of commencement. But the reported politicization at times in changing the list of the beneficiaries at the time when income is generated is a concern posed by FGD participants. Such activities will simply dismantle the effort of conservation through social forestry programs. This gives a message that co-management of SRF would also be jeopardized if potential political interference is not taken care of.

Insurance for the SRF resource collectors

The collectors take high financial and life risks during collection of products from the forest as the act of pirates (demanding high ransom) and tigers has been cited by a large number (30%) of SRF collectors as a major problem of extraction. Insurance schemes particularly for the SRF harvesters will be beneficial and will minimize risks in this respect.

Exploitation and Unemployment

The unemployment is getting more and more crucial in the SIZ areas, particularly due to the massive destruction of agricultural lands. The natural calamities have also contributed much to unemployment. The study reveals a dismal picture of the harvesters profitability as they earn net returns at best in the range of 3 to 7 percent while they create value additions (in terms of price) by as high as 50 to 75 percent, depending on the products in question. High interest rate and never ending dadon repayment, the abuse by the Mahajans and lack of working capital are the major reasons that contribute to the exploitations.

Capacity of the FD

Almost all actors along the value chain, particularly the collectors and Mahajans, are affected by ransom and other unofficial payments to various departments, which dramatically increases their costs of harvests, accounting for 10 to 25 percent of total costs of production, depending on products. As well recognized in many documents (e.g., SEALS), the shortage of personnel and equipment in the FD is a major constraint in protecting the forest from illegal harvests and protecting the collectors from forest and river pirates.

The law and order situation needs improvement to protect the SRF collectors from giving periodical ransoms to the forest and river pirates. Once the security is ensured this will have some bearing on the production costs and subsequently some benefits are likely to be trickled down to the harvesters. The FD has to be given more advanced equipment and technology. More speed-boats, gun-ships and manpower are necessary. More trainings and exercises jointly by the FD and the Navy will benefit the effort to fight the pirates.

Low cost equipment and adoption of computer technology: Low cost equipment is to be installed for the conservation of the forest. Digital technology will add advantage in conserving the forest.

Infrastructure of web-cam through out the SRF will bring low cost option for the FD in protecting and monitoring the sanctuaries and the overall conservation of the SRF.

Increase awareness on conservation and forest rules

The actors community appears to be not much aware of the conservation issues, risk of degradation, and the importance of the Sundarbans. Undertaking more campaign programs by appropriate authority (in collaboration with local NGOs) on the importance of conservation and related forest rules would also be a step forward.

Increase awareness on sanctuaries and fishing

The present study reveals that a large number of respondent actors were not aware of the prevailing sanctuaries of fish and other aquatic resources. Campaigns on public awareness in creating safe habitat for fish and conserving fisheries resources to protect rare species through bill-board, handbills, leaflets, stickers, and mobile SMS generation need careful attention.

The use of the Information Technology (IT) should be further enhanced in protecting the sanctuaries that are crucial to conservation of the Sundarbans. Some experts strongly suggested allocation of special budget for the FD to incorporate IT in their monitoring mechanism. The options for IGAs for the people living in places surrounding the sanctuaries should be targeted.

Provide ID card to collectors

The collectors of the SRF should be provided identification cards, which the SRF actors observed, will improve the situation and status of the collectors. In that case, the FD can ensure the total number of collectors and the amount of catch they are allowed per year, apart from providing some useful information on certain species.

Lifting restriction on goran

The pressure on fuel wood comes mainly from poor actors of the SRF. Such actors also supplement some incomes through fuel wood sales. Following this, it is difficult to stop illegal harvesting of goran. In this pretext, the poor community may also get involved in logging activities. So, the ban on goran (which was imposed after Sidr) needs to be withdrawn.

CHAPTER 1

INTRODUCTION, STUDY BACKGROUND AND METHODOLOGY

Chapter 1:

Introduction, Study Background and Methodology

1.1 Introduction and Study Background

The study report has been divided into two volumes: Volume I (Main Report) and Volume II (Supporting Information) [20]. This volume is concerned with the main report.

This chapter discusses background to the study [21] and describes how the study was carried out, and includes a discussion of the research scope, research design and limitations. The Sundarbans Reserved Forest (SRF) is the largest contiguous block of mangrove forest in the world. It has an area of about 10,000 sq. km. Some 62% of the forest is in Bangladesh and 38% in India. In Bangladesh the SRF, which is managed by the Forest Department, constitutes 52% of the forest estate of the country and contributes about 41% of the total forest revenue.

There are innumerable rivers and canals across the SRF. Nearly 450 large and small rivers occupy about 1.8 lac hectares or about 30 percent of the Sundarbans. The biggest river is the Pusur. The forest is within the three administrative districts of Khulna, Satkhira, and Bagerhat. Administered by the Forest Department (FD), the area is divided into four forest ranges, namely Sarankhola, Chandpai, Khulna, and Satkhira (Burigoalini). Three patches of the forest in the south have been declared as "Wildlife Sanctuaries". They are Kachikhali-Katka sanctuary in the Sarankhola Range, Neelkomol (at Hiron point) in Khulna Range and Mandarbari in the Burigoalini Range. The UNESCO declared it as one of the most important world heritages.

The Sundarbans has a tremendous impact on the ecosystem of this country, region and the world, as a whole. A biologically diverse ecosystem, dynamic and complex, it has been used by mankind for generations. Apart from providing timber and fire wood resources, it is a source of food, crops, fish, medicinal plants, ecotourism and recreation. It provides wildlife habitat, notably for the Royal Bengal Tiger. The SRF interfaces with cultivated lands intersected by tidal rivers, canals and streams. The waves and tides with changes in water depth and its biochemical constituents, and fresh water from rivers are the basis on which life and ecosystems depend.

Besides deriving economic value of directly extracted goods the Sundarbans serves as coastal protection from cyclones and tidal surges. It contributes to the local and national economy. Estimates on the number of employment provided by SRF widely vary but it is believed to be more than half a million. The population in the immediate vicinity of the SRF is approximately two million people, with a quarter of them directly dependent on the SRF itself [22]. The

[20] As the study has generated vulmenous data and information, the division is made in order to make it more readers- friendly. One has to read this volume (Main Report) in combination with Volume II (Supporting Information).

[21] Some of the study background is drawn on the initial proposal and ToR of the study, prepared by IPAC, IRG and the Principal Investigator of the study.

[22] Integrated Resource Development of the Sundarbans Reserved Forest: Project Findings and Recommendations. Report prepared for the Government of Bangladesh by the FAO, Rome, 1998.

Integrated Resource Development Plan estimates that "at least half a million participate to a greater or lesser extent in SRF resource utilization" [23]. Nevertheless, various studies pointed to the fact that poverty levels of the population living around the SRF are likely to be high (For an analysis on SIZ poverty levels, see district and upazila profiles in Chapter 2).

The extraction of goods from the Sundarbans has had a harmful effect on the terrestrial and aquatic resource base. Even in the most remote parts of the SRF, the largest trees of Sundri and some other species are gradually disappearing from the forest. This is true even in the three Wildlife Sanctuaries included within the SRF. It is commonly accepted even within the Forest Department that the forest is being depleted at a rate faster than it can replenish itself. There are several other documents concluding that the 'Sundarbans are in depletion' [24]. That this depletion has continued in the decade as also evident from interviews with people living in the area in the present study.

Studies of the economic analysis of those having economic and ecological impact on the SRF have been confined principally to provide general account of the populations and descriptions of the nature and amount of goods extracted in the areas surrounding the SRF. On the other hand, there exist a large number of studies on poverty, however, for areas throughout rural Bangladesh. There are little specific information on the SRF areas. Analyses undertaken of threats and opportunities of the SRF have commonly identified the presence of a large population of poor households in the immediate vicinity of the SRF, including many thousands that depend directly on the direct use of the SRF resources for their survival. The MARC surveys of 1996 include household surveys of poor households in the buffer areas of the Sundarbans [25]. The socio-economic reporting from those surveys (such as those included in the final Integrated Resources Management Plan, Volume I) highlight the characteristics of the surrounding poor, but offer little information about the other stakeholders involved in resource extraction.

The draft revised SBCP (Sundarbans Biodiversity Conservation Project) proposal prepared by the Forest Department in 2003 identified a full range of user group stakeholder categories with an analysis of the extent to which the hundreds of thousands of poor resource users hide other more powerful actors [26].

The increased population with few alternative livelihood opportunities poses a serious threat to the Sundarbans which is the main cause of mangrove destruction (FAO 2003; Waggoner and Ausubel 2001; Ong 1995). Moreover, dependence of local people on the forest is high (18% of the households in the SIZ are dependent on the forest, as the present study reveals) and in future this dependence will increase (Anon 2001c), which is likely to aggravate the existing pressure on the government mechanisms for forest management and protection [27].

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[23] *Integrated Resource Development Plan,* Volume I, 1998.

[24] AGRIFOR Consult (2008). *Formulation Study for Sundarbans Environmental And Livelihoods Security (SEALS) project*, EU, Bangladesh; *Sundarban Biodiversity Conservation Project. 1999.* Financial proposal 2, Loan component. ARCADIS Euroconsult. In association with Winrock International, Kranti and Naco, Government of Bangladesh.

[25] MARC 1995, *Socio-Economic Study Final Report, FAO/UNDP Project BGD/84/056,* Integrated Resources Development of the Sundarbans Reserve Forest, Khulna, Bangladesh.

[26] See also Rahman (2007), CNRS

[27] The present study suggests that more than 28 percent of SIZ population are dependent on SRF (Chapter 2).

Although the resource users are blamed for extraction, the real benefit they get is less than what is required as they are exploited by moneylenders and becomes poorer day by day. The name and fame of the Forest Department as custodian of the Forests have also suffered a lot. The general people, whose lives and assets are protected by the Sundarbans during natural disasters, are now more vulnerable to disaster than before.[28]

Following the above background, the study, the first of this kind within SRF, aims to understand and, where possible, quantify the economics of extraction and sale of marketed products from the Sundarbans Reserved Forest (SRF). Information and knowledge obtained through this study aim to provide a foundation upon which economic interventions, climate change actions, and governance interventions can be more efficiently designed and implemented for the SRF and associated Protected Areas, in support of the improved, collaborative management and sustainable use of these resources. The study aims to understand the value and flow of the various categories of SRF goods: timber; non timber forest products; fish; and other aquatic resources.

1.2 Brief Literature Survey and Issues related to SRF Extraction

At the outset, a literature survey is carried out keeping in mind the general objective as economics of extraction, and value chain analysis, in particular. The aspects such as livelihoods, resource-use pattern and stakes of different groups will also be kept in perspective to some extent.

The Sundarbans Reserved Forest (SRF) in Bangladesh is the largest mangrove forests in the world. In addition to the national economic service, the Sundarbans has long been recognized for the benefits it brings to people around in terms of livelihoods and protection from disasters. It is estimated that around two million people in the immediate vicinity of the SRF earn livelihoods while a quarter of them are directly dependent on the SRF itself most of which population, again, are said to be living below poverty levels (Integrated Resource Development of the Sundarbans Reserved Forest 1998) (See Chapter 2 for current poverty levels in SIZ).

There are estimates of economic value of extracted goods from the Sundarbans (e.g., by Dey 2001). There exist a number of studies on poverty analysis but mostly relating to Bangladesh, as a whole, with little analysis specifically to SRF areas themselves. The socio-economic reports from surveys such as MARC 1995 and the Integrated Resources Management Plan highlight characteristics of the poor households. The study by Quddus, Ahsan and Guha (1996) captured the extent to which the rural poor directly extracting from the Sundarbans are employed and impacted by other forces. Almost all the population of the study area are directly or indirectly dependent on the forest resources and a section of them are directly dependent on them.

The study by Landell-Mills (1995) explored, through benefit-cost analysis, whether sustainable use of the mangrove forest would yield higher welfare benefits than its full or partial conversion to aquaculture. The study concluded that a decision to develop SRF would be extremely damaging, not only to current population's welfare but for the future generations as well.

Quddus, Ahsan and Guha (1996) observed that the major benefit of the forest resources went to Mahajans, officials of the Forest Range Office and the pirates in the Sundarbans area. The BBS

[28] (Draft) Project Proposal: Sundarbans Biodiversity Conservation Project 2004-2009, Prepared for Asian Development Bank by Forest Department, Ministry of Environment and Forests, GoB, pp 24-25; Islam *et al* (2005).

studies largely generated national or district level data, again, largely related to aggregate demographic and population issues allow no conclusions about the subset of population directly dependent on the SRF.

Other surveys have explored the income and poverty levels in the buffer areas of the Sundarbans, including a number of Bangladesh Bureau of Statistics (BBS) surveys. From these surveys one can obtain a general estimate of the levels of poverty immediately adjacent to the Sundarbans forests. But these were conducted with small samples within much larger national surveys, aiming at providing reliable estimates of household dynamics aggregated to the national level. Sample size and estimation from the BBS poverty surveys, for example, are not conducive to drawing conclusions about the Districts immediately surrounding the Sundarbans, and certainly not to drawing conclusions about the subset of persons using from the Sundarbans directly.

While a number of available project documents include descriptive information about specific products extracted from the Sundarbans (studies on NTFP's, fisheries resources, honey and tourism), none of those reports attempt to describe in detail the chain of value addition and processing that occurs as these items are extracted from the SRF. Nor do any of these studies examined or described the nature of relationships between different actors in the Sundarbans value chains.

Haque, Shammin and Islam (2002) analyzed the dependence of the different users on the ecology of Sundarbans and its impact of degradation on the stakeholders through using a cost function approach. The study found a positive relationship between quality of mangroves and cost of production. That is, higher the quality of mangroves higher the cost of extraction; this was observed for fish, timber, honey and grass.

The Sundarbans Biodiversity Conservation Project (SBCP) proposal (revised draft) prepared by the Forest Department in 2003, identified a full range of user group stakeholder categories. The document observed that although the resource users undertook over-extraction the poor users are most exploited by the moneylenders, only to expedite the process of pauperization.

While a number of other project documents offered descriptive information about specific products extracted from the Sundarbans, few of those reports addressed the chain of value. A fisheries study being conducted by the World Fish Center and the Department of Fisheries is expected to focus on an assessment of the condition and trends of fisheries resources including changes in fish populations and habitats in the Sundarbans area.

The SBCP had the strategy to include infrastructure and associated livelihood investments in the upazilas surrounding the Sundarbans. It is now argued that the livelihood interventions may have a minimal impact on reducing forest loss. The strategy of forming forest user groups from the SIZ was to provide those user groups with some alternative income opportunities.

The management of the Sundarbans has evolved over the years. The Forest Department maintains statutory authority over the entire SRF including the water bodies within it. Recognizing, however, the complexity of managing fisheries resources, the Forest Department has held several consultations with the experts from the Fisheries Department as well as the World Fish Center to provide advice on aspects relating to fisheries resources management.

Project resources have not proved adequate to meet the needs of all communities and individuals now benefiting from the Protected Areas. The design of economic interventions therefore must carefully target a clearly identified subset of stakeholders who can probably become active

advocates of conservation in return for a defined benefit. The study by Rahman (CNRS) (2007) delineated methods for identification of SRF stakeholders, and then identified them, including outlining the hierarchical power structure of resource management and use in SRF. The study provided an interesting account of hierarchies for different SRF products. The stakeholder group consists of people who are directly dependent on SRF resources for their livelihoods who can also be treated as "user communities". But this user group consists of two distinct sub-groups: one sub-group directly collect resources by themselves, more often working on wages, called "collectors". The other sub-group "engage, support and protect the collectors" presumably for their own interest, called "investors". As will be seen in subsequent chapters, all these will have implications in terms of value chain analysis.

With regard to value chain for fish marketing, a number of studies have recently been carried out. Hussain and Uddin (1995) found the moneylender-cum-wholesalers (Aratdars) to procure fish from fishermen at pre-determined prices. The most dominant role is said to be played by Beparis. There is no price control in wholesale or retail fish markets. Rouf and Jensen (2001) outlined problems of fisheries within the Sundarbans Reserved Forests (SRF) in order to develop a sustainable management system. The study found that fishermen had no bargaining power to achieve the price they deserved. A large number of middlemen are involved in the marketing channels. The present study demonstrates that poverty levels of SIZ areas, compared to non-SIZ areas, are quite high (for a comparative analysis, see Chapter 2,). Naturally, the issue arises as to why the SIZ population are living in poverty and whether SRF extraction activities have any bearing on this poverty situation. This study is an attempt to explore this.

Kleith U *et al* (2002;2003) (Kleih U, Alam K, Dastidar R, Dutta U, Solaiman M, Chowdhury I U, Kareem N and Ward A (2002;2003) identified major factors that cause poverty in the fishing communities, which include declining fish catches, lack of security (mainly in the fishing grounds due to piracy), natural disasters and lack of capital. The study outlined an improved understanding of the trading and credit system, and poverty in coastal fishing communities. The study also emphasized on a methodology integrating market and credit analysis techniques with a livelihood approach. The study argued that if fishermen are "exploited" due to loan arrangements with traders, this reflects inefficiencies of the credit system. Due to declining fish supplies, parts of coastal fishing communities will be forced out of the fishery to seek other employment. As a consequence, alternative income generating activities (IGAs) need to be urgently identified and created.

Ahmed *et. al*. (2005) identified that fish marketing channels even near Dhaka (Gazipur) are almost entirely regulated by skilled middlemen. The study found that only 40-45 percent of retail price went to the fishermen, 35-40 percent to middlemen while the remaining 20-25 percent spent for transportation, preservation and other charges. Ahmed (2007) carried out a similar study for coastal Bangladesh. The study considered three types of markets (primary, secondary and consumer); Dhaka city retail markets were also surveyed to analyze the price variations. The net share to the fishermen of the price paid by the consumer was 55 percent. Shamsuddoha (2007) conducted a study on supply and value chain analysis of marine dried fish; the study found that around 60 percent of total catch directly went to Aratdars, majority of whom owned fishing vessels or made advance payment for the catch. Primary producers secured considerably less profit, only 5 to 8 percent. Ali *et al* (2010) estimated the margin earned by the boat/net owner of hilsha as 37 percent while the fishers (group) together earned 23 percent.

A recent study by Hossain (2007) (financed by USAID's Nishorgo Support Project) mapped out the range of major stakeholder groups that were involved in marketing of forest resources. The study mapped the flows and type of major SRF products collected by the stakeholders in the value chains. While the relationships, flows and categories are catalogued in general terms, one has to explore the economic relationships behind. The aspects such as amount of payments, the

nature of contractual agreements, the amount of goods extracted and the profit margins were not included in the scope of the study.

Barkat *et al* (2009, ECOMAC, CDMP) carried out an analysis of contribution of the coastal economy to the national economy and appraised economic risk of the coastal region (e.g. fishing/tourism/industry) to surge event. Along with other estimates and analyses, the study presents region wide estimates of the three basic aggregates of the macroeconomic variables such as GDP, its growth rate and share of agriculture, industry and service sectors. For obvious reasons, however, the analysis was based on rather outdated data.

1.3 Objectives of the Study

Following the above background, the major objective of the present study, which is perhaps the first of this kind within SRF, is to understand and, where possible, quantify the economics of extraction and sale of products marketed from the Sundarbans Reserved Forest (SRF). In other words, the study is expected to provide a foundation upon which economic and other interventions can be more efficiently designed and implemented for the SRF and associated Protected Areas.

The study will use the framework and language of the value chain analysis. The "VC approach" is also expected to enhance understanding of the constraints and the relationships among actors at each step of the chains, and associated product transformation, recognizing that demand for processed products begins far away from the Sundarbans in many cases. The study is expected to identify interventions that can improve the overall total value generated along the chains.

Attempt will be made to measure not just stated market prices of products but rather the full cost of doing business at each stage in the value chain. In this respect, expenditures relating to access rights - whether legally or illegally obtained - will be included in the analysis. This will again facilitate designing interventions to modify those value chains. An approximate idea of the number of different actors involved, jobs crated, geographical flow of products, and income distribution of the actors related to the SRF is also one of the aims of the study. The study is also expected to make recommendations concerning those stakeholder groups that might be involved in a participatory or collaborative management structure for the Sundarbans.

In particular, the study is expected to contribute to revision of the Integrated Resource Management Plan (IRMP, 1998-10) of the Sundarbans Reserved Forest, the preparation of which is in progress.

1.4 Methodology

This section describes how the study is carried out. In particular, it deals with the methodological issues, such as estimation procedure of the value chains, costs and returns, number of various resource users, spatial flow and volume of extraction. This describes principal tools, analytical framework, various implementation stages, and limitations and scope of the study.

1.4.1 Principal Tools

Briefly, the methodology includes the following principal tools:

- The study carries out structured questionnaire survey apart from adopting standard PRA tools and approaches (e.g., FGD, key-informant interviews, community survey, consultations, and case studies).
- Spatial sampling is adopted to assist in estimating the numbers of resource collectors and actors involved in extracting from the Sundarbans. The principal stages implemented by the team include the following:

1.4.2 Analytical Framework of the Study

The survey area

The periphery of the SRF includes the legally declared "Ecologically Critical Area" assumed to be within a 20 km band surrounding the SRF [29]. This is what can be called the Sundarbans Impact Zone (SIZ)[30] in the context of the modalities of the livelihood interventions and support for environmental conservation, which is the present study area. The SIZ vis-à-vis the study area comprises 5 districts, 10 upazilas, 151 unions/wards and 1,302 villages, which are presented in Table 1.1.

Table 1.1: Sundarbans Impact Zone Areas

District	UZ	No. of Unions/Wards	No. of villages
Bagerhat	Sadar, Mongla, Morrelganj, Sarankhola	65	486
Khulna	Dacope, Koyra, Paikgacha	37	440
Satkhira	Shymnagar	13	216
Pirojpur	Matbaria	20	94
Barguna	Patharghata	16	66
ALL (5 Dist)	10 (UZ)	151	1302

Source: BIDS-IPAC VC Analysis Study-Reconnaissance Survey, 2010.

In addition to the above upazila locations, the district towns including Khulna City Corporation (KCC) are included to comprise the study locations. This is because the SRF marketing channels and destinations thereof end up with areas away from the Sundarbans, in nearby urban centers in many cases. In other words, the survey locations have covered huge areas which are widely spread.

The study aims to understand the value and flow of the following categories of SRF products: timber; non timber forest products; fish, aquatic, non-aquatic resources and other products. The study excludes the value chain for service-oriented intangible product - ecotourism, as it is being

[29] Sen, Soham G. (2010). "Conservation of the Sundarbans in Bangladesh through Sustainable Shrimp Aquaculture," Nishorgo Project, Department of Forestry,Bangladesh.

[30] However, only recently published *Strategic Management Plan for the Sundarbans Reserved Forest* (March 2010) defined SIZ as comprising 17 UZs.

examined elsewhere and is of a nature and organization that is considerably different from the other tangible value chains identified.

Sectors and products coverage

The following major SRF sectors and products [31] are under the purview of the present study:

Timber:
1. Sundri
2. Passur
3. Kankra
4. Gewa

NonTimber
1. Goran
2. Golpata/Grass (*Shon*)

Fish:
1. *Gura* (small) fish
2. *Sada*(white) large fish
3. Hilsha
4. Shrimp large (galda)
5. Shrimp large (bagda)
6 Shrimp *gura* (galda)
7 Shrimp *gura* (bagda)
8. Shrimp fry (galda)
9. Shrimp fry (bagda)

Aquatic Resources
1. Crab
2. Mollusc/Shell/Oyster

Non-Aquatic Resources
1. Honey

Other Products
1. Medicinal plants
2. Fuel wood
3. Bee wax
4. Hantal

It needs to be mentioned here that not all the products listed above will be within the scope of this brief study, which is aimed at focusing on value chain analysis (VCA). For example, the products under "Other Products" will not be included in the current VCA. However, the type of associated actors and flows of all the products under the above list are contemplated. In the case of multi-products dealing with by a single actor, the dominant product is considered.

[31] There has been a ban on sundri for a long time; goran is also banned since cyclone Sidr. One sample of sundri (illegal) and 6 samples of goran (legal but as by-product) have been included in this study to identify marketing chains and other aspects of extraction other than detailed costs and returns.

Shrimps have been divided into four categories: shrimp large (galda), shrimp large (bagda), shrimp small (gura chingri) (galda) and shrimp small (gura chingri) (bagda) according to their significance in terms of consumption by different socio-economic groups of people. Shrimp large, both galda and bagda, is important for its contribution to foreign exchange earnings. The fish of shrimp small (gura chingri) (galda and bagda) is important in the context of relatively higher consumption by mass population. Shrimp fry catch, important from a different socio-economic consideration, is undertaken by relatively poorer section of population, including children and women.

Some of the intermediaries were found to be themselves involved with the collection related activities. Others may be related with only distribution (through Aratdars, Beparis, wholesalers and retailers). Hence, a few case studies of resource collectors and intermediaries have also been carried out.

Reconnaissance survey and pilot survey

A reconnaissance survey has been carried out to

(a) identify the tentative steps and value chains for each of the SRF products;
(b) assess information needs at each nodal point of the value chains and identify appropriate primary and secondary sources for relevant information; and
(c) to identify actors in the chains and associated concentration centers (See Annexes B, C and E).

The definitions of the SRF actors and their functions/roles in the value chains are presented in Annex B. The actors include, among others, Collector, Faria/Bepari, Choto Mahajan, Boro Mahajan, Bahaddar, Aratdar, Wholesaler and Retailer.

In fact, the marketing chains of SRF products are complex and of innumerable combinations. As can be seen from Annex C, a large number and combination of multi-dimensional flows and actors have been identified for major SRF products. Further, a pilot survey was carried out to perform pre-testing of the survey instruments.

1.4.3 Concentration Areas and Sampling

Conducted at the very outset, the Reconnaissance Survey identified the concentration areas (landing places, primary markets and secondary markets) for SRF products across 5 SIZ districts, comprising 10 upazilas and 151 unions/wards. The major concentrations are presented in Annex E. As high as 159 markets, 138 primary centers (landing places) and 21 secondary markets across 5 districts for all SRF products have been identified. It cannot, however, be said that the prepared list is exhaustive but, hopefully, most of the centers have been included.

These primary landing places for various SRF products are our sampling units. Appropriate sampling procedure i.e., systematic random sampling method is adopted [32]. About one third (48 out of 159) of the major concentration centers were covered, so as to include all the major SRF products and the major actors under study. In other words, the sampling was adopted considering the following criteria : (1) 5 Districts (2) 10 upazilas (3) 5 district towns (4) 45 Primary markets

[32] The sampling method could not, however, be strictly followed because of, among others, seasonlity of products.

(Landing places) [33] (5) 12 SRF products and (6) 7 Actors. Needless to mention that the method of sampling, incorporating all the above mentioned criteria, was much complex for this brief study, but all efforts were taken to make the sampling as representative as possible [34]. The ultimate sample size was 237 [35]. A total of 47 FGDs was conducted across upazilas and activities. The findings from structured questionnaires were validated through FGDs and meetings with relevant experts and officials which also helped developing recommendations for efficient value chains. The sampling method was sort of constrained because of, among others, seasonality characteristic of the activities concerned. The distribution of sample by district is shown in Table 1.2 (See Tables A3.1 through A3.4 for the distribution by primary centers, upazila and product). The distribution of 47 FGDs by 5 districts is shown in Table 1.3.

Table 1.2: Sample size by district

District	Sample	%
Bagerhat	89	37.6
Khulna	58	24.5
Satkhira	60	25.3
Pirojpur	11	4.6
Barguna	19	8.0
Total	237	100.0

Table 1.3: Number of FGDs conducted by district by product

District	Upazila / Municipality	Fish	Crab	Golpata	Honey	Timber	Total
Bagerhat	Mongla	-	-	2	-	2	4
	Sarankhola	3	2	2	-	-	7
	Morrelganj	1	-	1	-	-	2
Khulna	KCC	3	2	2	-	2	9
	Dacope	1	1	-	-	-	2
	Koyra	-	1	2	1	-	4
	Paikgacha	3	2	1	-	-	6
Satkhira	Shymnagar	1	3	-	5	1	10
Barguna	Patharghata	2	1	-	-	-	3
TOTAL	-	14	12	10	6	5	47

Given the large number of concentration centers, sectors, products and agents under investigations, detailed level Value Chain Analysis for only the major SRF items would be under the purview of this study. However, the supply chain for each product of the extended list (See 1.4.2: Sectors and Products Coverage) would be identified. As discussed earlier, the study excludes the value chains for service-oriented intangible products, ecotourism, for example.

[33] The primary markets are grouped into 2 broad categories according to scale and size of operation: High and Medium concentration.

[34] It goes without saying that the randomness of the sample selection suffered because of so many criteria of sampling considered and, more importantly, the seasonality of extraction of SRF products.

[35] At some point of time during the survey, it was observed that structured questionnaire interviews started not giving us much value addition in terms of information; so it was decided that more FGDs be done to capture more valuable insights on aspects that were difficult to be obtained from formal interviews. Following this, we carried out increased number of FGDs through limiting the actors interviews to around 237.

In the process of our consultations during pilot survey an issue immediately emerged [36]. This was about how saw mills and furniture units are operating in SIZ locations in spite of virtually no timber products can be extracted due to its ban for a long time now. Hence, an investigation was carried out in all the major SIZ areas as to how these enterprises are surviving. In all, 34 units across SIZ areas were interviewed, which included both saw mills and furniture units. Interestingly, many saw mills had furniture units or timber trading or timber logging. Hence, given the scope of this brief study and small sample size of saw milling units, we processed the data lumping them together as our main issue was to look into the production and investment trends of such units.

1.4.4 Mapping of Actors and Flows

As the major theme of the study is related to mapping for actors, activities and volume, and the analysis on value chain, the following five major steps are involved in the process:

- Mapping for core steps in the value chain
- Mapping for actors
- Mapping for number of actors and jobs
- Mapping for volume of products
- Mapping for geographical flows, and finally
- Mapping for the values at different levels of the value chain.

Mapping core steps in the value chain

Typically, the first step is to find the different core processes in the value chain. In other words, this entails the processes that occur from raw material through to final consumption of end products. As the present study identifies the chains along the collection of SRF products up to final destination it excludes processes involved in converting into final products through processes (e.g., saw milling, log making, furniture making, fish drying, etc). In other words, the study aims to map marketing chains only. However, from different perspectives, as already mentioned, the study investigates a few processing activities centered around SRF products, such as saw milling and furniture making enterprises.

Mapping for actors

Now that the main marketing chins are mapped, it is possible to move on to the actors – the people who are involved in the value chain. In other words, who the actors that are involved in the chains and what they actually do and what are their roles in the value chains (See Annexes B and C).

In many value chains, especially in small or weaker markets, there is often no pure specialization. One actor may take on several different roles. One has to find out the main occupation of this actor to categorize it accordingly.

Mapping for number of actors and jobs

[36] This was particularly mentioned by IPAC-CoP in a meeting of the study team with IPAC and personnel in Khulna, 9 March 2010.

Now that the main marketing agents are mapped, two dimensions that are quantifiable are the number of actors and the employment opportunities they offer. These two dimensions are closely related to each other.

Mapping for flow and volume of products

Once the chains, actors and specific activities in the value chain are mapped one has to map the flows of products through the value chain. This involves identifying the products at each marketing stage from collection through to final destinations. Mapping these flows creates a clear picture of what forms of chains are handled at each stage of the value chain. Nevertheless, the present study entailing marketing chains deals with nearly the same product without any significant processing or transformation.

Approximate mapping of the volume of products relating to the selected major concentration areas would be the next step. The volume of products is closely related to mapping the product flow. Finding out the volume of product makes it possible to have an overview of the size of the different channels within the value chain.

Mapping geographical flows:

Based on the mapping of flows, volumes and actors it is relatively straightforward to develop an approximate geographical map, however, based on first-stage movement, which may be of particular importance in the context of necessary interventions. Starting from the place of origin (i.e. where it is collected) it may be possible to approximately map how and where the product travels, that is, from places of collection, to places of intermediary traders, then to places of wholesalers, retailers and final consumers [37].

Mapping the value at different levels of the value chain.

The study aims to map marketing chains only. The focus of this study, that is, the core element of value chain mapping is to map the monetary value throughout the chain. Value is something that can be measured in many ways. The most straightforward depiction of a monetary flow would be to look at the price value additions at every step throughout the marketing chains, providing an overview of the earnings at the different stages (See Section on Limitations of the Study). Other economic parameters are, amongst others, cost structures, profit, and return on investment. It is important to recognize that at the mapping stage of the value chain analysis sometimes accurate information about costs, margins and profits at different levels within the value chain may not be adequately available. It is found that only price information is known at each level, and thus so far the marketing chains are concerned value additions in terms of price are the core concerns of this brief study.

Existing product-specific marketing chains are identified by developing flow charts with all active market agents, starting from the collector level to the final retailer level (See Annex C). The functions and roles of individual actors in the value chain are outlined in Annex B.

1.4.5 Value Chain Analysis

[37] The Reconnaissance survey indicates that the actors, by and large, are well aware of the places of origin and destinations of SRF products.

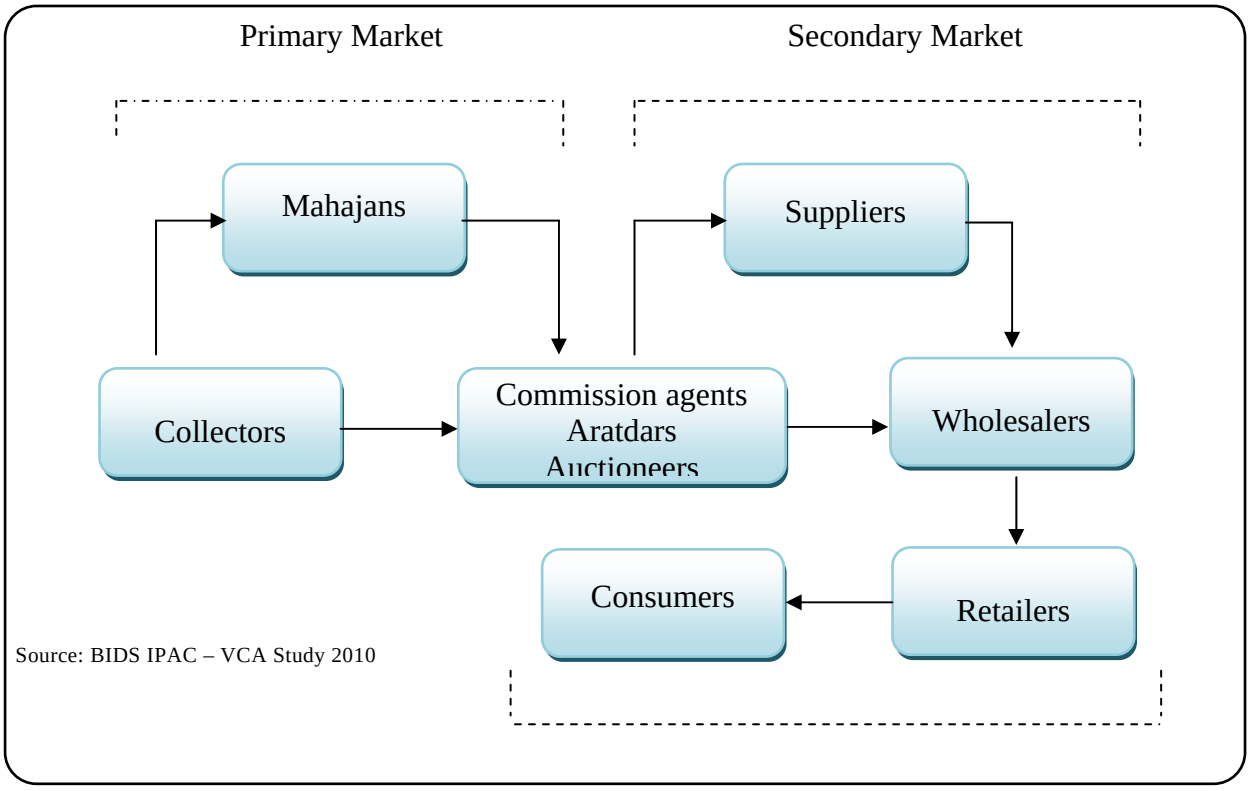
The value chain framework, which is a powerful analysis tool for the strategic planning of an activity, is a string of agents or collaborating players, who work together to satisfy market demands for specific products or services.

The ultimate aim of any value chain framework is to maximize value creation while minimizing costs. This entails the concept of value added, in the form of the value chain, which is utilized to develop a sustainable competitive advantage of the activity concerned. This may consist of the key steps within an activity that link together to develop the value of the final product. Such steps may include purchasing, manufacturing, distribution and marketing of the products and activities [38].

The value chain analysis essentially entails the linkage of two areas. Firstly, the value chain identifies and links the value of the activities with its main functional parts. Then, the assessment of the contribution of each part in the overall added value is made. The profitability of an activity depends to a large extent on how effectively it manages the various steps in the value chain, such that the price that a customer is willing to pay for the products and services exceeds the total costs of the value chain steps. It is important to bear in mind that while the value chain analysis may appear much simple in theory, it is quite time-consuming and complex in practice.

This study entails value chain analysis in its simplest meaning in that the activities centered around SRF products are assessed in terms of price value additions and overall returns starting from resource collectors to ultimate retailers. Focus is given, however, on social relationships among actors involved across supply value chain. For simplicity, the study assumes no export activities in the process. In other words, only indigenous and local actors are under the purview of the present investigation.

Figure 1.1: Basic structure of SRF products marketing systems

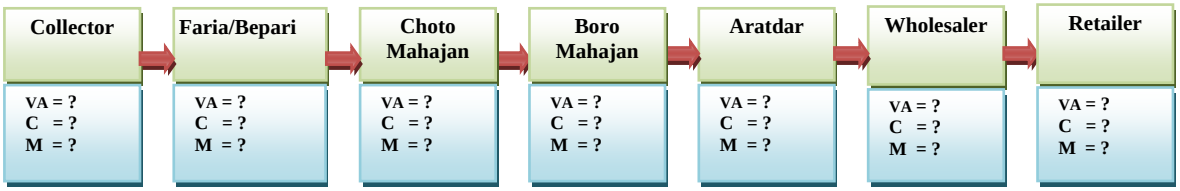


[38] The core concern of the present study, however, is the marketing chains of products starting from harvests.

The basic structure of marketing chains for SRF products is shown in Figure 1.1. However, the actual marketing chains are found to follow multi-dimensional patterns (Annex C).

As mentioned earlier, the theme of the present study is to map the monetary value throughout the chain. In other words, our ultimate output would look like something involving the following steps (Figure 1.2):

Figure 1.2: A simplified and typical SRF marketing system and value chain of the actors (% of retail price)



VA = Value addition; C = costs; M = Margin = VA – C

1.4.6 Characteristics of SRF Actors and Plausible Hypotheses regarding the Value Chain

The study aims to track the various channels of SRF product marketing and the agents involved. As will be evident later, the marketing and distribution system of major SRF products follow a complex system in a unique economic zone. For many of the items, which are dependent to some extent on FD rules and regulations, the number and type of major intermediaries (e.g., Mahajans and Aratdars) are rather limited, allowing for oligopolistic behavior to carry out such activities. The complex pattern of markets of SRF items in Bangladesh makes the market operation interesting and critical. In this backdrop, concerns with regard to resource control of the leading powerful agents, musclemen and intermediaries are strongly voiced from time to time, however, often without adequate proof. The market power (in terms of share of particular player in total supply) is also reported to be concentrated in the hands of a few powerful players (See, for example, Rahman 2007). On the other hand, the bargaining power of disadvantaged group (e.g., harvesters) is critically low for various factors. This may give rise to the possibility of inequity and anti-competitive behavior (for example, price manipulation, ownership of productive resources and control of supply in the market, earning extraordinary profit) through a well-coordinated oligopolistic behavior. The present study is an attempt to examine the relevant issues in this context.

Within a complex system, it is hypothesized that the number of important and powerful players in the marketing and distribution system of SRF goods is limited who can exert the major control over the productive resources allowing for oligopolistic behavior to carry out such activities [39]. In other words, it is hypothesized that such network of powerful actors creates unequal income distribution among SIZ populations through widespread exploitations.

1.4.7 Methodological Issues relating to Estimation Procedures

[39] See Rahman (2007) for a similar hypothesis.

The study carries out micro level analyses to get insights into market behavior of the selected forest products. As there are innumerable chains in the process the most common product-specific value chains are identified through developing flow charts with all active market agents, starting from the producer level to the final retailers (Annex C).

Data generated through various methods are summarized and analyzed to seek estimates of the main research parameters. A number of statistical indicators have been used in this study. For example, to get an estimate of the average Gross Marketing Margin GMM = (Sale Price - Purchase Price) for a particular agent of a specific product, average is made over all the collected/validated sample values [40]. Similarly, agent and product specific Net Marketing Margin NMM= (GMM - Marketing Cost) is estimated. In a similar way, gross and net monthly returns are estimated from GMM and NMM by incorporating average volume of products traded. In normal situations, average selling prices of one actor should be equal to average buying prices of the next actors in the hierarchy in turn. But following various reasons explained later, this has not happened in this study. Consequently, the average selling prices were not used in estimating gross returns as buying prices were different from selling prices of the preceding actors. The costs of production and marketing include transportation cost (including labor, fuel cost), market toll, loading and unloading, commission of Aratdars and wages of employees, packaging cost, storage cost, official and unofficial payments, as applicable. In the case of the original resource collectors, cost of resource collection includes associated living expenses, or any other payments depending upon the terms of contract (e.g., contract basis or piece-rated basis), and official and unofficial payments, if any [41]. The value of family labors, if any, is imputed according to prevailing wage rates taking into account of appropriate opportunity costs.

The estimates of margins or returns have also to consider investment. Returns over working capital, both in terms of gross returns over working capital (GRWC) and net returns over working capital (NRWC), are estimated to offer an idea about the return that the agents acquire from their investments. GRWC and NRWC are estimated as gross (net) Return over working capital in percentage term = {Gross (Net) Margin x 100/ (Purchase Price +Marketing Cost)}, where working capital approximately equals to (Purchase Price + Marketing Cost). Returns on working capitals are important for some of the agents in order to get an idea about its rate, and to see if such returns are abnormally high or low.

As will be seen in subsequent sections, the marketing chains for the SRF products are complex and multi-dimensional, involving, again, innumerable combinations. A large number and combinations of multi-dimensional flows and actors have been identified for major SRF products, depending on locations and products (See Annex C). As generally applicable for all SRF products, the calculation of value additions, and costs and returns is fraught with the problem in that resource collectors are engaged in harvesting multi-products (as high as more than 20 species in *sada* or *grua* fish, for example). In particular, it posed problem to estimate returns of some actors (Mahajans and Aratdars, for example) as they also have multiple roles. Some Mahajans were found to act as Aratdars and some Aratdars as Mahajans. Similar was the case with Choto Mahajans, Beparis and even some wholesalers. Over and above, some of the intermediaries in this sector as well are themselves involved with the collection related

[40] See Rahman *et al* (2008), CPD.

[41] Before designing the questionnaires, a pilot survey was thus essential to frame exact questions incorporating various prevailing terms of payments.

activities. For example, some of the Farias are also collectors; some of the Mahajans, Aratdars or wholesalers are directly involved as collectors.

Furthermore, the resource collectors or even Beparis or Farias sell their products partly to Mahajans and partly to Aratdars or even wholesalers at different prices so that buying prices and selling prices were different. Another limitation is related to costs of collection that are borne or shared by actors, depending on who are involved in organizing the collection trips. Hence, consistent and systematic buying or selling prices (price value additions) and even returns according to hierarchy were not always discerned. Following this, it was not feasible to estimate Value Additions, from economics point of view, particularly for per unit product. Associated costs calculations and their segregations were complicated when there were advance sales to traders or Mahajans by the collectors in the form of dadons, which was applicable almost for all the cases. Consequently, associated adjustments posed complex, particularly when there were multi-products that were dealt with by a single actor; in such cases, the dominant product is considered and relevant costs are segregated for the product in question.

As also discussed in Chapter 5, the calculation of costs and returns is found to be complicated in that when there was often no systematic hierarchy among actors and when a single actor is concerned with multi-products and has multiple roles. In normal situations, average selling prices of one actor should be equal to average buying prices of the next actors in the hierarchy in turn. But some actors sell directly to other actors through bypassing the immediate higher level actor. For example, some Beparis sell, in addition to Choto Mahajans, directly to Boro Mahajans or even Aratdars so that buying or selling prices or value additions selling prices or price value additions may not appear to be systematic and consistent in all the cases. In practice, both buying prices and selling prices varied according to various transactions so that average buying prices in combination with average selling prices were used in estimating gross margins and gross returns. Consequently, the gross or net returns may also appear to be not always consistent. Collectors who work for others on wages are not considered to have any working capital. Majhis get a share of profit in addition to wage as collector when products are sold at fixed (either by bargains or unilaterally by Mahajans or Aratdars) or reduced price.
Some of the problems discussed above could be surmounted if a single combination/set of actors, for a single product, single grade [42], size and quality could be pursued, in accordance with respective origin (source) and destinations so that the values along actual chains could be pursued. This was not feasible for this brief study, which dealt with as many as 12 different sub-sectors, and at least 7 actors, spread over as many as 159 primary landing places of 5 districts and 10 upazilas.

Following the above problems, the emphasis in this study is given on estimating gross or net returns of individual actors (on a monthly basis) so that their relative positions, in terms of income and inequality, for example, are revealed. The value additions for the resource collectors, who largely work for others on wages with associated costs borne by trip organizers, are considered to be merely the price at which the products are sold. Since this study is concerned with marketing chains, in consequence, the price value additions have been taken as proxy to economic value additions.

The study makes an attempt to estimate the extent of income concentration at intermediaries level (share of income of top few traders in total income) and also at area level, in order to have

[42] For example, crabs have at least 16 grades, Sada fishs have more than 20 different species types, with various sizes and quality.

an idea about possible market power and income inequality prevailing among SRF actors. Given the multi-dimensional pattern of flows, again, the aggregate estimate of the 'number of agents involved'/'number of jobs created' from the Sundarbans would be tentative in this study. The volume of products was estimated at enterprise level only. While it was not feasible for this brief study to contemplate all the chains, the basic, common and dominant chains for the selected SRF products are identified for investigations. In the case of multi-products and multi-grades dealing with by a single actor, the dominant product or grade is considered.

Based on the mapping of flows, volumes and actors the study attempts to develop an approximate geographical map, however, based on first-stage movement, which may be of particular importance in the context of necessary interventions. Starting from the place of origin (i.e. where it is collected), it was possible to approximately map how and where the product travels, that is, from places of collection, to places of intermediary traders, then to places of wholesalers, retailers and final consumers.

The basis of assessing the product movements in the economy emerged from the assumption that, the actors, by and large, were well informed about and geographical destinations of SRF products including their end-use. They are also generally knowledgeable about regional origins of their purchases. In other words, presumably, the actors are generally aware of the demand and supply conditions prevailing in different parts of the country [43].

1.4.8 Limitations and Scope of the Study [44]

Following the above discussion, the most difficult problem that had to be encountered was the collection of unofficial and illegal tolls/expenses incurred in the process of undertaking the business, starting from resource collection to final consumers. In the case of multi-products that are dealt with by a single actor, the dominant product was considered and relevant costs were segregated for the product in question.

- The study had to depend on information provided by the respondent agents. There was a tendency for the agents to show buying price higher and selling price or profit lower, than what they actually are. However, validity of such information is preformed from various sources; in some cases, judgment of the study team has to be applied to correct the data.
- Some agents (except, perhaps, resource collectors) had the tendency to conceal information, considering this to be a business secret. This was more evident when there is illegal business. In such cases, some triangulation techniques from various informal sources or some judgment had to be applied. Following that the collection of such information is somewhat tricky, one has to be careful in digging out such illegal and unofficial payments including expenses on account of ransoms[45].
- In estimating the production costs of collectors, family labor costs are imputed based on prevailing wage rates and considering 50 percent as opportunity costs of labor.
- It was not feasible to estimate Aratdars' fixed cost and initial investment for this brief study, and in that case only the running costs were used.

[43] During the exploratory trip to study areas and pre-testing of questionnaires, the above assumption was proved largely valid. However, the results are based on first-stage movement, and should be used with caution as the information were not pursued for subsequent stages of movement and, in effect, final and ultimate destinations.

[44] Most of the observations presented here are drawn on the pilot and reconnaissance surveys.

[45] The pilot survey indicated that SRF agents, by and large, became suspicious of study aims and investigations, particularly so in the case of Mahajans, Aratdars and money lenders.

- Care was taken in calculating marketing costs, which often vary to a great extent, depending on locations.
- Operating costs of agents such as Mahajans posed difficult to obtain as they were found to be less cooperative, in most cases.
- Retailers' transport costs were estimated by taking information on total transportation cost of all types of products bought at a time, and then apportioning this for the selected items. This required some standardization of transportation cost, which could have resulted in under or over estimation although this is assumed to be counter balancing.
- Given the multi-dimensional pattern of flows, the aggregate estimate of the "number of agents involved"/"jobs created" from the Sundarbans would be tentative in this study.
- A stated ban on timber felling remains in effect for the Sundarbans since long (1989). Some of the actors associated with timbers have been displaced; some have altogether abandoned the profession. The flows for timber were carried out with the help of some timber traders who used to be in operation in the past. Some reported unofficial logging (e.g., in Patharghata) has been contemplated to capture this. Fortunately, ban on golpata has been withdrawn and during our survey the harvest of golpata was in full swing.
- Interviewing resource users at the business place was found to be difficult, and so was to locate and interview them at individual homes. In particular, the resource collectors constitute a floating population who search for livelihoods particularly when there is a moratorium or a lean season. On the other hand, people keep busy in their trades at the time of harvests. Besides, most people for interviews appeared to be suspicious, particularly so in the case of Mahajans and Aratdars.
- Lack of standardization of SRF products (e.g., crab, sada fish, gura fish, hilsha) in terms of size, quality and grade posed a major difficulty in the investigation of value chains [46]. To surmount this problem, this brief study had little option but to consider an average grade of the products.
- Seasonality of SRF activities posed another major problem in conducting interviews. Except for fish, different harvests have different time periods (See Table 1.4). Following inaccessibility and poor transportation system in the SIZ, a considerable portion of time was required in traveling over huge SIZ areas for data collection.

Maximum care was taken to overcome the above problems. The assistance from a number of NGOs (CCEC and PRADIPAN, in particular) was useful in selecting the stakeholders; it was important to ensure that the participation of stakeholders remained neutral and non-partisan.

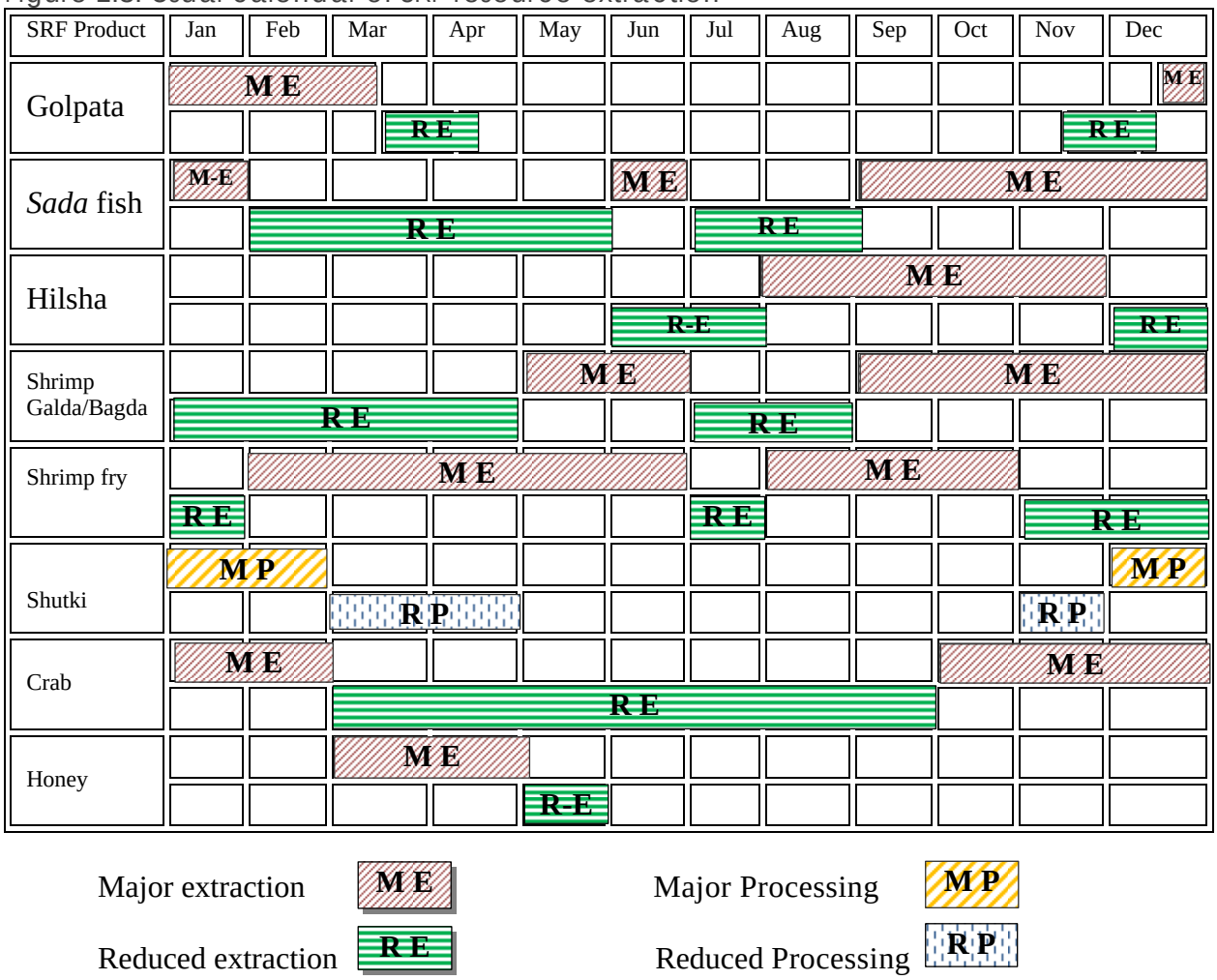
A number of problem analyses were carried out with people, particularly at the bottom layers, that is, collectors of a number of SRF products. The core of the problem was their "low income". The reason for which the study team did the problem analysis or constructed problem trees, was to understand the reasons for the low income of the SRF collectors. The "cause and effect" relationships of the "low income of the SRF collectors" were elaborated in the problem trees. The analyses were particularly important to upgrade the situation of the bottom layer actors of the value chains. The subsequent objective analysis from the problem tree gave clear conception regarding potential interventions, some of which are suggested in the final chapter on policy implications.

[46] For example, crabs have at least 16 grades according to sizes and weights.

Table 1.4: Usual harvest time of SRF products

Product Name	Total months	Harvest Month (English)	Harvest Month (Bangla)
Golpata	3	15 January – 15 April	Poush - Chaitra
Goran	3	December – March	15 Agrahayan-15 Falgun
Sada (White) fish (large)	12	Round the year	Round the year
	4	15 September – 15 January (Peak)	Ashin - Poush (Peak)
	3	15 January – 15 April (Medium)	Magh – Chaitra (Medium)
	5	Other months (Low)	Other months (Low)
Hilsha	3	15 August - 15 November	Sraban - Ashin
Shrimp Fry	5	15 January – 15 June	Magh – Jaistha
Shutki	5	October – March	15 Ashin -15 Falgun
Honey	2	April – May	15 Chaitra-15 Jaistha
Crab	4	15 October – 15 February	Kartik – Magh

Figure 1.3: Usual calendar of SRF resource extraction



1.4.9 Survey Instruments

Comprehensive check lists have been prepared in line with the research enquiries and the set of parameters. The checklists for Actors, FGDs and Key-Informants are presented in Annex F. The survey instruments have been pre-tested in the field and feedbacks from a number of experts obtained have been incorporated.

1.4.10 Upazila Profile

Besides Value Chain Analysis, upazila profiles for all the ten upazilas have been prepared incorporating aspects such as population, education, health, occupation, poverty, agricultural and non-farm activities, manufacturing, institutions and organizations.

1.4.11 Forming Research Team

A core research team, the body responsible for carrying out the study, has been formed, with Principal Investigator, three Assistant Principal Investigators, five Field Officers and two analysts. A few local NGOs, such as CCEC and PRADIPAN, have provided substantial inputs to this study. Following experiences from pilot and reconnaissance surveys, deployment of Field Officers were preferred from local areas to conduct the main survey.

1.4.12 Deliverables and Outputs

Principal deliverables and outputs include the following:

- Value chain flowcharts for the major actors with estimates of returns at each stage of the chains
- Identification of the leading and most powerful economic actors involved with primary marketed value chains derived from the Sundarbans, including estimates of the income derived from those value chains
- Recommendations of strategies for intervening in the value chains for these major products
- Identification of strategies undertaken currently for climate change adaptation strategies by key members of primary SRF value chains
- Upazila profiles for all the ten upazilas, and
- A draft report and a final report, including recommendations on the above issues

1.4.13 Structure of the Report

The report is organized in six chapters along the major theme of the study - value chain analysis of SRF extraction activities. Starting with the Chapter 1 presenting the study background, objectives, relevant issues and methodology, Chapter 2 presents SIZ district and upazila profiles which will help understanding the socio-economic and poverty situations of the SIZ (Sudarbans Impact Zone), comprising 5 districts and 10 upazilas. Chapter 3 presents the survey findings on, among others, occupational pattern, income, capital employed, output and various features related to extraction of SRF products. The chapter also presents findings on perceptions of SRF actors on

climate change severity level and associated adaptations taken or suggested to deal with the climate change. Chapter 4 identified dominant chains for the SRF products for subsequent investigations, along with functions and roles of various SRF actors. The chapter also deals with mapping for flows, actors, jobs and volume along the value chains.

Chapter 5 deals with the major theme of the study–value chain analyses. The chapter mapped the monetary value at different level of the chain. It delineates collection process, actors involved, assessment of value additions, gross and net reruns and so on. Finally, Chapter 6 draws on the analysis of the main survey, FGDs and Case Studies and presents policy implications.

CHAPTER 2

SIZ DISTRICT AND UPAZILA PROFILE

Chapter 2:

SIZ District and Upazila Profile

2.1 Profile of SIZ Districts

This chapter presents the profiles of those districts and upazilas which fall within Sundarbans Impact Zone (SIZ). Such profiles are particularly important because it would facilitate understanding the socio-economic situation of the SIZ, which will subsequently help understand the economics of SRF extraction and thereby formulate appropriate policy interventions to improve the situation.

Updated data were not available for all the variables or indicators concerned [47]. The analyses that follow are carried out considering three major areas: SIZ districts, coastal zone (where available)[48] and Bangladesh as a whole. The comparison of socio-economic factors of SIZ districts with those of non-SIZ districts is expected to help understand the associated factors related , among others, to the spatial pattern of market chains of SRF products.

The socio-economic profiles of SIZ upazilas are presented in Annex A.

2.1.1 Sundarbans Impact Zone (SIZ)

The periphery of the SRF includes the legally declared "Ecologically Critical Area" assumed to be within a 20 km band surrounding the SRF. This is what can be called the Sundarbans Impact Zone (SIZ) in the context of the modalities of the livelihood interventions and support for environmental conservation, which is the current study area. The SIZ vis-à-vis the study area comprises 5 districts, 10 upazilas, 151 unions and 1,302 villages, which are shown as follows (Table 2.1) [49].

Table 2.1: Sundarbans Impact Zone Areas

District	UZ	Unions /Wards	No. of village in UZ
Bagerhat	Sadar, Mongla, Morrelganj, Sarankhola	65	486
Khulna	Dacope, Koyra, Paikgacha	37	440
Satkhira	Shymnagar	13	216
Pirojpur	Matbaria	20	94
Barguna	Patharghata	16	66
ALL (5 Dist)	10 (UZ)	151	1302

Source: BIDS-IPAC VC Analysis Study-Reconnaissance Survey, 2010.

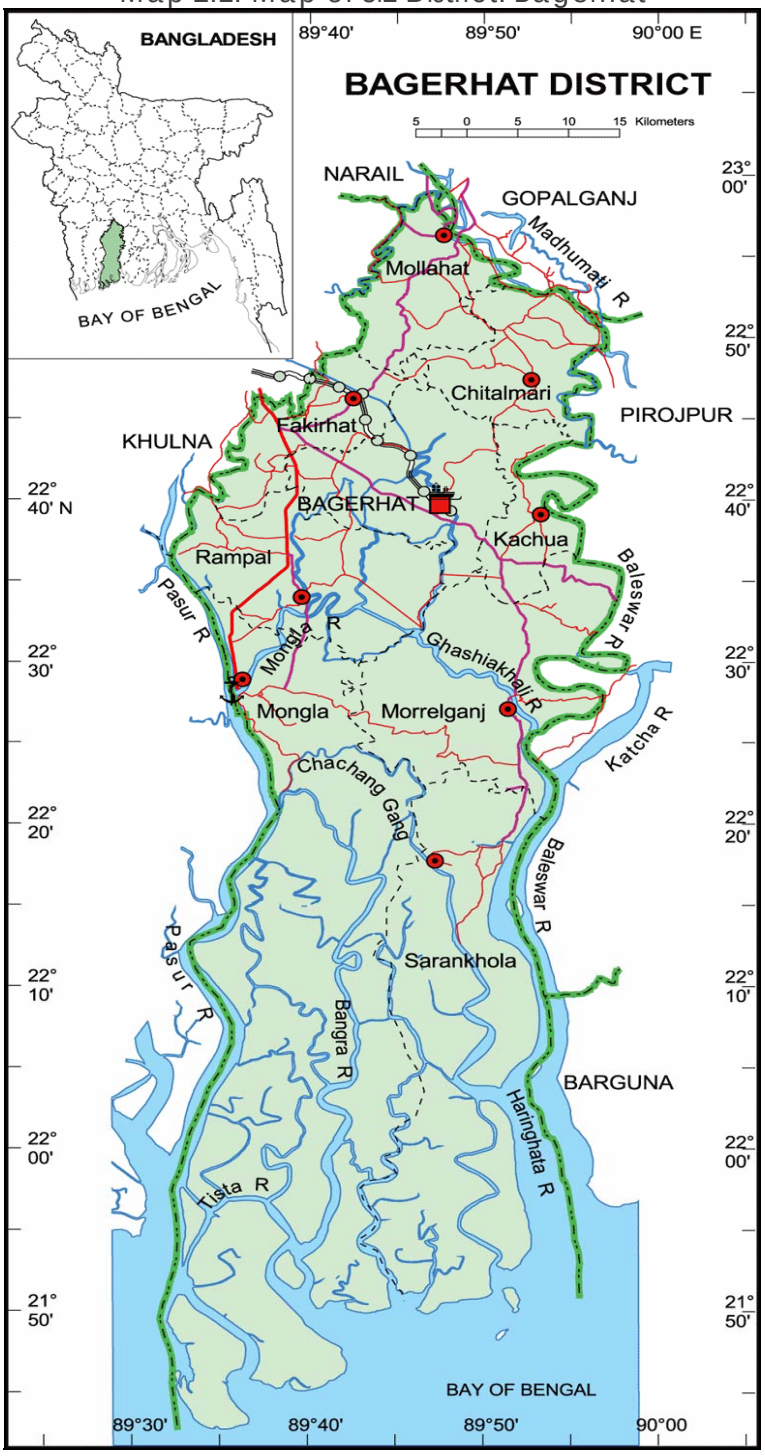
[47] One should use the absolute figures with care; what is more important in this situation is the demonstrated trends.

[48] Coastal zone comprises 19 sea-facing districts, of which 5 are SIZ districts.

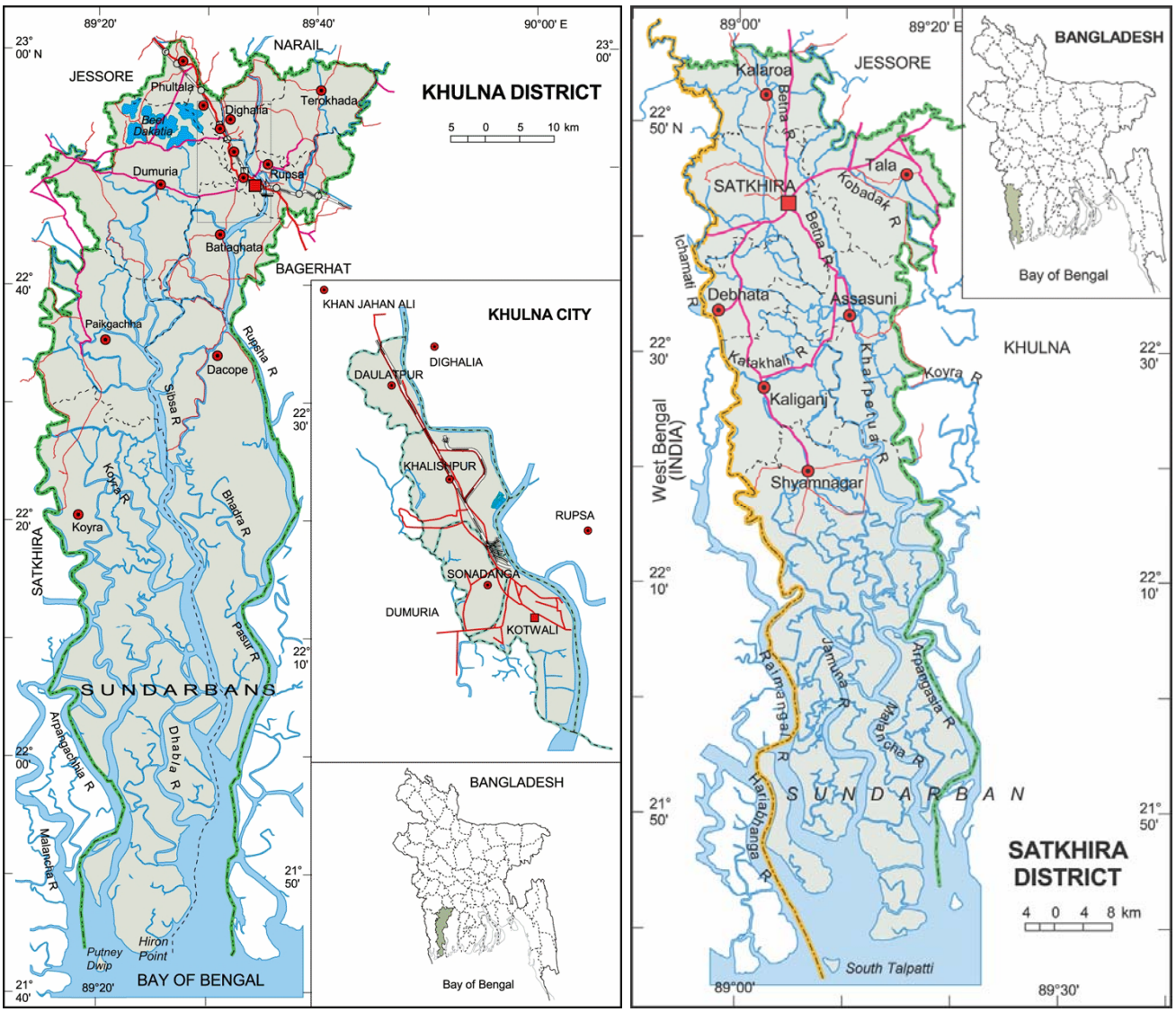
[49] However, only recently published *Strategic Management Plan for the Sundarbans Reserved Forest* (March 2010) defined SIZ as comprising 17 UZs.

It is likely that SRF extraction activities have some direct, indirect or induced impacts on the economic activities of the districts and upazilas as a whole. The people of relevant district towns are also likely to have been impacted. This is because the SRF marketing channels and destinations thereof end up with areas away from the Sundarbans, in nearby urban centers in many cases. For example, although Khulna City Corporation (KCC) is not included in SIZ, substantial number of people in this divisional city is dependent on SRF related activities (e.g., trading in SRF products). Hence, In addition to the above districts and upazila locations, the district towns including KCC are included to comprise the study locations.

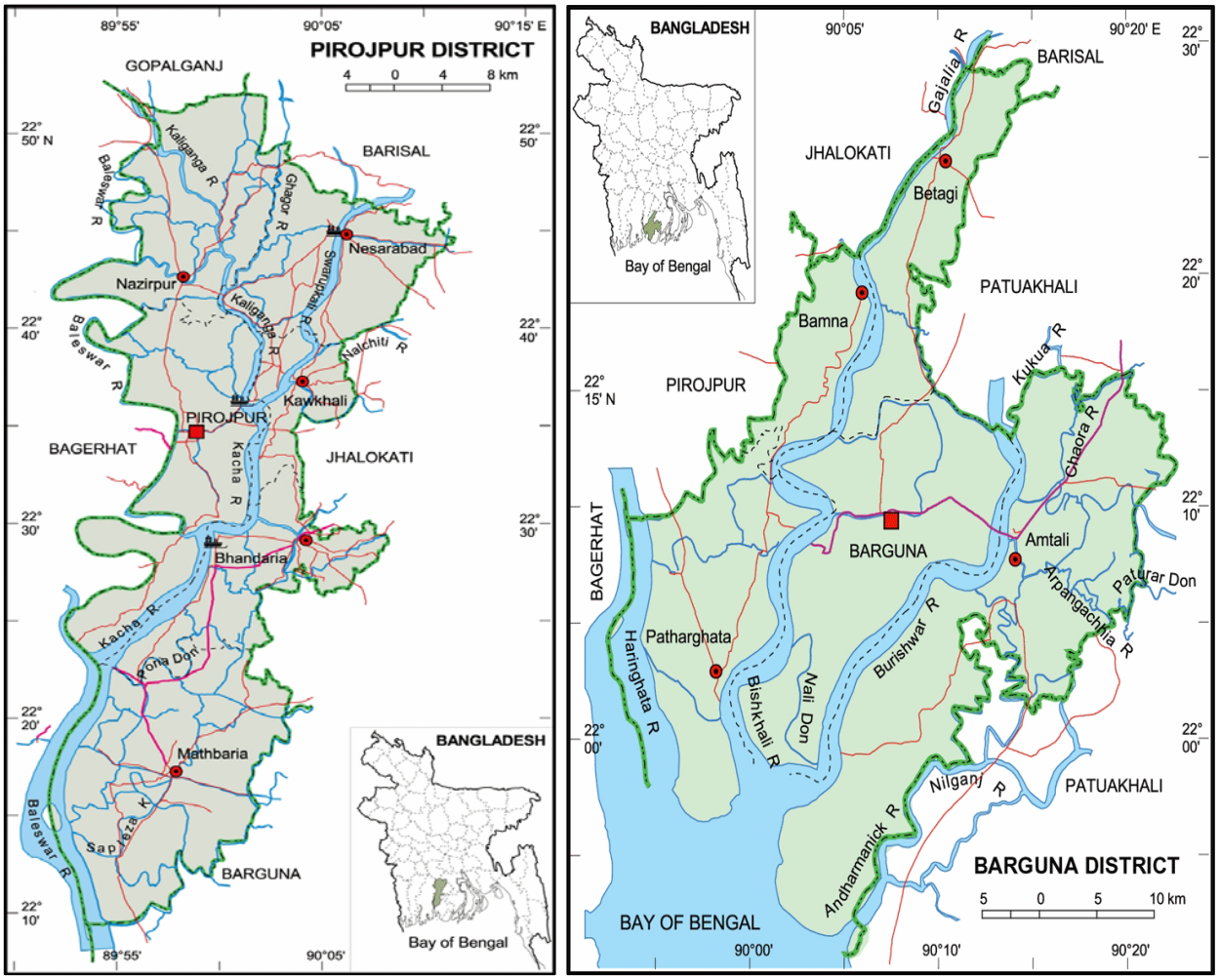
Map 2.1: Map of SIZ District: Bagerhat



Map 2.2: Map of SIZ Districts: Khulna and Satkhira



Map 2.3: Map of SIZ Districts: Pirojpur and Barguna



2.1.2 Population and Demographic Characteristics

The population for SIZ has been estimated for 2009 on the basis of average population growth rate during 1991-2001 for each individual district and upazila. Table 2.2 shows the percentage of SIZ area and SIZ population according to the five SIZ districts. It can be seen that approximately 49 percent of the total area of five districts lie in SIZ. Khulna has the highest area to lie in SIZ (72.3%), followed by Satkhira (51.0%), Bagerhat (41.4%), Pirojpur (27.0%) and the lowest Barguna (21.1%). In terms of population (estimated for 2009), about 28.1 percent of five-district total population belongs to the SIZ. The highest percentage of population lives in Bagerhat SIZ (56.4%), followed by Khulna (24.1%), Pirojpur (23.6%), Barguna (20.7%) and the lowest in Satkhira SIZ (17.0%). Almost similar is the distribution of the 1302 villages across SIZ districts.

SIZ districts have a population of 85.5 lacs which constitute about 6.0 percent of the total Bangladesh population. SIZ districts have an area of about 15,352 sq km which represents 10.4 percent of the country's area (Table 2.3). The density of population in SIZ districts (557) is far below the national average (966), nearly 58 percent less.

Table 2.2: Proportion of SIZ area and population in respective districts

District	% of SIZ area in respective district	% of SIZ population (2009) in respective district	% of SIZ Villages in respective district
Bagerhat	41.4	56.4	47.1
Khulna	72.3	24.1	40.0
Satkhira	51.0	17.0	15.1
Pirojpur	27.0	23.6	14.6
Barguna	21.1	20.7	11.8
Average SIZ district	49.0	28.1	27.2

Source: compiled from BBS (2009).

Figure 2.1: Proportion of SIZ area and population in respective districts

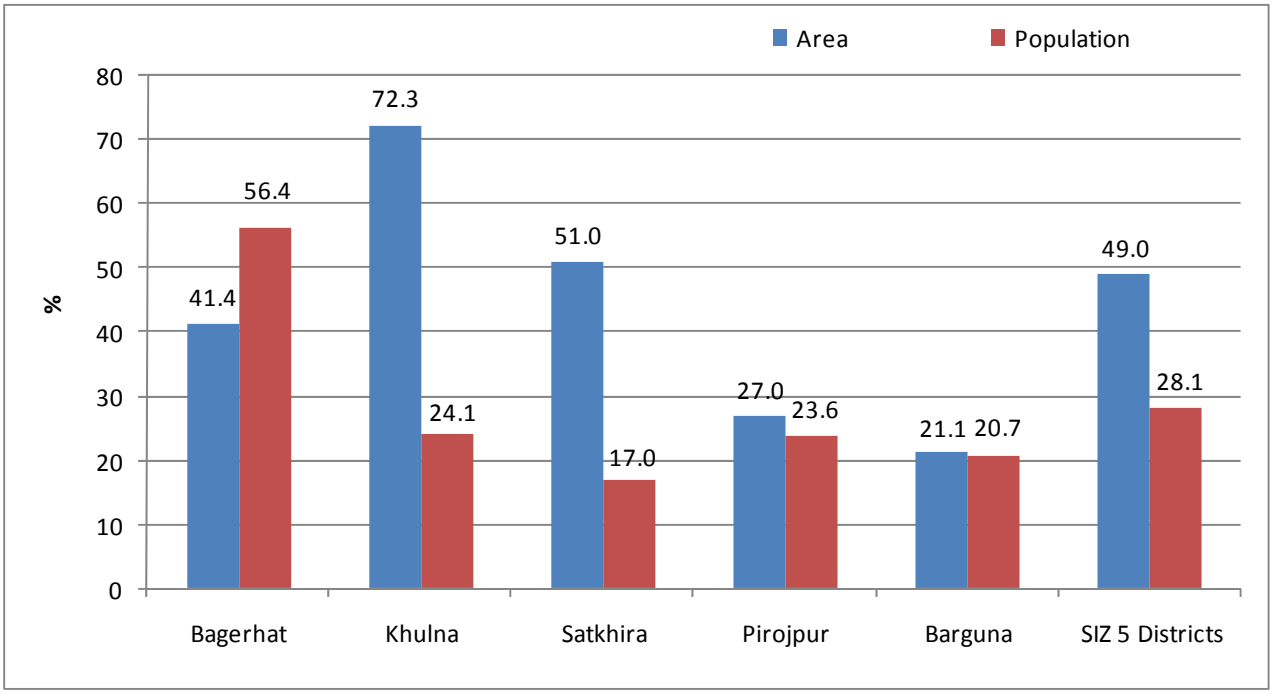
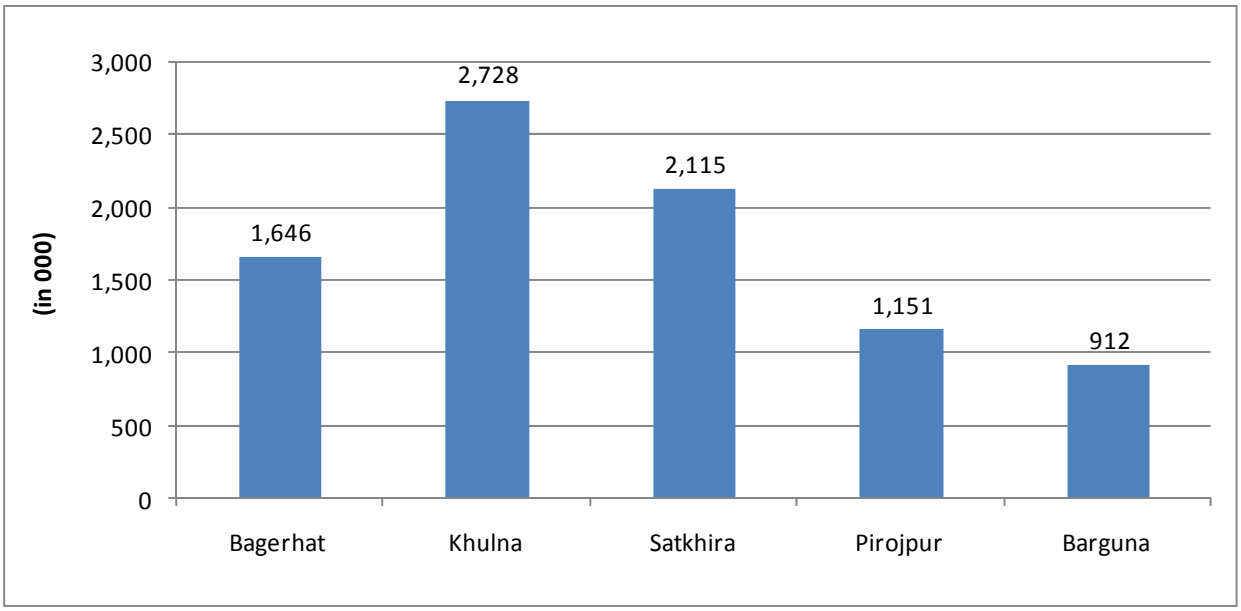


Table 2.3: Population and demographic characteristics in SIZ districts

District	Area Km^2	Population (2009) (in 000)			No. of household (000)	Size of household	Sex Ratio (M/F)	Population (2009) density (Per sq km)
		Total	Male	Female				
Bagerhat	3,959	1,646	854	791	343	4.8	108	416
Khulna	4,395	2,728	1,427	1,301	568	4.8	110	621
Satkhira	3,858	2,115	1,083	1,031	441	4.8	105	548
Pirojpur	1,308	1,151	582	569	240	4.8	102	880
Barguna	1,832	912	463	450	194	4.7	103	498
SIZ districts	15,352	8,551	4,408	4,144	1,781	4.8	106	557
Bangladesh	147,570	142,600	73,495	69,105	29,102	4.9	106	966

Source: BBS-Statistical Yearbook of Bangladesh (2009); DAE (2009). Information refers to 2009.

Figure 2.2: Population in SIZ districts



2.1.3 Selected Socio-economic Indicators

As was mentioned earlier, disaggregated and updated statistics on SIZ are lacking and for that reason, the scope of comparing the extent of concentration of physical and social infrastructure is limited. Nonetheless, from the existing information whatever available one can compare the level of development of SIZ areas with that of the coastal zone and the country as a whole. For example, 25 percent of the households in the SIZ enjoy the electricity connection which is below that in the coastal zone (31%) or the country, as a whole (31%) (Table 2.4). Similarly, the number of active tube wells per Km^2 in SIZ is 5 compared to 7 in both coastal and national average. The percentage of households enjoying sanitation in SIZ is 44.5, which compares favorably with the national average (36.9%). In terms of literacy or child mortality rates, the SIZ enjoys a slightly better position than that of the coastal zone or the nation, as a whole. Child mortality rate for every thousand is estimated as 93, compared to 103 for the coastal district and 90 for Bangladesh, as a whole. There appears to show no significant variations among the districts in this respect.

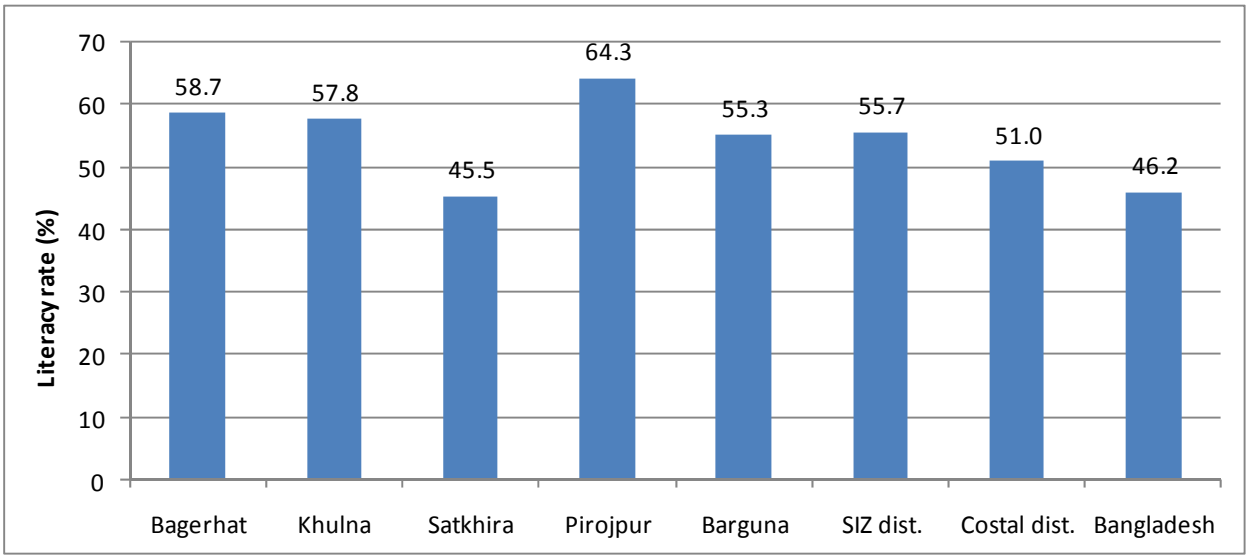
Table 2.4: Selected socio-economic indicators by SIZ districts

Districts	Agricultural HH as % total rural households	Literacy 7 + Years	Child mortality (less than 5 years)	Sanitation (%)	No. of active tube wells (km^2)	Electricity connection (%)
Bagerhat	76	58.7	87	33.2	4	27
Khulna	69	57.8	90	37.0	6	26
Satkhira	60	45.5	96	59.2	4	42
Pirojpur	18	64.3	94	47.6	10	10
Barguna	79	55.3	94	36.7	4	9
SIZ	58	55.7	93	44.5	5	25

Districts						
Coastal Zone	NA	51.0	103	45.6	7	31
Bangladesh	NA	46.2	90	36.9	7	31

Source: Banglapedia (2003); ICZMP (2004); BBS (2009).

Figure 2.3: Educational status of the SIZ Districts



Source: BBS (1994, 1996, 2001); Banglapedia, 2003.2.1.4 GDP and Per Capita GDP

2.1.4 GDP and Per Capita GDP

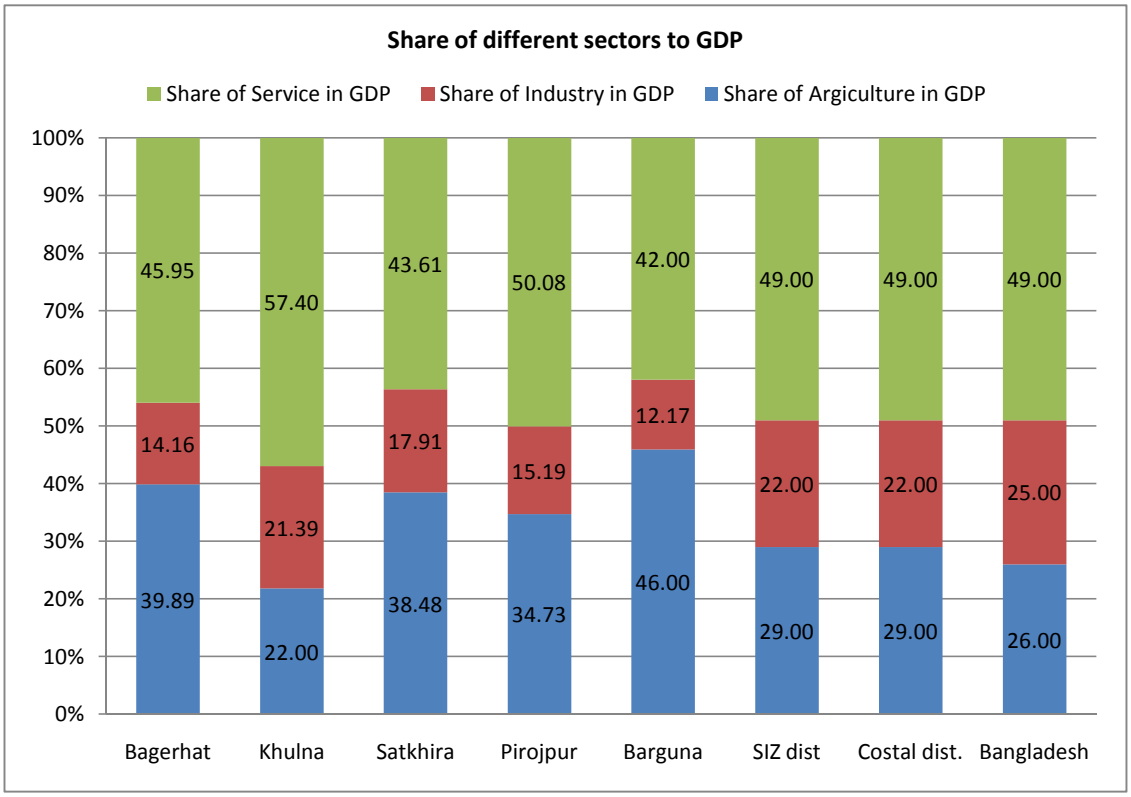
Both the SIZ and coastal region contribute significantly to the economy of Bangladesh. However, agriculture still remains the mainstay at the economy of SIZ. While disaggregated and updated data are not available, in FY1999-2000, the share of agriculture to GDP in SIZ was 29 percent against the national average 26 percent. The contribution of industries sector was 22 percent, which was same as that of coastal zone but less than that of national average (viz. 25%) (Table 2.5). The SIZ shares 49 percent to service sector while it is more or less the same in the case of both coastal and the country, as a whole.

Table 2.5: Sectoral contribution to the economy of the SIZ districts (2000 constant price)

Districts	Sectoral contribution (%)		
	Agriculture	Industry	Service
Bagerhat	40	14	46
Khulna	22	21	57
Satkhira	38	18	44
Pirojpur	34	15	50
Barguna	46	12	42
SIZ districts	29	22	49
Coastal Zone	29	22	49
Bangladesh	26	25	49

Source: BBS (2002).

Figure 2.4: Share of different sectors to GDP



Most of the SIZ districts have miserably low level of GDP per unit area indicating low regional development (Table 2.6). An average SIZ district has GDP per sq km of only Tk 8.5 million, compared to Tk 14.4 million in that in coastal zone and Tk 21.8 million in an average district in Bangladesh. Bagerhat has the highest level of GDP per sq km (Tk 10.4 Million), which is nearly two times higher than that of Satkhira (Tk 5.6 million).

Table 2.6: Per capita and per sq km GDP

Districts	GDP (2000 constant price)		Per sq km GDP (Million Tk)
	District GDP (Million Tk)	Per Capita	
Bagerhat	27,717	16839	10.39
Khulna	63112	23135	10.20
Satkhira	27360	12936	5.61
Pirojpur	16040	13936	7.01
Barguna	15414	16901	6.16
Average SIZ districts	27642	15929	8.5
Average coastal district	35726	18198	14.38
Average district (Bangladesh)	40706	18,269	21.8

Source: Banglapedia (2003); Barkat (2005); BBS (2009).

Figure 2.5: Per capita district GDP of the SIZ districts

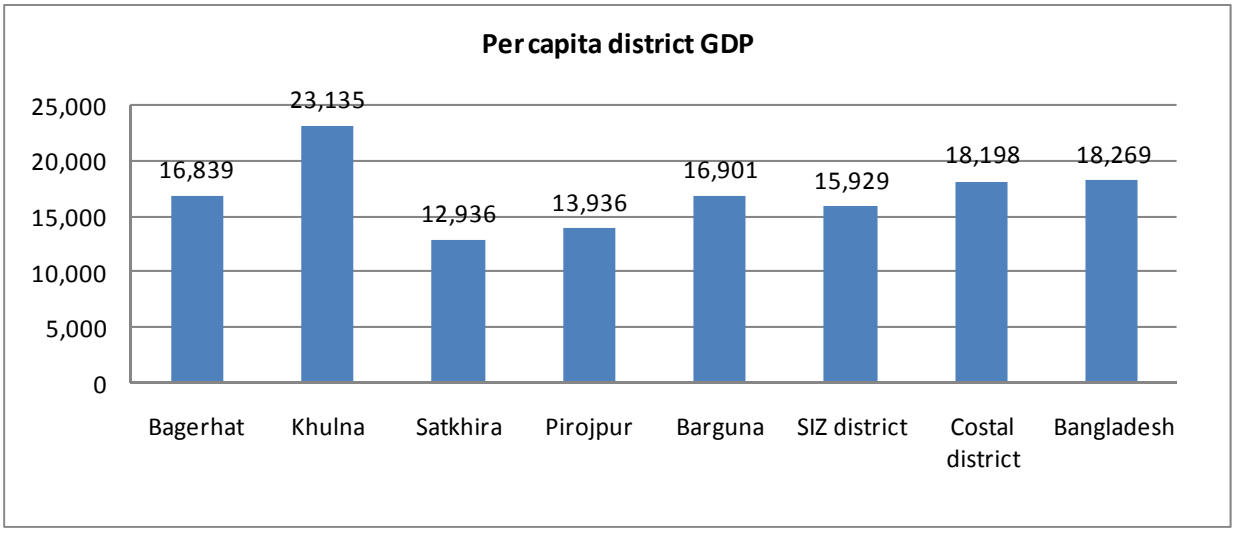
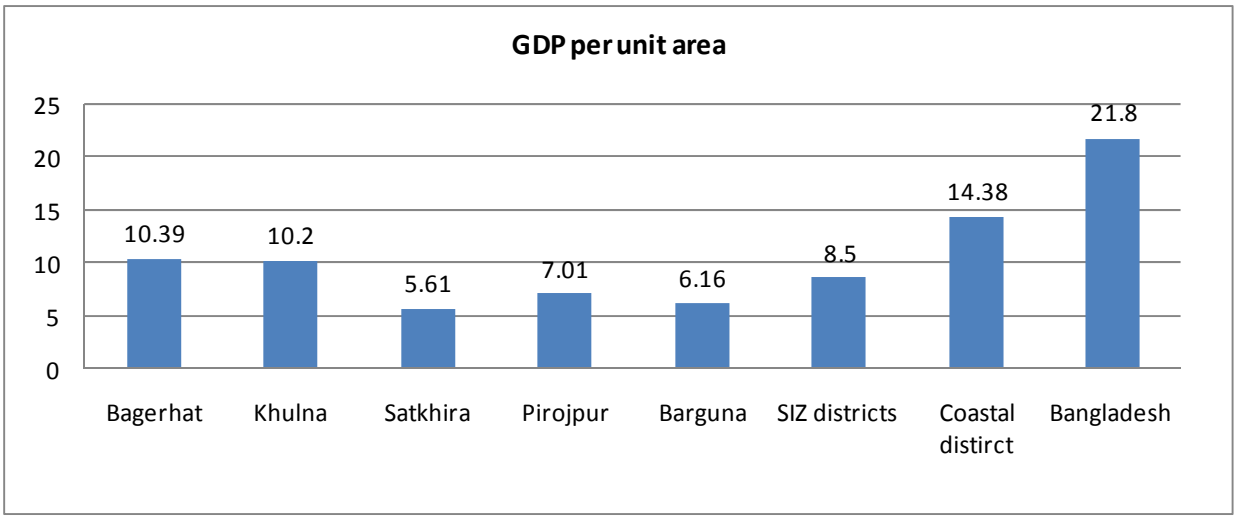


Figure 2.5: GDP per unit area of the SIZ districts



2.1.5 SIZ Livelihoods

The main characteristic of the SIZ which differentiates from the other areas is its complexity. This complexity is manifested in the diversity and dynamic nature of the livelihoods of the people especially the poor. Although agriculture is still the mainstay of the economy in the region, the SIZ provides varied sources of livelihood which are not commonly available in other parts of Bangladesh. For example, more than half a million people live on by collecting fish, honey, wax, wood and leaves of trees from the Sundarbans. In the SIZ, 30 percent of the people or nearly four times that of the share of national figure earn their living by fishing (Table 2.7). The discussion from the previous section (e.g., per capita income level), however, shows that people, in general, are just surviving at subsistence level. Since soil conditions vary considerably because of various hydrological conditions, the cropping intensity also varies accordingly. In general, the SIZ has experienced low cropping intensity, 134 percent as a whole. But non-saline tidal flood plain has a good agricultural land than that of saline tidal flood plain. Pirojpur has the highest cropping intensity (171%), followed by Satkhira (156%), Barguna (151%) and lowest in Bagerhat (107%) (Table 2.7). The SIZ agriculture (irrigated) is still far underdeveloped as only

29 percent (approximately) of the SIZ agricultural land came under irrigation as against more than 50 percent in non-SIZ region (not shown in Table 2.7).

Table 2.7: SIZ livelihoods: selected indicators

Districts	Landless	Agri-Labor (%)	Pre capita land (Ha)	Per capita ag. land (Ha)	Fishermen (%)	One crop land	Two crop land	Three crop land	Cropping intensity (%)
Bagerhat	49.3	36	0.24	0.09	12	95	3	2	107
Khulna	49.0	40	0.16	0.05	40	NA	NA	NA	-
Satkhira	47.3	31	0.18	0.07	31	50	28	-	156
Pirojpur	53.2	32	0.11	0.09	32	36	57	7	171
Barguna	49.0	32	0.20	0.11	38	56	37	7	151
SIZ Districts	49.1	33	0.18	0.08	30	59	30	5	134
Coastal Zone	53.5	33	0.06	0.06	14	NA	NA	NA	-
Bangladesh	52.6	36	0.10	0.07	8	31	42	13	154

Source: BBS (2003); ICZMP (2004); BBS (2009); District Series (WARPO) (2005); DAE (2009).

Figure 2.6: SIZ livelihoods by district

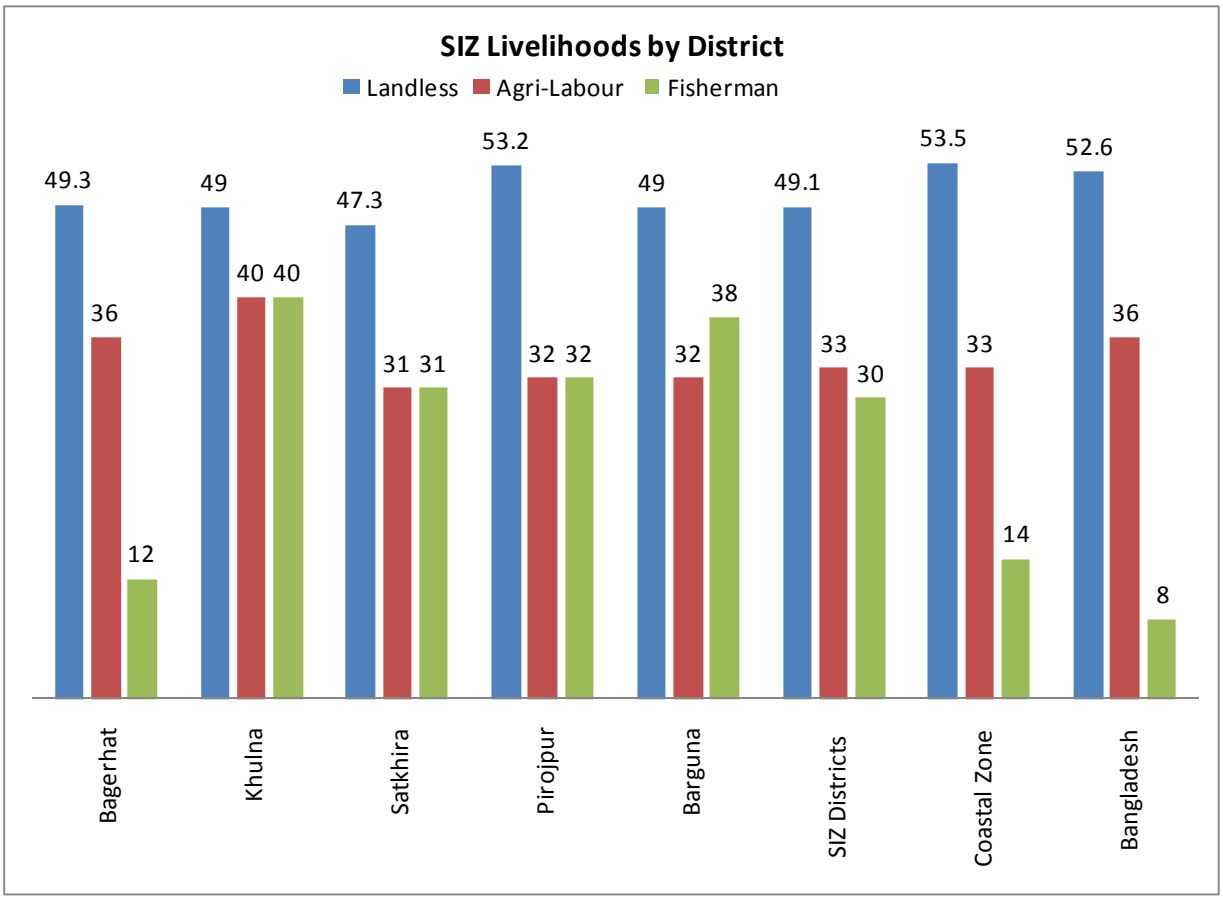
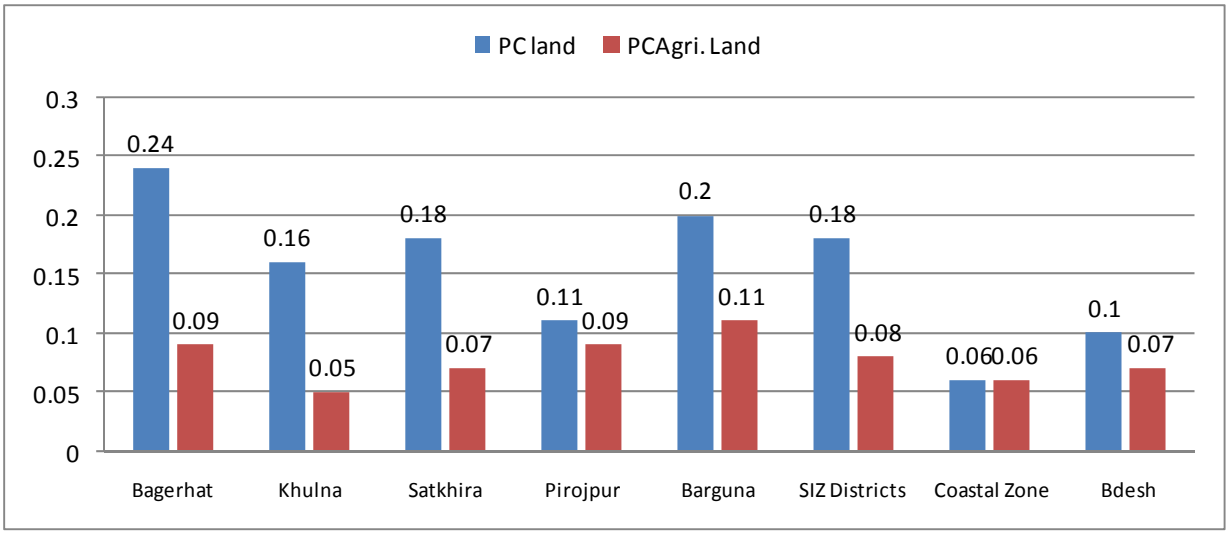


Figure 2.7: SIZ per capita lands by district



Source: BBS (2003); ICZMP (2004); BBS (2009); District Series (WARPO) (2005); DAE (2009)

In spite of that, the principal sources of livelihood are agriculture and SRF extraction activities. Per capita land is estimated as 0.18 hectare while that for agricultural land is 0.08 hectare compared to national average of 0.07. With respect to landlessness, however, the position of SIZ districts is not too bad (49.1%), compared to costal zone (53.5%) and Bangladesh as a whole (52.6%) (List of NGOs operating in upazila locations is presented in Annex Table A2.1). In the urbanized areas of the SIZ districts such as Khulna, Bagerhat and Satkhira, the scope of employment generation in industry and services is a little higher. In the offshore island a large number of people are dependent for their livelihood on natural resources.

2.1.6 Poverty Situation in SIZ

It is generally believed that the SIZ populations are suffering from marginalization and inequality in income. Poverty status can be considered as a proxy to extent of marginalization. Head Count Ratios (HCR) for the SIZ districts and upazilas are presented in Table 2.8. A comparative analysis is shown of the SIZ areas with those of non-SIZ areas, which shows a dismal picture. The extreme poverty levels of SIZ districts and upazilas are at a considerably higher level in almost of all the districts and upazilas, compared to respective non-SIZ areas. Although the coastal zone, as a whole, and SIZ, in particular, is endowed with natural resources and environment resources the SIZ upazilas have a much higher extreme poverty rates (0.42) compared to non-SIZ upazilas in Bangladesh (0.26) [50]. Thus, the poverty situations in the SIZ appear to be extremely severe, which have immense policy implications.

The HCR for SIZ Bagerhat is estimated as 0.43 as compared with 0.24 for non-SIZ upazilas of Bagerhat, followed by SIZ Khulna (0.41) and non-SIZ Khulna (0.32), SIZ Satkhira (0.65) and non-SIZ Satkhira (0.45). The only exception is for Barguna (SIZ – 0.36 and non-SIZ -0.43). For Pirojpur, the HCR is almost identical (SIZ – 0.18 and non-SIZ – 0.19). Hence, among the upazilas, the estimated HCRs are relatively higher for Shymnagar (0.65), Dacope (0.60) Morrelganj (0.50), Sarankhola (0.49) and Mongla (0.42). Relatively less worse situation prevails for Matbaria (0.18), Bagerhat Sadar (0.32), Paikgacha (0.34), Koyra (0.35) and Patharghata (0.36) (Table 2.8).

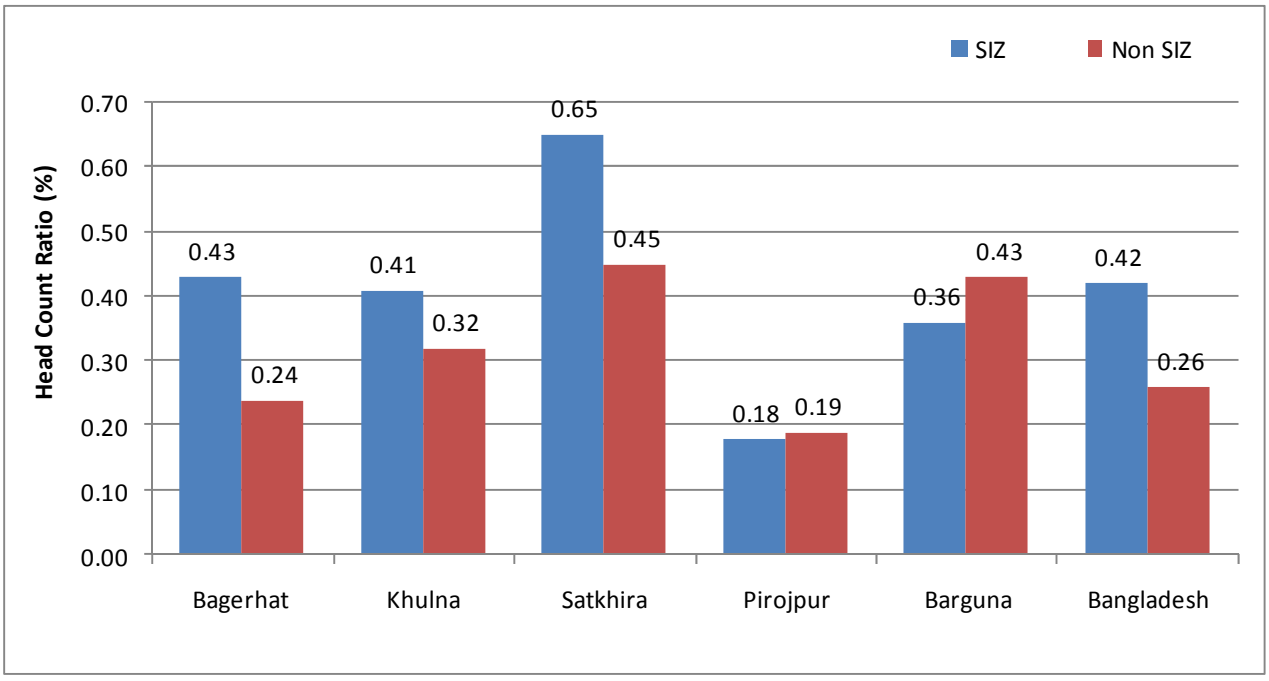
[50] Based on Cost of Basic Needs (CBN) method, the present study made the estimates incorporating BBS-2005 data that are yet to be published.

Table 2.8: Poverty mapping SIZ and Non-SIZ upazilas

SIZ District	SIZ Upazila	Head Count Ratio (%) (HCR)
Bagerhat	Bagerhat Sadar	0.316
	Mongla	0.415
	Morrelganj	0.503
	Sarankhola	0.487
	SIZ Bagerhat	**0.430**
	Non-SIZ Bagerhat	**0.238**
Khulna	Dacope	0.604
	Koyra	0.348
	Paikgachha	0.344
	SIZ Khulna	**0.414**
	Non-SIZ Khulna	**0.318**
Satkhira	**SIZ** Satkhira (Shyamnagar)	**0.652**
	Non-SIZ Satkhira	**0.451**
Pirojpur	**SIZ Pirojpur (Matbaria)**	**0.179**
	Non-SIZ Pirojpur	**0.185**
Barguna	**SIZ** Barguna (Patharghata)	**0.361**
	Non-SIZ Barguna	**0.432**
Bangladesh	**SIZ** upazilas	**0.423**
	Non-SIZ upazilas (Bangladesh**)**	**0.262**

Note: Compiled from BBS poverty mapping data (unpublished) on HCR, which refers to 2005.
The district population figures of 2001 are taken as weights to estimate averages.

Figure 2.8: Poverty mapping SIZ and Non-SIZ upazilas



The detailed socio-economic profiles of SIZ upazilas are presented in Annex A (Volume 2).

CHAPTER 3

FINDINGS FROM THE SURVEY – FEATURES RELATED TO SRF EXTRACTIONS

Chapter 3:

Findings from the Survey - Features related to SRF Extractions

This chapter presents major findings obtained from the structured questionnaire survey. It first discusses socio-economic characteristics of SRF actors, and then delineates various features related to extraction of SRF products.

As mentioned earlier, the SIZ vis-à-vis the study area comprises 5 districts and 10 upazilas. A total of 159 primary landing places for various SRF products were identified. About one third of (48 out of 159) of the concentration centers were covered in the sample, so as to include all the major SRF products and the major actors who were our respondents (See Annex E for the list of concentration centers).

3.1 Profile of Respondent Actors

The sample size by district, range and actors are presented in Tables 3.1 through to 3.3. The sample distribution by upazila and products is shown in Annex Tables A3.1 and A3.2. In all, investigations were carried out to 237 actors [51]. The sample constitutes the highest (37.6%) for Bagerhat and the lowest (4.6%) for Pirojpur District (Table 3.1). Range wise, the sample constitutes highest for Sarankhola (40.9%) and lowest (9.3%) for Chandpai Range (Table 3.2) [52]. The collectors represent about 26.6 percent, followed by Choto Mahajans (19.8%), Farias/Beparis (18.6%), Aratdars (13.9%), Boro Mahajans (8.4%), retailers (7.6%) and wholesalers (5.1%) (Table 3.3). Product wise, golpata constitutes the highest percentage of sample products (22.8%), followed by sada (white) large fish (19.4%), crab (19.0%), hilsha (8.0%), gura fish (6.8%), honey (6.3%), shrimp (bagda) fry (3.8%) and shrimp (galda) fry (3.2%) (Annex Table A3.2). The remaining products include shrimp (bagda), mollusc, hantal, grass and shutki. As explained in Chapter 1, only one case of sundri and few cases of goran were initially included in the sample but detailed analyses were not carried out on these products [53]. The following section discusses socio-economic characteristics of SRF actors

Table 3.1 : Sample size by district

District	Sample	%
Bagerhat	89	37.6
Khulna	58	24.5
Satkhira	60	25.3

[51] The sample of 237 actors was covered from 210 primary markets, 26 secondary markets and I bazaar (Annex Table A3.3).

[52] As was explained in Chapter 1, the selection of sample was not completely under our control because of, among others, seasonality and availability of actors for interviews.

[53] The case of sundri was discovered in Pathargatha upazila under Barguna district; the actor was reportedly involved in illegal logging. He agreed to be interviewed on the condition of anonymity. Detail level analysis was not pursued for this case. The goran case was not included in detailed analysis as these were not collected as separate product but merely as by-product while collecting products such as golpata, honey and fish.

Pirojpur	11	4.6
Barguna	19	8.0
Total	237	100.0

Table 3.2 : Sample size by Range

Range	Sample	%
Sarankhola	97	40.9
Khulna	58	24.5
Chandpai	22	9.3
Satkhira	60	25.3
Total	237	100.0

Table 3.3: Type of SRF actors interviewed

Actor type	Sample	%
Collector	63	26.6
Faria/Bepari	44	18.6
Choto Mahajan	47	19.8
Boro Mahajan	20	8.4
Aratdar	33	13.9
Wholesaler	12	5.1
Retailer	18	7.6
Total	237	100.0

3.2 Socio-economic Characteristics of Actors

Age of actors

Nearly 19 percent of all actors in the study area have age up to 18 years[54] while about 81 percent have age above 18 years (Table 3.4). Among the collectors, the proportion of younger age group is the highest, nearly one fifth. Among wholesalers there is no younger group of 18 years of age. Only one case of female was found in the sample actors in the category of fish fry collector.

Literacy

Literacy is defined as the ability to read and write in Bengali. In that sense, slightly higher than 83 percent of all actors can be said to be literate. In other words, slightly less than 17 percent are illiterate, at least functionally (Table 3.4). When classified by actors, collectors constitute the highest number of illiterates while none in Aratdar group is illiterate. Slightly higher than 39 percent of the actors can read and write while about 39 percent have education up to SSC and only 5 percent have education above SSC level. As regards origin of the actors, slightly less than three-fifths (59.1%) reported that they were local while slightly higher than two-fifths were non-local operating from outside the jurisdiction of the SRF.

[54] In Bangladesh context, children belong to this age group.

Table 3.4: Socio-economic characteristics of sample respondents

Actors type	Age		Education				Origin	
	% Up to 18	% Above 18	% Illiterate	% Only read and write	% Up to SSC	% Above SSC	% Local	% Non Local
Collector	19.5	80.5	38.1	44.4	17.5	-	73.0	27.0
Faria/Bepari	11.4	88.6	18.2	50.0	29.5	2.3	61.4	38.6
Choto Mahajan	8.5	91.5	6.4	38.3	51.1	4.3	46.8	53.2
Boro Mahajan	10.0	90.0	5.0	35.0	45.0	15.0	65.0	35.0
Aratdar	18.2	81.8	-	12.1	75.8	12.1	42.4	57.6
Wholesaler	-	100.0	16.7	58.3	16.7	8.3	75.0	25.0
Retailer	5.6	94.4	11.1	38.9	44.4	5.6	50.0	50.0
All	19.0	81.0	16.9	39.2	38.9	5.1	59.1	40.9

Ownership and Operational land holding

Table 3.5 shows the ownership and operational land holding of the actors. It can be seen that the average land holding size of all SRF actors is miserably low, by any standard, less than one acre (88 decimals) and half an acre (49 decimals) on account of ownership and operation respectively. Among the collectors, it can be seen that land holding for most is rather small, the average holding of ownership being only up to 18 decimals; the operational holding is yet miserable, the average size being only 6 decimals. In other words, the collectors are virtually landless.

But on the other hand, land is inequitably distributed among the actors' categories. As one moves along the hierarchy of the actors, for both ownership and operational holdings the size tends to get larger. For example, average land holding size (ownership) of collectors estimates as 18 decimals, followed by Farias/Beparis (43 dec.), Choto Mahajans (99 dec.), Boro Mahajans (222 dec), Aratdars (163 dec.) and so on. Almost similar trend can be seen for operational holdings.

For actors up to Aratdars, Chi-Square estimated as 92.6 and 60.2 for ownership and operational holding respectively, which are significant at 99% limit for the both cases (Tables 3.6 and 3.7). This implies that the higher level actors are relatively richer and wealthier (in terms of land holding) sections of the society.

Table 3.5: Land ownership and operation by actor types

Actor type	Land holding (decimals)	
	Owned	Operated
Collector	17.7	6.4
Faria/Bepari	42.5	15.0
Choto Mahajan	99.4	60.2
Boro Mahajan	221.7	125.9
Aratdar	162.7	101.8
Wholesaler	112.9	102.0
Retailer	107.2	30.2

All	87.5	48.7

Figure 3.1: Land ownership and operation by actor types

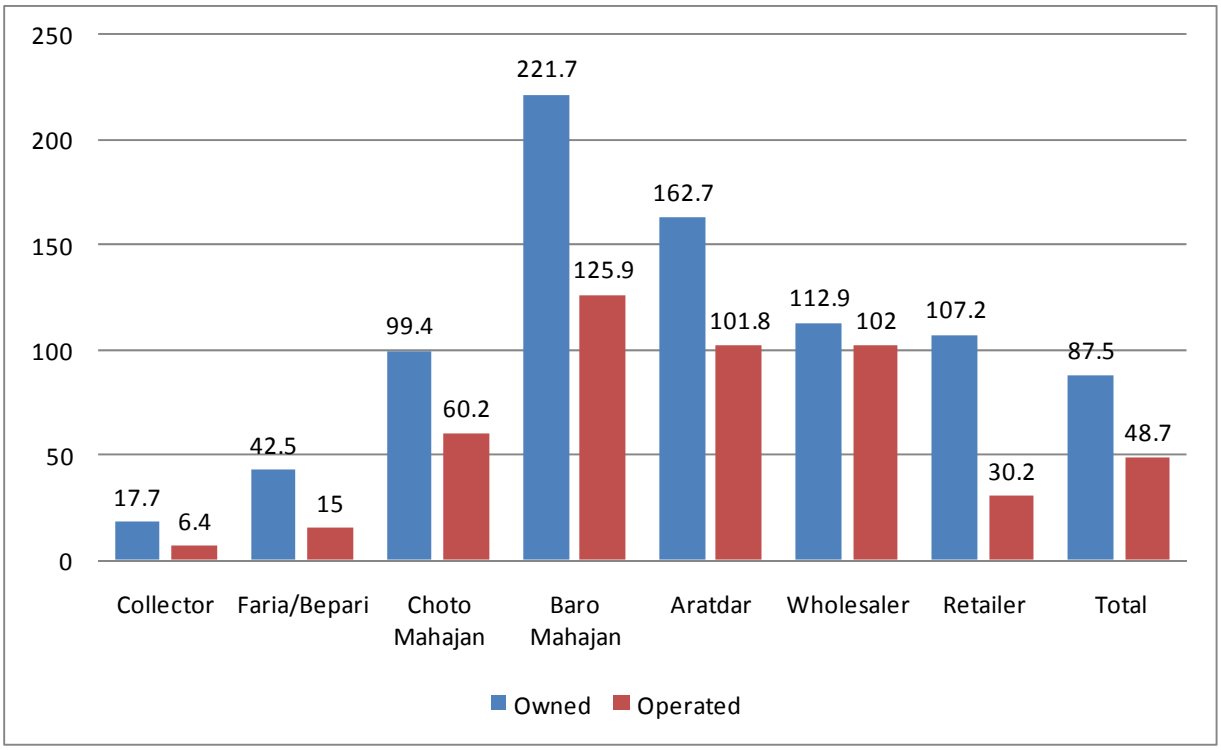


Table 3 6: Land ownership by actor type

Land holding (owned) range	Actor type					Total
	Collector	Faria/Bepari	Choto Mahajan	Boro Mahajan	Aratdar	
1.00	51	23	13	2	1	90
2.00	5	10	6	5	8	34
3.00	7	8	17	3	13	48
4.00	0	3	11	10	11	35
All	63	44	47	20	33	207

Note: 1=0-25; 2=26-50;3=51-75;4=76 +(Decimals) for actors up to Aratdars;
3 cells (15.0%) have expected count less than 5. The minimum expected count is 3.29.
Chi-Square = 92.6 which is significant at 99% limit.

Table 3.7: Land operation by actor type

Land holding (operated) range	Actor type					Total
	Collector	Faria/Bepari	Choto Mahajan	Boro Mahajan	Aratdar	
1.00	58	35	30	7	16	146
2.00	1	4	4	0	3	12
3.00	4	4	9	4	8	29
4.00	0	1	4	9	6	20
All	63	44	47	20	33	207

Note: 1=0-25; 2=26-50;3=51-75;4=75 +(Decimals);

11 cells (15.0%) have expected count less than 5. The minimum expected count is 1.16.
Chi-Square = 60.2 which is significant at 99% limit.

3.2 Various Features related to SRF Extraction

This section delineates various features related to extractions of SRF products. The features include collection process, occupation pattern and working months, seasonality, fish catch from sanctuaries, capital structure, working capital and incidence of dadons, income level, cost structure, marketing facilities and severity level of climate change.

3.3.1 Collection and Payment System

Gura (Small) Fish

Gura (small) fish includes, among others, Amadi, Fesha, Chanda, Tela, Kowa, or any other small species. Normally gura fish catch takes place on a weekly basis. One boat (manual) consisting of 2 to 3 people (depending on size of boats and nets) carries out the catch in two to three trips in a month.

Like in other harvests, some of the intermediaries in this sector as well are themselves involved with the collection related activities. As in other cases, some of the Farias are also collectors, some of the Aratdars or even wholesalers often get involved in the collection process. Our survey shows that on an average one boat with more or less 2-3 collectors catch in the range of 20 to 60 Kg of gura fish

Generally, Farias cannot sell their catch to anybody other than Aratdars/wholesalers as contractual obligation at a price which is not often fair. In the case of gura fish, usually Farias collect fish from collection grounds. Some Farias who are directly involved in the collection process sometimes sell their products in villages.

Farias or Mahajans have to invest in nets and boats for fishing, some borrowing from local Aratdars at a high interest rate. Average cost of food and others in each trip is around Tk 2-3 thousand per person. The owners, however, have many risks. Sometimes they lose their whole investment due to cyclone or robbery in the sea.

Sada (white) Large Fish

Sada (white) large fish consists of, among others, Rupchanda, Bhola, Pasha, Bhetki, Pangas and Payra. Normally fishing takes place on a weekly basis. Like in other fish products, for Sada fish as well, there are two *goons (peak) – bhara goons* and *mara goons* in a month, each lasting 4 to 5 days [55]. The remaining days are lean time for fishing. One boat consisting of 4 to 8 people usually travels twice a month. .

Like in other harvests, some of the intermediaries such as Majhis/Farias also carry out the collection, some of the Mahajans, Aratdars or even wholesalers often get involved in the

[55] Bhara goons are the situation referring to most appropriate time - when fish catch is most plentiful around full moon (*Purnima)*). Mara goons are when fish catch is, again, plentiful around new moon (*Amabasha*).

collection process. Our survey shows that on an average one boat with more or less 4-6 collectors catch around 3-4 maunds of fish in one trip.
Normally, Majhi has a special role in the whole trip. Sometimes, Majhi has no special role. Fishers sell their catch to Aratdars/wholesalers as contractual obligation. The general practice is that all sorts of costs (including costs of fuel of those which are run by engines, food and net repairing) borne by owners during the trip are deducted from total earnings. In some cases, the sharing of profit applies. In some cases, collectors work on wages.

Average cost of food for the fishermen in each trip is around Tk 5-10 thousand. The owners of nets/boats have the risk of losing their whole investment due to cyclone or robbery.

A specific group of people having good amount of cash act as financier or Mahajans/money lenders. They lend money to actors such as Aratdars, net/boat owners/ice depot owners at certain interest rates (usually as high as 10% monthly). However, they have risks of loan default in case of accident, cyclone, bad harvest or theft where fishers may delay payment or pay lower interest.

There are also Aratdars who own net and boat and this enhances their profitability. However, there is a risk involved in the business of Aratdars as they sell fish to Paikars on credit. At times, Paikars do not pay their dues and stop business with the Arat and start business with new Aratdars.

Hilsha

Normally hilsha fishing takes place on a weekly basis. Like in other fish products, for hilsha as well, there are two *goons (peak) – bhara goons* and *mara goons* in a month, each lasting 4 to 5 days. The remaining days are lean time for hilsha fishing. One boat consisting of 4 to 8 people travels twice a month.

Like in other harvests, some of the intermediaries in this sector as well are themselves involved with the collection related activities. As in other cases, some of the Majhis/Farias are also collectors, some of the Mahajans, Aratdars or even wholesalers often get involved in the collection process. This poses problem in calculation of costs and returns for individual actors separately. Our survey shows that on an average one boat with more or less 4-8 collectors catch around 20-30 maunds of hilsha fish in one trip.

Most fishermen get engaged in hilsha fishing on the basis of sharing of harvest among fishers (fishing laborers) and the capital providers (net/boat owners). Normally, group leaders (Majhi) receive twice the amount of each fisher. The general practice is that the fishers cannot sell their catch in markets other than the specified markets/Aratdars/wholesalers at a lower than market price because of contractual obligations. Generally, the fishers (laborers) receive advance money (dadons) in the lean season from net/boat owners on condition that they would work for the whole season for the owners. In the fishing grounds, they work under a boatman/captain (Majhi) who is responsible for the whole trip.

The general practice is that all sorts of costs for the trip are borne by owners which deducted from total earnings and a share of 10/16 (i.e. 62.5%) is retained by capital providers. The remaining earnings are distributed among fishing laborers with double share to Majhi (almost similar arrangement was observed by a study by Ali *et al* 2009).

Net/boat owners are actually the Mahajans who invest in nets and boats for fishing. Still many of them have to borrow from local money lenders or Aratdars to carry out hilsha fishing at a high

interest rate (viz. 5% for 15 days or so for their borrowed money) on an additional condition that they sell their entire catch to them throughout the year. With few exceptions, they do not go fishing directly. Usually, a fishing trip requires 15 days.
Average cost of food for the fishermen in each trip is around Tk 10-12 thousand; average cost of fuel and others for engine in each trip is Tk 30-40 thousand; and average cost for ice per trip is around 6-10 thousand taka. The owners have to take risks of such investments in that sometimes they can lose due to cyclone or robbery in the sea.

Generally, Aratdars act as commission agents. But some Aratdars directly get involved in collection. They own net and boat and this enhances their profitability. There is an association of Aratdars at each fish landing center. Fishermen, owners of the nets/boats and local Paikars bring their fish to the Arat. Paikars and local retailers participate in the process of auction to buy the fish. Koyals carry out the whole process of sales through auctions. Generally Paikars pay the value of fish to the Aratdars and Aratdars pay to the fish owners. Aratdars receive commission; usually it is 2.5% from each side (i.e., 5% in total). However, there is a risk involved in the business of Aratdars as they sell fish to Paikars on credit. Sometimes, Paikars do not pay their dues and stop business with the Arat and start business with new Aratdars.

Crab

Normally crab fishing takes place on a weekly basis. One boat (manual) consisting of 2 people carries out the catches two to three trips in a month.

Aratdars in this sector are themselves involved with the collection related activities. Farias are also involved in the collection process. Our survey shows that, on an average, one boat with more or less 2 collectors catches in the range of 20-40 Kg of crab. Usually, Farias (sort of Choto Aratdars) carry out the stocking in depots from collection grounds. Some Farias who are directly involved in the collection process sometimes sell their products to Aratdars.

Honey

The Forest Department issues permits every year to groups of six to eight members for one month. Majhis or boatmen, responsible for the whole management, carry honey every week to Mahajans through collection from harvesters.

Mahajans act as financiers and lend money (in the form of dadons) to collectors, either on interest or sharing a profit or selling at reduced prices. Sometimes, Majhis also play the role of Mahajans on the basis of similar terms.

Average monthly cost of food and others for the Mawalis in each trip is around Tk 40-60 thousand. Our survey shows that, on an average, one boat with more or less 6-8 collectors harvests around 12-14 maunds of honey in a month.

3.3.2 Collectors Working for Other Actors

The above discussion shows that among the SRF actors the collectors are the most vulnerable. About 60 out of 63 or 95 percent of the collectors work for wages or work/collect for others. Most collectors work for Boro Mahajans (43.4%) followed by Choto Mahajans (38.3%), Aratdars (11.6%) and Farias/Beparis (4.7%) (Table 3.8). In other words, only 3 out of 63 (i.e., 4.8%) carry out self-run collection of SRF products through informally forming groups.

Table 3.8: Collectors working for various actors

Working for	n	%
Faria/Bepari	4	6.7
Choto Mahajan	23	38.3
Boro Mahajan	26	43.4
Aratdar	7	11.6
All	60	100.0

Note: Out of 63, 60 collectors responded to this question.

3.3.3 Catch in Fish Sanctuaries

During our survey, the respondent actors were asked about whether they were aware of the prevailing sanctuaries of fish and other aquatic resources. A total of 47 out of 110 or about 43 percent actors responded that they were aware about such sanctuaries while 60 out of 110 respondents or about 55 percent responded that they were not (Table 3.9). Three respondents or nearly 3 percent did not reply. The fisher respondents who were aware of the restricted areas of fishing grounds were asked whether they harvest in restricted fish sanctuaries. Out of 47, only one respondent (i.e., 2.1%) confessed that they always did, while 9 (i.e., 19.1%) confessed that they practiced it often, followed by 18 respondents (i.e., 38.3%) reporting that they rarely practiced and 19 (i.e., 40.5%) reporting that they never practiced (3.10).

Average proportion of total harvest from sanctuaries of aquatic resources as estimated by aquatic actors is 8.3 percent (Table 3.11). The highest proportion estimated for shrimp fry (bagda) is 34.4 percent, followed by hilsha (16.6%), shrimp fry (galda) (8.0%) and sada (white) large fish (6.0%). The question was also pursued with collectors (aquatic resources) who estimated average proportion of their total harvest from sanctuaries as 11.5 percent. According to them, the highest proportion of harvests was on account of shrimp fry (bagda) (42.0%), followed by sada (white) large fish (14.0%), shrimp fry (galda) (13.3%), crab (12.5%) and hilsha (11.3%).(Table 3.12).

Table 3.9: Awareness of the respondents about sanctuaries of aquatic resources

	n	%
Yes	47	42.7
No	60	54.5
No response	3	2.8
Total	110	100.0

Table 3.10: Frequency of harvesting in restricted aquatic sanctuaries

	n	%
Always	1	2.1
Often	9	19.1
Rarely	18	38.3
Never	19	40.5
Total	47	100.0

Table 3.11: Proportion of total harvest from sanctuaries of aquatic resources (average estimated by all aquatic actors)

Product	Proportion of total harvest (%)		
	Mean	N	Std. Deviation
Gura (small) fish	3.8	16	7.2
Sada (white) large	6.0	46	10.7
Hilsha	16.6	19	19.2
Shrimp galda	1.4	7	3.8
Shrimp bagda	.0	1	-
Shrimp fry (galda)	8.0	10	19.3
Shrimp fry (bagda)	34.4	9	49.3
Crab	5.0	45	11.3
All	8.3	153	18.1

Table 3.12: Proportion of total harvest from sanctuaries of aquatic resources (average estimated by relevant collectors)

Product	Proportion of total harvest (%)		
	Mean	N	Std. Deviation
Golpata	4.2	12	9.0
Gura (small) fish	8.3	6	9.8
Sada (white) large fish	14.0	10	17.1
Hilsha	11.3	4	2.5
Shrimp galda	.0	3	.0
Shrimp fry (galda)	13.3	6	24.2
Shrimp fry (bagda)	42.0	5	53.1
Crab	12.5	12	17.3
Mollusc	-	1	-
Honey	-	3	-
Hantal	-	1	-
All	11.5	63	21.3

3.3.4 Distance of Harvest Place from Home Village

Economics of SRF extraction is directly related to distance of harvest place from home village. The distances of harvest place from home village of the respondents are presented by Range and by product (Tables 3.13 and 3.14). It can be seen that average distance of harvest place from home village of the respondents is 34.4 km. The distribution of distance by Range shows that the distance is the highest for Khulna Range (38.1 km), followed by for Satkhira Range (36.4 km), Sarankhola Range (31.4 km) and Chandpai Range (31.2 km). In terms of products, Hilsha fishers have to travel longest distance (67.7 km), followed by golpata collectors (50.3 km), honey (34.8 km), crab (31.2 km) and gura fish collectors (29.5 km). So far the sample actors by districts are concerned, the longest distance applies for Barguna (40.1 km) and the shortest distance is for Pirojpur (16.3 km) (Annex Table A3.7).

Table 3.13: Distance of harvest place from home village by range

Range	Distance of harvest place (Km)		
	Mean	N	Std. Deviation
Sarankhola	31.4	89	45.40
Khulna	38.1	55	33.49
Chandpai	31.2	13	45.24
Satkhira	36.4	60	25.65
All	34.4	217	37.71

Note: 217 out of 237 actors responded.

Table 3.14: Distance of harvest place from home village by product

Product	Distance of harvest place (Km)		
	Mean	N	Std. Deviation
Golpata	50.3	52	41.1
Gura (small) fish	29.5	13	26.3
Sada (white) large fish	14.0	44	23.0
Hilsha	67.7	17	72.1
Shrimp galda	16.8	7	14.0
Shrimp bagda	NA	1	.
Shrimp fry (galda)	21.0	10	21.0
Shrimp fry (bagda)	22.0	9	17.9
Crab	31.2	38	24.8
Mollusc	10.0	1	.
Honey	34.8	15	27.4
Hantal	30.0	1	-
All	34.4	217	37.7

Note: 217 out of 237 actors responded.

3.3.5 Distance between Collection Point and Markets

Distance from collection points to markets can be regarded as a proxy of existing marketing facilities. In order to get an idea on marketing facilities of SRF products, information on distance between collection point , primary (landing) and other markets were collected from SRF actors (Table 3.15). It can be seen that average distance between collection point and primary (landing) markets is around 41 km and the average distance between primary markets and secondary markets (wholesale) is even farther, around 61 km. Although goran harvest is currently restricted it was included in the sample. Similar is the case with grass. The products for which the distance between collection point and primary centers are much large (beyond 30 km) include grass (113 km), golpata (48 km), hilsha (46 km), crab (43 km), goran (43 km), gura fish (41) and honey (33 km). The products for which the distance between collection point and primary centers are relatively less (up to 20 km) include Sada (large) fish (22 km), shrimp fry galda (18 km) and mollusc (10 km).

The products for which the distance between primary centers and wholesale markets are much large (beyond 50 km) include shrimp galda (131 km), shrimp bagda (80 km), hilsha (79 km), crab (71 km), sada fish and gura fish (66). The products for which the distance between primary centers and wholesale markets is relatively less (beyond 50 km) include shrimp fry bagda (31

km), mollusc (10 km) and honey (10 km). The above information suggests that the existing marketing facilities, both primary and wholesale, in the SIZ are miserably low (Table 3.15).

Table 3.15: Distance between collection point, primary (landing) and other markets by products

SRF product	Distance between	
	Collection point and primary (landing) market	Primary (landing) market & secondary (wholesale)
Goran	43	39
Golpata	48	41
Grass	113	50
Gura (small) fish	41	66
Sada (white) large fish	22	67
Hilsha	46	79
Shrimp galda	28	131
Shrimp bagda	4	80
Shrimp fry (galda)	18	100
Shrimp fry (bagda)	25	31
Crab	43	71
Mollusc	10	10
Honey	33	10
All	41	61

3.3.6 Days Spent in Collection of SRF Resources

Like distance of harvest place, costs of harvests are obviously related to days spent in collection of SRF products, which are presented in Tables 3.16. Highest time is required in collecting golpata (32 days), followed by for honey (25 days-in several trips together), hantal (19 days), hilsha (12 days), crab (8 days), gura fish (6 days) and sada (white) large fish (5.5 days). For other products, days spent in collection are between 1 and 2 days. In the case of products such as honey, hilsha and large fish, collection and trip do not demand such a long duration – Beparis/Farias or any designated person often procure them from the collection spots every after few days.

Table 3.16 : Days spent in collection of SRF products

Product	Days spent in collection				
	Travel to SRF	Harvest	Back from SRF	Unloading	Total
Golpata	2.5	22.9	2.7	4.3	31.8
Gura (small) fish	0.7	4.7	0.7	-	6.0
Sada (white) large fish	0.6	4.1	0.6	0.2	5.5
Hilsha	1.3	8.3	1.3	1.0	11.8
Shrimp galda	1.0	4.0	1.0	-	6.0
Shrimp bagda	0.5	6.0	0.5	-	7.0
Shrimp fry (galda)	0.2	1.2	0.2	-	1.5
Shrimp fry (bagda)	0.2	1.0	0.2	-	1.4
Crab	1.2	5.6	1.2	0.8	7.9
Mollusc	1.0	8.0	1.0	1.0	11.0
Honey	2.0	21.3	2.0	0.3	25.0
Hantal	1.0	16.0	1.0	1.0	19.0

All	1.1	8.7	1.1	1.1	12.7

Note: Responses are from relevant collectors.

3.3.7 Working Months and Days for SRF Products/Activities

A profile of working months and days for SRF activities (including collection, trade and other ancillary activities) shows that peak months range from 3 to 6 months, except for grass and hantal which is in the range of 9 months (Table 3.17). Average peak months considering all the SRF products together amount to around 5 months. Non-peak months (adjusted for number of days worked) range from 2 to 6 months but most products have non-peak months of 2 to 3 months, the overall average being around 3.7 months. On an average, SRF actors work 23 days in the peak season and 14 days in non-peak months. It must be mentioned that in the non-peak seasons, the activities mainly include those associated with trading and this does not represent full time employment during these working months or days.

Table 3.17: Working months and days for SRF products

Product	Average months work annually			Average days work per month	
	Peak months	Non-peak months		Peak months	Non-peak months
		Non-peak months	Non-peak months (Adjusted for days)		
Goran	3.8	8.2	2.2	27.3	7.3
Golpata	3.7	5.8	1.9	25.9	8.3
Grass (shon)	9.0	3.0	2.1	28.0	20.0
Gura (small) fish	5.5	6.5	5.3	25.2	20.4
Sada (White) large fish	6.4	5.4	4.5	17.7	14.8
Hilsha	3.8	4.1	3.3	27.3	21.8
Shrimp galda	6.7	5.0	4.4	19.4	16.9
Shrimp bagda	5.0	7.0	6.1	30.0	26.0
Shrimp fry (galda)	4.0	8.0	4.0	20.0	10.0
Shrimp fry (bagda)	3.9	4.8	2.8	23.0	13.4
Crab	6.0	6.0	4.6	26.0	20.0
Mollusc	5.0	7.0	5.6	25.0	20.0
Honey	4.0	5.0	0.9	17.0	3.0
Hantal	9.0	-	-	12.0	-
Shutki	5.0	-	-	9.0	-
All	5.0	6.0	3.7	23.0	14.0

3.3.8 Occupation Pattern of SRF Collectors

Data were collected on occupation pattern of SRF collectors across various Bengali months of whole year (Table 3.18). It may be mentioned here that the SRF products include fish and aquatic resources – the activities which are more or less carried out nearly whole year (Table 3.17). On an average, the collectors under study together are found to be engaged in collection activities more than half of the time (52.4%) whole year. They are engaged in SRF collection in maximum numbers, during four months such as Poush, Magh, Falgun and Chaitra, to the extent 71, 68, 65 and 68 percent respectively. Besides, the collectors get engaged in SRF related business and other activities to overall extent of 18 percent whole year. The collectors are engaged in such activities in

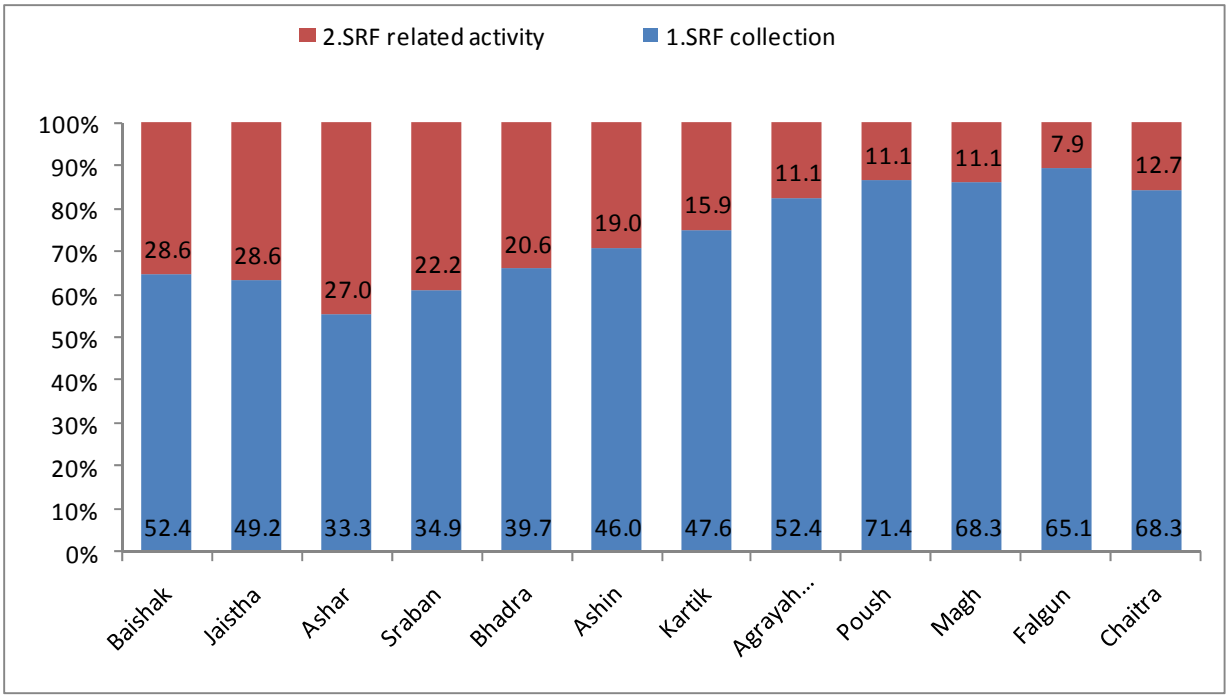
relatively more numbers during the month of Baishak, Jaistha, Ashar and Sraban. (Figures 3.1 and 3.2). As the collectors have hardly any agricultural lands, they get engaged in only 2.0 percent of the time whole year; some of them get employed as wage earners, but to the extent of only 6.0 percent of time. The collectors appear to remain unemployed around 16 percent time of the year, most crucial months of which are Ashar, Sraban, Bhadra and Falgun.

Table 3.18: Annual occupation pattern of SRF collectors

	Bengali months												All
	Baishak	Jaistha	Ashar	Sraban	Bhadra	Ashin	Kartik	Agrahyan	Poush	Magh	Falgun	Chairtra	
SRF collection	52.4	49.2	33.3	34.9	39.7	46.0	47.6	52.4	71.4	68.3	65.1	68.3	52.4
SRF related activity/business	28.6	28.6	27.0	22.2	20.6	19.0	15.9	11.1	11.1	11.1	7.9	12.7	18.0
Agriculture (crop)	3.2	3.2	3.2	3.2	3.2	3.2	3.2	1.6	0.0	0.0	0.0	0.0	2.0
Agriculture (non-crop)	1.6	0.0	0.0	3.2	1.6	4.8	1.6	9.5	1.6	0.0	1.6	0.0	2.1
Wage earner	3.2	1.6	6.3	6.3	6.3	7.9	12.7	9.5	9.5	0.0	3.2	4.8	6.0
Construction work	4.8	4.8	4.8	4.8	4.8	3.2	1.6	6.3	0.0	0.0	0.0	0.0	2.9
Self-employed	0.0	0.0	0.0	0.0	1.6	0.0	3.2	3.2	0.0	3.2	0.0	0.0	0.9
Unemployed	6.3	12.7	25.4	25.4	22.2	15.9	14.3	6.3	6.3	17.5	22.2	14.3	15.7
All	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Figure 3.2: Annual occupation pattern of SRF collectors

Figure 3.3: Annual occupation pattern of SRF collectors



3.3.9 Capital Structure of SRF Activities

As will be explained later in the chapter on value chain analysis (Chapter 5), understanding dadons and its calculation is extremely complex. Almost all the actors starting from collectors either receive or offer dadons in this way or that way. The higher level of actors mostly offer dadons but also sometimes receive money (sort of advance) against sales obligation to their clients which may or may not be termed as dadons [56] . The Aratdars, for example, consist of Choto Aratdars who receive and Boro Aratdars who offer dadons. They also comprise local and non-local Aratdars. Boro Aratdars also receive sort of dadons in the form of advance received. With a few exceptions with wholesalers, the retailers and wholesalers do not receive any dadons but they carry out business with Aratdars on credits at some enhanced prices of their products. Similar is the case with retailers.

In fact, it is difficult to identify what are dadons and what are credits as there are innumerable ways of repayment - repayment in cash with interest (47.6%) or without interest (4.0%), repayment in goods at market price (16.7%) and repayment at reduced market price (33.3%) (Table 3.19). Our field survey shows that the collectors have to sell their collected products at a price reduced by up to 22.5 percent compared to prevailing market price, depending on products. Besides, the purchasers also take additional share for the dadons by making pilferage in terms of weights of quantity of the purchased products, especially aquatic products (crab, fish). A detailed investigation to this needs further study. For the sake of simplicity the present study considers those credits or advances as dadons against which there is an obligation of selling/purchasing those goods at some market or reduced price.

[56] One may raise questions how and where from Mahajans or Aratdars arrange fund while they offer huge amount of money as dadons to lower hierarchy actors. They might avail institutional sources of financing. Besides, as is generally believed, yet higher levels of actors are there operating in the SIZ who are far wealthier section but not so visible in the SRF community.

Table 3.19: Repayment mode in SRF trading (all actors)

Repayment mode	No. of respondents	%
Repayment in cash (with interest)	59	47.6
Repayment in cash (without interest)	5	4.0
Repayment in goods at market price	20	16.7
Repayment in goods at reduced price	40	33.3
All	124	100.0

Note: Besides, many Mahajans or Aratdars.

Capital structure of SRF activities is presented in Table 3.20. Fixed capital includes value of land and buildings while working capital includes what is traditionally called *Chalan*, which includes expenses such as repair of boats, nets, salary, wage, fuel, transpiration and unofficial expenses etc. to run day-to-day business. The SRF activities are basically working capital oriented. Concentrating on such capital, among the actors, Boro Mahajans appear to employ highest working capital (Tk 512 thousand), followed by Aratdars (Tk 466 thousands), wholesalers (Tk 396 thousand), retailers (Tk 201 thousands) and so on [57]. The small amount of dadons received by collectors can be termed as working capital (Tk 4,365). Averaged over all actors, an actor employs a little more than Tk 169,470 as working capital. On an average, fixed capital constitutes slightly more than one-fourth (27.4%) and working capital constitutes little less than three-fourths (72.6%). In other words, SRF activities are more working capital oriented.

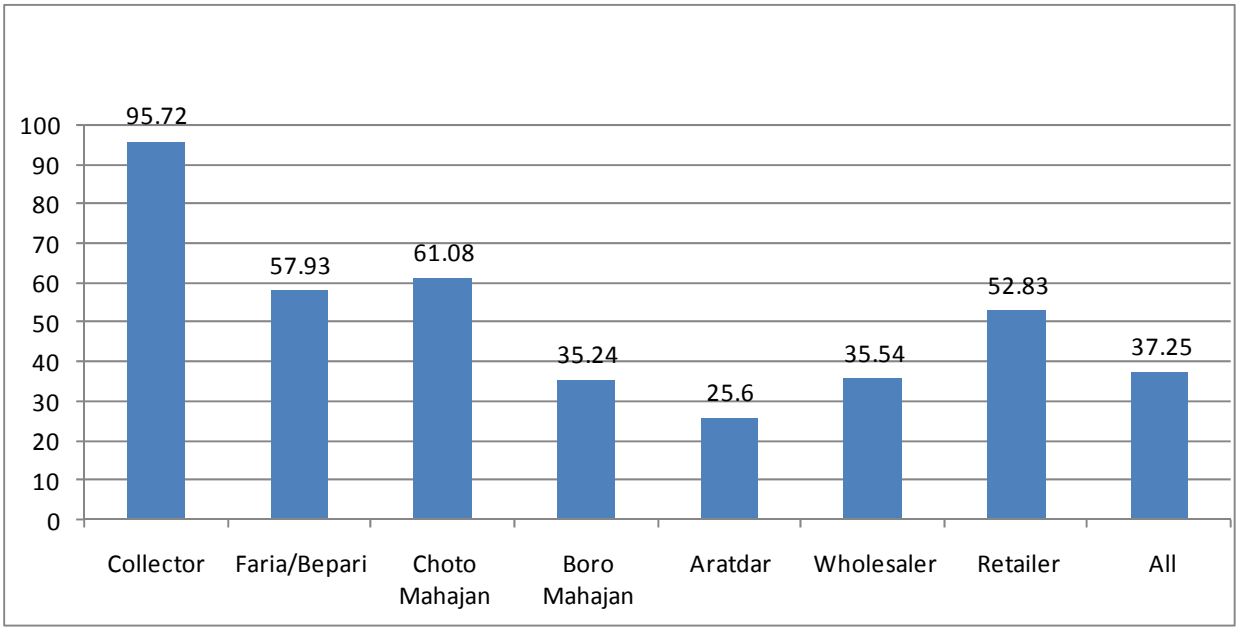
Income structure of actors and costs structure of SRF collection/business activities are addressed in Chapter 5 (Value Chain Analysis).

Table 3.20: Capital structure associated with SRF actors

	Capital structure (Tk)			Dadon Received (Tk)	Dadon amount as % of working capital
Actor type	Fixed capital	Working capital	Total capital		
Collector	-	4,365	4,365	4,178	95.72
Faria/Bepari	16,977	40,955	57,932	23,727	57.93
Choto Mahajan	86,766	87,043	173,809	53,170	61.08
Boro Mahajan	217,250	511,500	728,750	180,250	35.24
Aratdar	151,879	466,424	618,303	119,394	25.60
Wholesaler	37,500	396,250	433,750	140,833	35.54
Retailer	15,278	201,389	216,667	106,389	52.83
All	64,,032	169,470	233,503	63,129	37.25

[57] Usually, Aratdars buy products against fixed commission, which means that they should not require so much of capital. That means, at times they also act as Mahajans, offering dadons against some advance purchase. Similarly, some wholesalers also act as Mahajans and vice versa.

Figure 3.4: Dadon amount as % of working capital



3.3.10 Dadon - Capital for SRF Resource Collection

Source of capital is a major issue for the collectors. As they face lots of difficulties in obtaining loans from the formal institutions, they take dadons from Mahajans or the Aratdars. The whole of the trade, from collection to first one to three transactions, is run on dadons through an informal social network. As can be seen from the capital structure, the trade is centered around dadons (Table 3.20). The incidence of dadons is displayed most among collectors, Farias/Beparis and Choto Mahajans. Surprisingly though, even the upper level actors (e.g., Mahajans) take dadons in the form of advance sales. Dadons constitutes as high as 95.7 percent of working capital for collectors, followed by Choto Mahajans (61.1%), Farias/Beparis (57.9%) and so on.

<u>Dadon – Some Features</u>

- Dadon is an amount of money that the collectors receive in advance either from Aratdars, Paikars or from the Mahajans or from any upper hierarchy in the value chain, before they go for collecting the products from the SRF. The only condition is that the collectors are to sell the collected resources to them at some price usually fixed by dadondars (dadon givers) at some reduced price till the dadon money is not returned in full. As the dadon takers usually cannot pay off the debt, the whole cycle is never ending and the collectors remain locked for a long time.
- The system of realization of dadons and profit sharing is indeed complex. The trade deals are different for different places and actors. Some take additional commissions on sales, and some buy products (usually at some fixed and reduced price) to take the capital back. The price is determined after deduction of all costs in addition to a fixed share of profit received by the dadondars (dadon givers). Some also charge interest (usually 2-10% on a trip basis) on sales. In a few places, the selling commission is found to be as high as up to 20 percent.
- In spite of the above, dadon is preferred to bank or NGO loans; because, the bank or the NGO loans only collect installments and the interest on the capital; they hardly appreciate

the circumstances or the realities of resource collection. They do not or cannot ensure the safety of the collectors at the forest or sea areas. If a trawler is caught by pirates, for example, the dadondars (dadon givers) pay the money or ransom and set the collectors free from the hassle.

- Dadon, which is easily accessible, is administered through informal means. Dadon is also given to the collectors during the severe needs or lean periods of their families. Dadon is governed by a social network of trust and relationship. Nevertheless, a chain of obligations can hardly be paid back in full, which has an adverse effect on the collectors in the long run. Because, the collectors' 'dues on dadon' keep on increasing as they often have hardships. At times, poverty and dadons operate in a vicious cycle.
- A large majority of our respondent actors, particularly at the lowest layer in the value chain, have to rely on dadons. The good thing is that, as our survey shows, dadon markets, with two distinct groups - takers and providers, sometimes operate almost like an open and competitive market. Dadon takers can enjoy the scope of negotiating with respective dadondars (dadon givers) as, in some places, many people are available in the market offering dadons; the dadon takers have the liberty to switch over to other dadon providers depending on the conditions of respective offers. The powerful actors at the top layer in the value chain, however, are likely to be able to avail institutional loans.

3.3.11 Level of Physical Facilities

Perception of respondent actors on level of available physical facilities for fish was collected (Table 3.21). The facilities include, among other, handling, washing , sorting, grading, icing, storage, bargaining power and market information. It can be seen that the average physical facilities available for fish products are utterly poor as 40 percent of the fishers mentioned this to be low, while 45 percent mentioned this to be only average, with only 16 percent mentioned this as high. The available facilities appear to be relatively poor particularly in respect of washing, sorting, cleaning, storage capacity, bargaining power, market information and credit faculties.

Table 3.21: Perception of respondents on level of available facilities for fish

Available facilities	Perception on level of facilities for fish					
	High		Average		Low	
	No.	%	No.	%	No.	%
Handling	69	75.8	12	4.8	1	0.5
Washing	-	-	7	2.8	5	2.3
Sorting	-	-	8	3.2	5	2.3
Grading	5	5.5	8	3.2	3	1.4
Cleaning	-	-	5	2.0	5	2.3
Icing	8	8.8	10	4.0	4	1.8
Knowledge about hygiene	3	3.3	1	0.4	6	2.8
Storage capacity	-	-	8	3.2	22	10.1
Cold storage	-	-	1	0.4	20	9.2
Ice	1	1.1	22	0.8	14	6.4
Transport facilities	1	1.1	29	11.6	8	3.7
Bargaining power	-	-	23	9.2	71	32.6
Market information	2	2.2	40	16.0	44	20.2
Credit facilities	2	2.2	76	30.4	10	4.6
All	91 (16.3)	100.0	250 44.7)	100.0	218 (40.0)	100.0

Note: Figures in parentheses denote row percentages of total responses.

3.4 Perceptions of SRF Actors on Climate Change and their Effects

Although the SRF activities have no direct link with climate change and temperature rise the study ToR suggested looking into how SRF actors perceive on climate change and their effects. The study observes that, by and large, the SRF actors are quite aware of the ongoing climate change and their effects. Table 3.11 presents perceptions of value chain actors on climate change severity level due to increment of temperature and CO^2 level. The changes perceived include those already taking place or changes that are expected to happen. Generally, the SRF actors perceived that climate change has already resulted in abnormal increase in salinity. The percentage of respondents reporting the severity of the problem as very high is more than 57 percent. The harmful effects of salinity on soils have a possibility of creating food deficit. The problem has been compounded in that it has already resulted in severe shortage of fresh water in the SIZ area.

The world's heritage of the Sundarbans mangrove, which is the country's natural protection against cyclone and tidal surge, will be at threat due to inundation. The entire ecosystem with their few hundred species is likely to be affected, as reported by 25 percent of the actors. Both yield and quality of SRF are expected to decline as reported by 41 and 27 percent of the SRF acorns respectively. They have particularly mentioned about reduced honey extraction in this respect.

Some of the other problems that were mentioned to be highly severe are dykes under threat (24.9%), agriculture badly affected (22.8%), mangroves swamp getting/would be under water (15.6%), protection from tidal surge /cyclone would be affected (13.9%), incidence of water logging (13.5%), and incidence of severe flooding (11.0).

Table 3.22: Perceptions of value chain actors on climate change severity level due to increment of temperature and CO^2 level

	% of respondents mentioning severity level as					
Impacts	Very high	High	Medium	Low	Not aware	Total
Yield of SRF declining	40.5	32.1	23.6	2.5	1.3	100.0
Quality of SRF declining	27.4	36.5	26.2	3.0	7.2	100.0
Salinity increasing	57.4	31.6	8.9	1.3	0.8	100.0
Ecosystem affected	24.9	38.8	14.8	10.1	11.4	100.0
Dykes under threat	24.9	38.8	32.5	3.4	0.4	100.0
Agriculture badly affected	22.8	56.1	17.3	-	3.8	100.0
Further shortage of fresh water in SIZ	45.6	39.2	10.5	0.8	3.8	100.0
Incidence of water logging	13.5	27.8	32.5	13.9	12.2	100.0
Incidence of increased temperature	12.7	31.2	28.3	14.8	13.1	100.0
Incidence of pests	8.9	24.9	48.1	7.6	10.5	100.0
Incidence of diseases	10.1	21.9	51.1	10.1	6.9	100.0
Incidence of severe	11.0	17.7	51.1	11.4	8.9	100.0

flooding						
Mangroves swamp getting/would be under water	15.6	21.5	44.7	5.9	12.3	100.0
Protection from tidal surge /cyclone would be affected	13.9	28.7	46.8	5.9	4.6	100.0
Employment dependency on SRF would be impacted	3.8	22.4	50.6	2.1	21.1	100.0
Out-migration taking place	0.4	3.8	35.3	10.5	49.0	100.0
All	20.8	29.6	32.7	6.5	10.4	100.0
Total responses	790	1121	1240	245	396	3792

Adaptation/Mitigations/Preparedness Taken/Suggested

A large number of adaptation and mitigation measures suggested by SRF actors include those already taken/practiced or include those that have to be taken up for coping with the potential adverse impacts due to the climate change. The results are presented under the following major impact sectors (Table 3.23).

- Cyclone
- Flooding
- Water Logging
- Salinity
- Forest resources
- Rise in temperature
- Drought
- Increased diseases
- Shortage of fresh water
- Others

As presently the dykes and embankments are in a terrible state of physical condition, these can hardly provide defense against tidal surges due to the possible climate change and resulting sea level rise. They have particularly mentioned about recent havoc of Sidr and Aila in this respect (Effects have not yet been fully overcome) [58]. As suggested by the actors, one of the top priorities would be to strengthen these dykes, and construct much needed new ones, including cyclone shelters, in order to reduce vulnerability to population.

Ensuring access to safe water supply would be one of the top priorities mentioned by the respondents. The actors mentioned that they were already practicing rainwater harvesting and pond sand filter (PSF) techniques. However, ponds need to be re-excavated for conservation of adequate water. This will at the same time help reduce water logging which is a major issue in SIZ areas.

[58] During our survey work, some of the victims of Aila were found to be still shelter less; having apparently failed by BWDB only recently the Army has been deployed for undertaking the repair and rehabilitation works.

With regard to agriculture, specialized crops such as salt-tolerant and soil-less species have to be promoted. Although planting more trees (especially coconut trees, or even mangrove plantation) along embankments and roads is already practiced, further efforts need to be stepped up in this respect. The soil-less cultivation system (i.e. hydroponics system) has already been practiced by some actors as an adaptation against potential sea level rise and climate change.

A large majority of population in SIZ areas, particularly women community, heavily depends on livestock and poultry for their livelihood. While they have already taken some adaptations the actors by and large suggested that livestock pasture be widely cultivated in newly developed char areas, instead of leasing them out as a preparation to climate change and seal level rise in the future.

The actors suggested undertaking further and massive social forestry program apart from what have already been implemented. It is important to strengthen afforestation program by planting salinity-tolerant and local species of trees in future to deal with climate change.

The actors suggested that massive public awareness campaign be undertaken including preparedness training on potential sea-level rise and its impacts.

Table 3.23: Adaptations/mitigations/preparedness taken/suggested by SRF actors to deal with climate change

Possible effects of CC on	Recommended/Practiced Adaptations
Cyclone	• Raise homestead (already practiced due to storm surge) • Strengthen coastal afforestation programs (already practiced) • Construct multipurpose shelters • Construct floating shelters in and around SRF • Ensure availability of drinking water • Ensure effective early warning system • Increase volunteers in SRF locations • Raise public awareness and provide preparedness training
Flooding	• Increase introducing soil-less floating crops (already practiced) • Increase height of embankments cum roads along rivers and sea • Excavate canals around SRF • Raise and construct pucca houses (already practiced) • Plant more trees (especially coconut tree) along embankments (already practiced) • Undertake massive social forestry program with the help of SRF population • Conserve forest resources with the help of local people • Increase navigation by dredging • Set up hand-driven tube-well at elevated places • Raise land level with the spoils obtained from excavation of canal

	• Change cropping time/pattern (practiced) • Introduce mixed cropping (practiced) • Increase raised ponds for fish culture (practiced) • Cultivate fish and crop suitable for saline water • Innovate short-time HYV rice

Water Logging	• Excavate canals around SRF • Carry out canal/river excavation (practiced) • Raise roads and houses (practiced) • Construct planned and adequate sluice gates along embankment • Introduce local technology in constructing embankments • Decentralize financial and other management and construct sluice gates in planned way for water drainage
Salinity	• In order to protect soil from salinity and hence increase soil fertility stop shrimp culture • Strengthen aforestation program by planting salinity-tolerant and local species of trees • Increase coconut cultivation and devise crops/fish species tolerant to salt (practiced) • Carry out canal excavation (practiced) • Increase rain water harvesting and Pond-Sand-Filter (practiced) • Ensure provision of fresh water inside SRF • Introduce mangrove planting • Introduce salinity-tolerant paddy and fish
Forest resources	• Raise awareness campaigns on importance of SRF; motivate to plant trees along seashore, roadsides and river banks (practiced) • Undertake afforestation and effective forest resource conservation programs with help from local people and local government • Use alternatives to fuel wood for brickfield and domestic cooking • Take legal action against illegal loggers of forest resources and strengthen Coast Guard activities • Formulate national plan for marine and bio-diversity conservation, raise public awareness and develop safe zone for favorable habitat of animals • Implement coastal fisheries resource conservation policies • Raise walls of fishing firms (practiced)
Rise in temperature	• Increase plantation, implement new forestation • Increase mangrove plantation in Chars and damaged areas of SRF • Conduct awareness program on effects of CC (practiced)

Drought	• In order to protect arable land, undertake farming of high yielding agricultural varieties and make seeds available to farmers • Excavate ponds/canals to be used as reservoirs (practiced) • Increase cropping intensity and develop alternative farming methods (such as, soil-less crop farming) (practiced) • Import high yielding variety seeds and cultivate crops tolerable to salinity and drought • Increase vegetables production by applying modern methods; ensure import of high yielding verity seeds and make them available to farmers • Increase farming of high nutrition-enriched crops in SIZ (practiced) • Conduct plantation of fruit and forest species • Store water through rain water harvesting and PSF method in SIZ (practiced) • Provide increased agricultural extension service to farmers
Increased diseases	• Undertake PSF and rainwater harvesting to ensure safe drinking water and protect from diarrheal diseases • Ensure supply of fresh water from upstream • Conduct awareness and cultural programs on health (practiced) • Ensure sanitations for households in SIZ (practiced) • Protect rivers from pollution in SIZ (practiced) • Limit use of pesticides and introduce organic fertilizers (practiced) • Distribute water purifying tablets during monsoon in SIZ
Shortage of Fresh Water	• Undertake saline water treatment and PSF to ensure safe drinking water and protect from diarrheal diseases • Set up deep hand-driven tube-well • Arrange fresh water reserves by excavating/re-excavating canals and ponds • Undertake rainwater harvesting
Others	• Undertake programs in Char areas of SIZ to address fodder crisis (island) instead of leasing them out (practiced) • Design strategies for infrastructure buildings, applying sustainable technology considering the potential sea level rise • Decentralize financial and other management • Introduce crop and property insurance • Cultivate livestock feeds to develop pasture in newly developed chars

3.5 Historical Moratorium on SRF Products

An account of historical moratorium, based on readily available data, is shown in Table 3.24. Passur is one of the valuable timbers of SRF but its stock fell down to a minimal level due to unsustainable extraction when FD decided for moratorium on the tree in 1972. In 1989, timber extraction was banned from the Protected Areas (Reserved Forests) and thus moratorium imposed on timber felling by making gher in 20 years felling cycle i.e. gher auction basis. However, Sundri (*Heritiera fomes*) top-dying trees were allowed and sold from Kasiabad and Dhangmari depot under FD management. The woods such as Singra, Bola and Jhana used to be extracted as fuel wood from SRF but due to fall in stock the FD put moratorium in 1995.

The government imposed ban on shrimp fry collection in the coastal areas of Bangladesh including SRF canals and rivers with immediate effect followed by a standing committee meeting in April 2003.

The extraction of all SRF forest products including snails, oyster was banned for one year (FY 2007-08), followed by Cyclone-Sidr (Nov. 15, 2007) but the ban on golpata (*Nypa fruticans*) was withdrawn in January 2009 for FY 2008-09 . Extraction of golpata continued for FY2009-10.

Table 3.24: Moratorium on various SRF products

Year	Moratorium imposed on SRF products			Reasons/Remark
	Timber	Fuel wood	Non-timber	
1972	Passur	-	-	Stock fell down due to unsustainable extraction
1989	All timbers	-	-	20-years felling cycle except for sundri (*Heritiera fomes*) top-dying trees
1995	-	Singra, Bola, Jhana	-	Stock fell down
2003	-	-	Shrimp fry	Unsustainable extraction
2007	-	-	All forest products including snail, oyster	Cyclone-Sidr (Nov15 2007) but ban on golpata (*Nypa fruticans*) withdrawn in January 2009 for FY 2008-09
2010	-	-	Golpata	Extraction of golpata allowed for 2009-10

3.6 Impact of Moratorium on Local Economy

In the process of our consultations during our survey in Sundarbans Impact Zone (SIZ) an issue immediately emerged as to effects of moratorium (if any) on local economy [59]. This is about how saw mills and furniture units are operating in SIZ area in spite of timber products extractions are officially banned for a long time now. Hence, an investigation was carried out in all the major SIZ areas as to how these enterprises are surviving.

[59] This was particularly mentioned by CoP, IPAC in a meeting of the study team with IPAC and FD personnel in Khulna on 9 March, 2010.

In all, 34 units across SIZ were interviewed, which included both saw mills and furniture units. Interestingly, many saw mills had either furniture units or timber trading or timber logging. Hence, given the scope of this brief study, we processed the data lumping together as our main issue was to look into the production and investment trend of such units. About 53 percent of sample units were located in Sarankhola Range, followed by 29 percent in Khulna, 12 percent in Satkhira and 6 percent in Chandpai Range (Table 3.25).

Table 3.25: Sample of saw mills/furniture units by Range

Range	No. of units	%
Sarankhola	18	52.9
Chandpai	2	5.9
Khulna	10	29.4
Satkhira	4	11.8
Total	34	100.0

Information were sought from the entrepreneurs on estimated proportions of raw materials (in %) used during previous five years (2005 through 2009), for both local and SRF timbers (Annex Tables A3.9 and A3.13) [60]. Information were also sought on aspects such as fixed and working capital, gross and net income, and number of enterprises in respective locality for the previous five years (Annex Tables A3.14 through AA3.16).

Trend growth rates were then estimated on capitals and returns, based on data, however, at current prices (Table 3.26). It can be seen that there has been a tremendous growth of saw mills and furniture units on all counts. The growth in terms of fixed and working capital estimates as 19 and 20 percent respectively. In terms of capital, both fixed and working capital, Khulna Range occupies the first position, 34 and 32 percent respectively. In terms of gross and net output, again, Khulna Range occupies the first position, the trend growth being 20 and 16 percent respectively. Surprising though, Satkhira experienced a negative growth during the last five years, 10 and 2 percent for both gross and net output respectively [61]. As regards growth in terms of number of enterprises, again, there has been a tremendous growth, as high as 24 percent, in respective SIZ locations. Khulna, again, experienced as high as 29 percent growth in the last five years, followed by Sarankhola (20%), Chandpai (19%) and the lowest in Satkhira (13%) Range. The case of Khulna experiencing high growth rates could be attributed to higher product demand arising out of higher urbanization, and proximity to a Divisional city.

Table 3.26: Estimates of trend growths of saw mills/furniture units by Range

Range	Estimates of trend growths						
	Local raw materials	SRF timber products	Fixed capital	Working capital	Gross income	Net income	Number of enterprises
Sarankhola	.16*	- .21*	.08*	.17*	.08*	.06***	.20*
Chandpai	.15*	- 1.62**	.16*	.17*	.13*	.14*	.19*
Khulna	.21**	- 1.70**	.34**	.32*	.20**	.16***	.29*
Satkhira	.01***	No use	.12**	.16**	-.10***	- 02***	.13**
All	.14*	- .24*	.19**	.20*	.11*	.09***	.24*

[60] Subsequently, the information on proportions were converted to quantity of raw materials used, using gross income as respective weights and thus trend of raw materials estimated.

[61] One has to take note, however, that the estimates are not statistically significant. Additionally, the sample could be a few outliers, extremely small at that.

Note: Exponential growth rate; Log linear models used to estimate trend estimates. *=Statistically significant at 99 percent significance level. **=Statistically significant at 95 percent significance level. ***= Not statistically significant

Obviously, the raw materials of saw mills and furniture units largely consist of timbers, either procured from local source or from SRF source. Our analysis shows that trend growth rate of local timbers used by saw mills and furniture units in SIZ estimates as 14 percent (Annex Tables A3.14 and A3.16). In contrast, timbers as SRF source experienced an overall high negative growth, 24 percent. The use of SRF materials by enterprises in Khulna, Chandpai and Satkhira has been reportedly either nil or nearly nil. Only in Sarankhola, reportedly, there is some use, but the rate has declined drastically, at the rate of 21 percent.

What the above analyses imply that apparently three has been no adverse impact of moratorium on the growth of saw mills and furniture enterprises. In contrast, there has been a tremendous growth of such enterprises, which indicates that cutting of local trees has been on sharp increase. The possibility that the entrepreneurs have misreported on the use of SRF timbers in their enterprises, however, cannot be ruled out.

A number of large industries located in Khulna Division and established in the 1960s used to be heavily dependent on the raw materials (e.g., gewa, sundri and singra) from the SRF for their production. Some of the industries included Khulna Newsprint Mill, Khulna Hardboard Mill and Dada Match Factory. It is reported that these industries have suffered a lot for a long time due to moratorium imposed since 1989.

Ban on goran

Ban on fuel wood such as goran has also adverse impact on the households, particularly at the bottom level who have limited options for securing and/or paying for fuel wood needed for cooking purposes. This has also impacted in that poor communities used to supplement their incomes through fuel wood sales before the ban (which was imposed after Sidr). On the other hand, cow dung is getting scarce for use fuel, which is likely to have impact on agriculture. Women have to spend greater time fetching fuel-wood to meet domestic cooking needs. The increase in time burdens is likely to have impact on the caring responsibilities of household members.

Table 3.27: Trend of fixed capital employed in previous 5 years by Range

Range	Average fixed capital in					
	2005	2006	2007	2008	2009	Trend rate of growth rate *
Sarankhola	100556	107778	117222	125556	141667	.08*
Chandpai	175000	225000	260000	315000	325000	.16*
Khulna	95000	96000	105200	149500	424500	.34**
Satkhira	157500	207500	222500	235000	275000	.12**
All	110000	122941	134471	156618	251324	.19**

Note: Exponential growth rate; Log linear models used to estimate trend estimates. *=Statistically significant at 99 percent significance level. **=Statistically significant at 95 percent significance level. ***= Not statistically significant

Table 3.28: Trend of working capital employed in previous 5 years by Range

Range	Average working capital in					
	2005	2006	2007	2008	2009	Trend rate of growth rate *
Sarankhola	39111	41167	54556	60833	74333	.17*
Chandpai	115000	117500	145000	175000	225000	.17*

Khulna	54500	78500	111000	146000	195000	.32*
Satkhira	342500	516250	585000	622500	700000	.16**
All	83794	112529	138882	158676	192294	.20*

Note: Exponential growth rate; Log linear models used to estimate trend estimates. *=Statistically significant at 99 percent significance level. **=Statistically significant at 95 percent significance level. ***= Not statistically significant.

Table 3.29: Trend of net income earned in previous 5 years by Range

Range	Average net income in					
	2005	2006	2007	2008	2009	Trend rate of growth rate *
Sarankhola	36000	76667	47722	53778	58778	.06***
Chandpai	17000	17500	22500	25000	28000	.14*
Khulna	99200	97600	132250	217690	145200	.16***
Satkhira	153000	207000	136250	136500	173500	- 02***
All	67235	94676	81515	110026	95882	.09***

Note: Exponential growth rate; Log linear models used to estimate trend estimates. *=Statistically significant at 99 percent significance level. **=Statistically significant at 95 percent significance level. ***= Not statistically significant.

Table 3.30: Number of units in respective locations in previous 5 years by Range

Range	Average number of units in respective locations in					
	2005	2006	2007	2008	2009	Trend rate of growth rate *
Sarankhola	4.50	6.17	7.56	8.94	10.39	.20*
Chandpai	6.00	8.00	9.50	10.50	13.50	.19*
Khulna	13.40	19.40	25.40	33.40	42.40	.29*
Satkhira	10.00	13.50	15.25	16.50	17.50	.13**
All	7.85	11.03	13.82	17.12	20.82	.24*

Note: Exponential growth rate; Log linear models used to estimate trend estimates. *=Statistically significant at 99 percent significance level. **=Statistically significant at 95 percent significance level. ***= Not statistically significant.

CHAPTER 4

MAPPING FOR CORE STEPS AND ACTORS IN VALUE CHAINS

Chapter 4:

Mapping for Core Steps and Actors in Value Chains

This chapter discusses the steps and processes that occur from harvests to final consumption of SRF products. As the present study identifies the marketing chains up to final destination, it excludes processes involved in converting into final products through processing activities (e.g., fish drying, etc). In other words, the study aims to map marketing chains only. However, from different perspectives, the study investigates a few processing activities centered around SRF products, such as saw milling and furniture making enterprises.

4.1 Sectors and Products under Study

As also described in Chapter 1, the SRF products are broadly divided into five major categories: timber, non-timber, fish, aquatic and non-aquatic resources. The timber category consists of sundri and other trees, followed by non-timber consisting of goran, golpata, grass and hantal, fish consisting of *gura* fish, *sada* (large) fish, hilsha and shrimp, aquatic resources consisting of crab and mollusc, and non-aquatic resources consisting of honey (Table 4.1). However, for not all the items investigations have been carried out in details. Of these, for various reasons, the products such as sundri or goran (banned items), grass, hantal, shutki and mollusc (small sample size) have not been covered for detail level analysis in this report [62]. Golpata is one of the SRF products which needs special attention as this is so called "CI sheet of the mass population who are poor for house roofing". This is getting far more important due to the ever-increasing pricing pressures from CI sheets in the existing market.

As mentioned earlier, not all the products listed above will be within the scope of this brief study. For example, the products under "Other Products" will not be included in the current VCA. However, the type of associated actors and flow chains of the above product list are contemplated. In the case of multi-products dealing with by single actor, the dominant product is considered.

As discussed in the methodology chapter (Chapter 1), the marketing chains for the SRF products are complex, multi-dimensional involving innumerable combinations. Only the basic, common and dominant chains for the selected SRF items have been identified for subsequent investigations.

[62] There has been a ban on Sundri for a long time; goran is also banned since cyclone Sidr. One sample of sundri (illegal) and 6 samples of goran (legal but as by product) have been included in this study to identify marketing chains and other aspects of extraction other than detailed costs and returns. Marketing chains for these items have been identified but these are more or less similar to other SRF items: Collector ⇒ Choto Mahajan ⇒ Boro Mahajan/ Bahaddar (for fish or *shutki*) ⇒ Aratdar ⇒ Wholesaler ⇒ Retailer.

Table 4.1: Sectors and products under study

Sector	Product
Timber	Sundri
Non-Timber	Goran Golpata/Grass Hantal
Fish	*Gura* (small) fish *Sada(white) large* fish Hilsha Shrimp large (galda) Shrimp large (bagda) Shrimp small (galda) Shrimp small (bagda) Shrimp fry (galda) Shrimp fry (bagda) Shutki
Aquatic Resources	Crab Mollusc/Shell/Oyster
Non-Aquatic Resources	Honey
Other Products	Medicinal plants Fuel wood Bee wax Hantal

Administratively, the Forest Department is the legal occupier of the Sundarbans. It has divided the Forest into two Forest Divisions: Sundarbans East and West Divisions. The West Division consists of two ranges: Satkhira and Khulna, while the East Division is also comprised of two ranges: Chandpai and Sarankhola. The analysis of mapping for steps and actors in the value chain is carried out according to administrative upazilas, districts and forest ranges.

4.2 Mapping

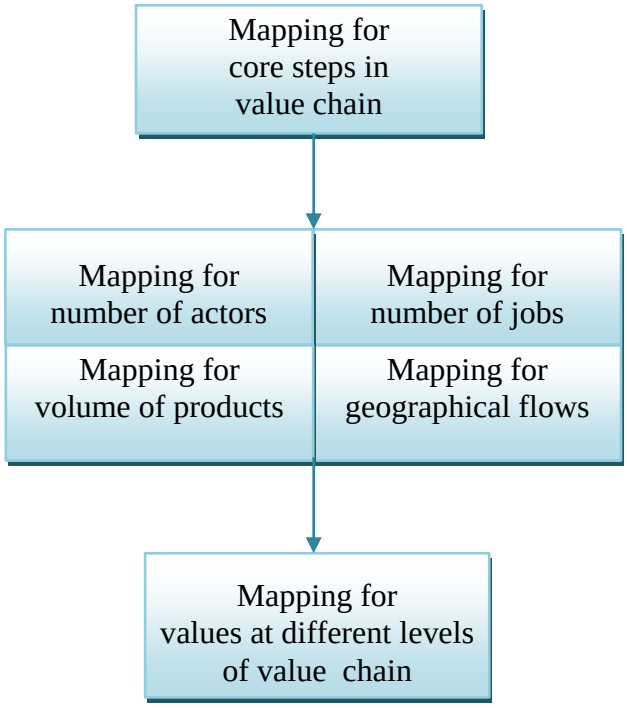
As depicted in Figure 4.1, the major theme of the study is related to mapping for flows, actors, and volume, and value chain. More categorically, the following six major steps are involved in the process [63]:

- Mapping for core steps (flows) in the value chain
- Mapping for number of actors
- Mapping for number of jobs
- Mapping for volume of products [64]
- Mapping for geographical flows, and finally
- Mapping for the values at different levels of the value chain.

[63] Given the scope of this study, the estimates of these parameters are carried out at enterprise levels.

[64] This bief study aims to estimate volume of products at enterprise level only.

Figure 4.1: Stages for mapping value chain



4.3 Mapping Core Steps in the Value Chain

Typically, the first step is to identify the different core steps in the value chain in the context of marketing of SRF products. The definitions of the SRF actors and their functions/roles in the value chain are presented in Annex B. The actors include, among others, Collector, Faria/Bepari, Choto Mahajan, Boro Mahajan, Aratdar, Wholesaler and Retailer.

Once the chains, actors and specific activities in the value chain are mapped, one has to map the flows of products through the value chain. This involves identifying the products at each marketing stage from collection through to final destinations. Mapping these flows creates a clear picture of what forms of chains are handled at each stage of the value chain. Nevertheless, the present study entailing marketing chains deals with nearly the same product without any significant processing or transformation.

Once the main marketing chains are mapped, it is possible to move on to the actors – the people who are involved in the value chain. In other words, who the actors that are involved in the chains and what they actually do and what are their roles in the value chains (See also Annex C).

The actors involved in the value chains for the above major sectors/products have been identified, the detail of which are presented in Annex C (simplified chain of actors) and relevant flow charts). The marketing chains for the SRF products are complex, multi-dimensional with innumerable combinations. While it is not feasible for this brief study to contemplate all the chains, the basic, common and dominant chains for the selected SRF items are identified for subsequent investigations, which are as follows:

We start with timber

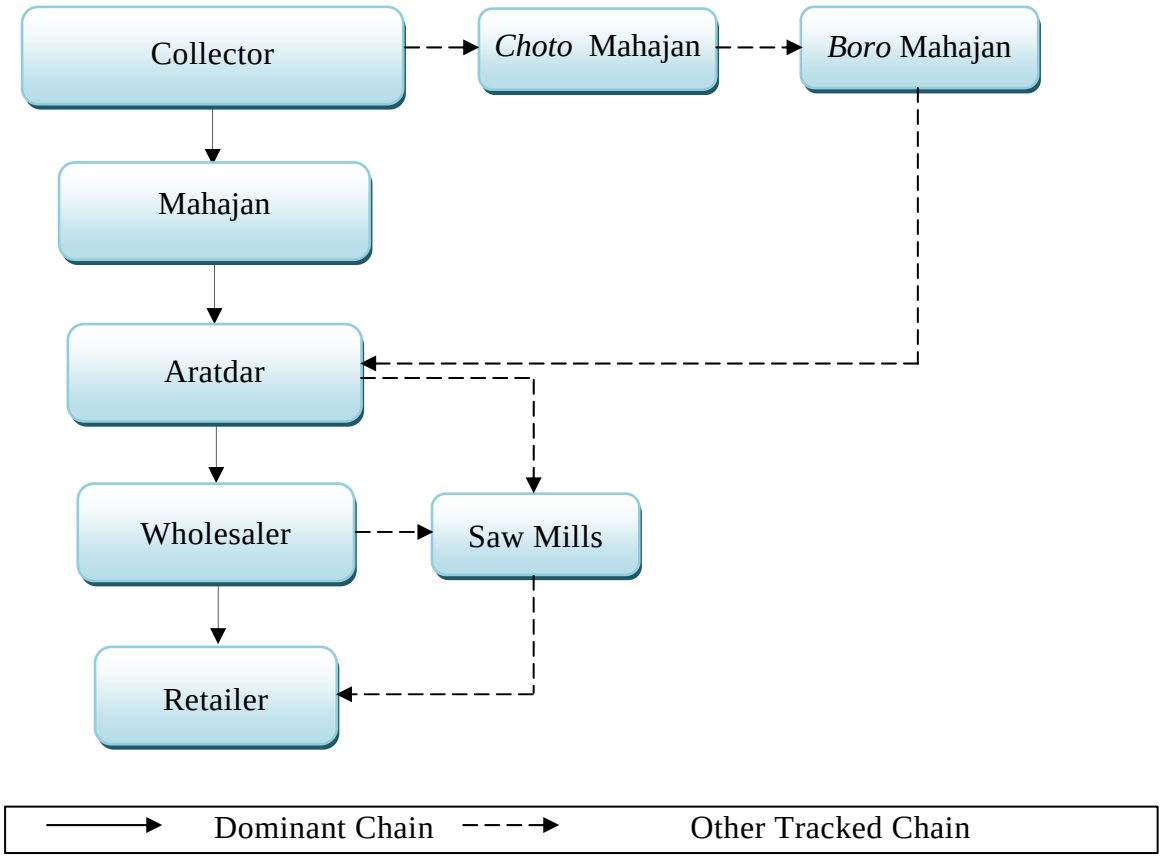
4.3.1 Timber - Sundri

Although there is a continued moratorium on timber extraction since long, the study team could trace a few collectors, reportedly, of sundri in Patharghata of Barguna District. This was, however, not commonly found in other upazilas. One of them agreed to be interviewed on condition of anonymity. However, they did not cooperate in providing with detailed accounts of costs and returns nor they did provide with the names of relevant other actors such as Aratdars or wholesalers. Two common and dominant chains for sundri are identified as follows:

Chain 1: Collector ⇒ Mahajan ⇒ Aratdar ⇒ Wholesaler ⇒ Retailer
Chain 2: Collector ⇒ Choto Mahajan ⇒ Boro Mahajan ⇒ Aratdar ⇒ Wholesaler ⇒ Retailer

In a few cases, Beparis or Farias also exist between collectors and Mahajans. The chains are also more or less true for timbers such as passur, kankra and gewa [65].

Flow chart 4.1: Value chain for timber (Sundri, Passur, Kankra, Gewa)



[65] It may be mentioned here that the study team undertook a few interviews with timber traders who used to be involved in such items in the past when there was no ban on these items.

4.3.2 Non-timber

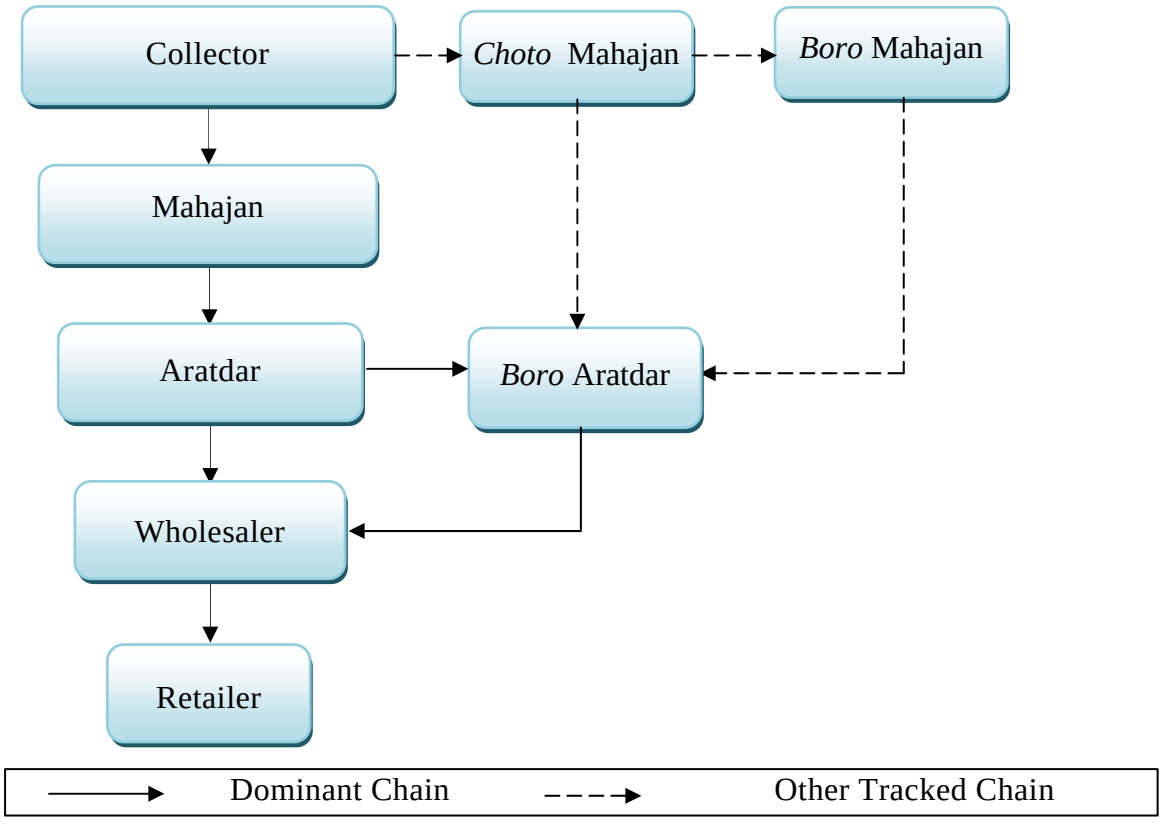
Golpata/Grass (*Shon*)

Three common and dominant chains for golpata or grass are identified as follows:

Chain 1: Collector ⇒ Mahajan ⇒ Aratdar ⇒ Wholesaler ⇒ Retailer
Chain 2: Collector ⇒ Choto Mahajan ⇒ Boro Mahajan ⇒ Aratdar ⇒ Wholesaler ⇒ Retailer
Chain 3: Collector ⇒ Choto Mahajan ⇒ Boro Mahajan ⇒ Choto Aratdar ⇒ Boro Aratdar ⇒ Wholesaler ⇒ Retailer

In a few cases, again, Beparis or Farias also exist along the chain between collectors and Mahajans. This is demonstrated in Chart 4.2. It must be noted that sometimes the chains are not systematic as shown above. Although more often collectors sell their products to Choto Mahajans or Boro Mahajans, some also sell their products directly to Aratdars or wholesalers, depending on from whom they have taken dadons. In other words, some Mahajans are also Aratdars and vice versa [66].

Flow chart 4.2: Value chain for non-timber (Golpata/Grass/Shon/Matting)



[66] As will be seen later in Chapter 5, this poses problem in estimating value additions at various stages along the chains.

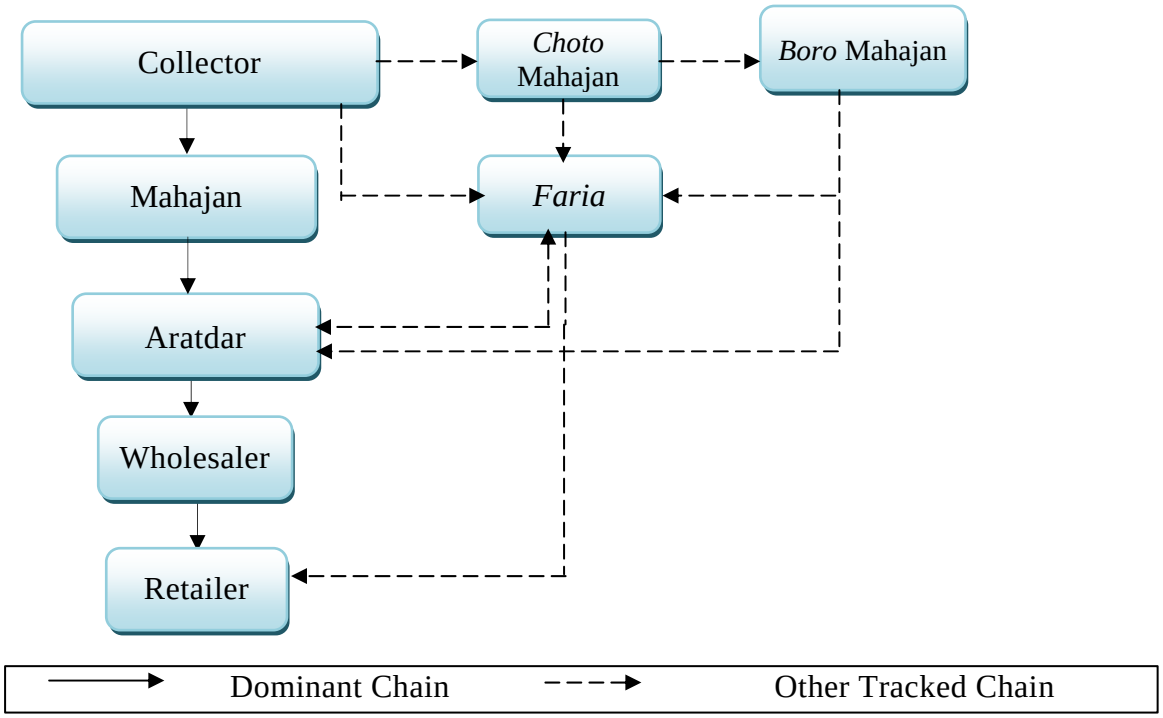
4.3.3 Fish

The fish sector consists of *gura* fish, s*ada* (white-large) fish, hilsha, shrimp (galda), shrimp (bagda) and shrimp fry (galda) and shrimp fry (bagda). Among innumerable combinations, the following marketing chains are most commonly found.

***Gura* fish**

Chain 1: Fisher ⇒ Mahajan ⇒ Aratdar ⇒ Auctioneer ⇒ Wholesaler ⇒ Retailer
Chain 2: Fisher ⇒ Choto Mahajan ⇒ Boro Mahajan ⇒ Aratdar ⇒ Wholesaler ⇒ Retailer
Chain 3: Fisher ⇒ Faria ⇒ Mahajan/Aratdar ⇒ Wholesaler ⇒ Retailer
Chain 4: Fisher ⇒ Mahajan ⇒ Aratdar ⇒ Company/Exporter

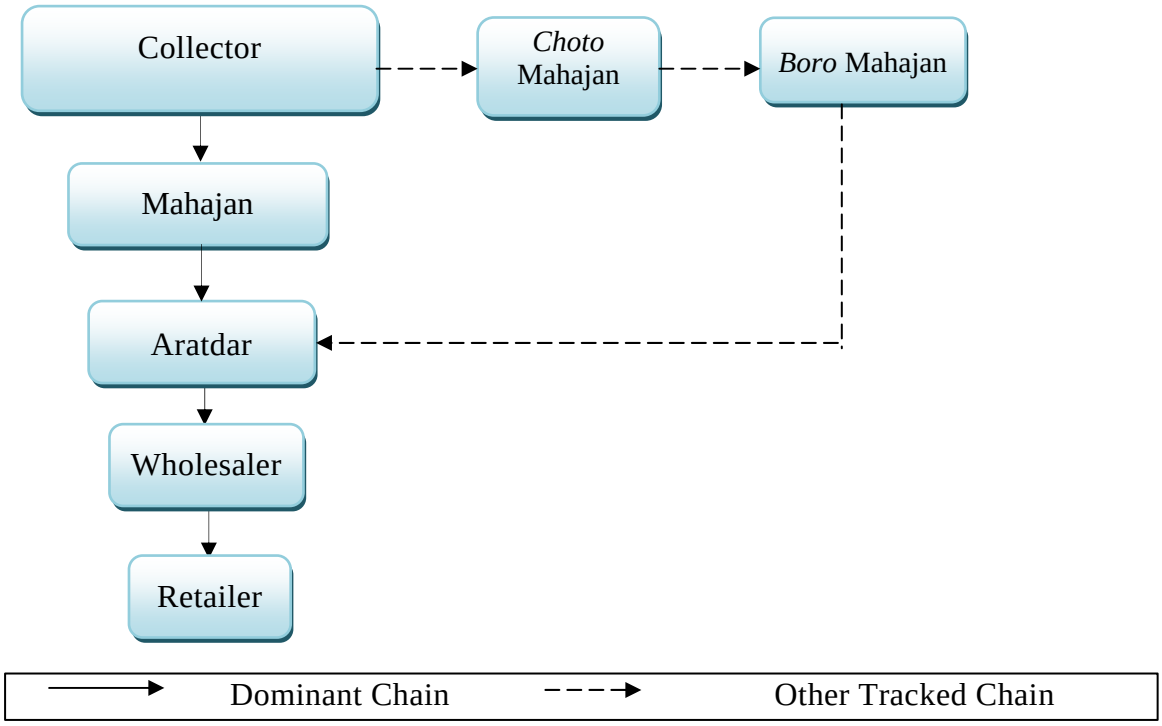
Flow chart 4.3: Value chain for Gura fish



***Sada* (White-Large) fish**

Chain 1: Fisher ⇒ Mahajan ⇒ Aratdar ⇒ Auctioneer ⇒ Wholesaler ⇒ Retailer
Chain 2: Fisher ⇒ Choto Mahajan ⇒ Boro Mahajan ⇒ Aratdar ⇒ Wholesaler ⇒ Retailer
Chain 3: Fisher ⇒ Mahajan ⇒ Aratdar ⇒ Auctioneer ⇒ Wholesaler ⇒ Retailer
Chain 4: Fisher ⇒ Mahajan ⇒ Aratdar ⇒ Company/Exporter

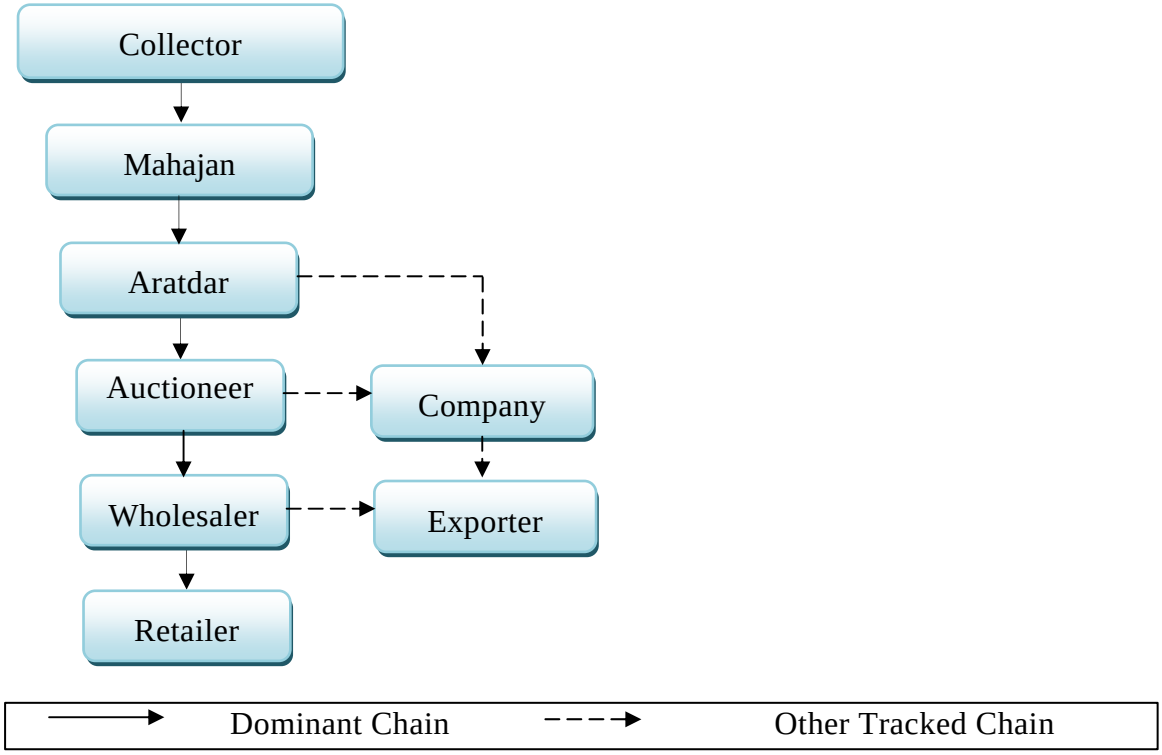
Flow chart 4.4: Value chain for sada fish



Hilsha

Chain 1: Fisher ⇒ Mahajan ⇒ Aratdar ⇒ Auctioneer ⇒ Wholesaler ⇒ Retailer
Chain 2: Fisher ⇒ Aratdar ⇒ Auctioneer ⇒ Wholesaler ⇒ Retailer
Chain 3: Fisher ⇒ Mahajan ⇒ Aratdar ⇒ LC party /Exporter

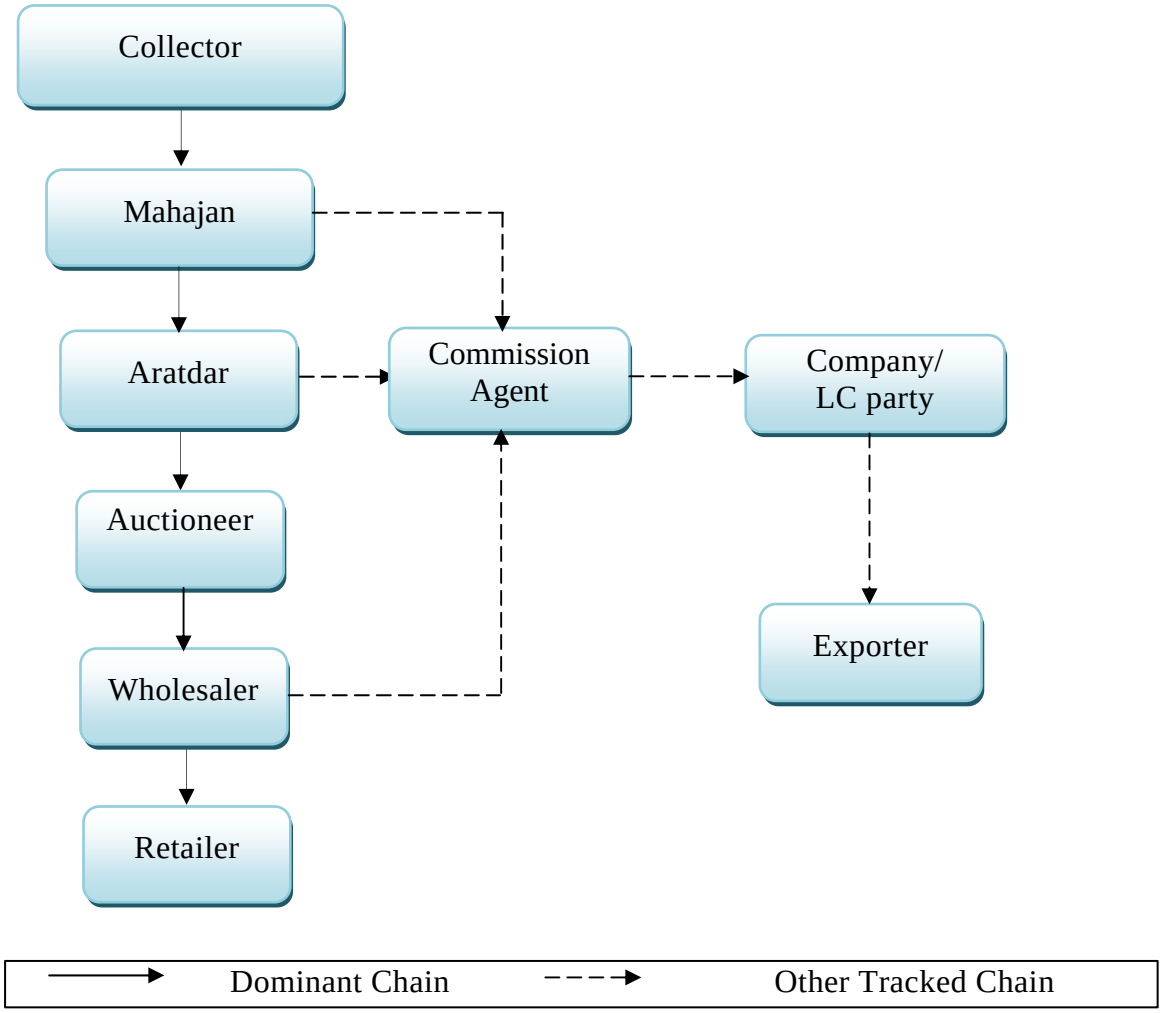
Flow chart 4.5: Value chain for hilsha



Shrimp (Galda and Bagda)

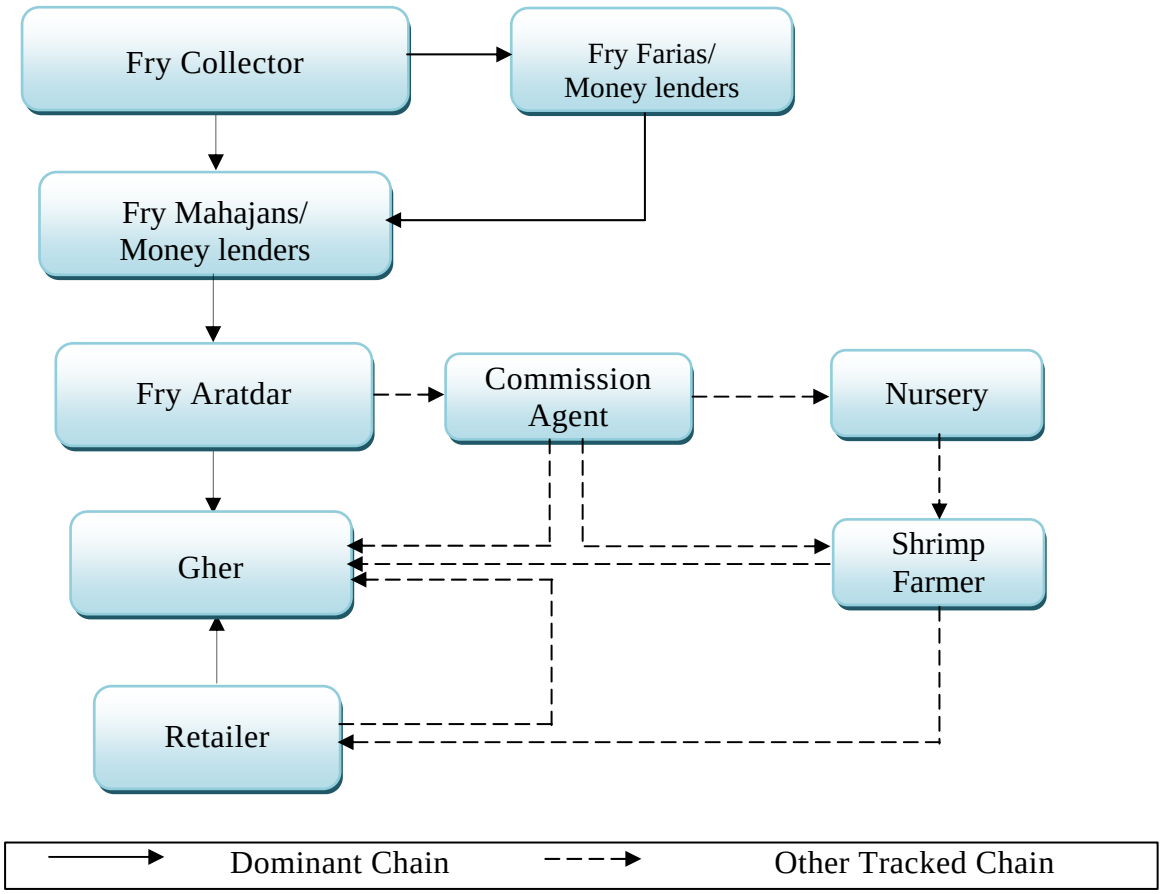
Chain 1: Fisher ⇒ Mahajan ⇒ Aratdar ⇒ Auctioneer ⇒ Wholesaler ⇒ Retailer
Chain 2: Fisher ⇒ Faria ⇒ Mahajan/Aratdar ⇒ Wholesaler ⇒ Retailer
Chain 3: Fisher ⇒ Mahajan ⇒ Aratdar ⇒ Commission Agent ⇒ Company/LC party ⇒ Exporter

Flow chart 4.6: Value chain for Shrimp Galda and Bagda



Fish (Shrimp) fry (galda and bagda):
Chain 1: Fry collector ⇒ Faria/Bepari ⇒ Mahajan ⇒ Aratdar ⇒ Nursery ⇒ Retailer

Flow chart 4.7: Value chain for shrimp fry



Almost in all the cases, Choto Mahajans or Boro Mahajans organize the collection job, while the collectors work on only wages to sell their collected products at some fixed or reduced price. As in other cases, collectors sell their products to Choto Mahajans or Boro Mahajans and some also sell their products directly to Aratdars or wholesalers. The basic structure being the same or similar, in the case of exports, Aratdars sell their fish products to exporters [67]

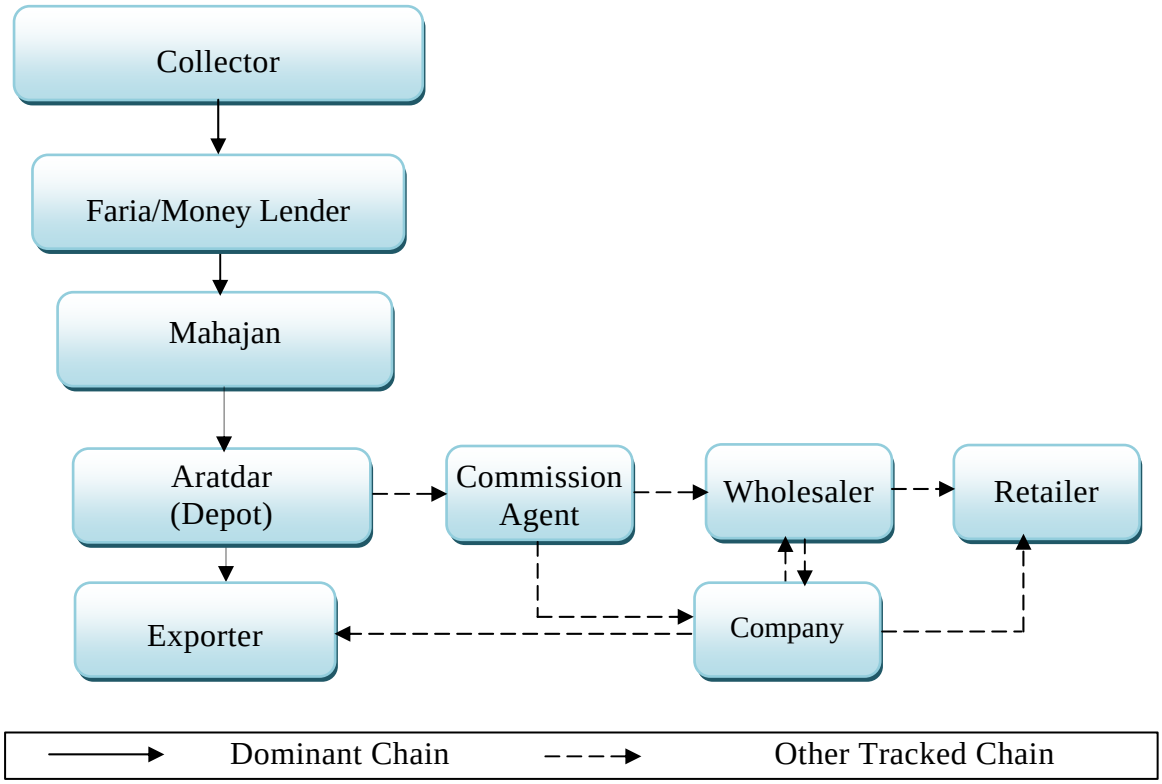
4.3.4 Aquatic Resources

Crab

Chain: Collector ⇒ Mahajan ⇒ Aratdar/Depot ⇒ Exporter

[67] As will be seen in later sections, the expert proportions of their total catch are in the range of 10 to 20%.

Flow chart 4.8: Value chain for Crab

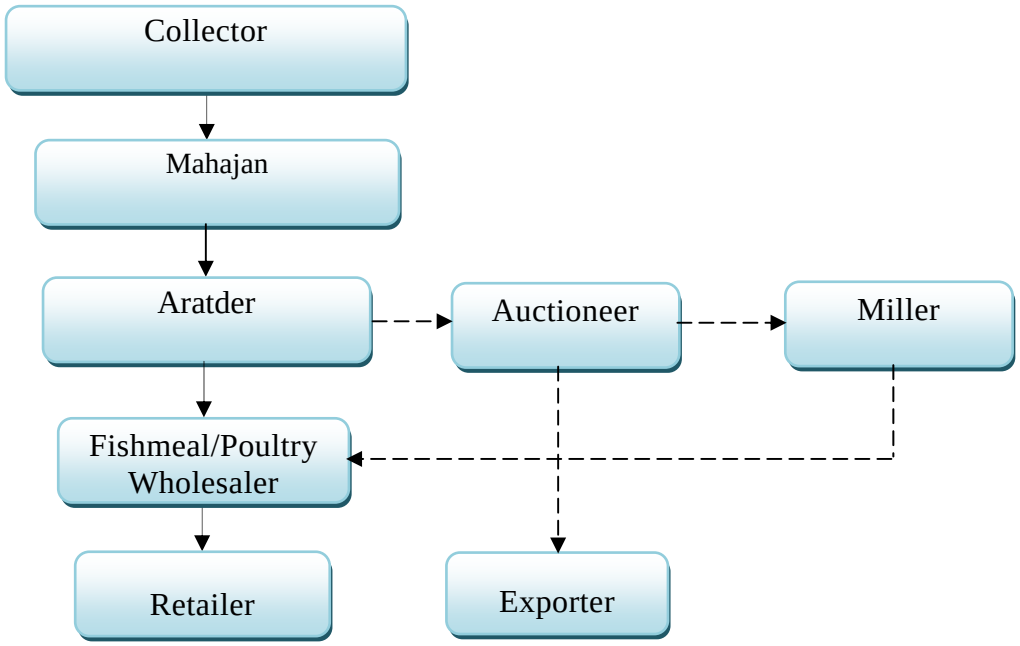


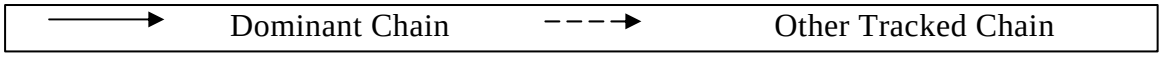
Mollusc/Shell/Oyster

Chain 1: Collector ⇒ Mahajan ⇒ Miller ⇒ Fishmeal/Poultry Wholesaler ⇒ Retailer

In the case of mollusc/shell/oyster, millers constitute a major actor who manufactures fishmeal or poultry feed.

Flow chart 4.9: Value chain for Mollusc/Shell/Oyster



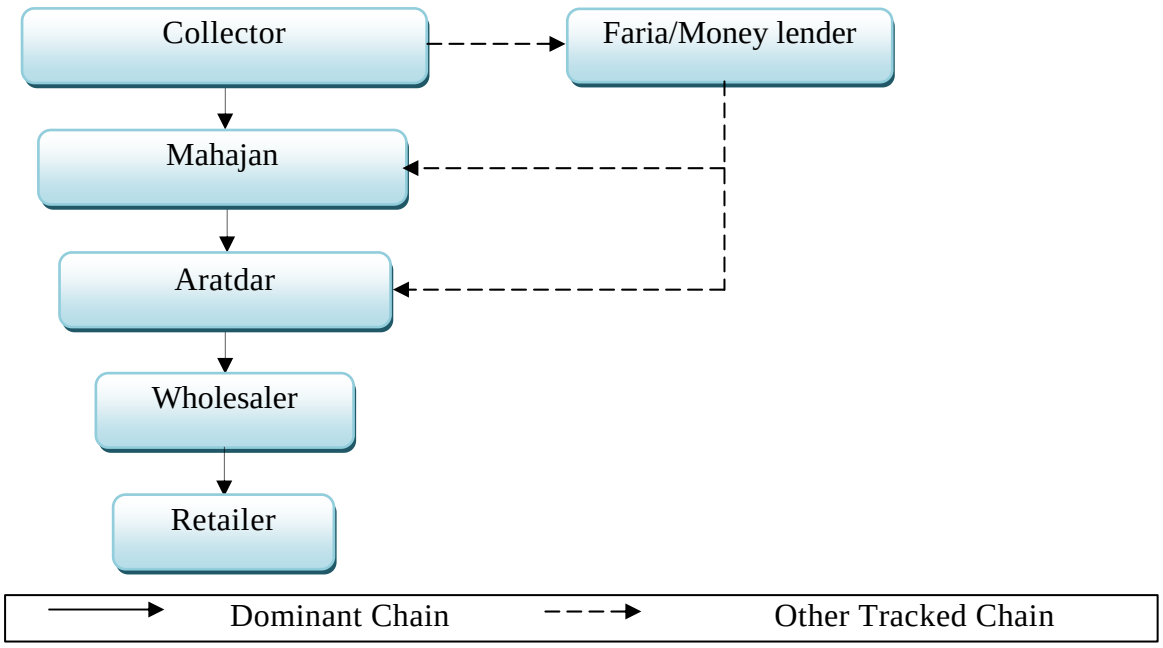


4.3.5 Non-Aquatic Resources

Honey:
Chain 1: Collector ⇒ Faria/Bepari ⇒ Mahajan ⇒ Wholesaler ⇒ Retailer
Chain 1: Collector ⇒ Mahajan ⇒ Wholesaler ⇒ Retailer

Although sometimes honey is exported such purchases are made directly from wholesalers.

Flow chart 4.10: Value chain for honey



4.4 Mapping for Number of Actors in Value Chain

Now that the main marketing chains are mapped, it is possible to move on to the number of actors – the people who are involved in the value chain.

In many value chains, especially in small or weaker markets, there is often no pure specialization. One actor may take on several different roles. One has to find out the main occupation of this actor to categorize it accordingly. One more dimension that is quantifiable is the number of employment opportunities the actors offer. The two dimensions, number of actors and employment, are closely related to each other.

It can be recalled that at the very outset we prepared a list of primary concentration (landing) centers for all the 10 upazilas of 5 SIZ districts. There are about 159 such centers for different products [68]. The present study carried out field investigations to a little less than one third of these centers (a total of 48 out of 159), which included 3 secondary markets.

[68] As can be recalled, the list included a few secondary and tertiary markets.

Average number of boats involved in collecting SRF products per sample primary center in a week estimates as 222 in harvest season and 77 in off season (Annex Tables A4.1 through to A4.3) [69]. The highest number of boats (495) is involved in Khulna Range, followed by Chandpai (358), Sarankhola (119) and the lowest (80) for Satkhira Range (Annex Table A4.3). It can be seen that more number of boats are involved in the collection of shrimp fry (galda and bagda) (1838), *gura* fish (260), crab (234) and shrimp (200) in harvest season (Table 4.2).

Table 4.2: No. of boats involved in collecting SRF products and involvement of persons by product

Product type	Weekly average no. of boats entering into sample landing places		Weekly average no. of persons involved in sample landing places	
	Harvest season	Off season	Harvest season	Off season
Golpata	74	4	532	24
Gura fish	260	-	697	-
Sada (white large)	185	124	444	287
Hilsha	134	47	1029	354
Shrimp galda	72	15	349	120
Shrimp bagda	200	100	1200	500
Shrimp Fry (galda)	1130	100	1525	200
Shrimp fry (bagda)	708	100	999	225
Crab	234	118	511	235
Honey	17	-	165	-
Average	222	77	587	257

The distribution of average number of actors operating in various concentration centers is shown in Annex Table A4.4. The distribution of total number of actors operating in various upazilas is shown in Annex Table A4.5.

Average number of actors (of all categories) in the value chain per sample primary center estimates as 718 in a week, of which collectors number 568, followed by Faria/Beparis (76), Choto Mahajans (31), Boro Mahajans (16), Aratdars (14), wholesalers (2) and retailers (10) (Table 4.3).
More specifically, by SRF products, weekly average number of actors in a primary center estimates as highest (2288) for shrimp fry (galda), of which collectors are 1525, followed by Farias/Beparis (585), Choto Mahajans (80), Boro Mahajans (36), Aratdars (50). Shrimp fry (bagda) actors are also huge, as high as 1681 in an average primary center (Table 4.3).

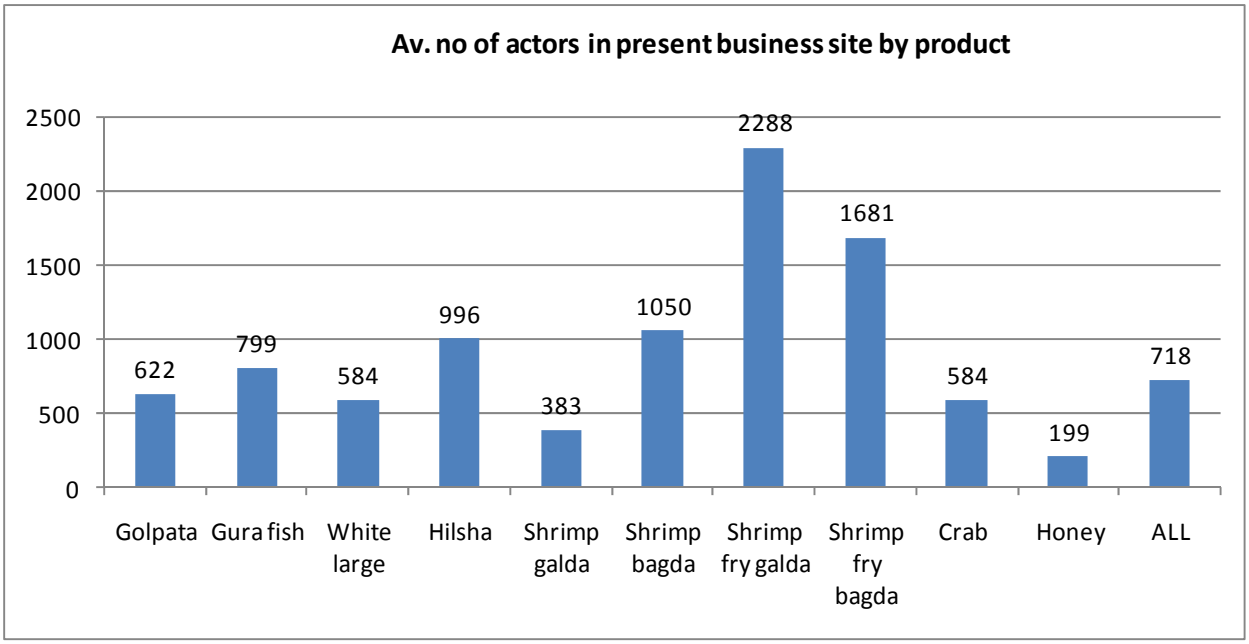
Weekly average number of actors in a primary center for shrimp estimates as 1050 for bagda and 383 for galda type. The weekly figures estimate as 799 for gura fish, 584 for sada (large) fish, 996 for hilsha and 584 for crab. The weekly number of actors for golpata and honey is 622 and 199 respectively (Table 4.3).

[69] It should be mentioned that the estimates made for parameters such as actors, jobs and geographical flows are quite approximate, based on respondents' perception.

Table 4.3: Per center weekly average no of actors in the current harvest season by product

Product type	Per center weekly average no. of actors							Total	Rank
	Collector	Faria/ Bepari	Choto Mahajan	Boro Mahajan	Aratdar	Wholesaler	Retailer		
Golpata	525	24	32	15	9	2	15	622	6
Gura fish	700	30	25	8	13	4	19	799	5
Sada large fish	450	34	53	26	6	2	13	584	8
Hilsha	852	88	18	8	13	2	15	996	4
Shrimp galda	309	20	15	9	12	2	16	383	9
Shrimp bagda	978	40	5	9	4	2	12	1050	3
Shrimp Fry (galda)	1525	585	80	36	50	0	12	2288	1
Shrimp fry (bagda)	1200	352	71	40	10	0	8	1681	2
Crab	503	41	10	3	26	1	0	584	7
Honey	164	9	7	5	2	1	11	199	10
Average	568	76	31	16	14	2	10	718	-

Figure 4.2: Average no. of actors in the present business site by product



As regards distribution of actors across district, Khulna occupies the highest position (1332), followed by Pirojpur (908), Bagerhat (615), Satkhira (376) and Barguna (303) (Table A4.6). Among upazilas, Dacope has the highest number of actors (2713) and Paikgacha has the lowest number of actors (303) (Annex Table A4.5).

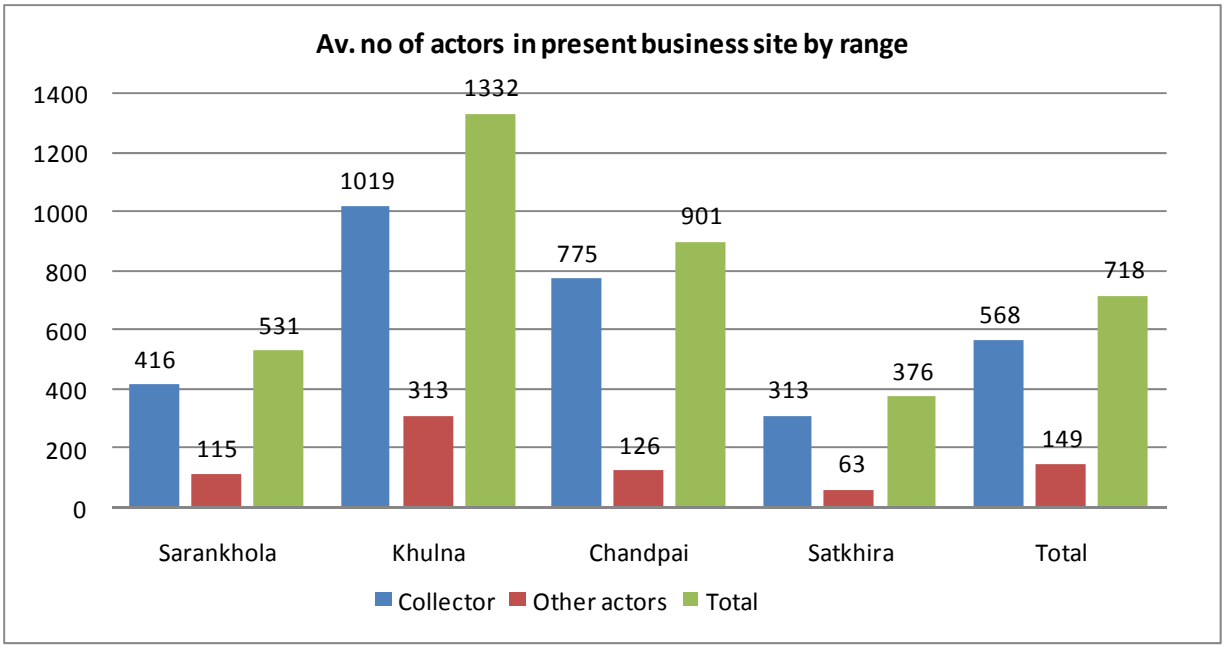
As regards distribution of actors across ranges, Khulna Range occupies the highest position (1332), followed by Chandpai (901), Sarankhola (531) and lowest, Satkhira (376) (Table 4.4).

Table 4.4: Average no of actors (per landing center) in the current harvest season by Range

Range	Per center weekly average no. of actors	Total	Rank

	Collector	Faria/ Bepari	Choto Mahajan	Boro Mahajan	Aratdar	Wholesaler	Retailer		
Sarankhola	416	40	31	14	16	4	10	531	3
Khulna	1019	200	58	31	10	2	12	1332	1
Chandpai	775	68	27	6	17	2	6	901	2
Satkhira	313	21	10	9	13	1	9	376	4
Average	568	76	31	16	14	2	10	718	-

Figure 4.3: Average no. of actors in present business site by range



4.5 Mapping for Number of Jobs involved in Value Chain

After mapping for actors, one more dimension that is quantifiable is the number of employment opportunities the actors offer. These two dimensions, actors and jobs, are closely related to each other.

Average number of jobs involved in collecting SRF products per sample primary center in a week are estimated (Tables 4.5 and 4.6; see also Annex Tables A4.8 and A4.9). It can be seen that more number of jobs are created in the collection of hilsha (2930), followed by shrimp galda (1777), shrimp fry (galda) (1746), shrimp fry (bagda) (1059), gura fish (772), shrimp bagda (748), golpata (642), sada (large) fish (585), crab (584) and honey (203) in the area and harvest season under investigation (Table 4.5).

As regards per center distribution of jobs across ranges, Khulna Range occupies the highest position (1123), followed by Sarankhola (1002), Chandpai (913) and the lowest, Satkhira (376) (Table 4.6).

As regards distribution of jobs across districts, Pirojpur occupies the highest position (2554), followed by Barguna (1396), Khulna (1123), Bagerhat (663) and lowest, Satkhira (376). Among upazilas, Dacope has the highest number of actors (2038) and Shymnagar has the lowest number of actors (376) (Annex Tables A4.8 and A4.9).

Table 4.5 : Per center no. of jobs offered by actors in the sample business sites in this harvest season by product

Product type	Per center average no. of jobs							Total	Rank
	Collector	Faria/ Bepari	Choto Mahajan	Boro Mahajan	Aratdar	Wholesaler	Retailer		
Golpata	541	19	28	28	11	2	13	642	7
Gura fish	700	18	12	8	20	6	8	772	6
Sada (white) large	450	31	55	27	7	3	12	585	8
Hilsha	1994	507	43	25	307	24	30	2930	1
Shrimp galda	1500	86	90	30	47	4	20	1777	5
Shrimp bagda	684	40	4	4	10	0	6	748	3
Shrimp fry (galda)	1600	60	2	1	63	14	6	1746	2
Shrimp fry (bagda)	983	20	18	10	5	12	11	1059	4
Crab	498	29	10	9	35	1	2	584	9
Honey	164	11	7	6	3	2	10	203	10
Average	685	65	27	17	44	6	11	855	

Table 4.6 : Per center no. of jobs offered by actors in the sample business sites in this harvest season by Range

Range	Per center no. of jobs offered by actors							Total	Rank
	Collector	Faria/ Bepari	Choto Mahajan	Boro Mahajan	Aratdar	Wholesaler	Retailer		
Sarankhola	694	131	43	21	85	12	16	1002	2
Khulna	1032	15	24	24	13	4	11	1123	1
Chandpai	807	57	19	6	20	1	3	913	3
Satkhira	314	16	6	10	21	1	8	376	4
Average	685	65	27	17	44	6	11	855	-

4.6 Mapping for Total Number of Actors in SIZ

Approximate estimates of total number of collectors and actors in SIZ have been made and the results are presented in Tables 4.7 through to 4.10. First the total number of collectors, which is estimated as 10.8 lacs (Table 4.7). It may be mentioned that the estimates refer to whole year, rather than only relevant harvest time. Usually one collector is engaged in more than one product. In other words, there are overlaps between actors of various products. Hence, this number of collectors does not reflect the total, which must be lower depending on how many activities one collector get engaged in. Our survey indicates that an average collector get engaged in 1.8 products in a year [70]. On this basis, the total number of collectors estimates as 6 lacs.

As regards the distribution of total number of collectors across districts, Khulna occupies the highest position (48.7%), followed by Bagerhat (22.3%), Barguna (12.7%), Pirojpur (12.3%) and lowest, Satkhira (4.1%) (Table 4.7).

Approximate estimates of total number of actors in SIZ have also been made (Tables 4.7 through to 4.9). The total number of actors (including collectors) is estimated as 13.37 lacs.

[70] Usually the fish or crab collectors get more or less engaged nearly whole year. But the other collectors (e.g., golpata, honey, goran) take on other activities during non-seasons.

Following the argument as made for collectors, the actors also deal with multiple products whole year. On the assumption that one actor deals with 1.8 products whole year, the total number of actors estimates as 7.4 lacs [71]. Product wise distribution shows that the highest number of actors are engaged in shrimp fry (galda) (24.3%), followed by in shrimp fry (bagda) (17.8%)

Table 4.7: Estimates of total collectors by SIZ district

District	Estimate of SIZ collectors					% of total	Rank
	Per center average no. of boats whole year *	No. of centers SIZ area	Total no. of boats whole year in SIZ area	Av. no. of collector per boat	Total no. of collectors whole year		
Bagerhat	1949	45	87705	2.74	240312	22.3	2
Khulna	4144	59	244496	2.15	525666	48.7	1
Satkhira	855	15	12825	3.46	44375	4.1	5
Pirojpur	2887	13	37531	3.53	132484	12.3	4
Barguna	1180	27	31860	4.31	137317	12.7	3
All	11,015	159	4,14,417	-	1080154	100.0	-

Note : * Adjusted for peak and non-peak months.

Estimates refer to whole year, rather than only relevant harvest time. Usually one collector is engaged in more than one product. In other words, there are overlaps between actors of various products. Hence, the number of collectors does not reflect the total and this must be lower than depending on how many activities one collector got engaged in.

Table 4.8: Estimates of total actors by SRF product

Product type	Total no. of actors							Total	% of total	Rank
	Collector	Faria/ Bepari	Choto Mahajan	Boro Mahajan	Aratdar	Wholesaler	Retailer			
Golpata	78696	2836	5966	342	1653	440	2358	92291	6.9	6
Gura fish	104928	3545	4663	183	2388	659	2986	119352	8.9	5
Sada (white) large fish	67453	4018	9886	594	1102	484	2042	85579	6.4	8
Hilsha	127712	10399	3360	183	2388	681	2358	147081	11.0	4
Shrimp galda *	46318	2363	2800	206	2204	528	2514	56933	4.3	9
Shrimp bagda *	146599	4727	1863	205	735	462	1886	156477	11.7	3
Shrimp Fry (galda)	228592	69132	14927	1027	9731	-	1886	325295	24.3	1
Shrimp fry (bagda)	179876	41598	13247	913	1286	-	1257	238177	17.8	2
Crab	75398	4845	931	69	4774	308	-	86325	6.5	7
Honey	24583	1064	1309	114	367	242	1729	29408	2.2	10
Total	10,80,155	1,44,527	58,952	3,836	26,628	3,804	19,016	13,36,918	100.0	-

[71] Landell-Mills (1995) estimated 5-6 lacs people depending on SRF for livelihood, 3 lac Bawalis (wood cutters), 1.6 lac fishermen and so on.

Note: The types include large and small shrimp.

Table 4.9: Estimates of total no. of actors by SIZ district

District	Total no. of actors by SIZ districts							Total	% of total	Rank
	Collector	Faria/ Bepari	Choto Mahajan	Boro Mahajan	Aratdar	Wholesaler	Retailer			
Bagerhat	192843	21380	14738	767	1515	136	4322	235701	17.6	3
Khulna	393802	85519	25141	1699	17319	1902	5618	531000	39.7	1
Satkhira	120962	8979	4335	493	2814	136	3890	141609	10.6	4
Pirojpur	289845	17104	6936	329	2165	272	1729	318380	23.8	2
Barguna	82702	11545	7802	548	2814	1359	3457	110227	8.2	5
Average	10,80,155	1,44,527	58,952	3,836	26,628	3,804	19,016	13,36,918	100.0	-

Figure 4.4: Estimates of total actors (000) by SIZ district

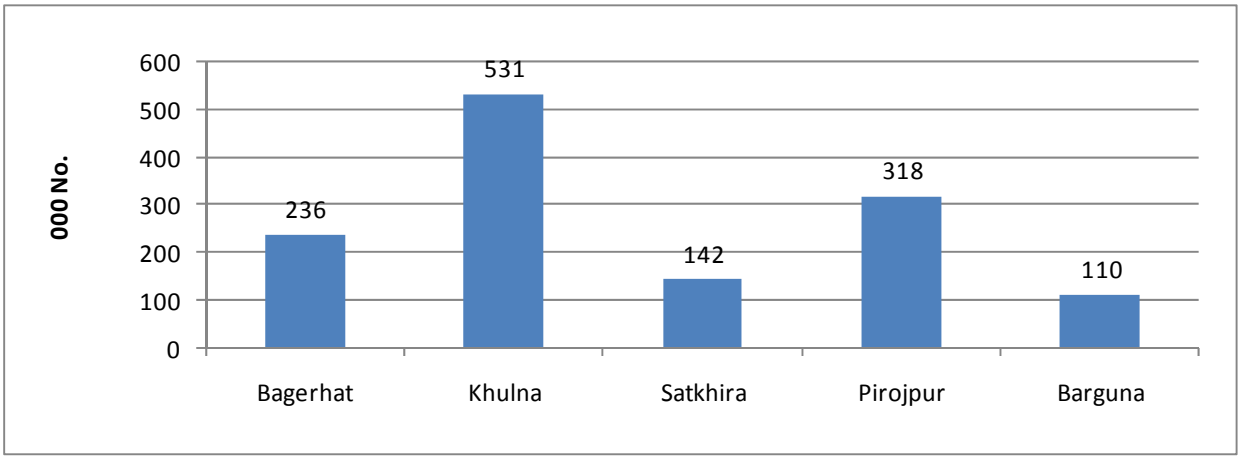
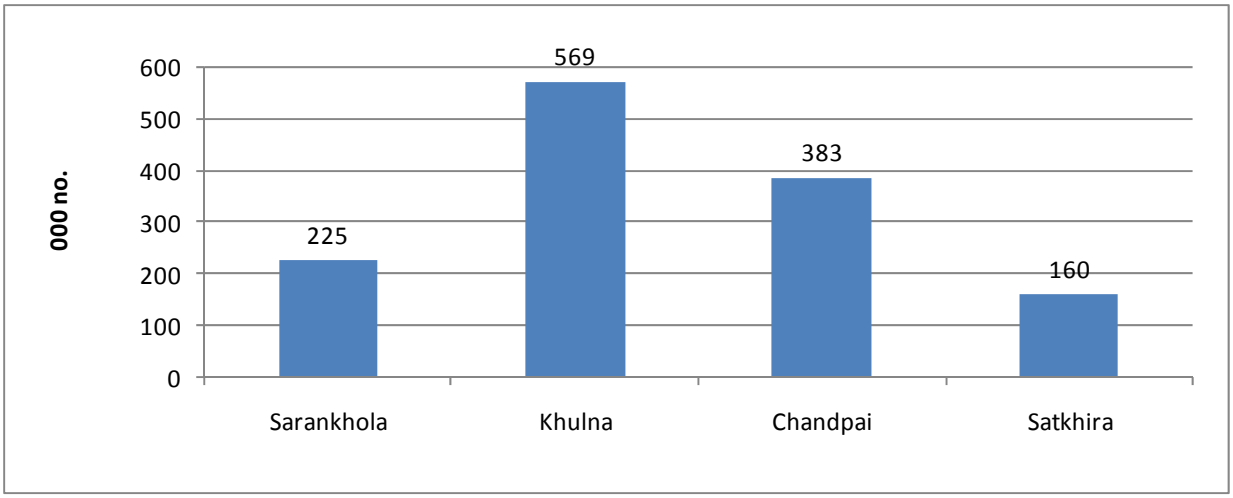


Table 4.10: Estimates of total actors by Range

Range	Total no. of actors by SIZ range							Total	% of total	Rank
	Collector	Faria/ Bepari	Choto Mahajan	Boro Mahajan	Aratdar	Wholesaler	Retailer			
Sarankhola	178099	17572	14504	895	7608	845	5139	224662	16.8	3
Khulna	436258	87858	27137	1982	8084	1691	6167	569177	42.6	1
Chandpai	331795	29872	12632	384	4754	845	3084	383366	28.7	2
Satkhira	134003	9225	4679	575	6182	423	4626	159713	11.9	4
Average	10,80,155	1,44,527	58,952	3,836	26,628	3,804	19,016	13,36,918	100.0	-

Figure 4.5: Estimates of total actors (000) by Range



4.7 Mapping for Geographical Flows

Based on the mapping of flows and actors it is relatively straightforward to develop an approximate geographical map, which may be of particular importance in the context of necessary interventions. Starting from the place of origin (i.e. where it is collected/landed) it may be possible to approximately map how and where the product travels, that is, from places of collection, to places of intermediary traders, then to places of wholesalers and final consumers [72]. It must be mentioned here that the flows to places refer to only movement at the first instance, and the subsequent movements are not incorporated.

The basis of assessing the product movements in the economy emerges from the assumption that, the actors, by and large, are well informed about geographical destinations of SRF products including their end-use. They are also generally knowledgeable about regional origins of their purchases. In other words, presumably, the actors are generally aware of the demand and supply conditions prevailing in different parts of the country [73].

The respondents from 41 primary concentration centers provided information (in the form of approximate proportions) on where, at the first stage, the relevant product travels, that is, from places of collection, to places of immediate intermediary traders, then to places of wholesalers and final consumers [74]. The proportions were pursued for three broad regions. The first one is SIZ itself i.e. the 10 SIZ upzilas of 5 SIZ districts; the second one is other parts of the country such as broadly Khulna, Chittagong and Dhaka regions, and other parts of the country. The third broad region is outside the country. The approximate movements of SRF products are tabulated in Tables 4.11 to 4.13 (See also Annex Tables A4.10 and A4.11 for the distribution from each of available 41 concentration centers and upazilas respectively). The overall movements, that is, overall average is estimated by taking respective product volumes as weights.

[72] As mentioned earlier, the Reconnaissance survey indicates that the actors, by and large, are well aware of the places of origin and destinations of SRF products.

[73] During the exploratory trip to study areas and pre-testing of questionnaires, the above assumption was proved largely valid. However, the results based on first movement should be used with caution as the information are not available for subsequent stages of movement and, in effect, final and ultimate destinations.

[74] However, this information provided by collectors and retailers are not used in the estimates made as such actors were likely to be less aware about this.

As can be seen from the Tables, according to first-stage trade movement, the SRF products are traded within SIZ upazilas to the extent more than one third (34.1%) while the proportion that are traded in other parts of the country (e.g., Khulna, Chittagong and Dhaka, and other parts of the country) estimates as about little less than two-thirds (63.7%) (Table 4.11). The proportion traded directly from SIZ to outside the country (in the form of exports) is estimated as about only 2.3 percent [75].

The product-wise distribution shows that golpata remains in SIZ by more than 29 percent while these are traded in other parts of the country by abut 71 percent (in particular, Khulna – more than 42%, with none in Chittagong or Dhaka) (Table 4.11). *Gura* fish are traded (at first stage) in SIZ areas by 21 percent while they are moved to Khulna (13%), Chittagong (2%) and Dhaka (44%) while substantial quantities are also exported to other countries directly from SIZ (20%). Sada (large) large fishes are traded within SIZ by about 46 percent, followed by in Khulna (including Khulna (KCC)- 31%, presumably some for exports) and Dhaka (23%, presumably, again, some for exports). Shrimps (galda) are consumed within SIZ by about 18 percent, followed by total of more than two-thirds moved to Khulna, Chittagong and Dhaka together (68.1%) (presumably, again, some for exports), with about 8 percent directly to places outside the country (Table 4.11).

Shrimp (bagda) has the largest movement to Khulna by 90 percent (presumably for exports from KCC). Shrimp fry (galda) are largely traded in SIZ (61%) and Khulna (KCC) (15%), mostly to meet demands for ghers and nurseries located in Khulna and surroundings; and shrimp fry (bagda) is also largely traded in SIZ (64%) and Khulna (KCC) (27%) (again, mostly for ghers) (Table 4.11).

Crab is an important SRF product which is seldom consumed in the country but the first movement is mostly either to Bagerhat Sadar (2.3%), Shymnagar (12%), Paikgacha (16%), Khulna (1%) or large bulk to Dhaka (63%) for exports. Honey is primarily traded in Shymnagar (24%) within SIZ, with major bulk of movement to Khulna (18%) and Dhaka (49%) either for local consumptions or exports (Table 4.11).

In terms of districts, the distribution of movements (at the first stage) shows that products from Bagerhat district are retained in the same district by 31 percent (Table 4.12). The retained figures for Khulna, Satkhira, Pirojpur and Barguna are estimated as 29.5, 33.2, 14.1 and 40.2 percent respectively. Overall, the district movement of SRF products within SIZ district is the highest for Bagerhat (12.4%), followed by Khulna (10.5%) and Satkhira (8.5%), and only 1.2 and 1.5 percent for Pirojpur and Barguna districts respectively. One cannot that most movements at the first instance take place to Khulna (non-SIZ) (19.8%), Chittagong (only 0.7%) and Dhaka (35.4%), and other parts of the country (7.9%), with only 2.3 percent as export directly from the SIZ districts (Table 4.12).

[75] It needs mention that most of the export products are first moved to large cities such as Dhaka, Khulna and Chittagong before exports.

Table 4.11: Proportions of SRF products moved at the first stage in this harvest season from selected primary centers by product

Product	Proportions of products moved from selected primary center (%)																Total
	SIZ UZ											Other parts			Outside country		
	Bag. Sadr	Mongla	Morgnj	Sh khola	Dacope	Koyra	Pk gacha	Shm nagar	Mot baria	Pathr ghata	Sub-total	Khulna	Chittagong	Dhaka	Other places		
Golpata	4.02	1.94	4.81	3.08	1.60	-	0.49	13.32	-	0.12	29.38	42.47	-	-	28.15	-	100.00
Gura fish	4.63	9.34	-	-	-	-	0.64	6.65	-	-	21.26	12.94	1.65	44.19	-	19.96	100.00
White large	8.77	-	4.04	6.99	0.75	-	24.31	-	-	1.34	46.20	30.70	-	22.82	0.27	-	100.00
Hilsha	24.52	-	-	0.63	-	-	-	-	7.43	10.66	43.24	44.86	-	3.04	8.86	-	100.00
Shrimp galda	1.80	-	-	-	-	-	-	16.09	-	-	17.89	1.80	57.30	8.95	6.01	8.05	100.00
Shrimp bagda	-	10.00	-	-	-	-	-	-	-	-	10.00	90.00	-	-	0.00	-	100.00
Shrimp fry (galda)	26.63	13.71	2.81	-	4.04	-	2.70	-	11.24	-	61.13	15.28	-	-	23.60	-	100.00
Shrimp fry (bagda)	41.86	6.63	2.25	-	3.20	1.82	2.88	5.45	-	-	64.09	27.39	-	-	8.53	-	100.00
Crab	2.27	1.20	-	1.00	0.08	-	16.21	11.55	0.03	0.21	32.55	1.03	-	62.66	3.77	-	100.00
Honey	0.28	-	-	0.18	-	-	5.02	24.17	-	-	29.65	17.90	-	48.94	3.51	-	100.00
Average	6.90	2.37	1.33	1.82	0.50	0.01	10.00	8.52	1.15	1.48	34.08	19.75	0.65	35.40	7.86	2.25	100.00

Note: all averages represent weighted averages. Other places include elsewhere in the country (other than mentioned above); movements represent at the first stage. Figures under "outside country" represent exports directly from the current primary centers.

Figure 4.6: Volume of products (%) moved in the present harvest season from selected sites by product

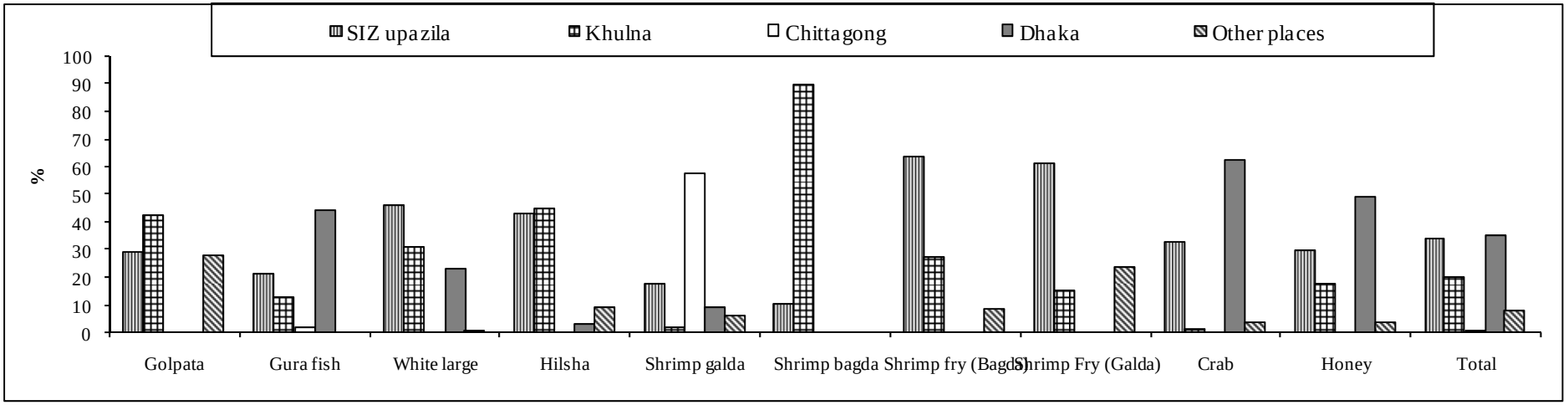


Table 4.12: Proportions of SRF products moved at the first stage in this harvest season from selected primary centers by district

District	Proportions of products moved from selected primary center (%)											Total
	SIZ district						Other parts					
	Bagerhat	Khulna	Satkhira (Shymnagar)	Pirojpur (Matbaria)	Barguna (Patharghata)	Sub-total	Khulna	Chittagong	Dhaka	Other places	Outside country	
Bagerhat	30.98	-	-	-	0.59	31.57	15.17	0.66	45.56	7.04	-	100.00
Khulna	2.71	29.48	-	-	-	32.19	27.67	-	27.57	12.57	-	100.00
Satkhira	-	0.09	33.21	-	-	33.3	3.03	1.54	51.14	2.20	8.78	100.00
Pirojpur	26.11	-	-	14.10	-	40.21	51.82	-	-	7.97	-	100.00
Barguna	26.27	-	-	0.18	40.20	66.65	23.42	2.25	-	7.68	-	100.00
Average	12.42	10.51	8.52	1.15	1.48	34.08	19.75	0.65	35.40	7.86	2.25	100.00

Note: Other places include elsewhere in the country (other than mentioned above); movements represent at the first stage. Figures under "outside country" represent exports direct from the current primary centers.

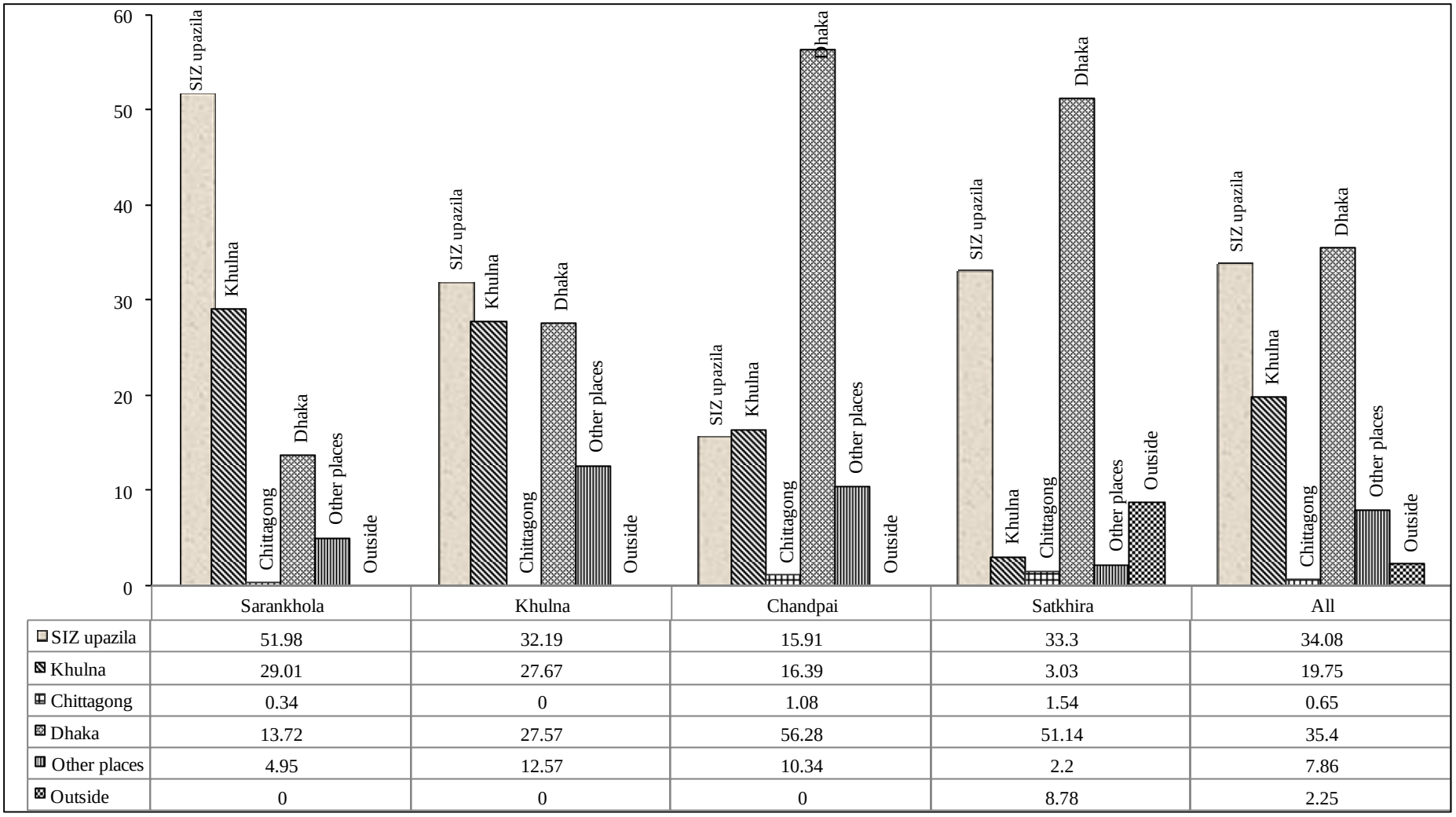
Table 4.13: Proportions of SRF products moved at the first stage in this harvest season from selected primary centers by Range

Range	Proportions of products moved from selected primary center (%)										
	SIZ Range					Other parts					
	Sarankhola	Khulna	Chandpai	Satkhira	Sub-total	Khulna	Chittagong	Dhaka	Other places	Outside country	Total
Sarankhola	51.18	-	0.80	-	51.98	29.01	0.34	13.72	4.95	-	100.00
Khulna	1.61	29.48	1.10	-	32.19	27.67	-	27.57	12.57	-	100.00
Chandpai	5.19	-	10.72	-	15.91	16.39	1.08	56.28	10.34	-	100.00
Satkhira	-	0.09	0.00	33.21	33.3	3.03	1.54	51.14	2.20	8.78	100.00
Average	12.68	10.51	2.37	8.52	34.08	19.75	0.65	35.40	7.86	2.25	100.00

Note: Other places include elsewhere in the country (other than mentioned above); movements represent at the first stage. Figures under "outside country" represent exports directly from the current primary centers.

As regards movements within ranges, the average per range proportion estimates as 12.7 percent for Sarankhola, followed by Khulna Range (10.5%), Satkhira Range (8.5%) and lowest, for Chandpai Range (2.4%) (Table 4.13).

Figure 4.7: Volume of products (%) moved in the present harvest season from selected sites by Range



	Sarankhola	Khulna	Chandpai	Satkhira	All
SIZ upazila	51.98	32.19	15.91	33.3	34.08
Khulna	29.01	27.67	16.39	3.03	19.75
Chittagong	0.34	0	1.08	1.54	0.65
Dhaka	13.72	27.57	56.28	51.14	35.4
Other places	4.95	12.57	10.34	2.2	7.86
Outside	0	0	0	8.78	2.25

CHAPTER 5

VALUE CHAIN ANALYSIS FOR SRF PRODUCTS

Chapter 5:

Value Chain Analysis for SRF Products

5.1 Introduction to Value Chain Analysis

The value chain framework, which is a powerful analysis tool for the strategic planning of an activity, is a string of agents or collaborating players, who work together to satisfy market demands for specific products or services.

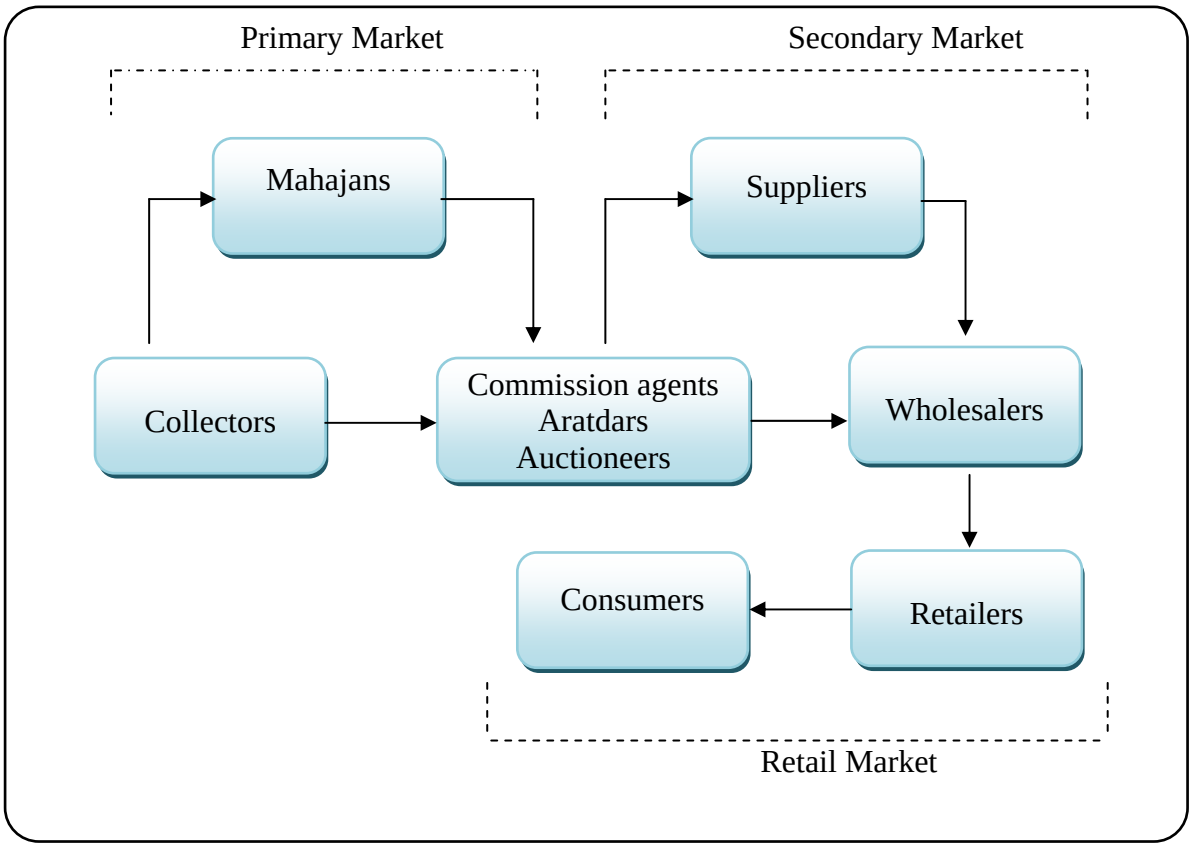
The ultimate aim of any value chain framework is to maximize value creation while minimizing costs. This entails the concept of value added, in the form of the value chain, which is utilized to develop a sustainable competitive advantage of the activity concerned. This may consist of the key steps within an activity that link together to develop the value of the final product. Such steps may include purchasing, manufacturing, distribution and marketing of the products and activities.

The value chain analysis essentially entails the linkage of two areas. First, the value chain identifies and links the value of the activities with its main functional parts. Second, the assessment of the contribution of each part in the overall added value is made. The profitability of an activity depends to a large extent on how effectively it manages the various steps in the value chain, such that the price that a customer is willing to pay for the products and services exceeds the total costs of the value chain steps. It is important to bear in mind that while the value chain analysis may appear simple in theory, it is quite complex in practice and its assessment is quite time consuming.

This brief study entails value chain analysis in its simplest meaning in that the activities centered around SRF products are assessed in terms of value added starting from resource collectors to ultimate consumers. Focus is given, however, on social relationships among actors involved across supply value chain. For simplicity, the study assumes no export activities in the process. In other words, only indigenous and local actors are under the purview of the present investigation.

As also described in methodology chapter, the basic structure of marketing chains for SRF products is shown in Figure 5.1. However, the actual marketing chains are found to follow multi-dimensional patterns (Annex C).

Figure 5.1: Basic structure of SRF products marketing systems



5.2 Mapping the Value at Different Levels of the Value Chain

The core element of value chain mapping is to map the monetary value throughout the chain. Value is something that can be measured in many ways. The most straightforward depiction of a monetary flow would be to look at the value that is added at every step throughout the chain, providing an overview of the earnings at the different stages. Other economic parameters are, among others, cost structures, profit, and return on investment. It is important to recognize that at the mapping stages of the value chain analysis sometimes accurate information about costs, margins and profits at different levels within the value chain may not be adequately available. It was revealed that only price information is adequately known at each level, and thus value additions in terms of price are the core concerns of this brief study.

As already mentioned in the methodology chapter (Chapter 1), calculation of costs and returns is found to be complicated for various reasons. The problem is compounded when there is no systematic hierarchy among actors and when a single actor is concerned with multi-products. For example, some Beparis sell, in addition to Choto Mahajans, directly to Boro Mahajans or even Aratdars so that selling prices or value additions appear to be not systematic. Collectors who work for others on wages do not have any working capital. Majhis get a share of profit in addition to wage as collector when the price is fixed (either by bargains or unilaterally by Mahajans or Aratdars).

As explained in Chapter 1, in normal situations, average selling prices of one actor should be equal to average buying prices of the next actors in the hierarchy in turn. But some actors sell directly to other actors through bypassing the immediate higher level actor. For example, some

Beparis sell, in addition to Choto Mahajans, directly to Boro Mahajans or even Aratdars. For much the same reason, selling prices or price value additions may not appear to be systematic and consistent in all the cases. Following reasons explained in the methodology chapter, in practice, both buying prices (not shown here) and selling prices varied according to various transactions so that average buying prices in combination with average selling prices (tabulated) were used in estimating gross margins and gross returns. Collectors who work for others on wages are not considered to have any working capital.

Existing product-specific marketing chains have been identified by developing flow charts with all active market agents, starting from the collector level to the final retailers level (See Annex C). The functions and roles of individual actors in the value chain are outlined in Annex B.

The SRF products are collected by collectors who, with a few exceptions, work for others on wages. The collection process and sharing of margins among actors are extremely complex and so is the calculation of costs and returns. Some agents such as Majhis, Farias and Beparis or even Mahajans organize the collection trip. Most of them at least keep involved in the process, some directly and some indirectly. More often, Majhis and Beparis are directly involved in the collection. Consequently, they get a margin for this involvement at the first stage. Then, they get another margin for their investment. Over and above, they get a margin in view of reduced price (compared to market price). Fourth, they get a normal business margin.

Price information collected have some additional implications. In practice, after collection of products Mahajans or Beparis, whoever organize the trip, prices are fixed (reduced or bargained or according to exiting market) after deductions of all associated costs such as living expenses, fuel, repairs of boats/nets and other costs of the trip. So, in calculation of returns hidden prices are adjusted through segregating the costs.

A total of 12 SRF products have been included in the value chain analysis. We start with golpata.

5.2.1 Golpata

Golpata is popularly known as “CI sheet for the poor population” as it is widely used by them in house roofing. Obviously, it has ample social values other than direct economic value. Normally it takes around 32 days to collect one boat of golpata, amounting to approximately Kaons of harvests (I Kaon = 16 Pons, I Pon = 80 pieces of golpata). Average distance from collection points to primary landing estimates as 50 Km. The trip is usually organized with one boat consisting of one Majhi, 8-10 collectors and so on.

Our survey shows that, on an average, one boat with more or less 10 collectors carries around 1000 Pon of golpata, which is equivalent to approximately 500-550 maunds of golpata. On this basis, one collector harvests around 104 Pons of golpata.

Value Addition

Table 5.1 presents value additions, and costs and returns for golpata. Monthly gross returns and net returns have been calculated. Net returns as percentage of working capital have been

calculated for each individual actor [76]. Our main concern at this stage is to look into value additions in terms of price. Value additions, defined as prices increased at every stage along value chains, are shown. In other words, this is price escalation at each stage. It can be seen that collectors provide the highest price value addition (49.7%) of the total price, the price being considered from collectors to consumers. Keeping collectors aside, retailers create the highest value addition (13.7%), followed by Choto Mahajans (12.7%), Majhis/Beparis (11.2%). Aratdars (6.1%), wholesalers (5.1%) and the lowest for Boro Mahajans (1.5 %).

Table 5.1: Value Addition and return for golpata

Actor type	Cost and return for golpata per SRF actor							
	Average selling price/Pon	Price Value Addition (%)	Av. Volume (Pon) per month	Gross Return (month)	Cost (month)	Net Return (month)	Working capital (WC)	Net Return as % of WC
Collector	98	49.7	104 (0.6)	10192 (2.9)	3647	6545 (2.7)	-	-
Majhi/ Bepari	120	11.2	641 (3.7)	14102 (4.1)	3938	10164 (4.2)	8333	121.97
Choto Mahajan	145	12.7	1150 (6.6)	28750 (8.3)	6691	22059 (9.0)	97308	22.67
Boro Mahajan	148	1.5	4865 (27.7)	136220 (39.4)	46315	89905 (36.8)	385714	23.31
Aratdar	160	6.1	7184 (40.9)	107760 (31.2)	25920	81840 (33.5)	325000	25.18
Wholesaler	170	5.1	2867 (16.3)	28670 (8.3)	8649	20021 (8.2)	266667	7.51
Retailer	197	13.7	736 (4.2)	19872 (5.8)	6400	13472 (5.5)	106364	12.67
Total	-	100.0	17547 (100.0)	345566 (100.0)	-	244006 (100.0)	-	-

Note: 1 Kaon = 16 Pon, I Pon = 80 pieces. Return on working capital rather than fixed capital has been estimated.

As explained in the methodology chapter, in normal situations, average selling prices of one actor should be equal to average buying prices of the next actors in the hierarchy in turn. But some actors sell direct to other actors through bypassing the immediate higher level actor. For much the same reason, selling prices or price value additions may not appear to be systematic and consistent in all the cases. In practice, both buying prices (not shown here) and selling prices varied according to various transactions so that average buying prices in combination with average selling prices (tabulated) were used in estimating gross margins and gross returns. Collectors who work for others on wages are not considered to have any working capital. Figures in parentheses denote column percentages.

[76] For detailed methodology, see Chapter 1. Working capital, rather than fixed capital, has been incorporated in the calculation of net returns on investments.

Volume of trade

The price value additions do not give an actual picture of what actually comes under transactions. So one should analyze the traded quantity dealt in by different actors. In order to portray a comparative picture, traded volumes are presented for each actor. Of all the actors, Aratdars carry out the highest volume of trade (40.9%), followed by Boro Mahajans (27.7%), wholesalers (16.3%), retailers (4.2%) and so on. Obviously, bottom layer actors, that is collectors, deal in the lowest quantity of trade, as low as less than one percent (0.6%).

Gross returns and net returns

Volume of trade, again, do not give an actual picture of what are actually earned. So one should analyze gross returns and net returns made by respective actors. Boro Mahajans or Aratdars have the highest amount of absolute returns, both gross and net returns, monthly net returns being estimated as Tk 89,905 earned by Boro Mahajans and Tk 81,840 by Aratdars. In aggregate, of all the actors the Boro Mahajans, again, have the highest proportion of gross or net returns (around 37-39%), followed by Aratdars (around 31-34%), Choto Mahajans (around 8-9%),wholesalers (around 8%), retailers (around 6%) and so on. Obviously, collectors have gross or net returns of only around 3 percent. In absolute terms, the Boro Mahajans and Aratdars have net income 13 to 14 times higher compared to that earned by collectors.

The estimates of margins or profits have also to consider investment. Returns over net returns over working capital (NRWC) are estimated. As Majhis or Beparis cannot afford to have larger working capital, consequently, although absolute amount of net returns are small (around only Tk 10 thousand) the percentage of net returns on working capital estimates as the highest (122%). Keeping this category aside, the analysis shows that high proportions of NRWC apply for Aratdars (25.2%), Boro Mahajans (23.3%) and Choto Mahajans (22.3%). Wholesalers or retailers have relatively much lesser returns on their working capitals (7 - 13%).

Figure 5.2: Golpata selling price (Tk per pon) by actors

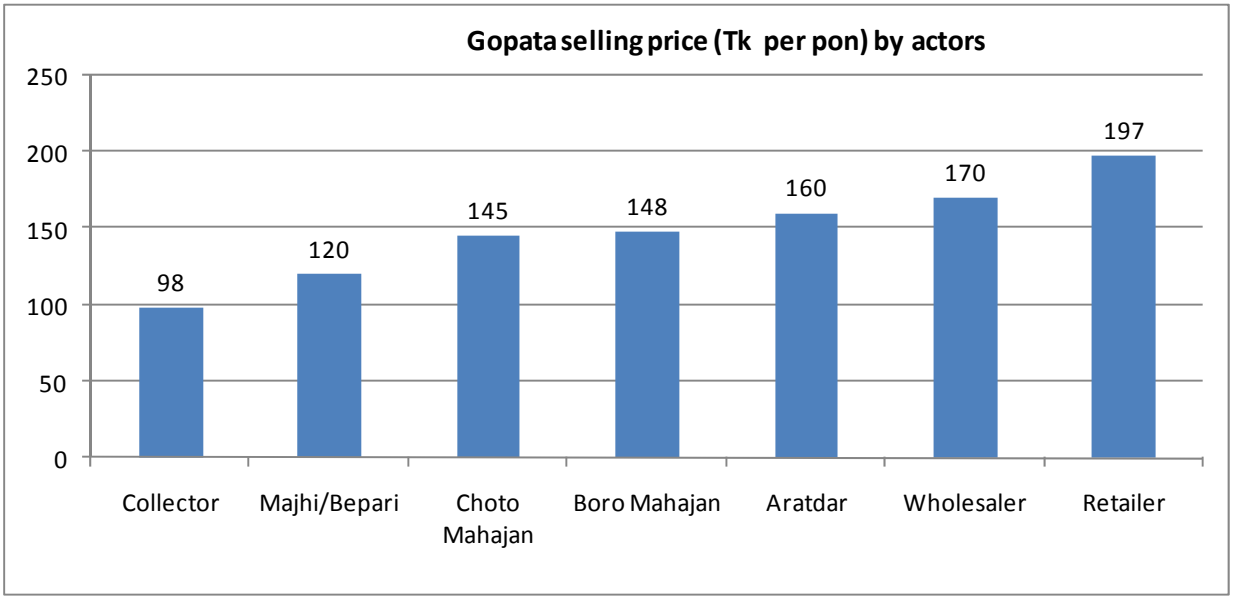


Figure 5.3: Golpata gross return (Tk monlty) by actors

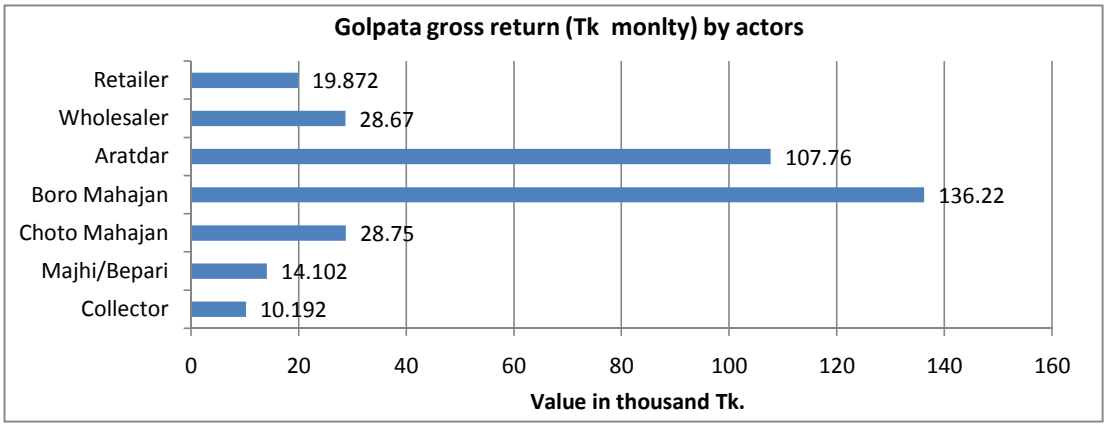


Figure 5.4: Golpata net return (Tk monthly) by actors

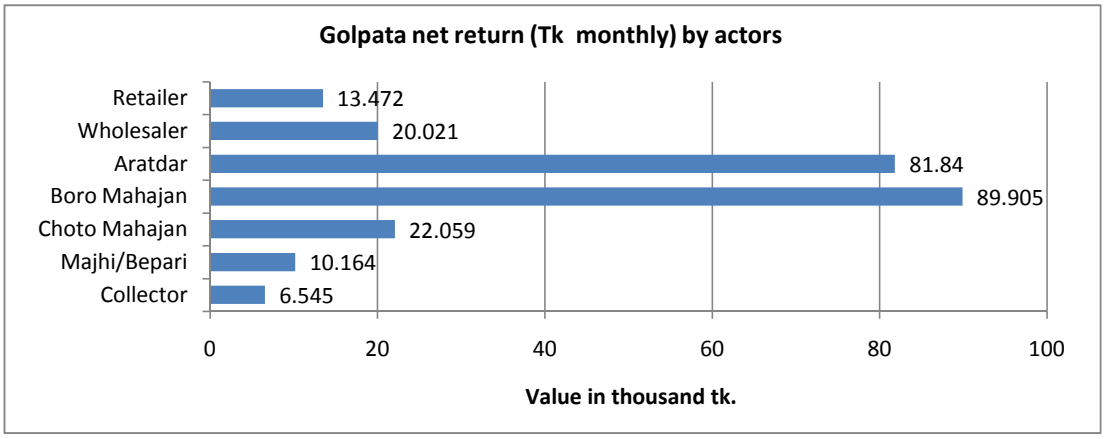


Figure 5.5: Golpata value addition (per pon) by actors

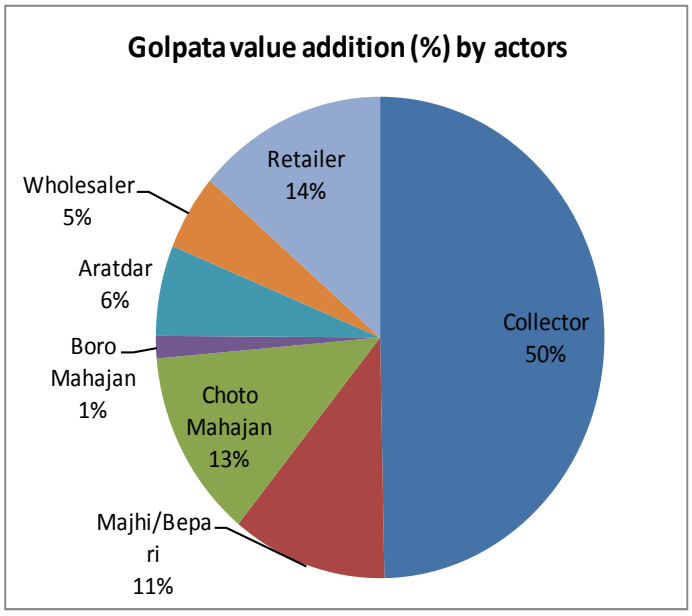
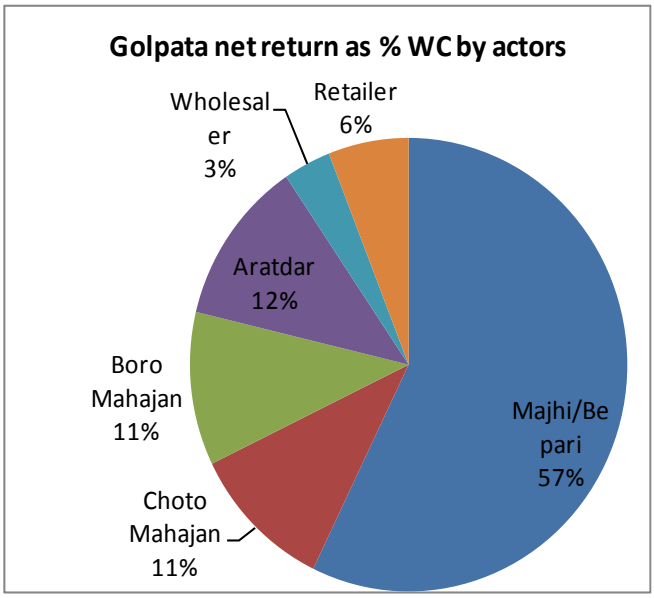


Figure 5.6: Golpata net return as % WC by actors



5.2.2 Gura Fish

As large network of rivers, channels, and creeks are intersecting the Sundarbans forest, the waterways (175,000 sq. km) offer the best opportunities for fishing grounds for the common people of SIZ. Gura fish is one of the most common fishes apart from its importance from socio-economic perspectives.

Normally gura fish catch takes place on a weekly basis but some also takes place on a daily basis. One boat (usually manual) consisting of two to three people (depending on size of nets) carries out the catch through two to three trips in a month.. There are two goons – Bhara goons and Mara goons, each lasting 4 to 5 days. The remaining days are lean time.

Like in other harvests, some of the intermediaries in this sector as well are themselves involved with the collection related activities. As in other cases, some of the Farias are also collectors, some of the Aratdars or even wholesalers often get involved in the collection process. Our survey shows that on an average one boat with more or less 2-4 collectors catches in the range of 60 to 120 Kg of gura fish.

Generally, Farias cannot sell their catch to anybody other than Aratdars/wholesalers as contractual obligations. at a price which is not often fair. In the case of gura fish, usually Farias collect fish from collection grounds. Some Farias who are directly involved in the collection process sometimes sell their products in villages.

Some Farias invest in nets and boats for fishing, and some borrow money or nets/boats from local Aratdars at a high interest rate or rent. Average cost of food and others in each trip is around Tk 2-3 thousand. The owners, however, have investment risks. Sometimes they lose their whole investment due to cyclone or robbery.

Calculation of costs and returns is found to be complicated as in most cases they harvest multi-products (along with gura fish): crab, mollusc, shrimp and large fish. Over and above, like in other harvests, some of the intermediaries in this sector as well are themselves involved with the collection related activities. For example, some of the Farias are also collectors, some of the Mahajans are also Aratdars or wholesalers and vice versa. The study considered those collectors who fish mainly gura fish. Costs and returns are then adjusted.

Value Addition

Table 5.2 presents costs and returns for gura fish. Monthly gross returns and net returns have been calculated. Net returns as percentage of working capital have been calculated for each individual actor. The study considers value addition in terms of price. It can be seen that collectors provide the highest price value addition, nearly two-thirds (viz. 64.6%) of the total price, from collection to consumers. Keeping collectors aside, retailers create the highest value addition (12.3%), followed by Farias (9.2%), wholesalers (7.7%), Aratdars (4.6%) and Choto Mahajans (1.5%).

Volume of trade

As price value additions do not reflect total profitability it is important to consider the traded quantity dealt in by actors. Of all the actors, Aratdars carry out highest volume of trade (72.7%), followed by wholesalers (11.8%), retailers (5.2%) and Choto Mahajans (5.0%) and so on.

Obviously, bottom actor types, Farias and collectors, deal in the lowest volume of trade, 4.7 percent and less than one percent (0.6%) respectively.

Table 5.2: Value addition and return for gura fish

Actor type	Cost and return for g*ura* fish							
	Average selling price/Kg	Price Value Addition (%)	Av. volume Per month (Kg)	G. Return (Tk/month)	Cost (Tk/month)	Net Return (Tk/month)	Working capital	Net Return as % WC
Collector	84	64.6	184 (0.6)	15364 (5.5)	9689	5675 (3.8)	7833	72.4
Faria	96	9.2	1400 (4.7)	17267 (6.2)	7354	9913 (6.6)	76667	12.9
Choto Mahajan	98	1.5	1500 (5.0)	21000 (7.5)	7920	13080 (8.8)	120000	10.9
Aratdar	104	4.6	21600 (72.7)	165600 (59.4)	76790	88810 (59.4)	800000	11.1
Wholesaler	114	7.7	3500 (11.8)	35000 (12.6)	16800	18200 (12.2)	200000	9.1
Retailer	130	12.3	1538 (5.2)	24608 (8.8)	10828	13780 (9.2)	17500	78.7
Total	-	100.0	29722 (100.0)	278839 (100.0)	-	149458 (100.0)	-	-

Note: See note under Table 5.1.

Gross returns and net returns

Gross returns and net returns made by respective actors are also estimated. Aratdars have the highest returns in absolute terms, both for gross and net returns, monthly net returns being estimated as Tk 88,810. Of all the actors, comparatively the Aratdars, again, have the highest gross or net returns (around 59%), followed by wholesalers (around 12-13%), retailers (around 8-9%) and Choto Mahajans (7-9%). Collectors or Beparis have gross or net returns of only around 5 to 6 percent – in absolute terms. The Aratdars have net income 16 times as much compared to that earned by collectors.

When considered investment, net returns over working capital (NRWC) are also found to be not much encouraging. Retailers of gura fish have relatively better returns (78.7%), followed by Farias (12.9%), Aratdars (11.1%), wholesalers (9.1%) and Choto Mahajans (10.9%).

Figure 5.7: Gura fish selling price (Tk per kg.) by actors

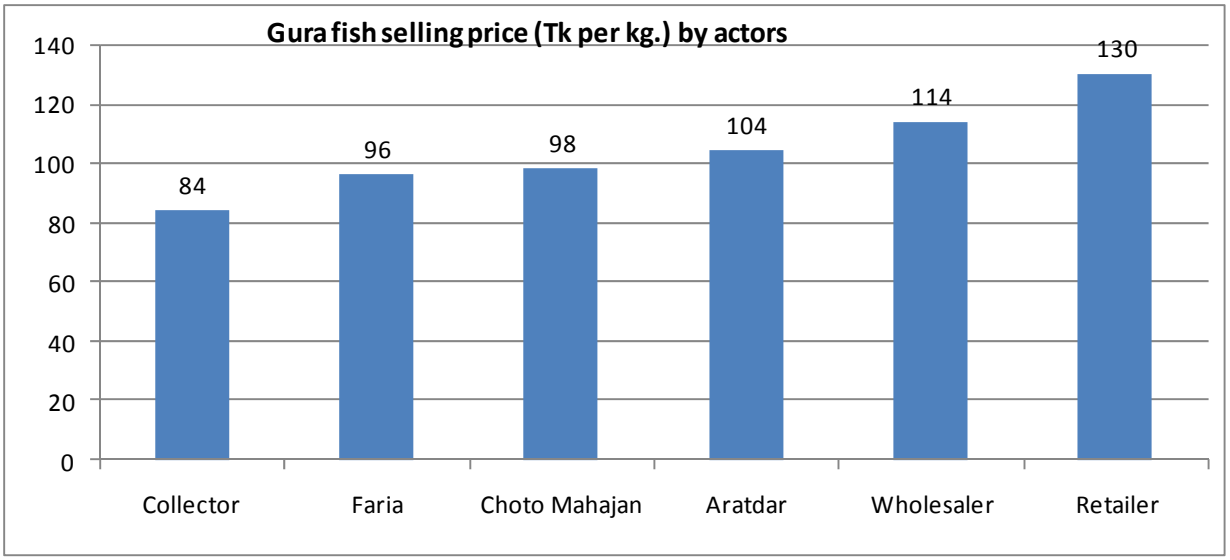


Figure 5.8: Gura fish gross return (Tk monthly) by actors

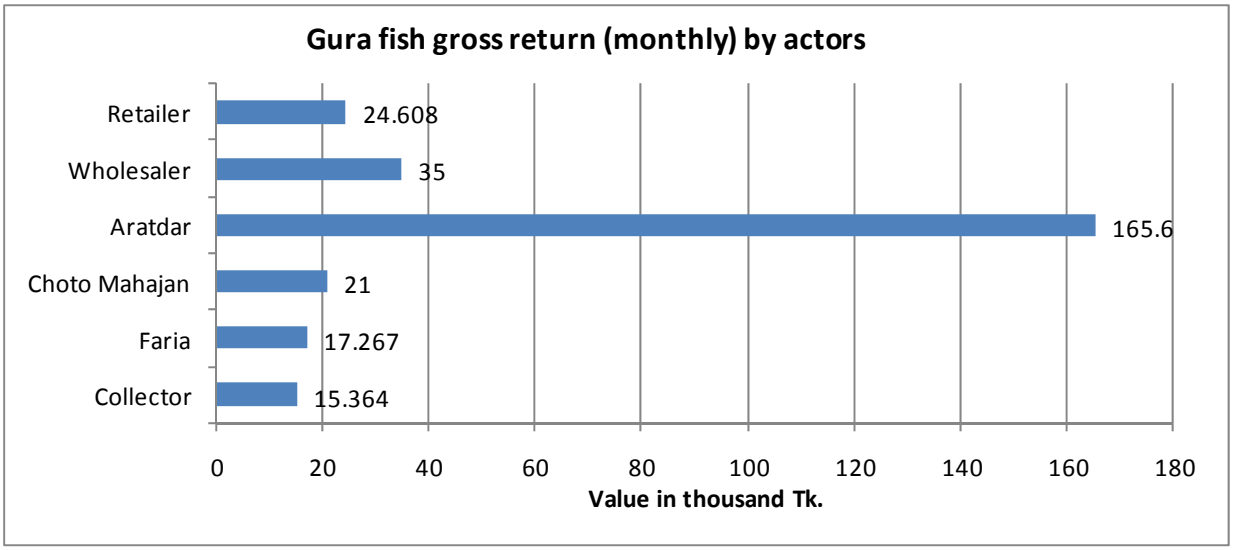


Figure 5.9: Gura fish net return (monthly) by actors

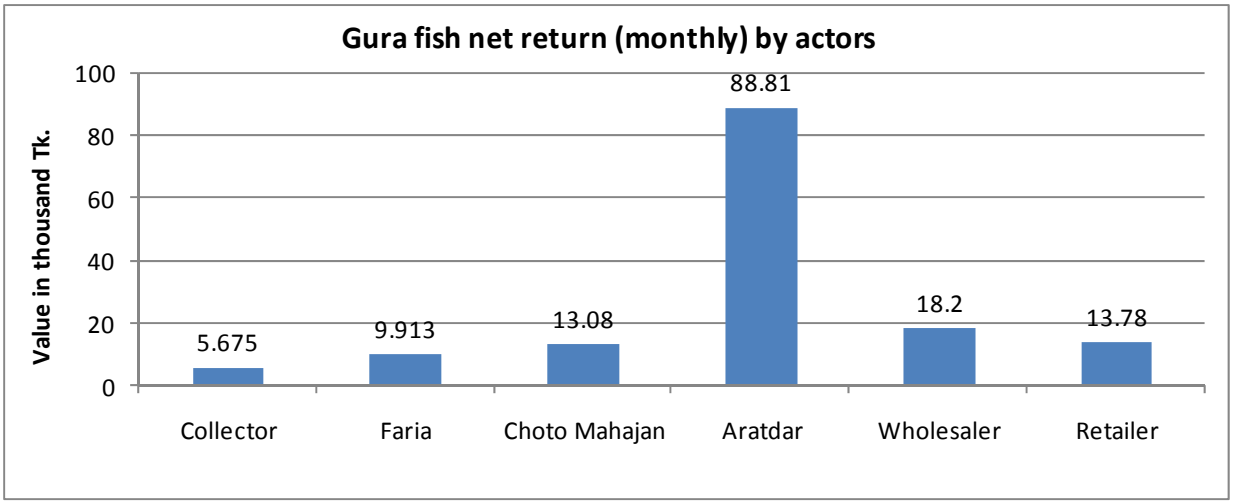


Figure 5.10: Gura fish value addition (%) by actors

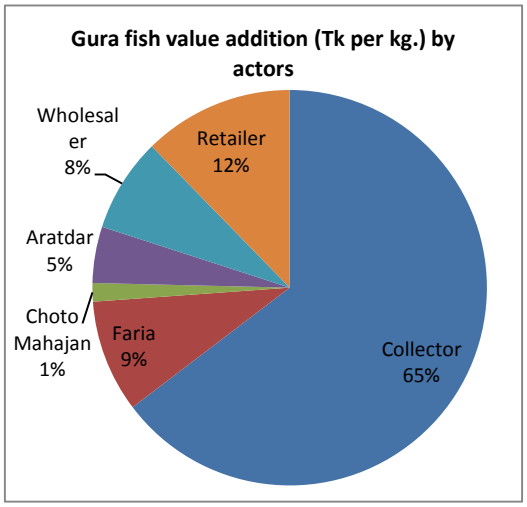
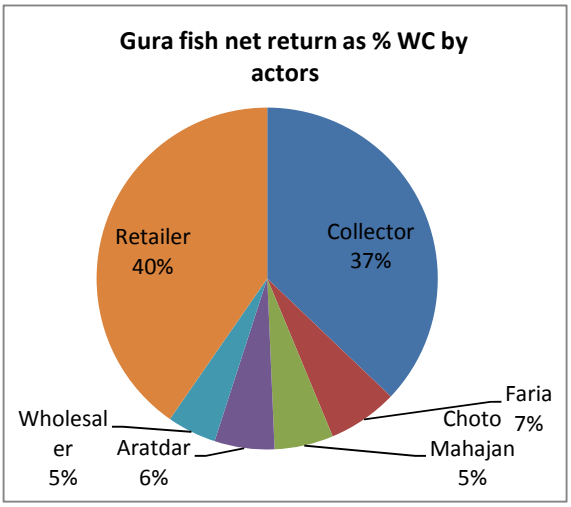


Figure 5.11: Gura fish net return as % of WC by actors



5.2.3 *Sada* (White) Large Fish

Collection process

As in the case of gura fish, normally collection of sada (white) large fish also takes place both on a daily or weekly basis. Some, however, takes a longer time, depending on *goons* (peakness). Like in other fishes, there are two *goons* – *Bhara goons* and *Mara goons*, each lasting about 4 to 6 days depending on location. The remaining days are lean time. One boat consisting of 4 to 8 people travels twice a month and can carry out catch amounting 4-5 maunds each trip of 7 days.

As generally applicable in the case of all other fish types, the calculation of costs and returns is fraught with the problem in that fishers are engaged in catching multi-products (along with *sada* fish) : crab, mollusc, shrimp and gura fish. Over and above, like in other harvests, some of the intermediaries in this sector as well are themselves involved with the collection related activities. For example, some of the Farias are also collectors, some of the Mahajans are also Aratdars or wholesalers and vice versa. The study considered those collectors who fish mainly sada fish. Costs and returns are then segregated.

Our survey shows that on an average one boat with more or less 4-6 collectors carries around 150-200 Kg of sada fish.

Normally, Majhis in this type of fishing has no special role. The general practice is that all sorts of costs (including costs of fuel of those which are run by engines), food and net repairing borne by owners during the trip are deducted from total earnings. In some cases, sharing of profit applies. In most cases, however, collectors work on wages.

Average cost of food for the fishermen in each trip is around Tk 5-10 thousand. The owners of nets/boats have many risks. Sometimes they lose their whole investment due to cyclone and robbery.

A specific group of people having good amount of cash act as financier or There are some Aratdars who also own net and boat and this enhances their profitability. However, there is a risk involved in the business of Aratdars as they sell fish to Paikars on credit. Many times, Paikars do not pay their dues and stop business with the Arat and start business with new Aratdars.

Value Addition

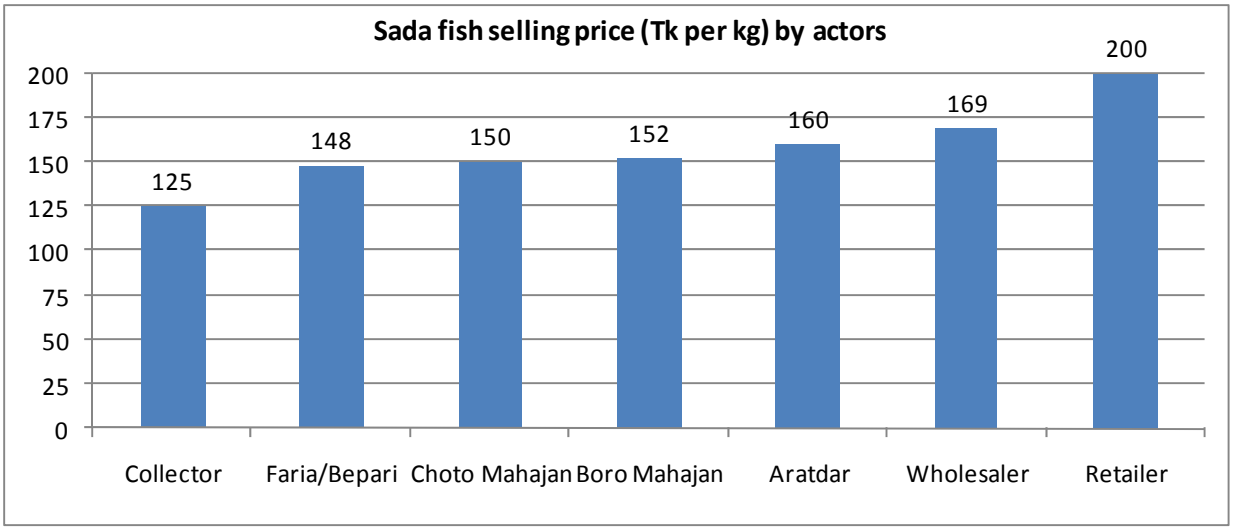
Table 5.3 presents costs and returns for sada fish. Monthly gross returns and net returns have been calculated. Net returns as percentage of working capital have been calculated for each individual actor. In terms of value addition in prices, it can be seen that collectors, obviously, provide the highest price value addition, little less than two-thirds (63%) of the total price. Keeping collectors aside, like in gura fish retailers get the highest value addition (15.5%), followed by Farias (11.5%) (who are also often involved in collection), Aratdars (4.0%), wholesalers (4.5%), and Choto Mahajans (1.0%).

Table 5.3: Value addition and return for *sada* (large) fish

Actor type	Cost and return for *sada* (large) fish							
	Average selling price/Kg	Price Value Addition (%)	Av. volume Per month (Kg)	G. Return (Tk /month)	Cost (Tk /month	Net Return (Tk/month)	Working capital (WC)	Net Return as % of WC
Collector	125	62.5	79 (0.63)	9875 (4.6)	3,171	6704 (4.6)	2800	239.4
Faria/Bepari	148	11.5	402 (3.2)	10580 (5.2)	2,450	8404 (5.8)	15000	56.0
Choto Mahajan	150	1.0	480 (3.8)	12000 (5.9)	1,540	10460 (7.2)	15700	66.6
Boro Mahajan	152	1.0	2300 (18.2)	62100 (30.6)	4,600	57500 (39.8)	126667	45.4
Aratdar	160	4.0	5210 (41.2)	46890 (23.1)	16,023	30867 (21.4)	482444	6.4
Wholesaler	169	4.5	3200 (25.3)	32000 (15.7)	15,140	16860 (11.7)	140000	12.0
Retailer	200	15.5	960 (7.6)	29760 (14.6)	15,980	13780 (9.5)	13330	103.4
Total	-	100.0	12631 (100.0)	203205 (100.0)	-	144575 (100.0)	-	-

Note: See note under Table 5.1.

Figure 5.12: Sada fish selling price (Tk per Kg) by actors



Volume of trade

As regards traded quantity dealt in by actors, of all the actors, Aratdars carry out the highest volume of trade (41.2%), followed by wholesalers (25.3%) (some of them are Aratdars as well), Boro Mahajans (18.2%), retailers (7.6%), Choto Mahajans (3.8%), and so on. Obviously, bottom actor types, Farias and collectors, deal in lowest quantity of trade, 3.2 percent and less than one percent (0.6%) respectively.

Gross returns and net returns

As regards gross and net returns made by respective actors, it can be found that (Table 5.3) Boro Mahajans and Aratdars have the highest amount of trade amount, both for gross and net returns, monthly net returns being estimated as Tk 57,500 and Tk 30,867 for Boro Mahajans and Aratdars respectively. Of all the actors, in terms of proportions, the Boro Mahajans, again, have the highest gross or net returns (around 31-39%). For the Aratdars, as usual, the proportions are also high, gross and net returns being in the range from 21 to 23 percent, followed by wholesalers (around 12-15%), retailers (around 9-14%) and Choto Mahajans (6-7%). In proportional terms, collectors or Beparis have gross or net returns of only around 5 to 6 percent. In absolute terms, the Aratdars have net income 16 times as much compared to that earned by collectors.

When considered investment, however, net returns over working capital (NRWC) are found to be exceptionally high for retailers (103%, as they trade in small amount with small working capital but at a very high margin), followed by Choto Mahajans (66.6%), Farias/Beparis (56.0%), Boro Mahajans (45.4%) and Aratdars (6.4%) – who, however, trade in large quantity of products.

Figure 5.13: Sada fish gross return (monthly) by actors

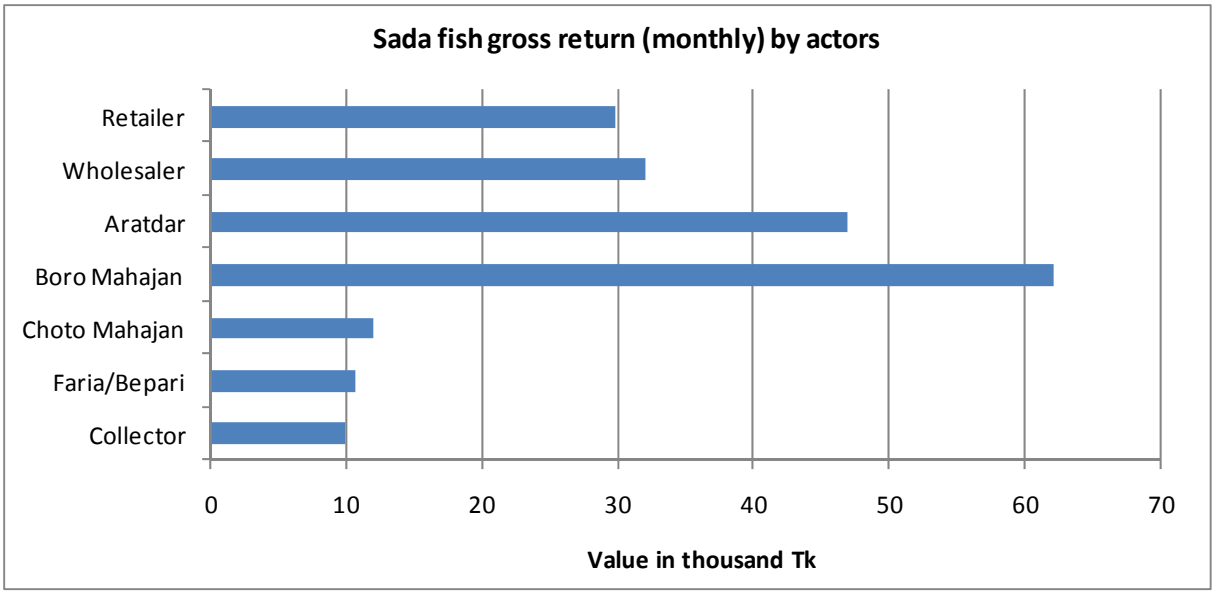


Figure 5.14: Sada fish net return (monthly) by actors

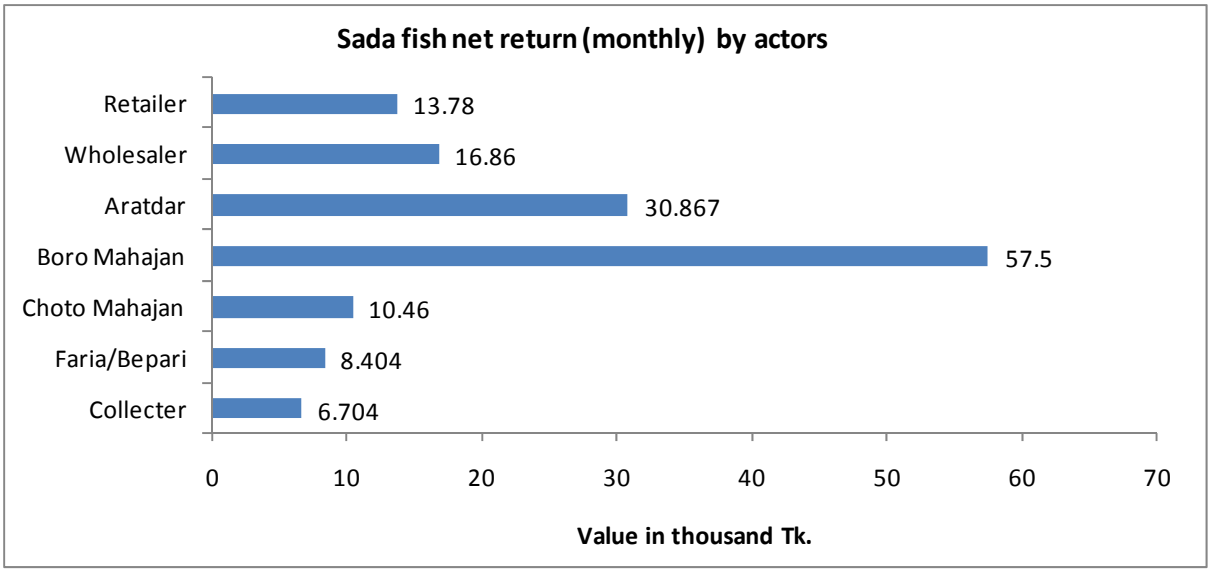
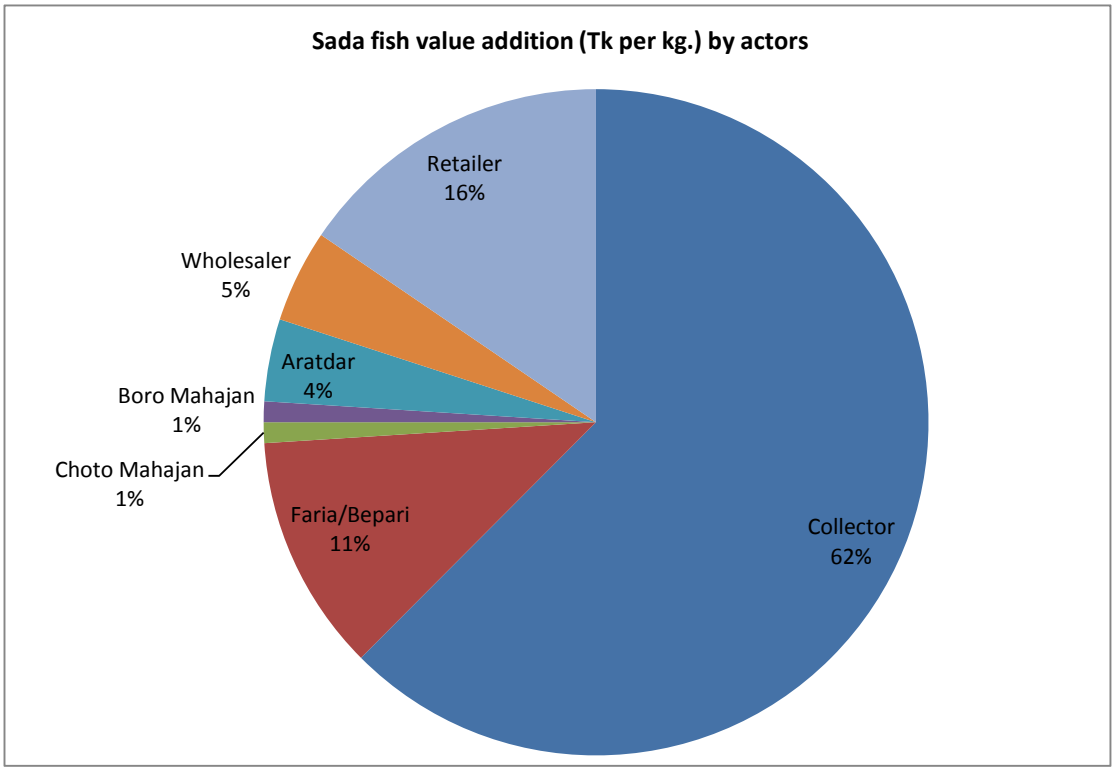


Figure 5.15: Sada fish value addition by actors



5.2.4 Hilsha

Collection process

Normally hilsha fishing takes place on a weekly basis. Like in other fish products, for hilsha as well, there are two *goons (peak) – bhara goons and mara goons* in a month, each lasting 4 to 5 days [77]. The remaining days are lean time for hilsha fishing. One boat consisting of 6 to 10 people can fetch fish worth 12-20 maunds.

Most fishermen get engaged in hilsha fishing on the basis of sharing of harvest among fishers (fishing laborers) and the capital providers (net/boat owners). Normally, group leaders (Majhis) receive twice the amount of each fisher. The general practice is the fishers cannot sell their catch in markets other than the specified markets/Aratdars/wholesalers as contractual obligation. at a reduced. Generally, the fishers (laborers) receive advance money (dadons) in the lean season from net/ boat owners on condition that they would work for the whole season for the owners. In the fishing grounds, they work under a boatman/captain (Majhis) who is responsible for the whole trip.

The general practice, again, is that all sorts of costs (including costs of fuel, food and net repairing) borne by owners during the trip are deducted from total earnings and a share of 10/16 (i.e. 62.5%) is retained by capital providers. The remaining earnings are distributed among fishing laborers with double share to Majhis (almost similar arrangement was observed by a study by Ali *et al* 2009).

Net/boat owners are actually Mahajans who have to invest in nets and boats for fishing. Still many of them have to borrow from local moneylender or Aratdars to carry out hilsha fishing at a

[77] Bhara goons are the situation which is most appropriate when fish catch is most plentiful. Mara goons are when fish catch is plentiful next to Bhara goons.

high interest rate (e.g., 5% for 15 days or so) on condition that they sell their entire catch to them throughout the year. With few exceptions, they do not go fishing directly. Usually, a fishing trip requires 10-15 days.

Average cost of food for the fishermen in each trip is around Tk 10-12 thousand; average cost of fuel for engine in each trip is Tk 40-50 thousand; and average cost for ice per trip is around 10 thousand taka. The owners, however, have many risks. Sometimes they lose their whole investment due to cyclone and robbery.

Aratdars usually works as commission agents. There is an association of Aratdars at each fish landing center. Fishermen, owners of the nets/boats and local Paikars bring their fish to the Arat. Paikars and local retailers participate in the process of auction to buy the fish. Koyal carry out the whole process of auction. Generally Paikars pay the value of fish to the Aratdars and Aratdars pay to the fish owners. Aratdars receive commission; usually it is 2.5 per cent from each side (i.e., 5% in total).

Value Addition

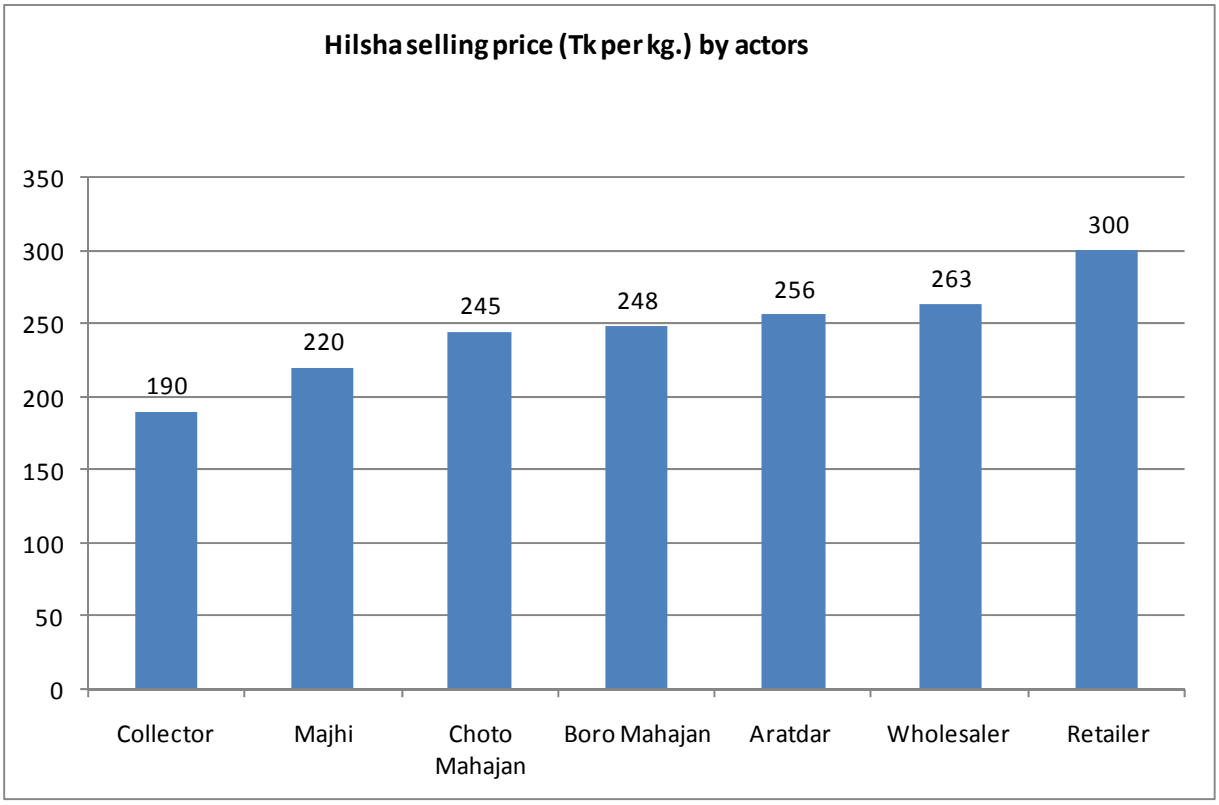
Table 5.4 presents costs and returns for hilsha fish. Monthly gross returns and net returns have been calculated. Net returns as percentage of working capital have also been calculated for each individual actor. It can be seen that the collectors provide the highest price value addition, a little less than two-thirds (63%) of the total price. Retailers create the next highest value addition (12.3%), followed by Majhis/Farias (10.0%), Choto Mahajans (8.3), Aratdars (2.7%), wholesalers (2.3%) and so on.

Table 5.4: Value addition and return for hilsha

Actor type	Cost and return for hilsha							
	Average selling price/Kg	Price Value Addition (%)	Av. volume Per month (Kg)	G. Return (Tk/month)	Cost (Tk/month)	Net Return (Tk/month)	Working capital	Net Return as % WC
Collector	190	63.3	70 (0.47)	13300 (5.3)	5140	8160 (4.2)	-	-
Majhi	220	10.0	683 (4.6)	20490 (8.2)	6352	14138 (7.3)	15500	91.2
Choto Mahajan	245	8.3	816 (5.5)	44880 (18.0)	3990	40890 (21.0)	68400	59.8
Boro Mahajan	248	1.0	2532 (17.0)	70896 (28.5)	9994	60896 (31.3)	333330	21.3
Aratdar	256	2.7	7500 (50.5)	67500 (27.1)	22500	45000 (23.1)	366667	12.3
Wholesaler	263	2.3	2957 (19.9)	20699 (8.3)	3726	16973 (8.7)	NA	NA
Retailer	300	12.3	300 (2.0)	11100 (4.5)	2410	8690 (4.5)	NA	NA
Total	-	100.0	14858 (100.0)	248865 (100.0)	-	194747 (100.0)	-	-

Note: See note under Table 5.1.

Figure 5.16: Hilsha selling price (Tk per kg.) by actors



Volume of trade

In contrast to lower price value addition, Aratdars trade in highest volume of products (e.g., more than half of total transaction (50.5%), followed by wholesalers (19.9%), Boro Mahajans (17.0%) and so on. Obviously, bottom actor types, Farias and collectors, deal in lowest quantity of trade, 4.6 percent and less than one percent (0.5%) respectively.

Gross returns and net returns

As regards gross returns, Boro Mahajans, Aratdars and Choto Mahajans get the highest absolute benefits, both for gross and net returns. Monthly net returns, for example, estimate as Tk 60,896, Tk 45,000 and Tk 40,800 for the three actors respectively. In terms of proportions, again, Boro Mahajans (28.5%), Aratdars (27.1%) and Choto Mahajans (18.0) are the highest beneficiaries. Similar is the trend for gross returns. Collectors or Beparis have net returns of only around 4 to 7 percent.. In absolute terms, the Boro Mahajans have net income more than 7 times as much compared to that earned by collectors.

A large amount of working capital is often required to providing with dadons to hilsha fishers. Incorporating investment, net returns over working capital (NRWC) is found to be the highest for Majhis/Beparis (132%) as they need little working capital. Aside from that, Choto Mahajans have relatively better NRWC (59.8%), followed by Boro Mahajans (21.3%) and Aratdars (12.3%).

Figure 5.17: Hilsha gross return (Tk per kg.) by actors

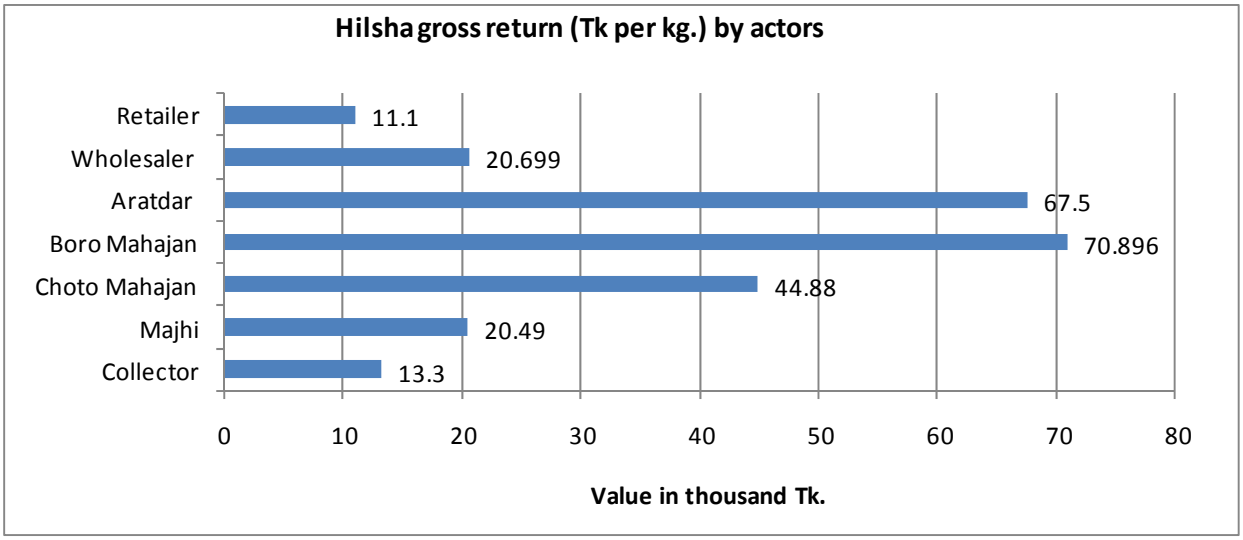


Figure 5.18: Hilsha net return (monthly) by actors

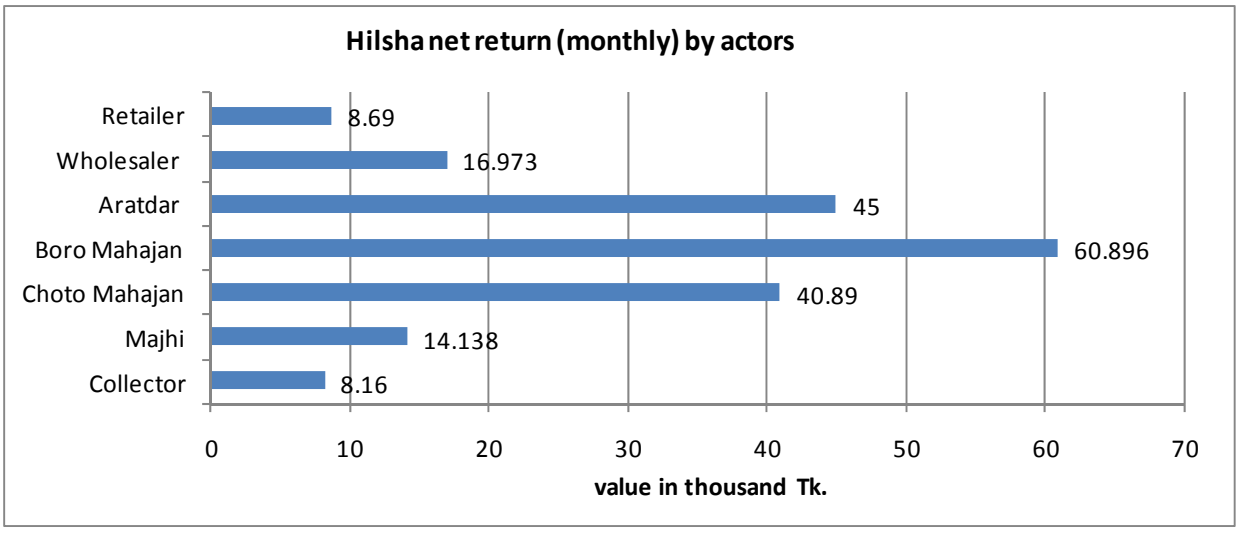


Figure 5.19: Hilsha value addition (%) by actors

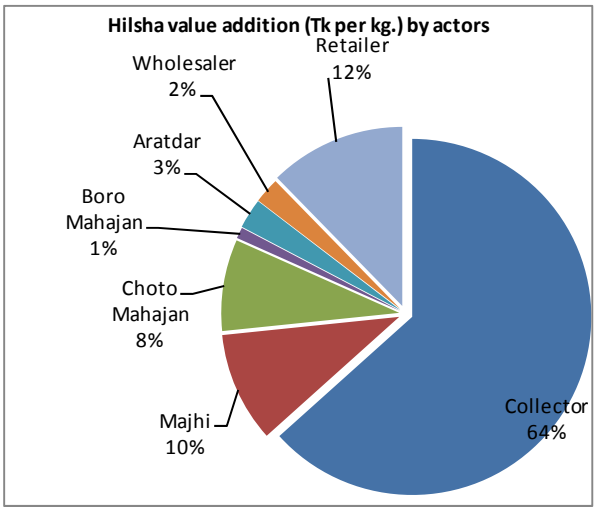
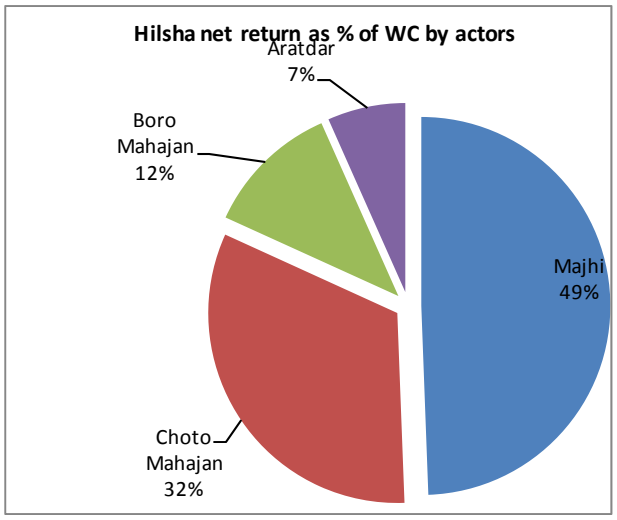


Figure 5.20: Hilsha net return as % of WC by actors



5.2.5 Shrimp large (galda)

Collection process

Shrimp (large) involves collection which is normally carried out on a weekly basis. In many cases, the collectors also get a small share of profit in this case. Our survey shows that on an average one boat with more or less 4-6 collectors carries around 40-60 Kg of shrimp large (galda) fish.

Value Addition

Table 5.5 presents costs and returns for large shrimp (galda). Monthly gross returns and net returns have been calculated. Net returns as percentage of working capital have been calculated for each individual actor. Value addition in terms of price shows that collectors as usual provide the highest price value addition, about three-fourths (75.0%) of the total price. Keeping collectors aside, retailers create the highest value addition (8.7%), followed by Majhis/Beparis (5.0%), Choto and Boro Mahajans (both 3.3%), Aratdars (2.5%) and wholesalers (2.2%).

Table 5.5: Value addition and return for shrimp large (galda)

Actor type	Costs and returns for shrimp (galda)					
	Average selling price/Kg	Price Value Addition (%)	Av. volume Per month	G. Return	Cost	N. Return
Collector	450	75.0	22 (0.31)	9900 (7.3)	3450	6450 (6.1)
Majhi/Bepari	480	5.0	360 (5.1)	10800 (8.0)	3600	7200 (6.8)
Choto Mahajan	500	3.3	580 (8.2)	11600 (8.6)	3850	7750 (7.4)
Boro Mahajan	520	3.3	950 (13.4)	19000 (14.0)	4560	14440 (13.7)
Aratdar	535	2.5	2850 (40.2)	42750 (31.6)	8596	34154 (32.4)
Wholesaler	548	2.2	2050 (28.9)	26650 (19.7)	3850	22800 (21.7)
Retailer	600	8.7	280 (3.9)	14560 (10.8)	2083	12477 (11.9)
	-	100.0	7092 (100.0)	135260 (100.0)	-	105271 (100.0)

Note: See note under Table 5.1.

Volume of trade

Volume of trade is one major indicator to look at profitability of the actors. Of all the actors, Aratdars carry out the highest volume of trade (40.2%), followed by wholesalers (28.9%), Boro Mahajans (13.4%), Choto Mahajans (8.2%) and so on. Obviously, bottom level actors, Beparis and collectors, deal in the lowest volume of trade, 5.1 percent and only 0.31 percent respectively.

Gross returns and net returns

Aratdars have the highest absolute gross and net returns, monthly returns being estimated as Tk 42,750 and Tk 34,154 respectively. Of all the actors, relatively the Aratdars, again, have the highest proportion of gross or net returns (around 31-32%), followed by wholesalers (around 20-21%), Boro Mahajans (around 14%) and Choto Mahajans (7-8%). As usual, collectors have the lowest proportions of both gross and net returns (6-7%). In absolute terms, the Aratdars have net income more than 5 times as much compared to that earned by collectors.

The data on working capital for shrimp large (galda) were not available so that net returns on investments have not been estimated.

Figure 5.21: Shrimp galda large selling price (Tk per Kg) by actors

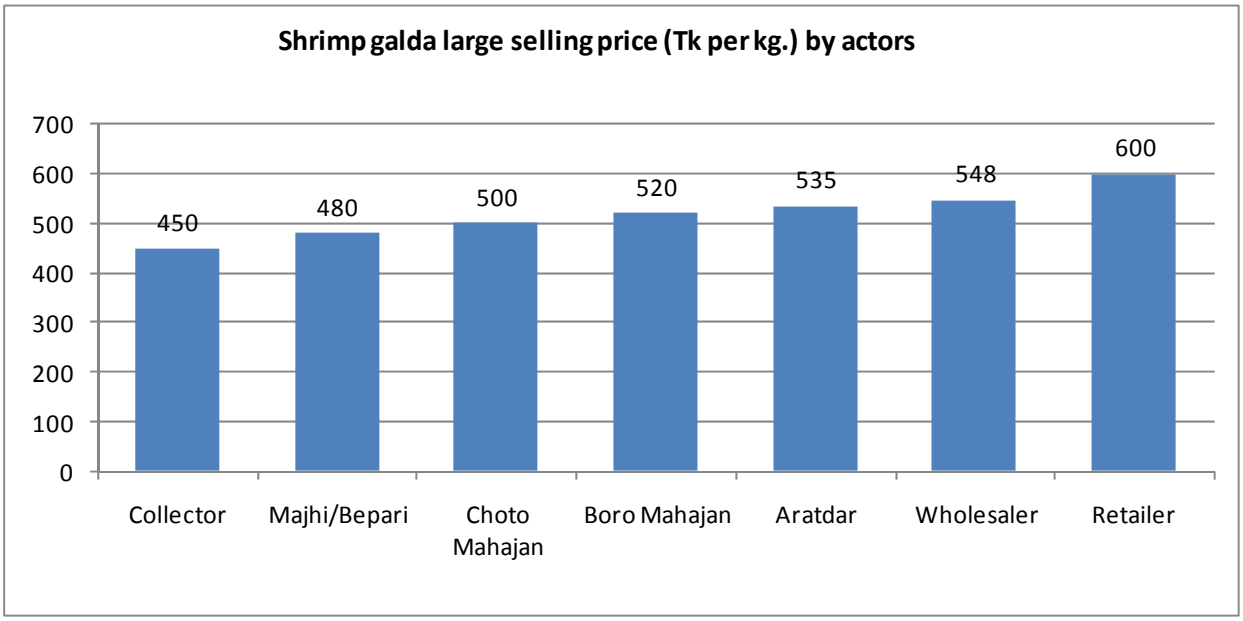


Figure 5.22: Shrimp galda large gross return (monthly) by actors

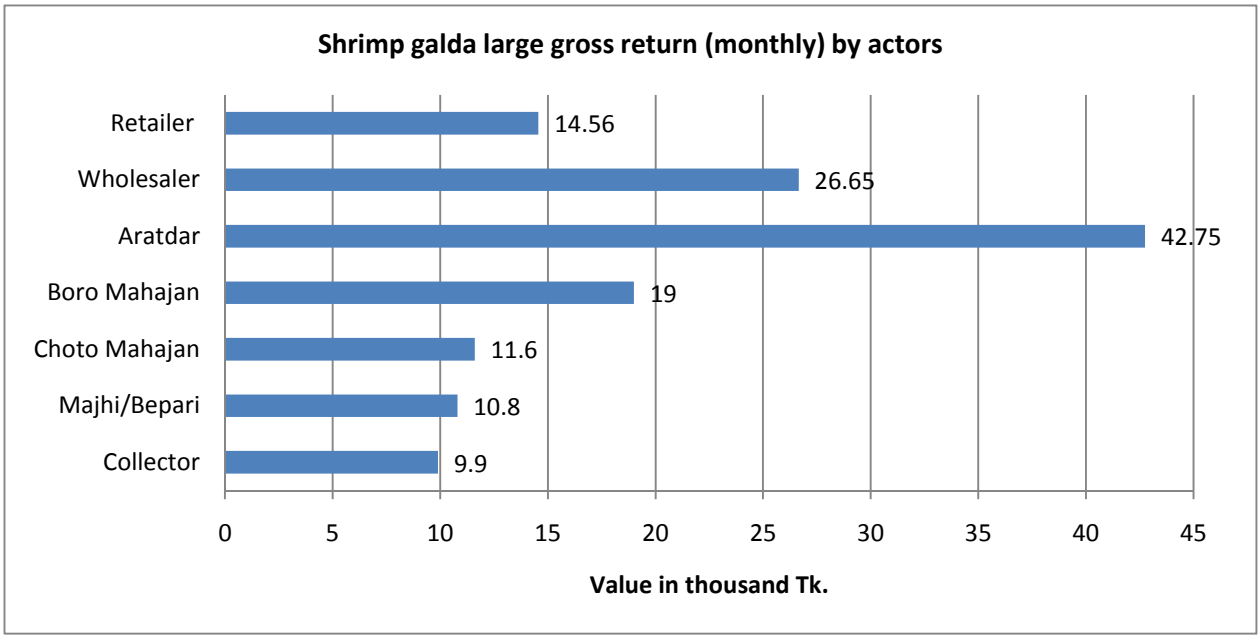

Shrimp galda large gross return (monthly) by actors
Retailer
Wholesaler
Aratdar
Boro Mahajan
Choto Mahajan
Majhi/Bepari
Collector
14.56
26.65
42.75
19
11.6
10.8
9.9
0
5
10
15
20
25
30
35
40
45
Value in thousand Tk.

Figure 5.23: Shrimp galda large net return (monthly) by actors

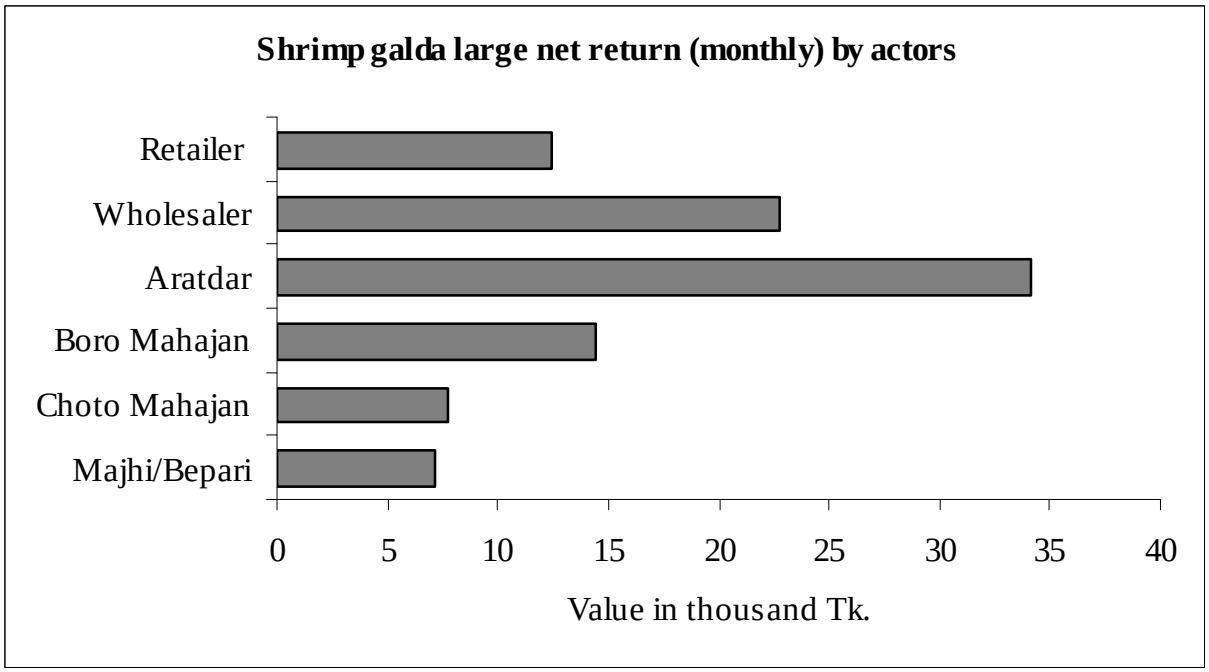
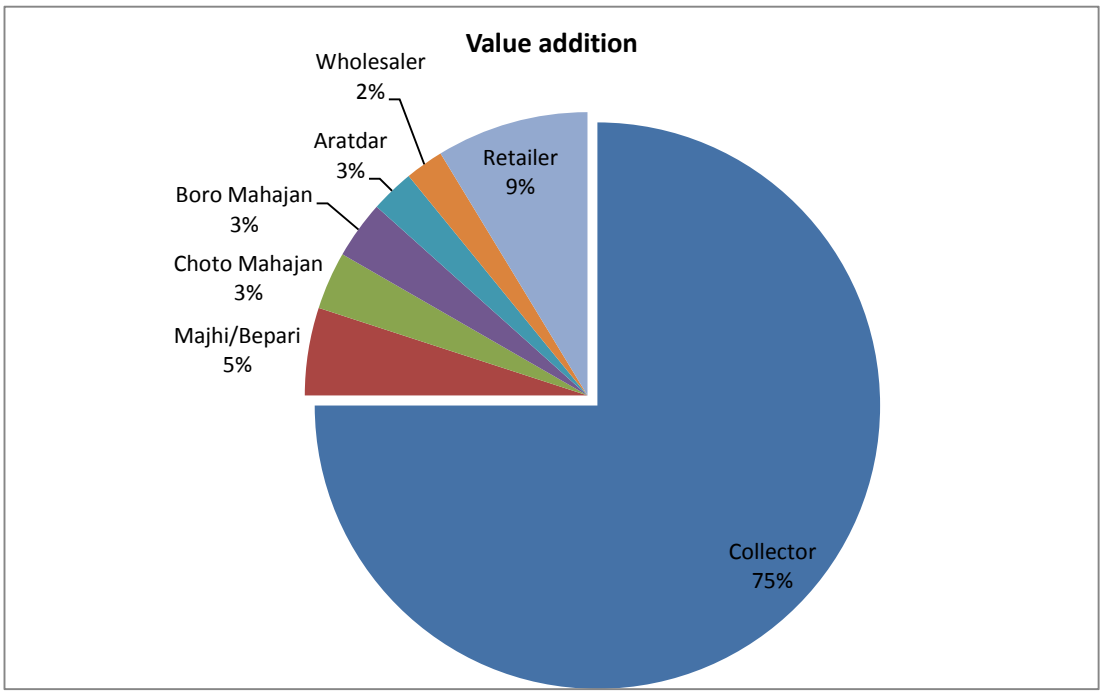


Figure 5.24: Shrimp galda large value addition (%) by actors



5.2.6 Shrimp large (bagda)

Collection process

Like large shrimp (galda), large shrimp (bagda) involves collection that usually takes place on a weekly basis. Normally the collectors also get a small share of profit in this product as well. Our

survey shows that, on an average, one boat with more or less 4-6 collectors carries around 50-80 Kg of shrimp large (bagda).

Value Addition

Like in shrimp large (galda), costs and returns for shrimp (bagda) show that more than two-thirds of value addition in price is made by collectors (Table 5.6). After the collectors, retailers create the next highest price value addition (11.1%), followed by Majhis/Beparis (6.7%), Choto and Boro Mahajans (both 4.4%), Aratdars (3.6%) and wholesalers (3.1%).

Table 5.6: Value addition and return for shrimp large (bagda)

Actor type	Costs and returns for shrimp (bagda)					
	Average selling price/Kg	Price Value Addition (%)	Av. volume Per month	G. Return	Cost	N. Return
Collector	300	66.7	36 (0.42)	10800 (6.4)	3650	7150 (5.5)
Majhi/Bepari	330	6.7	480 (5.6)	14400 (8.6)	3820	10580 (8.2)
Choto Mahajan	350	4.4	760 (8.8)	15200 (9.1)	4050	11150 (8.6)
Boro Mahajan	370	4.4	950 (11.0)	19000 (11.3)	4890	14110 (10.9)
Aratdar	386	3.6	3850 (44.6)	61600 (36.8)	12650	48950 (37.8)
Wholesaler	400	3.1	2250 (26.1)	31500 (18.8)	6450	25050 (19.3)
Retailer	450	11.1	300 (3.5)	15000 (9.0)	2480	12520 (9.7)
	-	100.0	8626 (100.0	167500 (100.0)	-	129510 (100.0)

Note: See note under Table 5.1.

Volume of trade

Just like shrimp large (bagda), Aratdars (45%), wholesalers (26%) and Boro Mahajans (11%) are the major actors in terms of volume of trade. Collectors have volume of trade amounting to less than 1 percent (0.42%).

Gross returns and net returns

Aratdars have the highest absolute gross and net returns, monthly returns being estimated as Tk 61,600 and Tk 48,950 respectively. Of all the actors, relatively the Aratdars, again, have the highest proportion of gross or net returns (around 36-38%), followed by wholesalers (around 19%), Boro Mahajans (around 11%) and Choto Mahajans (9%). As usual, collectors have the least gross or net returns (6%). In absolute terms, the Aratdars have net income more than 7 times as much compared to that earned by collectors.

The data on working capital for shrimp large (bagda) were not available so that net returns on investments have not been estimated.

Figure 5.25: Shrimp bagda large selling price (Tk per kg.) by actors

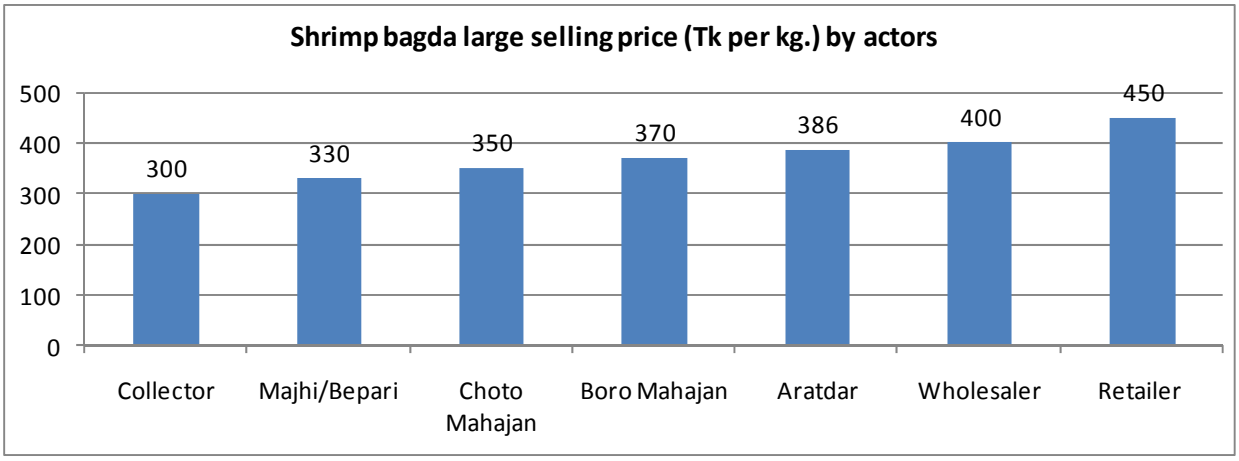


Figure 5.26: Shrimp bagda large gross return (monthly) by actors

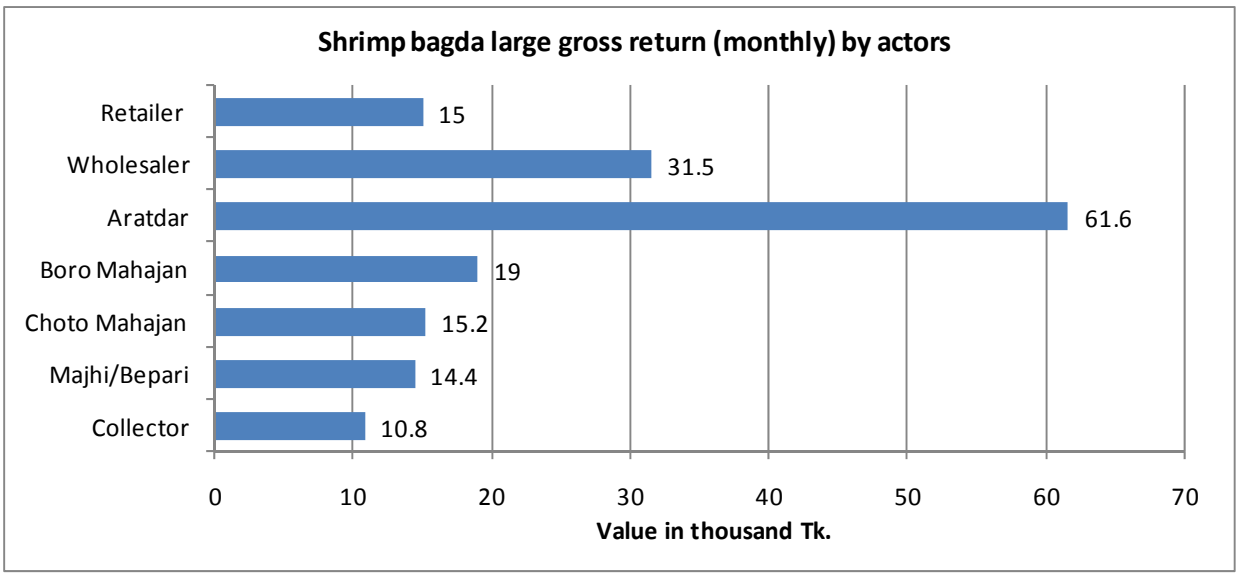


Figure 5.27: Shrimp bagda large net return (monthly) by actors

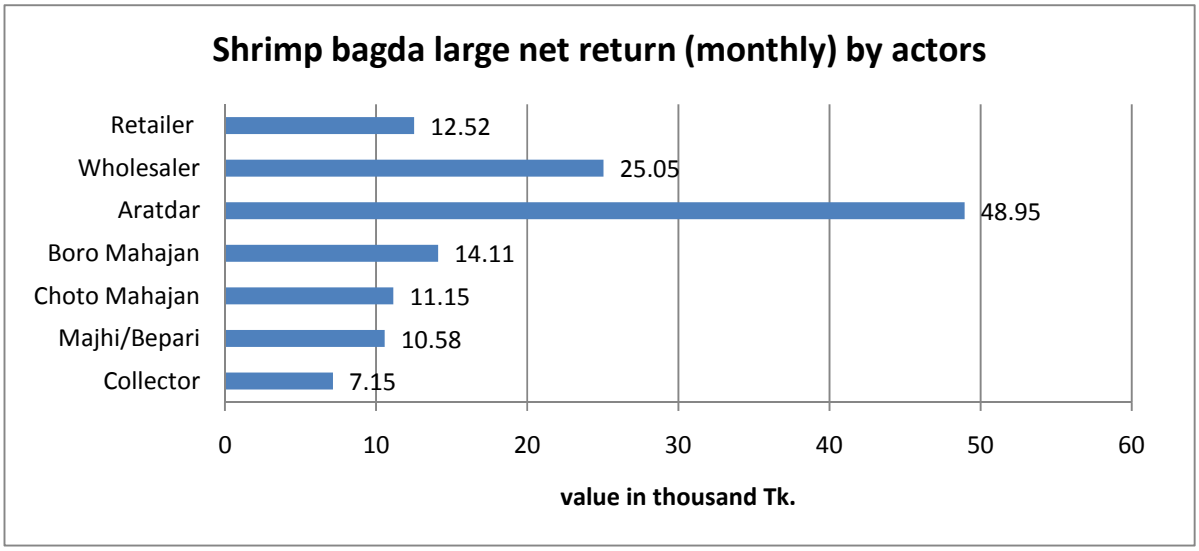
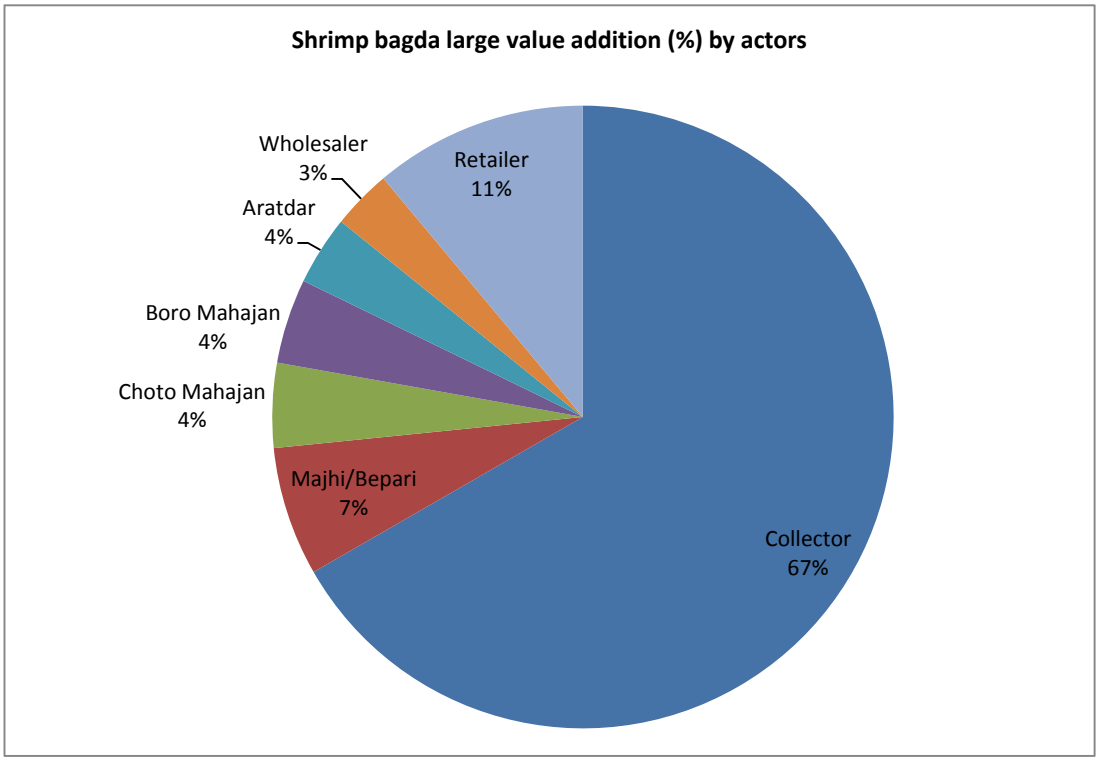


Figure 5.28: Shrimp bagda large value addition (%) by actors



5.2.7 Shrimp small (galda and bagda)

Collection process

Collection of shrimp small, popularly known as *gura chingri*, takes place on a daily or weekly basis. For those who catch through official pass harvest in SRF canals and khals it takes about a week and those who catch in local rivers and water bodies harvest on a daily basis.

Here, again, the collectors harvest multiple products (along with *gura chingri*) : crab, mollusc, and other small fish. Thus, the problem crops up in estimating costs and returns. Our survey shows that, on an average, one boat with more or less 3-4 collectors carries around 30-60 Kg of *gura chingri*, depending on locations and seasons.

Value Addition

Tables 5.7 and 5.8 present costs and returns for *gura chingri* for galda and bagda type respectively. Monthly gross returns and net returns have been calculated. Net returns as percentage of working capital have been calculated for each individual actor. As in other cases, the study considers value addition in terms of price. The same set of actors is involved in the whole chain for galda and bagda type; they are collectors, Choto Mahajans, Boro Mahajans, Aratdars, wholesalers and retailers. It can be seen that, as usual, collectors of *gura chingri* (galda and bagda) provide the highest price value addition, around 59 to 60 percent of the total price. Other than collectors, retailers create the next highest value addition (15-18%), followed by Beparis (12-15%), wholesalers (2-5%), Aratdars (2-4%), Choto Mahajans (2-3%) and Boro Mahajans (around 2%).

Table 5.7: Value addition and return for shrimp small (galda)

Actor type	Costs and returns for shrimp small (galda)							
	Average selling price/Kg	Price Value Addition (%)	Av. Volume (Kg) Per month	G. Return (Tk/month)	Cost (Tk/month)	Net Return (Tk/month)	Working capital	Net Return as % WC
Collector	120	60.0	105 (1.1)	12600 (7.3)	5060	7540 (5.8)	-	-
Majhi/Bepari	145	12.5	600 (6.4)	15000 (8.7)	4000	11000 (8.4)	10000	110.00
Choto Mahajan	150	2.5	680 (7.2)	20400 (11.9)	4250	16150 (12.3)	26000	40.97
Boro Mahajan	153	1.5	2250 (23.9)	74250 (43.2)	16160	58090 (44.4)	200000	20.45
Aratdar	156	1.5	3430 (36.4)	20580 (12.0)	5596	14984 (11.5)	200000	7.49
Wholesaler	165	4.5	2050 (21.8)	18450 (10.7)	3850	14600 (11.2)	NA	-
Retailer	200	17.5	300 (3.2)	10500 (6.1)	2083	8417 (6.4)	NA	-
Total	-	100.0	9415 (100.0)	171780 (100.0)	-	130781 (100.0)	-	-

Note: See note under Table 5.1.

Table 5.8: Value addition and return for shrimp (bagda)

Actor type	Costs and returns for shrimp (small)							
	Average selling price/Kg	Price Value Addition (%)	Av. Volume (Kg) Per month	G. Return (Tk/month)	Cost (Tk/month)	Net Return (Tk/month)	Working capital	Net Return as % WC
Collector	100	58.8	108 (0.9)	10800 (6.4)	4060	6740 (5.3)	-	-
Majhi/Bepari	125	14.7	580 (5.1)	14500 (8.6)	3960	10540 (8.4)	10000	105.40
Choto Mahajan	130	2.9	602 (5.3)	18060 (10.7)	4050	14010 (11.1)	26000	53.88
Boro Mahajan	134	2.4	2260 (19.7)	76840 (45.5)	18060	58780 (46.6)	200000	29.39
Aratdar	140	3.5	3840 (33.5)	23040 (13.7)	6590	16450 (13.0)	400000	4.11
Wholesaler	144	2.4	3640 (31.8)	14560 (8.6)	3850	10710 (8.5)	205701	5.21
Retailer	170	15.3	420 (3.7)	10920 (6.5)	2083	8837 (7.0)	20500	43.11
Total	-	100.0	11450 (100.0)	168720 (100.0)	-	126067 (100.0)	-	-

Note: * As working capital for shrimp small (bagda) was not available, that for galda is used for bagda.
See note under Table 5.1.

Volume of trade

As regards the traded quantity dealt in by actors, of all the actors, Aratdars carry out the highest volume of trade (33-36%), followed by wholesalers (22-32%), Boro Mahajans (20-24%) and so on. Obviously, bottom actor types, Beparis and collectors, deal in low quantity of trade, around 6 percent and around 1 percent respectively.

Gross returns and net returns

Gross returns and net returns made by respective actors are also estimated. Boro Mahajans have the highest absolute returns, both for gross and net returns, monthly net returns being estimated in the range of Tk 58000 to 59,000, followed by Aratdars in the range of Tk 15000 to 16,000. Of all the actors, relatively the Boro Mahajans, again, have the highest gross or net returns (around 44-47%), followed by Aratdars (around 12-13%) and so on. Collectors or Beparis have gross or net returns of only around 5 to 8 percent . In absolute terms, the Boro Mahajans have net income 8 to 9 times as much compared to that earned by collectors.

When considered investment, net returns over working capital (NRWC) show that Majhi/Beparis have relatively much better returns (105-110%), followed by Choto Mahajans (41-55%), Boro Mahajans (20-29%), Aratdars (4-7.5%) and so on.

Figure 5.29: Shrimp galda small selling price (Tk per kg.) by actors

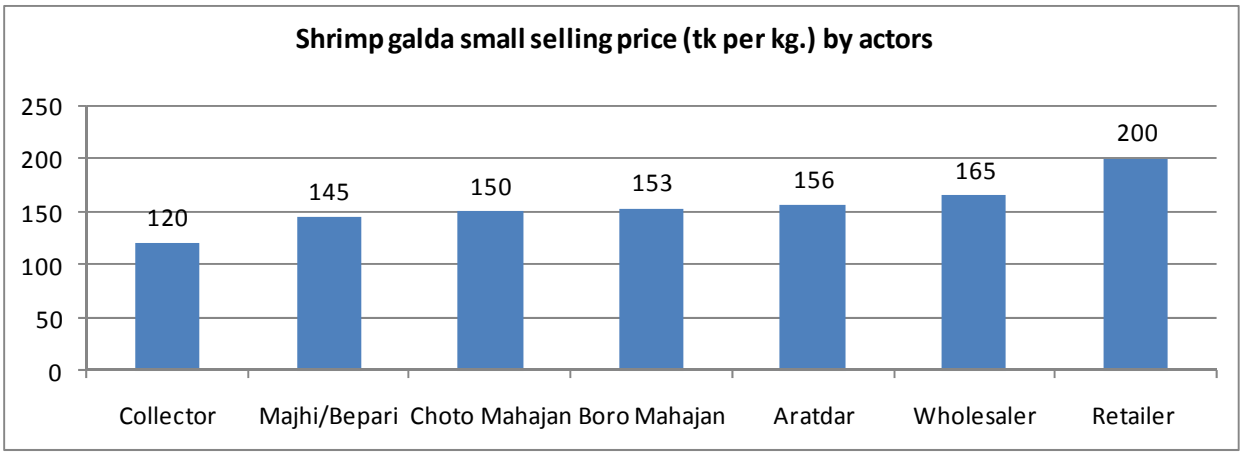


Figure 5.30: Shrimp galda small gross return (monthly) by actors

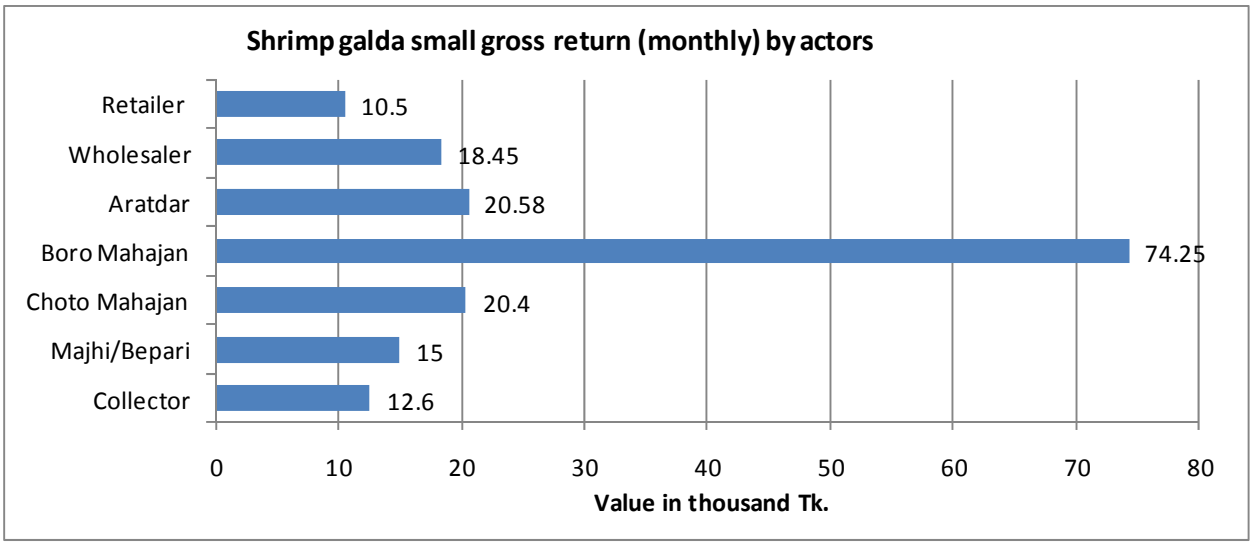


Figure 5.31: Shrimp galda small net return (monthly) by actors

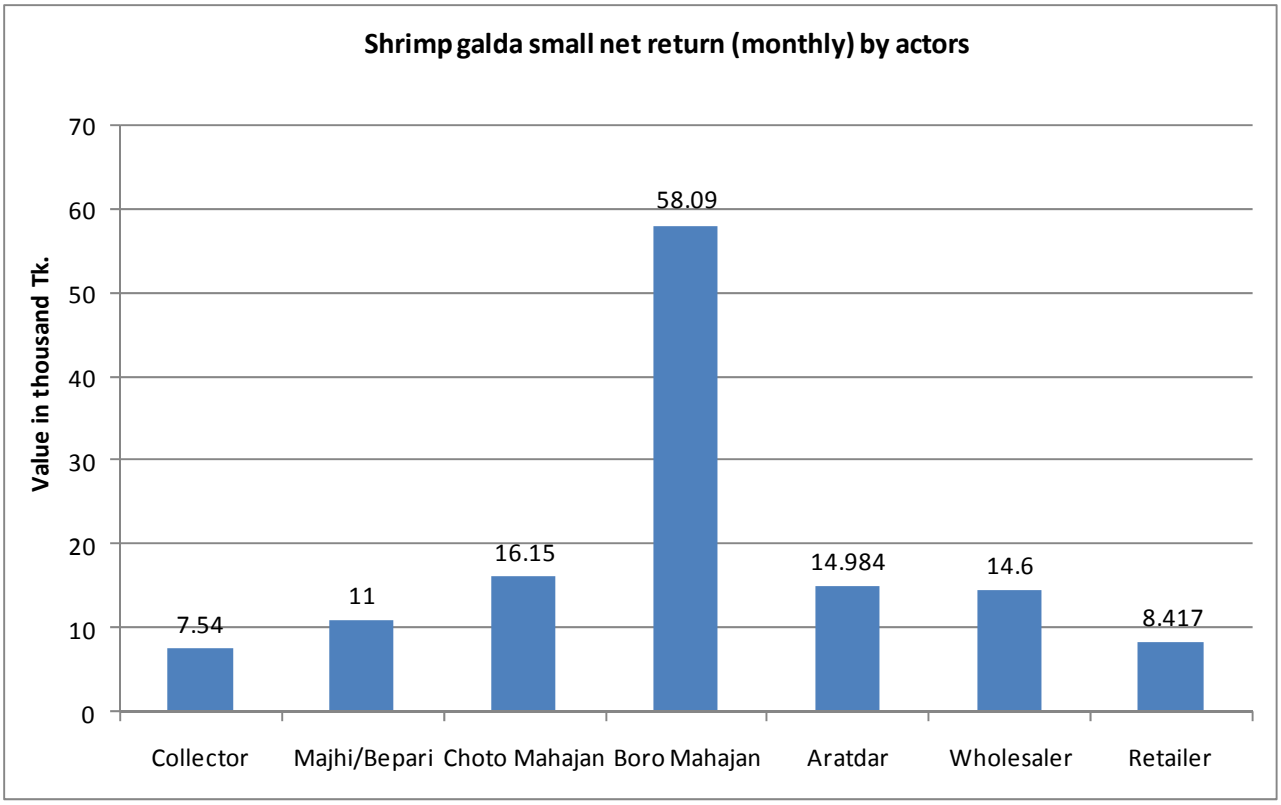


Figure 5.32: Shrimp galda small value addition (%) by actors

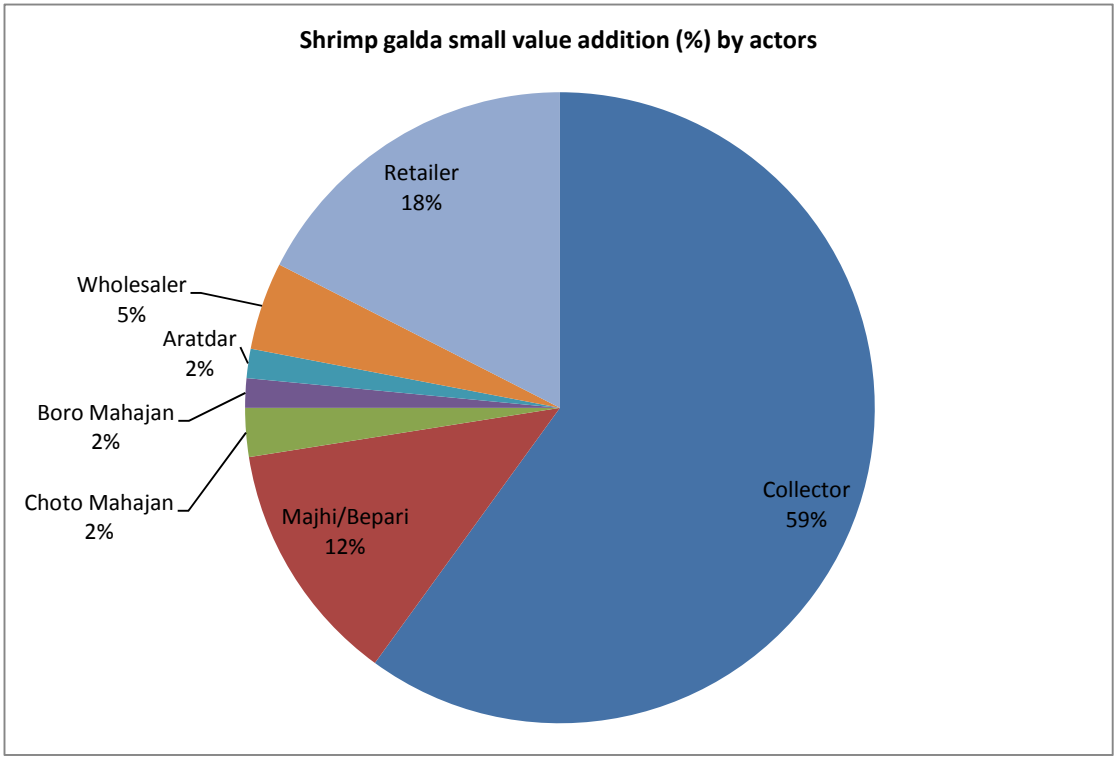


Figure 5.33: Shrimp bagda small selling price (Tk per kg.) by actors

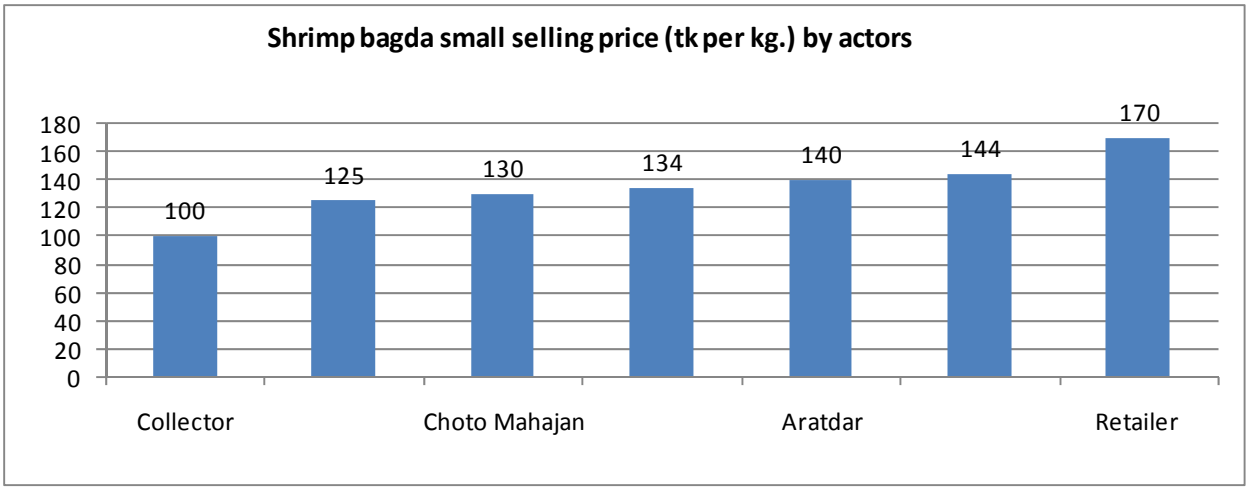


Figure 5.34: Shrimp bagda small gross return (monthly) by actors

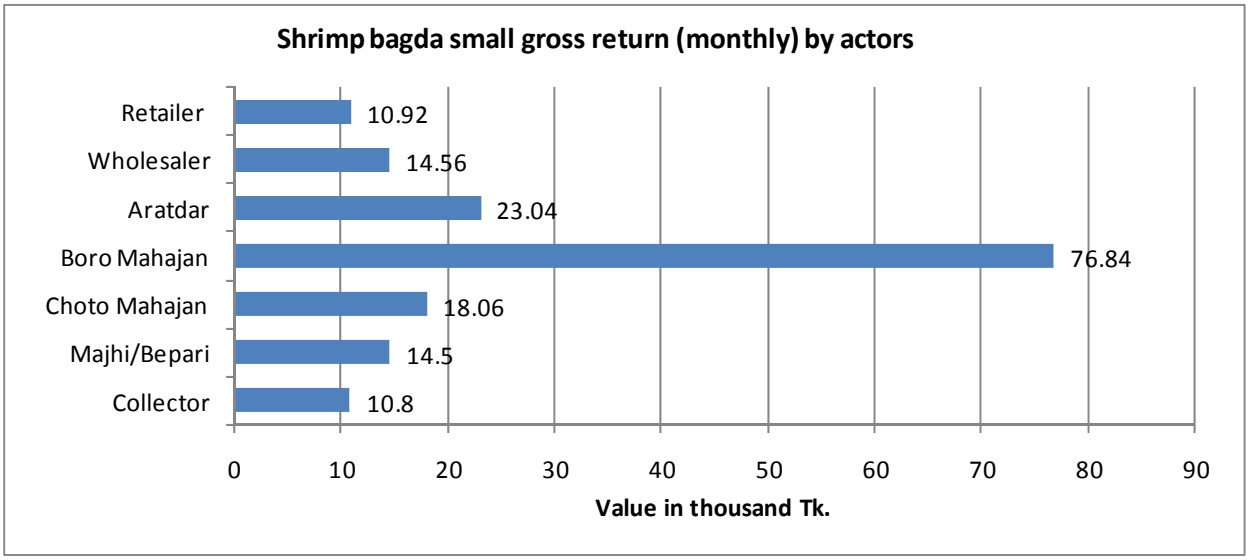


Figure 5.35: Shrimp bagda small net return (monthly) by actors

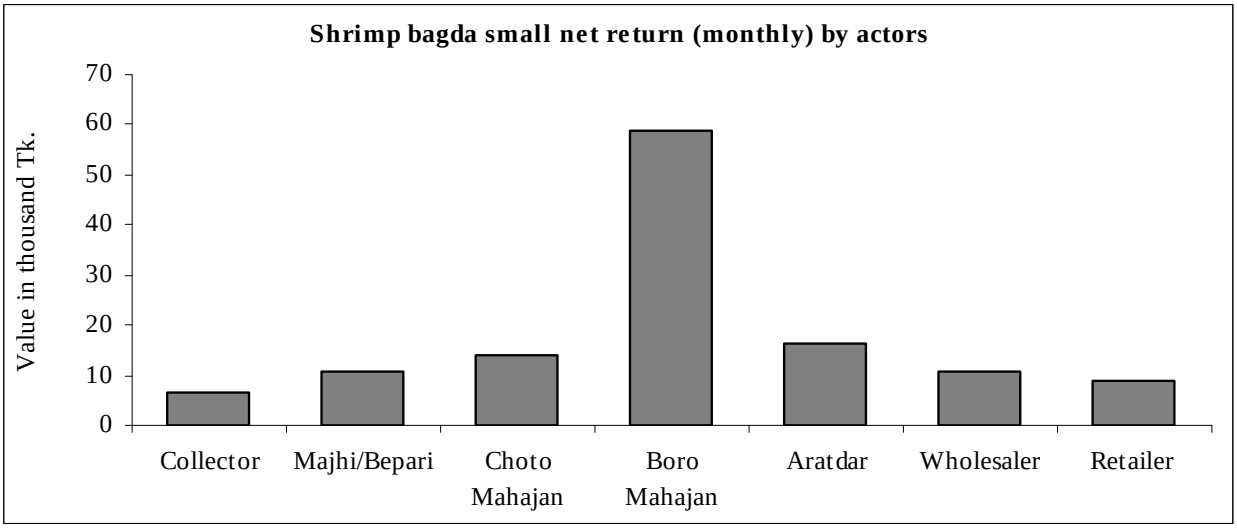
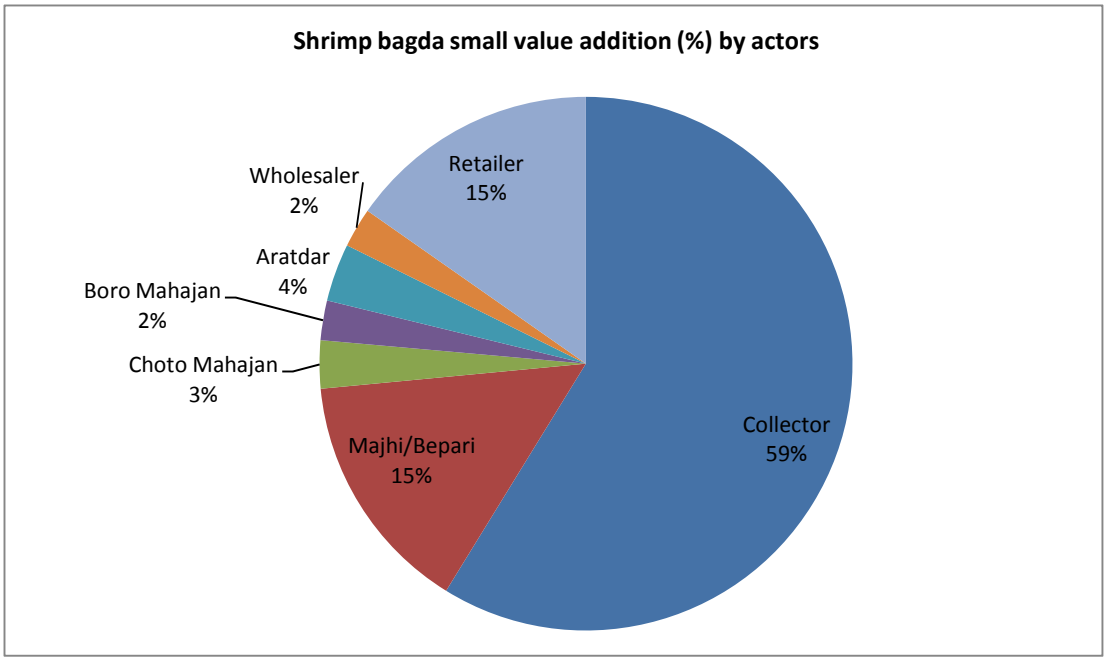


Figure 5.36: Shrimp bagda small value addition (%) by actors



5.2.8 Shrimp fry (galda and bagda)

Collection process

Shrimp fry is collected on a daily or weekly basis. Those who catch through official pass usually harvest in SRF canals and khals – it takes about a week in that case and those who catch in local rivers and water bodies harvest on a daily basis.

Our survey shows that on an average, one boat with more or less 2-3 collectors carries around 300-600 of shrimp fry daily.

Fry Farias or Mahajans lend money (dadons) to collectors in the lean season through an informal contract entered to selling the fry to the lenders at a price determined by the lenders. Many spend years locked in a cycle of debts and it appears that they are vulnerable more than any other SRF collectors. Usually, shrimp fry catchers catch unwanted fish resulting in the loss of biodiversity in the region.

A large number of intermediaries buy fry and sell them on to other intermediaries. Fry Farias buy fry from catchers nearly throughout whole year. They sell the fry to Aratdars who are usually commission agents. Often both Farias and Aratdars borrow money from higher intermediaries to sell fry exclusively to those lenders. On the other hand, interestingly, some Aratdars often provide loans to Farias and collectors so that they are committed to exclusively sell their catch. In some cases, fries are passed through nurseries before being sold to other intermediaries. However, the whole cycle is never ending centered around Dadons.

Some shrimp fry Aratdars buy shrimp from the Farias to sell to the commission agents who then sell to the processors and exporters. Commission agents are typically medium to large size entrepreneurs.

The profile of shrimp fry collectors indicates that a large number of them are either children or women; some catch by boats and some catch manually at the banks of river or canals. The shrimp fry is a sector that provides substantial economic opportunities to particularly middle and lower level participants in the value chain [78].

The shrimp fry catchers have little ability to influence the price at which they sell their product. Intermediaries such as Farinas and Aratdars reap the bulk of the value addition. The lenders or dadondars act as monopolists; once the credit is extended, the borrower must sell their product to the lender. There are spot markets, where fry is bought, sold, and delivered immediately, typically at higher prices than prices received in the factory or in the depots.

Value Addition

The shrimp value chain is complex, more than any other products, with a variety of actors and intermediaries at each node of the chain. Although there is said to be a ban on fry catching fry collectors appear to have continued to operate, however, at the risk of insecurity and increased level of unofficial payments that they are required to pay to local officials.

Tables 5.9 and 5.10 present costs and returns for shrimp fry for galda and bagda type respectively. The same set of actors are involved in the whole chain for galda and bagda type; they are collectors, Beparis and Aratdars. Considering value addition in terms of price, it can be seen that collectors of shrimp fry (galda and bagda) provide highest price value addition, around 57 to 64 percent of the total price.

Table 5.9: Value addition and return for shrimp fry (galda)

Actor type	Costs and returns for shrimp fry (galda)							
	Average selling price/piece	Price Value Addition (%)	Av. volume Per month (piece)	G. Return (Tk/month)	Cost (Tk/month)	Net Return (Tk/month)	Working capital	Net Return as % of WC
Collector	2.00	57.1	9256 (2.0)	18543 (5.0)	4950	13593 (6.4)	-	-
Bepari	2.65	18.6	150000 (32.7)	97500 (26.3)	34125	63375 (30.0)	90000	70.42
Aratdar	3.50	24.3	300000 (65.3)	255000 (68.7)	120700	134300 (63.6)	425000	31.60
Total	-	100.0	459256 (100.0)	371043 (100.0)	-	211268 (100.0)	-	-

Note: See note under Table 5.1.

Table 5.10: Value addition and return for shrimp fry (bagda)

Actor type	Costs and returns for shrimp fry (bagda)							
	Average selling Price/piece	Price Value Addition (%)	Av. volume Per month (piece)	G. Return (Tk/month)	Cost (Tk/month)	Net Return (Tk/month)	Working capital	Net Return as of % WC
Collector	0.50	64.1	16920	8460	-	8460	-	-

[78] The study team observed a large number of women and girls are involved in catching fry by the side of rivers who are apparently belonging to higher middle and middle income groups of the community.

			(4.0)	(13.6)		(16.8)		
Bepari	0.65	19.2	113577 (26.7)	17037 (27.3)	5962	11075 (22.1)	53000	20.9
Aratdar	0.78	16.7	295500 (69.3)	36938 (59.1)	6218	30720 (61.1)	800000	3.8
Total	-	100.0	425997 (100.0)	62435 (100.0)	-	50255 (100.0)	-	-

Note: See note under Table 5.1.

Volume of trade

As regards the traded quantity dealt in by actors, of all the actors, Aratdars of both fry types carry out the highest volume of trade (65-69%), followed by Beparis (around 27-33%). Obviously, bottom actor type, collectors, deals in low quantity of trade, only around 2-4 percent.

Gross returns and net returns

Gross returns and net returns earned by respective actors are estimated. Net returns for galda has been quite high. Aratdars earn the highest returns, in the range of Tk 134,000, followed by Beparis in the range of Tk 63,000 per month. Aratdars have net income nearly 10 times as much compared to that earned by collectors. In contrast, the income level for bagda fry has been relatively low. For example, monthly net returns for bagda fry estimates as Tk 30,720 and Tk 11,075 for Aratdars and Beparis respectively.

When considered investment, net returns over working capital (NRWC) for Beparis of galda fry have been around 70 percent, followed by Aratdars around 32 percent. NRWC for bagda fry, on the other hand, have been around 21 percent, followed by Aratdars around 4 percent. The fry catchers may be considered to be the most vulnerable workers/producers having the least power in the shrimp value chain.

Figure 5.37: Shrimp fry galda selling price (Tk per piece) by actors

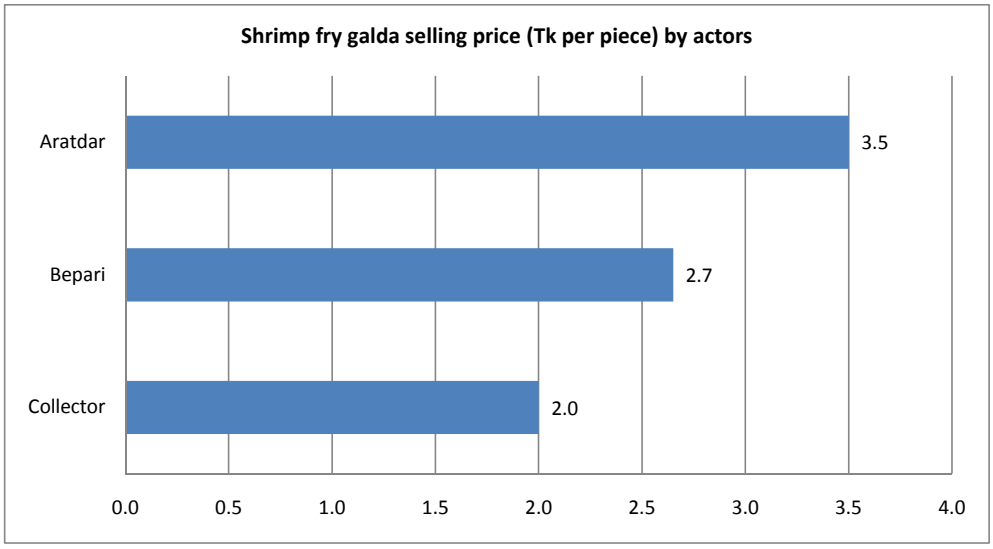


Figure 5.38: Shrimp fry galda gross return (monthly) by actors

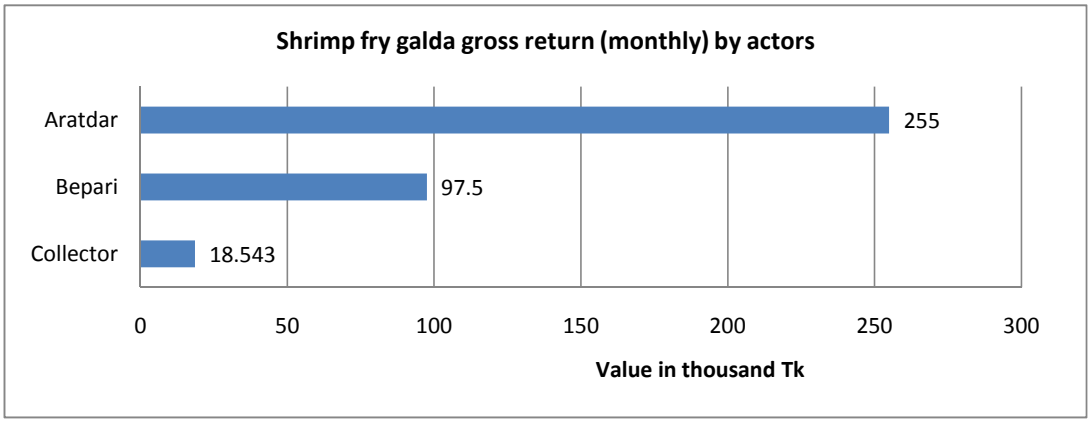


Figure 5.39: Shrimp fry galda net return (monthly) by actors (000 Tk)

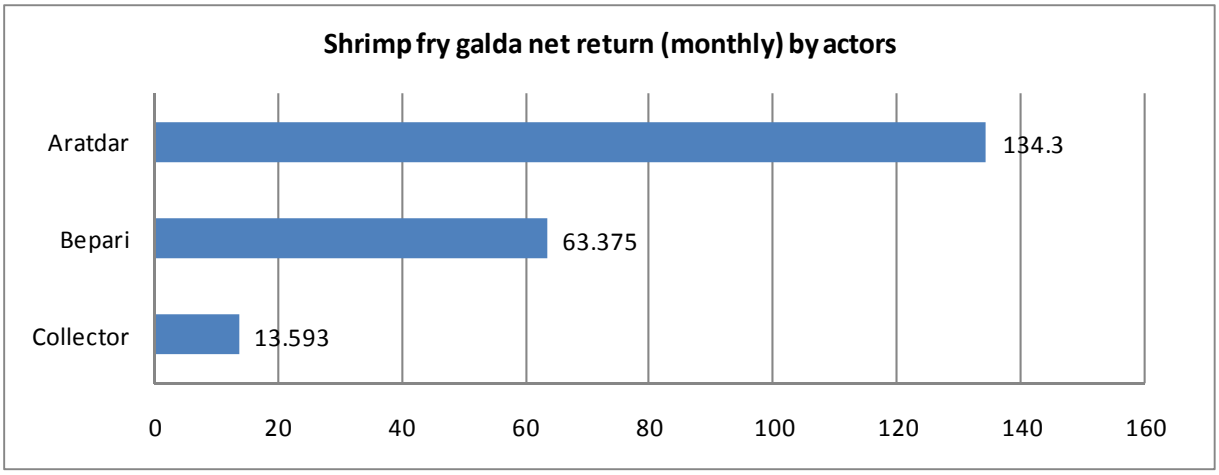


Figure 5.40: Shrimp fry galda value addition (%) by actors

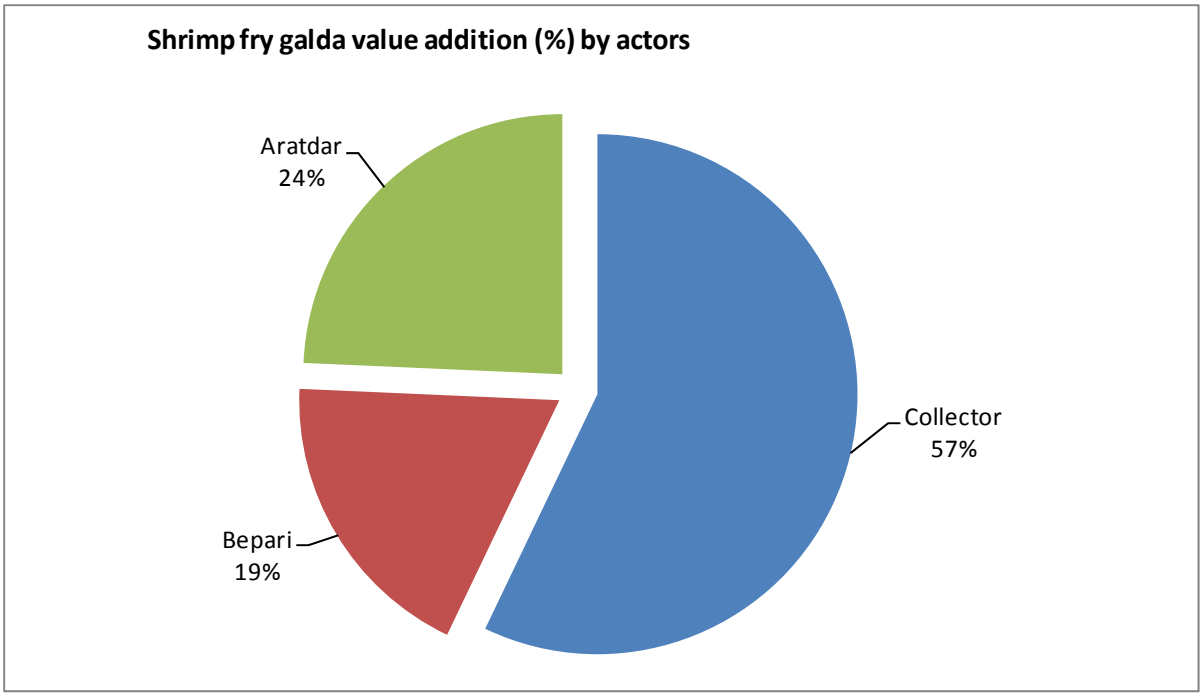


Figure 5.41: Shrimp fry bagda selling price (Tk per piece) by actors

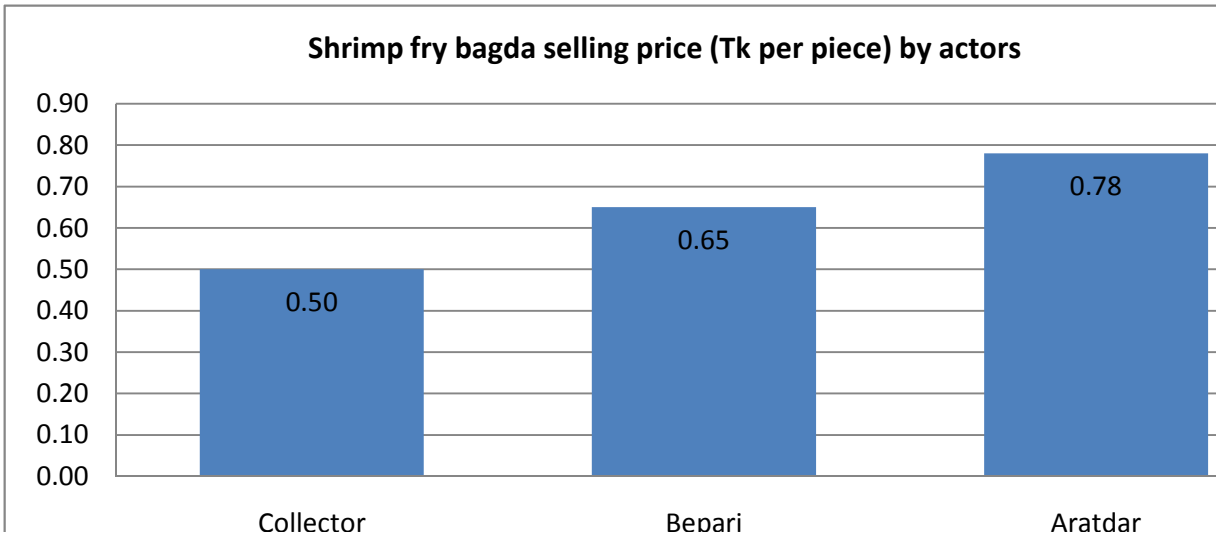


Figure 5.42: Shrimp fry bagda gross return (monthly) by actors (000 Tk)

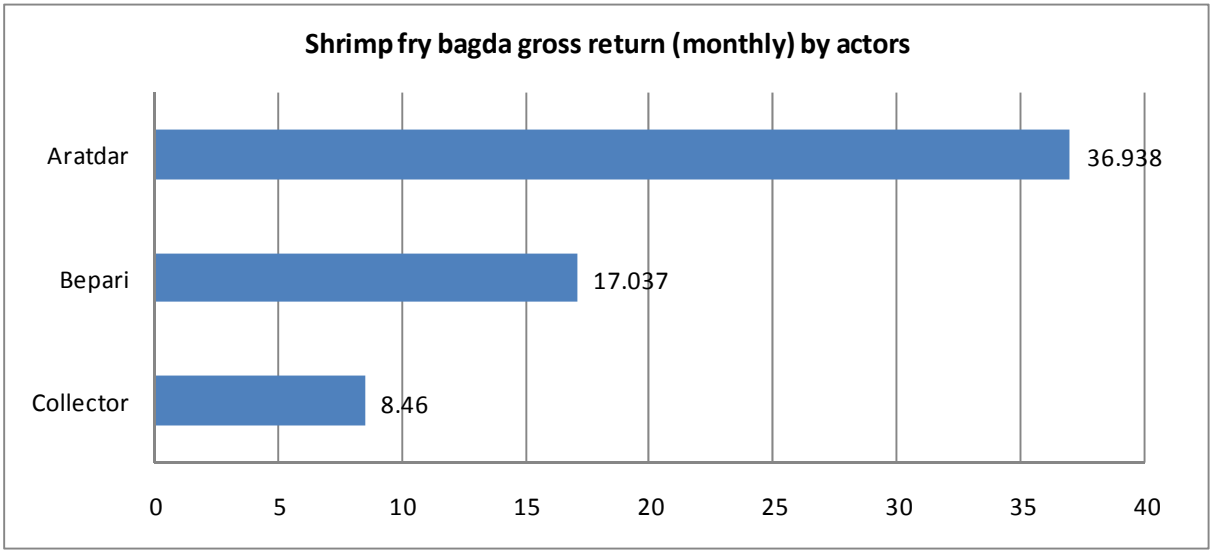


Figure 5.43: Shrimp fry bagda net return (monthly) by actors (000 Tk)

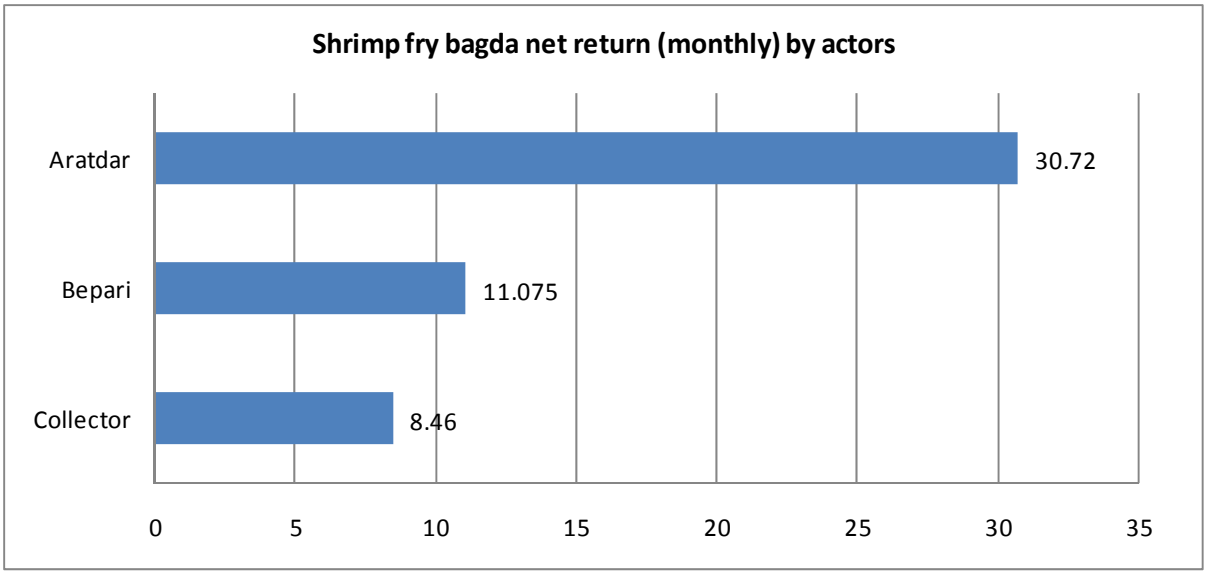
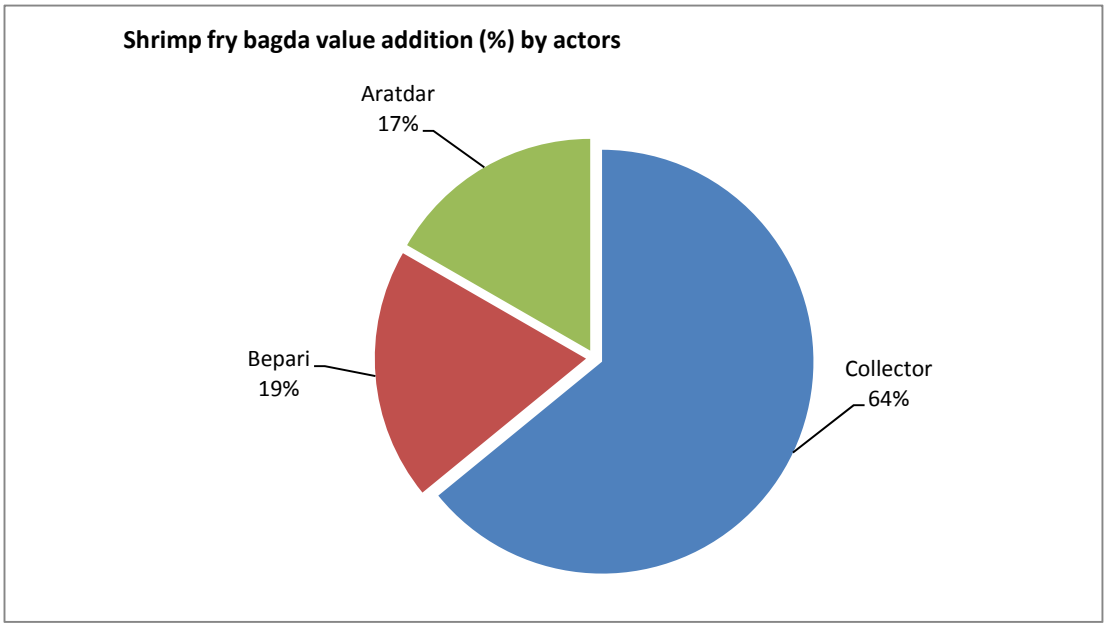


Figure 5.44: Shrimp fry bagda value addition (%) by actors



5.2.9 Crab

Crab fishing in the Sundarbans has experienced a rapid growth over the recent past, following increased international demands for the product. This is also an important supplementary activity for the fishermen in the Sundarbans. The activity needs simple gears that are affordable to catchers.

Normally crab fishing takes place on a weekly basis. One boat (manual) consisting of 2 people carries out the catch two to three trips in a month.

Aratdars in this sector are themselves involved with the collection related activities. Farias are also involved in the collection process. Our survey shows that on an average one boat with more or less 2 collectors catches in the range of 20 to 40 Kg of crab. Usually Farias (sort of Choto Aratdars) carry out the stocking in depots from collection grounds. Some Farias who are directly involved in the collection process sometimes sell their products to Aratdars.

Value Addition

Table 5.11 presents costs and returns for crab fishing. It can be seen that, apart from collectors who provide the highest price value addition, about a half (50%) of the total price, Majhi/Farias create the next highest value addition (17.6%), followed by Choto Mahajans (13.8%), Aratdars (8.3%), Boro Mahajans (6.9%), wholesalers (3.4%) and so on.

Table 5.11: Value addition and return for crab

Actor type	Costs and return for crab							
	Average selling Price/Kg	Price Value Addition (%)	Av. volume Per month (Kg)	G. Return (Tk/month)	Cost (Tk/month)	Net Return (Tk/month)	Working capital	Net Return as % of WC
Collector	145	50.0	130 (0.64)	18850 (3.4)	6720	12130 (4.1)	7667	158.2
Majhi/Faria	196	17.6	708 (3.5)	36108 (6.5)	17249	18859 (6.3)	69909	27.0
Choto Mahajan	236	13.8	2166 (10.6)	86640 (15.5)	50517	36123 (12.1)	205714	17.6
Boro Mahajan	256	6.9	5872 (28.8)	117440 (21.0)	53406	64034 (21.5)	1387500	4.6
Aratdar	280	8.3	7559 (37.1)	181416 (32.5)	95154	86262 (29.0)	350000	24.6
Wholesaler	290	3.4	3920 (19.3)	117600 (21.1)	37500	80100 (26.9)	1500000	5.3
Total	-	100.0	20355 (100.0)	558054 (100.0)	-	297508 (100.0)	--	--

Note: See note under Table 5.1.

Volume of trade

In contrast to relatively lower price value addition, Aratdars, compared to other actors, trade in highest volume of products (37.1%), followed by Boro Mahajans (28.8%), wholesalers (19.3%), Choto Mahajans (10.6%) and so on. Obviously, bottom actor types, Farias and collectors, deal in lowest quantity of trade, 3.5 percent and less than one percent (0.64%) respectively.

Gross returns and net returns

As regards gross returns, a comparison among actors shows that Aratdars, Boro Mahajans, wholesalers and Choto Mahajans get the highest absolute benefits, both for gross and net returns. As regards net returns, again, Aratdars get the highest benefits, as high as Tk 86,262 per month, followed by wholesalers (Tk 80,100) (presumably some wholesalers also act as Aratdars offering dadons), Boro Mahajans (64,034) and Choto Mahajans (Tk 36,123). The collectors, in contrast, earn only Tk 12,130 as net returns. In terms of proportions, again, similar trend can be observed (Table 5.11). In absolute terms, the Aratdars have net income more than 7 times as much compared to that earned by collectors.

A large amount of working capital is often required to providing with dadons to crab fishers. Incorporating investment, net returns over working capital (NRWC) is found to be the highest for Majhis/Farias (27%) as they need little working capital. Aside from that, Choto Mahajans have relatively higher NRWC (17.6%), followed by Aratdars (24.6%) and wholesalers (5.3%).

Figure 5.45: Crab selling price (Tk per kg.) by actors

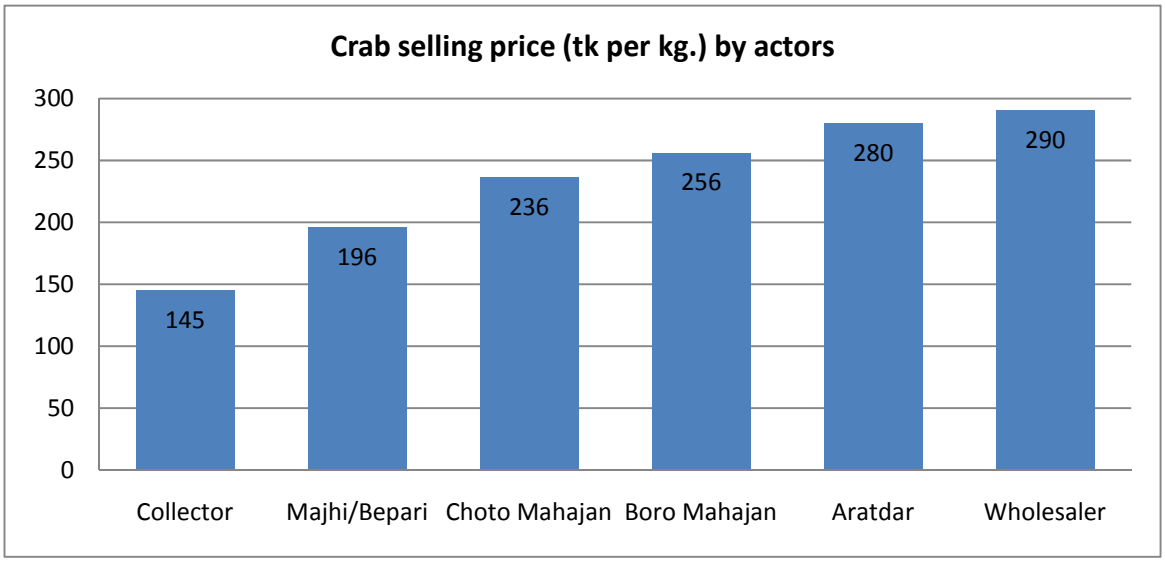


Figure 5.46: Crab gross return (monthly) by actors (000 Tk)

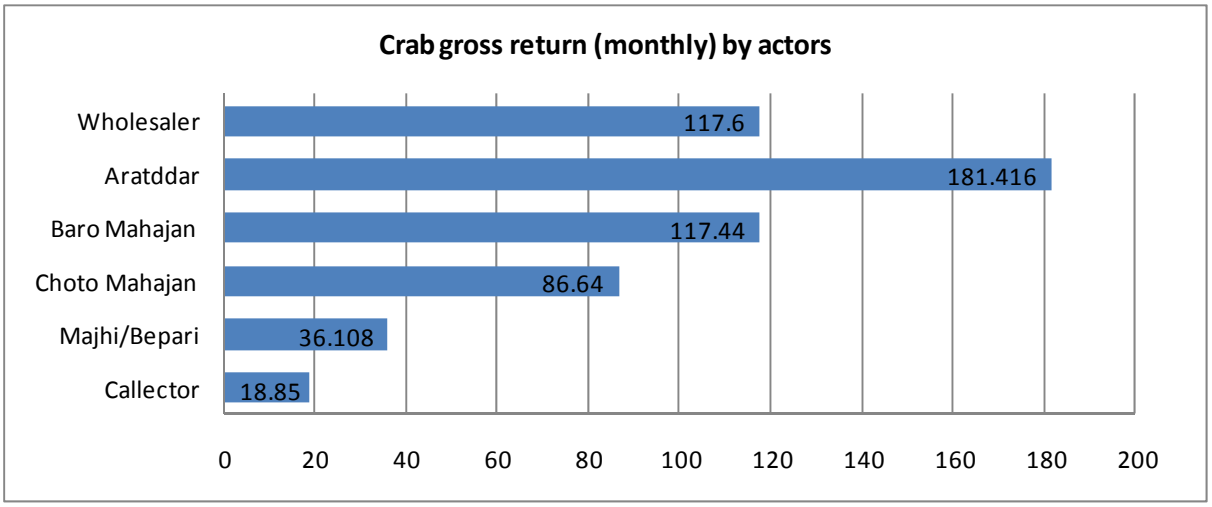


Figure 5.47: Crab net return (monthly) by actors (000 Tk)

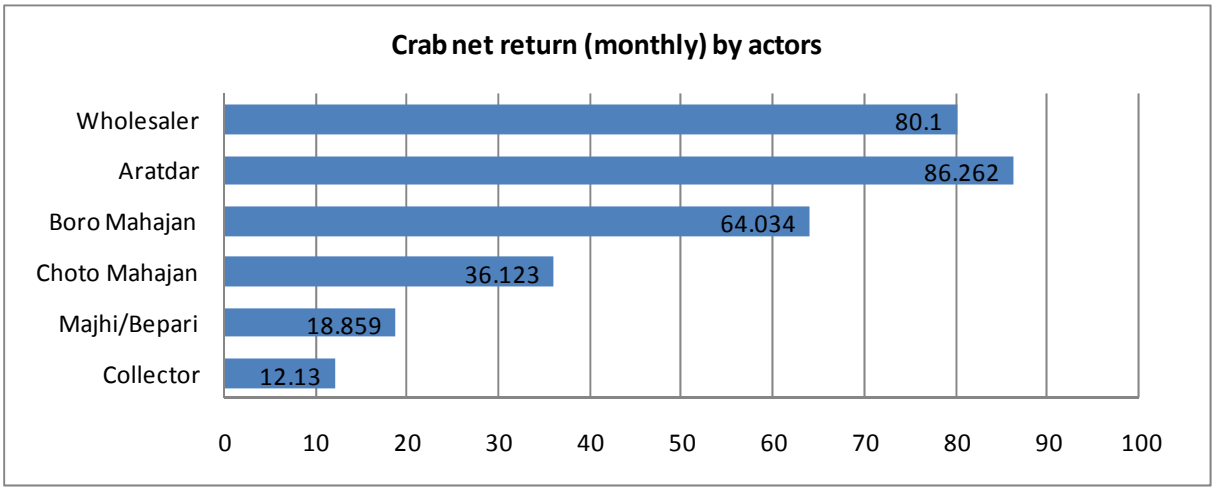
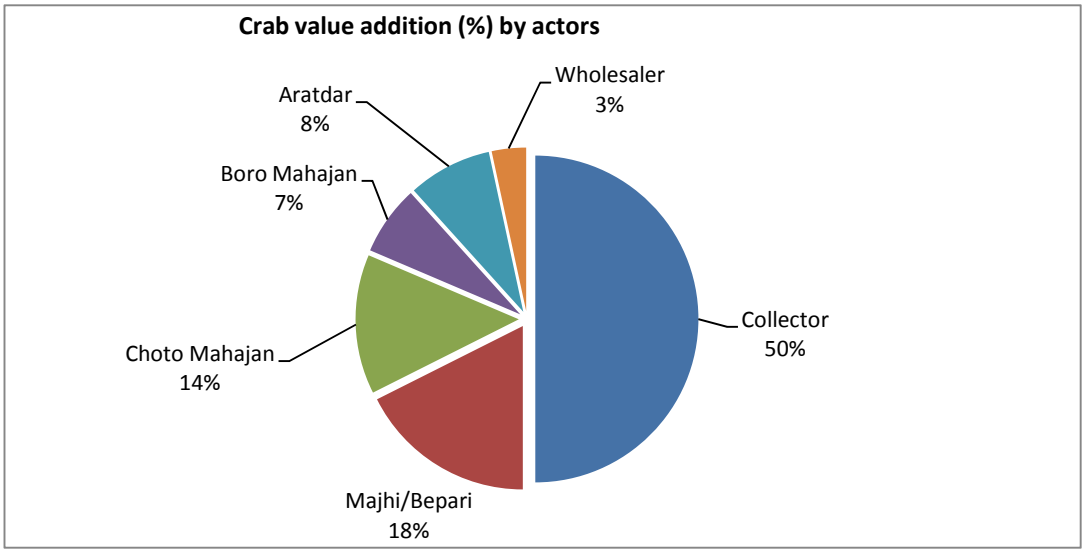


Figure 5.48: Crab value addition (%) by actors



5.2.10 Honey

The collection of honey in the Sundarbans is one of the major seasonal activities. Honey is extracted from plants such as Khalsi, Goran, Bain, Gewa and Keora. The normal collection season for honey is May to June although some are also produced during the months of March and April. The Forest Department (FD) issues permits to groups of six to eight members for one month. Permit holders are allowed to access only the Buffer Zone of Sundarbans Tiger Reserve [79]. Majhis or boatmen, responsible for the whole management, carry honey every week to Mahajans through collection from harvesters. The honey collectors are widely known as Mawalis.

Mahajans, as usual, act as financiers and lend money (in the form of dadons) to collectors., either on interest or sharing a profit or selling at reduced prices. Sometimes, Majhis also play the role of Mahajans in similar terms. At times, people form groups to themselves arrange trip for honey collection. Consequently, some collectors recently started employing working capitals of their own which they procure, reportedly, from personal source or cooperatives formed by NGOs [80].

Average monthly cost of food and others for the Mamalis in each trip is around Tk 40-60 thousand. Our survey shows that, on an average, one boat with more or less 6-8 collectors harvests around 12-14 maunds of honey in a month.

Value Addition

Table 5.12 presents costs and returns for honey. Value addition in terms of price shows that collectors as usual provide the highest price value addition, about three-fifths (60.0%) of the total price. Keeping collectors aside, retailers create the next highest value addition (16.7%), followed by Majhis/Beparis (12.0%), Boro Mahajans (6.7%), wholesalers (3.3%) and Choto Mahajans (1.3%). No Aratdars exist in honey value chain but most usually wholesalers act as Aratdars.

[79] For West Bengal part of SRF, the honey collectors are required to sell the entire quantity of collected honey and wax to the forest department at a price prescribed by the latter (Sen 1995).

[80] Some local NGOs (e.g., CCEC), reportedly, offer loans to Mawalis through formation of informal cooperatives.

Table 5.12: Value addition and return for honey

Actor type	Cost and return for honey							
	Average selling price/Kg	Price Value Addition (%)	Av. Volume (Kg) per month	G. Return (Tk/month)	Cost (Tk/month)	Net Return (Tk/month)	Working capital	Net Return as % of WC
Collector	180	60.0	68 (1.1)	12240 (9.6)	5875	6365 (6.7)	5333	119.35
Faria/ Majhi	216	12.0	462 (7.3)	16632 (13.1)	2587	14045 (12.9)	21667	64.82
Choto Mahajan	220	1.3	550 (8.7)	22000 (17.9)	5180	16820 (17.8)	57500	29.25
Boro Mahajan	240	6.7	1600 (25.3)	32000 (25.1)	7120	24880 (26.3)	200000	12.44
Wholesaler	250	3.3	3440 (54.4)	34400 (27.0)	7568	26832 (28.4)	300000	8.94
Retailer	300	16.7	200 (3.2)	10000 (7.9)	2600	7400 (7.8)	40000	18.50
Total	-	100.0	6320 (100.0)	127272 (100.0)	-	96342 (100.0)	-	-

Note: See note under Table 5.1.

Volume of trade

Volume of trade is one major indicator to look at overall profitability of the actors. Of all the actors, compared to other actors, wholesalers carry out the highest volume of trade (54.4%), followed by Boro Mahajans (25.3%), Choto Mahajans (8.7%) and so on. Obviously, bottom level actors, Farias and collectors, deal in the lowest volume of trade, 7.3 percent and only 1.1 percent respectively.

Gross returns and net returns

Wholesalers have the highest gross and net returns, monthly returns being estimated as Tk 34,400 and Tk 26,852 for gross and net reruns respectively. Of all the actors, relatively the wholesalers, again, have the highest proportion of gross or net returns by wholesalers (around 27-28%), followed by Boro Mahajans (around 25-26%) and Choto Mahajans (around 17-18%). As usual, collectors have the lowest proportions of both gross and net returns (6-10%). In absolute terms, the wholesalers have net income more than 4.2 times as much compared to that earned by collectors. This demonstrates that income gap between highest and lowest layer of the value chain of honey is less worse compared to other SRF products.

A large amount of working capital is often required particularly for higher layer actors such as wholesalers and Mahajans while the collectors employ only small amount of money as working capital (e.g., Tk 5333). Incorporating investment, net returns over working capital (NRWC) is found to be the highest for the collectors (120%) for obvious reason that they employ small amount of money as working capital. For similar reasons, Majhis/Farias have also high returns (65%) as they also need relatively small working capital. Aside from that, Choto Mahajans have relatively higher NRWC (12%), followed by wholesalers (9%).

Figure 5.49: Honey selling price (Tk per kg.) by actors

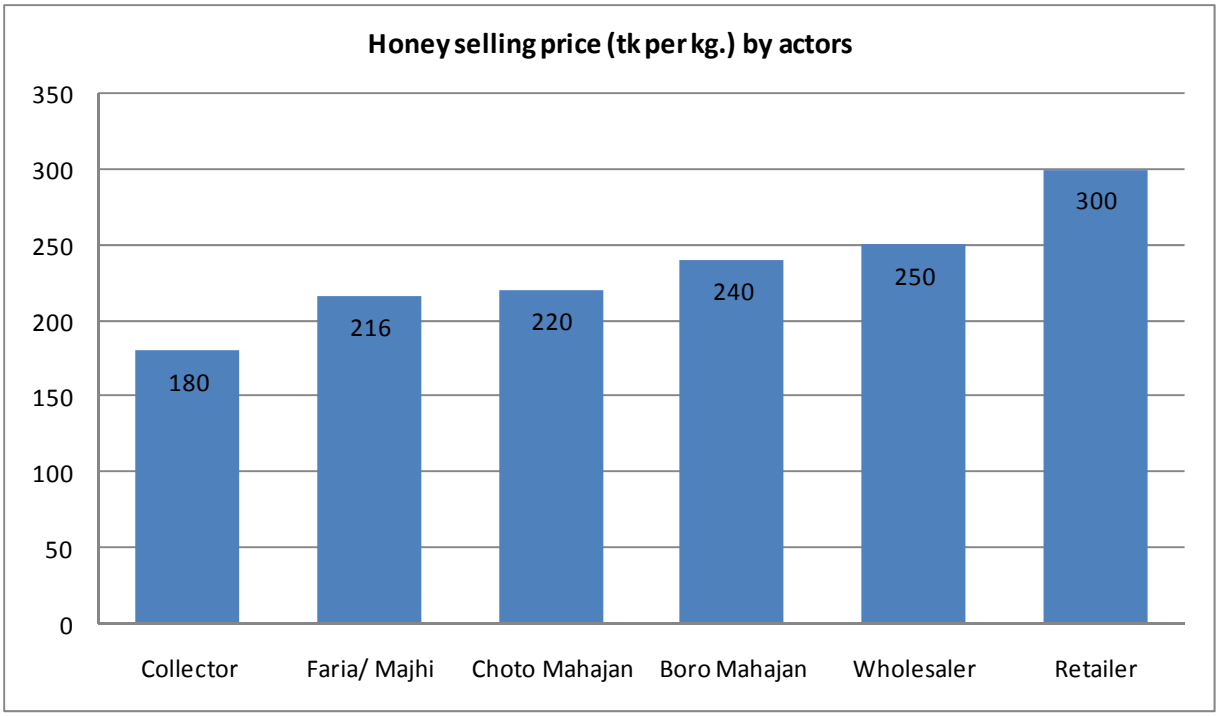


Figure 5.50: Honey gross return (monthly) by actors (000 Tk)

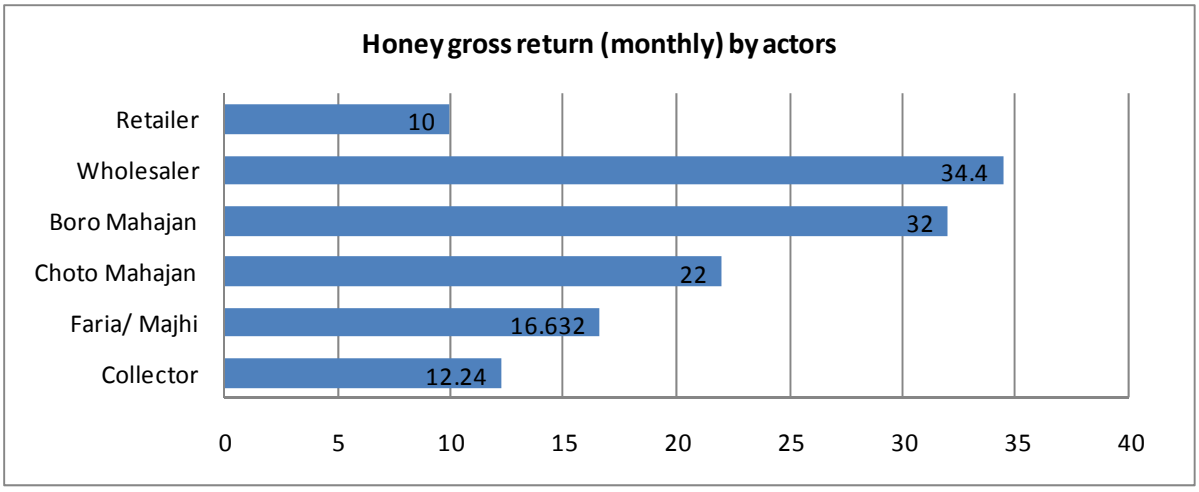


Figure 5.51: Honey net return (monthly) by actors (000 Tk)

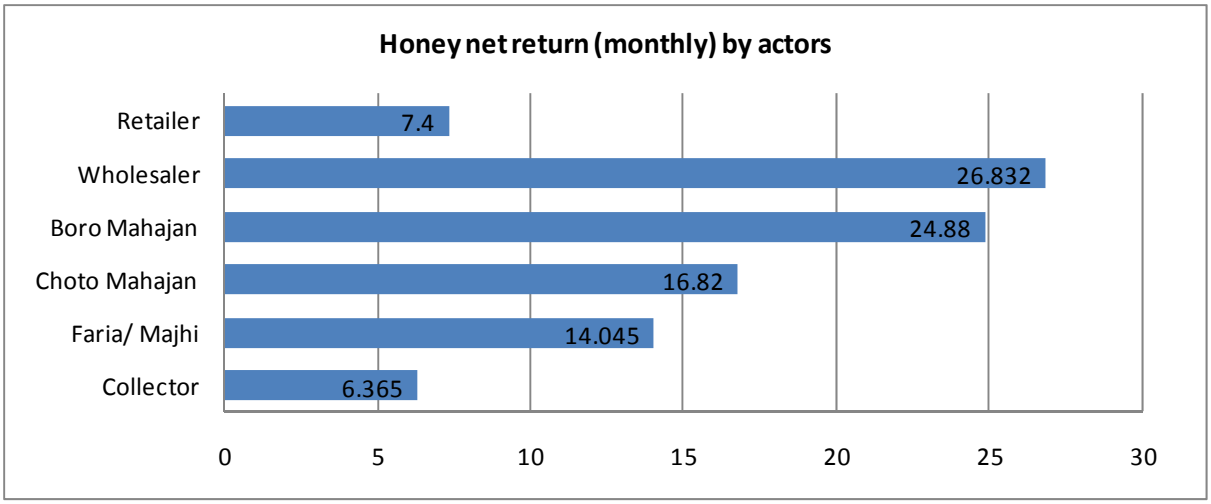


Figure 5.52: Honey value addition (%) by actors

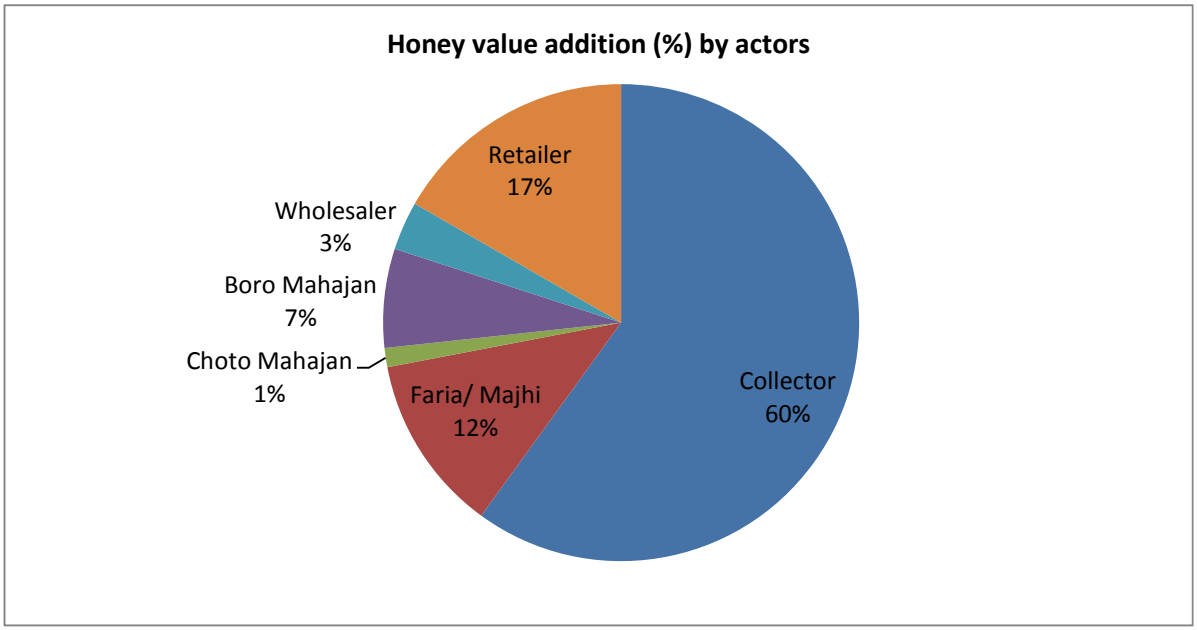
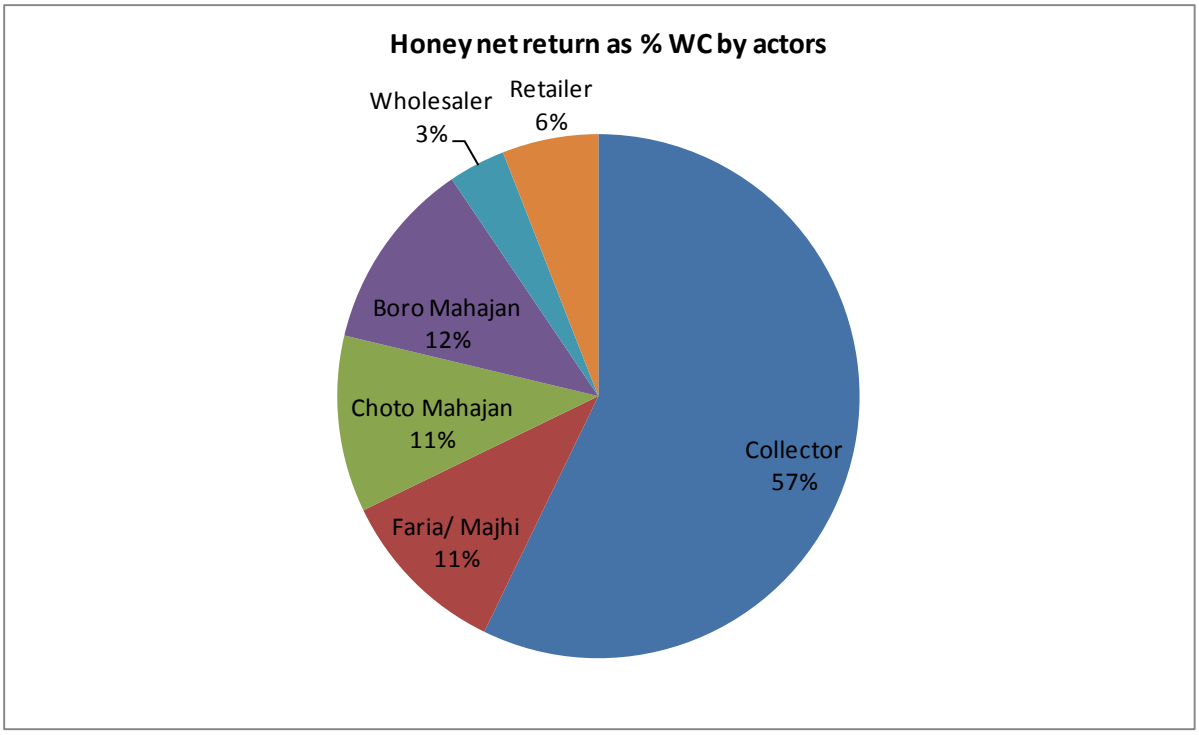


Figure 5.53: Honey net return as % WC by actors



5.3 Distribution of Actors Income – Income Inequality

The mean incomes across actors in the value chain have been estimated disaggregated by SRF products (Table 5.13 through 5.35) [81]. Annual incomes are estimated from monthly incomes by incorporating peak and non-peak months. Non-peak months have been standardized by adjusting with days worked in a month. However, mean income does not demonstrate the whole story about income or income poverty. One also needs to look into the distribution of income. Hence, the distribution of actors' average income (on per capita income scale) by the deciles of actors is also determined, focusing on inequality of income. Inequality may be defined as the proportion of average income to total income earned by all the actors.

Inequality is an important social issue the extent and trends of which have been estimated using income data for SRF products. Out of the several actors, the value of income for the two extreme groups, namely the collectors and Aratdars (or Mahajans) have been compared to quantify the extent of inequality. Gini coefficient, which is a good indicator of measuring inequality, is also estimated for each SRF product [82]. We start with golpata.

5.3.1 Golpata

An average collector of golpata earns annual income in the range of only Tk 23,451, almost progressively followed by Majhis/Beparis (Tk 33,939), Choto Mahajans (Tk 76,904), Boro Mahajans (Tk 323,878), Aratdars (368,280), wholesaler (Tk 97,425) and retailer (Tk 81,098).

[81] The income denotes from SRF sources alone. The incomes from other sources, if any, have not been incorporated in the analyses.

[82] Because of small sample size, the results on gini coefficients should be used with care.

The degree of inequality is quite high in that the average annual income earned by a collector is found to be more than 16 times as less as earned by an Aratdar (Table 5.13).

Inequality is also demonstrated in the value chain in that the income of a collector constitutes, in terms of total income of all actors, only 2.3 percent, followed by Majhis/Beparis (3.4%), Choto Mahajans (7.7%), Boro Mahajans (32.2%), Aratdars (36.7%), wholesaler (9.7%) and retailers (8.1%) (Figure 5.54).

In terms of deciles distribution, the income distribution appears to be much skewed (Table 5.14). Considering two deciles, representing two extreme actors groups, Decile 1 represents the bottom-ranking actors and Decile 10 represents the top-ranking actors. The evidence suggests that the top 10 percent of the actors earn 21 times as much income as the bottom Decile 1 (1:21) (See Figures 5.55 and 5.56). Gini coefficient for golpata estimates as 0.51, which is quite high.

Table 5.13: Annual income level of SRF Actors: Golpata

Actors	Monthly income (Tk)		Duration (Month)			Annual Income (Tk)	% of total income
	Peak	Non-peak	Peak	Non-peak	Adjusted non-peak		
Collector	6,545	3,038	3.42	0.85	0.351	23,451	2.33
Majhi/Bepari	10,164	4,943	3.17	1.33	0.348	33,939	3.38
Choto Mahajan	22,059	8,779	3.38	0.93	0.267	76,904	7.65
Boro Mahajan	89905	43,610	3.29	4.40	0.644	323,878	32.23
Aratdar	81,840	48,692	4.50	-	-	368,280	36.65
Wholesaler	20,021	13,584	4.00	3.00	1.277	97425	9.69
Retailer	13,472	6,582	4.64	4.88	2.824	81,098	8.07
Total	2,44,006	1,29,228	-	-	-	1,004,975	100.00

Note: Non-peak months are standardized with corresponding number of days worked.

Figure 5.54: Annual income level (%) of SRF Actors: Golpata

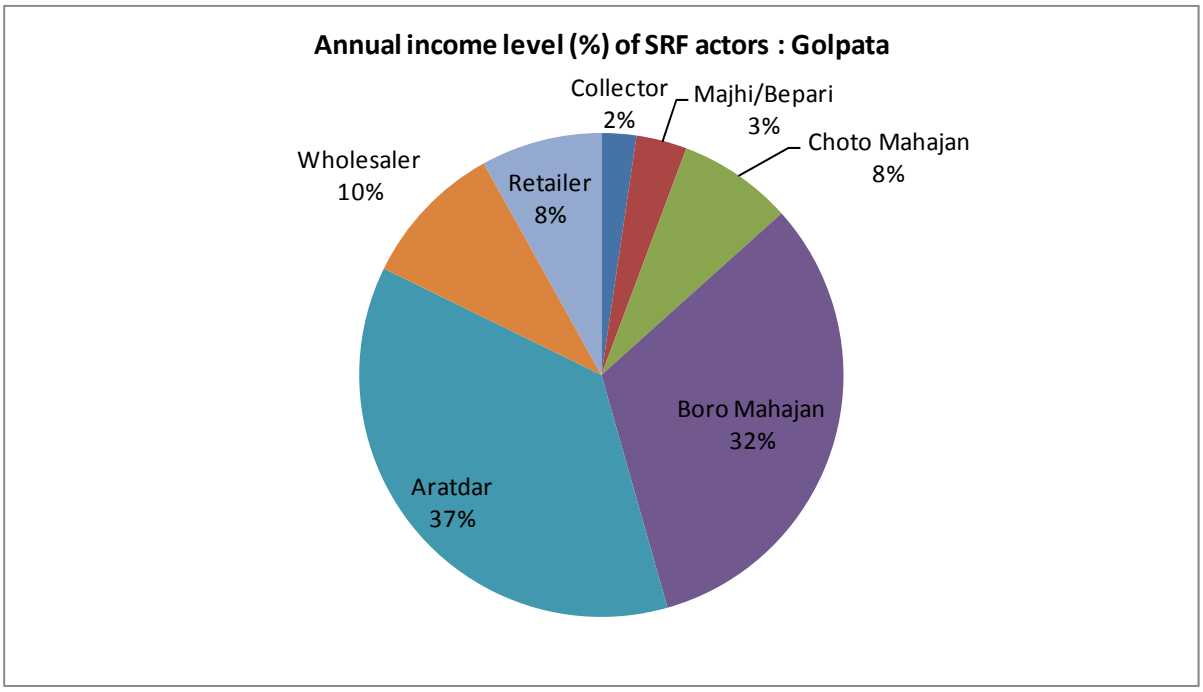


Table 5.14: Distribution of SRF actors income by product (Golpata)

Income decile of actors	Percentage share of income
	Golpata
Decile 1	2.0
Decile 2	2.5
Decile 3	3.5
Decile 4	3.6
Decile 5	5.0
Deciles: 1-5	16.6
Decile 6	5.4
Decile 7	9.1
Decile 8	10.4
Decile 9	17.5
Decile 10	41.0
Deciles: 6-10	83.4
Proportion of Decile 1 to Decile 10	1:20.5
Gini coefficient	0.51

Figure 5.55: Distribution of income golpata

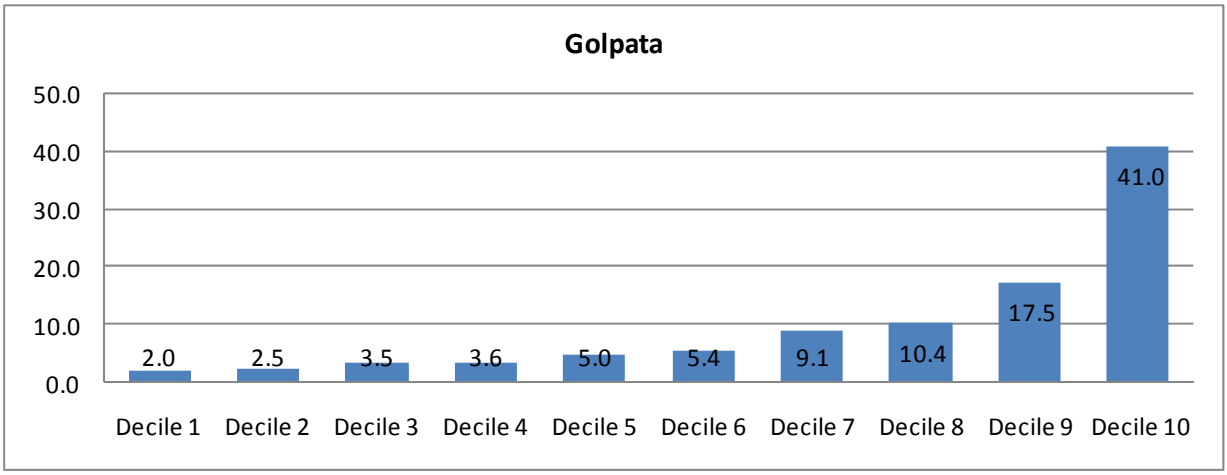
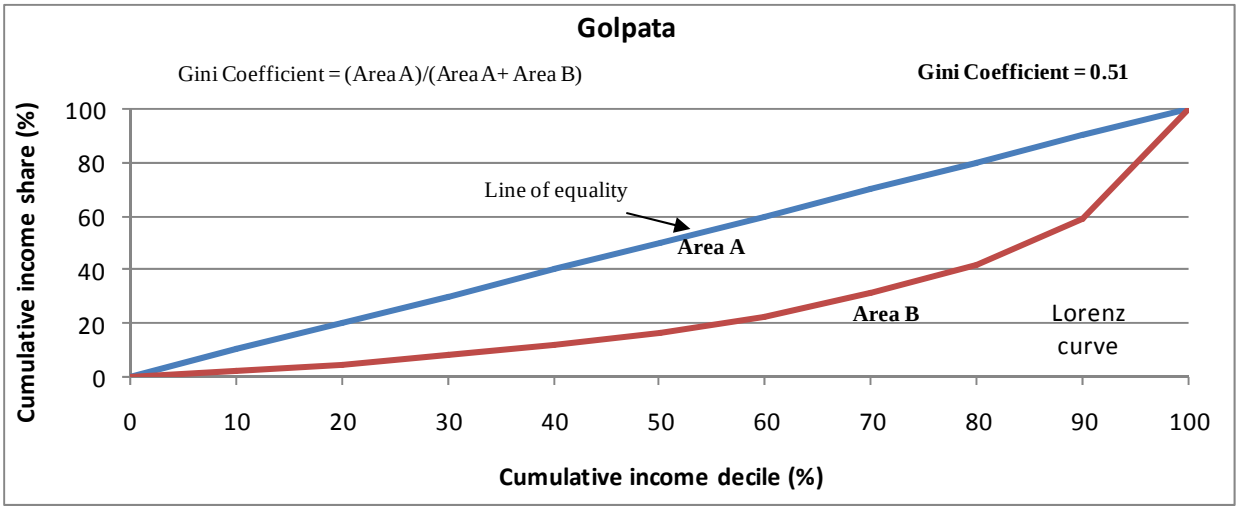


Figure 5.56: Lorenz curve: Golpata



5.3.2 Gura (Small) Fish

Gura (small) fish has its particular importance in terms of consumption by relatively lower class of households. An average collector of gura fish earns annual income in the range of only Tk 47,152 (but much higher compared to golpata), almost progressively followed by Farias/Beparis (Tk 100,481), Mahajans (Tk 116,046), Aratdars (Tk 635,830), wholesalers (Tk 186,550) and retailers (Tk 149,286) (Table 5.15). The degree of inequality is quite high in that the average annual income earned by the collectors, for example, estimates as more than 13 times as less as earned by an Aratdar.

In terms of total income of all actors, only 3.8 percent accounts for collectors, followed by Farias/Beparis (8.1%), Mahajans (9.4%), Aratdars (51.5%), wholesaler (15.1%) and retailers (12.1%) (Figure 5.57).

In terms of deciles distribution, the income distribution appears to be much skewed (Table 5.16). Considering two deciles, representing two extreme actors groups - Decile 1 for the bottom-ranking actors and Decile 10 for the top-ranking actors - the evidence suggests that the top 10 percent of the actors earn as high as 43 times as much income as the bottom 10 percent (i.e.,1:34) (See Figures 5.58 and 5.59). Gini coefficient for gura fish estimates as 0.53, which is again quite high.

Table 5.15: Annual income level of SRF Actors: Gura fish

Actors	Monthly income (Tk)		Duration (Month)			Annual income (Tk)	% of total income
	Peak	Non-peak	Peak	Non-peak	Adjusted non-peak		
Collector	5,675	3,299	5.33	6.67	5.124	47,153	3.82
Faria/Bepari	9,913	6,605	7.00	5.00	4.707	100,481	8.13
Choto Mahajan	13,080	7,848	4.00	8.00	8.120	116,046	9.39
Aratdar	88,810	35,230	5.00	7.00	5.444	635,830	51.47
Wholesaler	18,200	13,650	5.00	7.00	7.000	186,550	15.10
Retailer	13,780	11,307	5.50	6.50	6.500	149,286	12.08
Total	149,458	77,939	-	-	-	1,235,346	100.00

Note: Non-peak months are standardized with corresponding number of days worked.

Figure 5.57: Annual income level (%) of SRF Actors: Gura fish

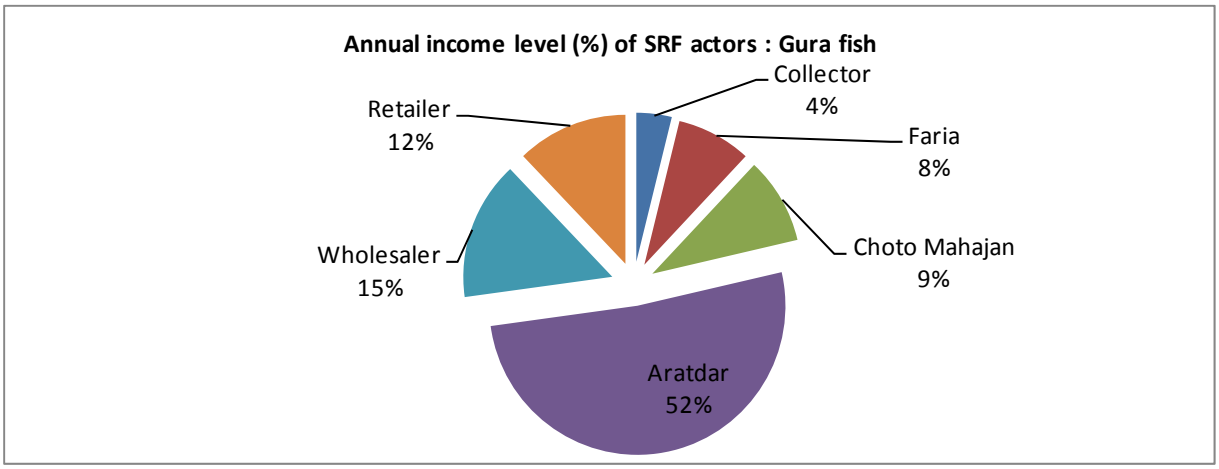


Table 5.16: Distribution of SRF actors income by product (Gura fish)

Income decile of actors	Percentage share of income
	Gura fish
Decile 1	1.1
Decile 2	2.5
Decile 3	2.7
Decile 4	3.1
Decile 5	4.8
Deciles: 1-5	14.2
Decile 6	6.2
Decile 7	7.6
Decile 8	11.1
Decile 9	24.1
Decile 10	36.8
Deciles: 6-10	85.8
Proportion of Decile 1 to Decile 10	1:33.5
Gini coefficient	0.53

Figure 5.58: Distribution of income Gura fish

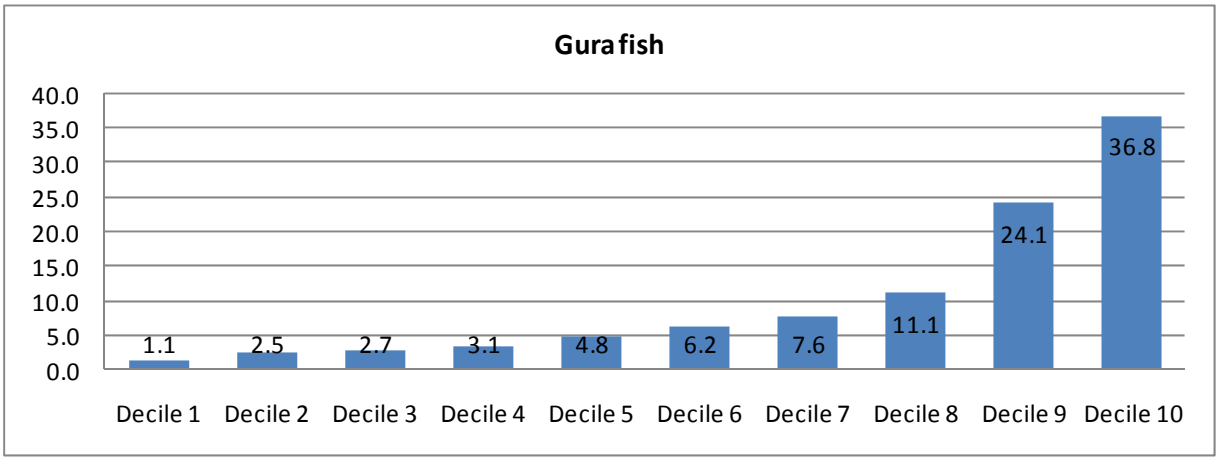
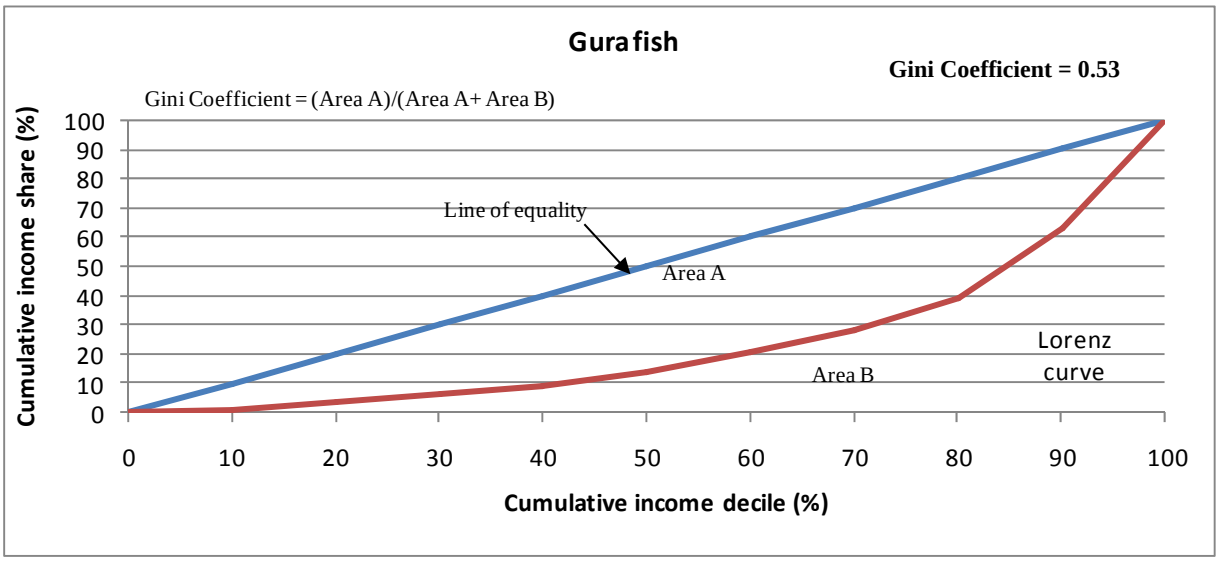


Figure 5.59: Lorenz curve: Gura fish



5.3.3 Sada (Large) Fish

An average collector of sada (large) fish earns annual income in the range of only Tk 63,311 (but much higher compared to golpata or gura fish), almost progressively followed by Farias/Beparis (Tk 85,407), Choto Mahajans (Tk 89,023), Boro Mahajans (Tk 648,970), Aratdars (271,888), wholesalers (Tk 156,952) and retailers (Tk 127,510) (Table 5.17). Unlike in other products such as golpata and gura fish, Boro Mahajans in the value chain earn the highest amount of income, presumably as they play as Aratdars too. The degree of inequality in the value chain appears to be quite high in that the average annual income earned by a collector, for example, estimates as more than 10 times as less as earned by an Aratdar.

In terms of total income aggregated for all actors, only 4.4 percent is due to collectors, followed by Farias/Beparis (5.9%), Choto Mahajans (6.2%), Boro Mahajans (45.0), Aratdars (18.8%), wholesalers (10.9%) and retailers (8.8%) (Figure 5.60).

In terms of deciles distribution of income, the distribution appears to be again skewed (Table 5.18). Considering two deciles, representing two extreme actors groups - Decile 1 for the bottom-ranking actors and Decile 10 for the top-ranking actors, the evidence suggests that the top 10 percent (Decile 10) of the actors earn as high as 19 times as much income as the bottom 10 percent (Decile 1) (i.e., 1:19) (See Figures 5.61 and 5.62) . Gini coefficient for Sada (large) fish estimates as 0.44, which is a bit lower compared to most other SRF products.

Table 5.17: Annual income level of SRF Actors: *sada* (large) fish

Actors	Monthly income		Duration (Month)			Annual income	% of total income
	Peak	Non-peak	Peak	Non-peak	Adjusted non-peak		
Collector	6,704	4,997	6.00	5.70	4.620	63,311	4.39
Faria/Bepari	8,404	5,901	7.14	4.86	4.305	85,407	5.92
Choto Mahajan	10,460	6,799	5.67	5.50	4.370	89,023	6.17
Boro Mahajan	57,500	46,210	7.67	4.50	4.500	648,970	44.97
Aratdar	30,867	16,761	6.33	5.67	4.564	271,888	18.84
Wholesaler	16,860	9,515	7.00	5.00	4.092	156,952	10.88
Retailer	13,780	8,078	6.33	5.50	4.988	127,519	8.84
Total	144,575	98,261	-	-	-	1,443,070	100.00

Note: Non-peak months are standardized with corresponding number of days worked.

Figure 5.60: Annual income level (%) of SRF Actors: sada (large) fish

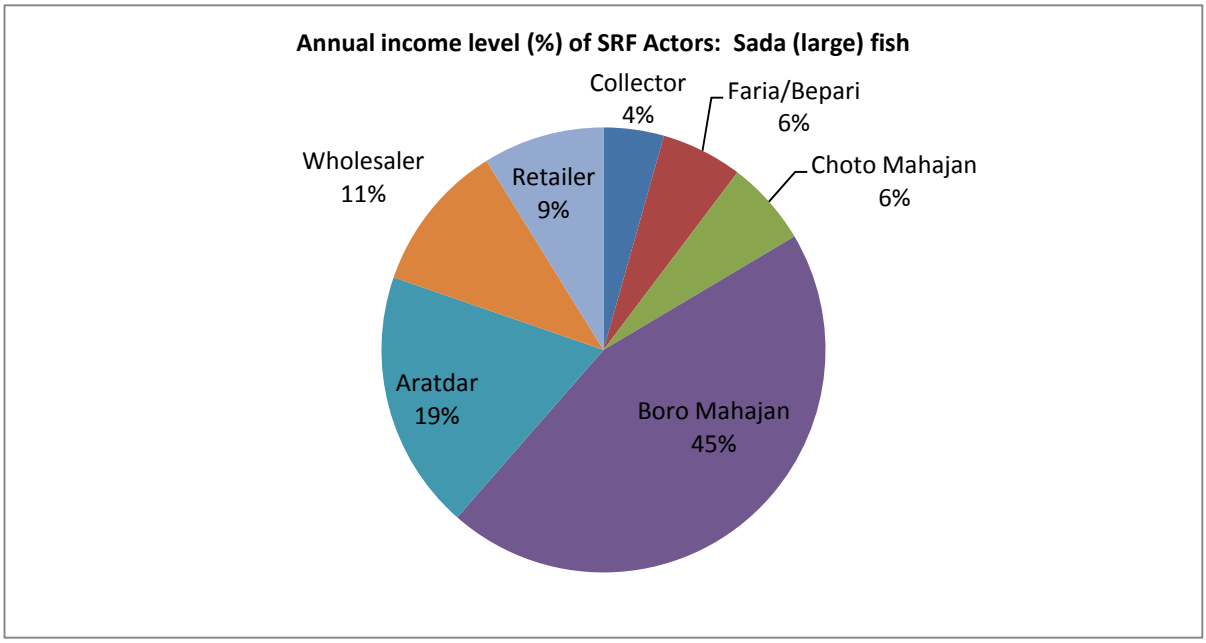


Table 5.18: Distribution of SRF actors income by product: *Sada* (large) fish

Income decile of actors	Percentage share of income
	Sada fish
Decile 1	1.6
Decile 2	2.5
Decile 3	4.3
Decile 4	4.5
Decile 5	7.4
Deciles: 1-5	20.3
Decile 6	7.5
Decile 7	9.1
Decile 8	14.6
Decile 9	17.9
Decile 10	30.6
Deciles: 6-10	79.7
Proportion of Decile 1 to Decile 10	1: 19.1
Gini coefficient	0.44

Figure 5.61: Distribution of income sada fish

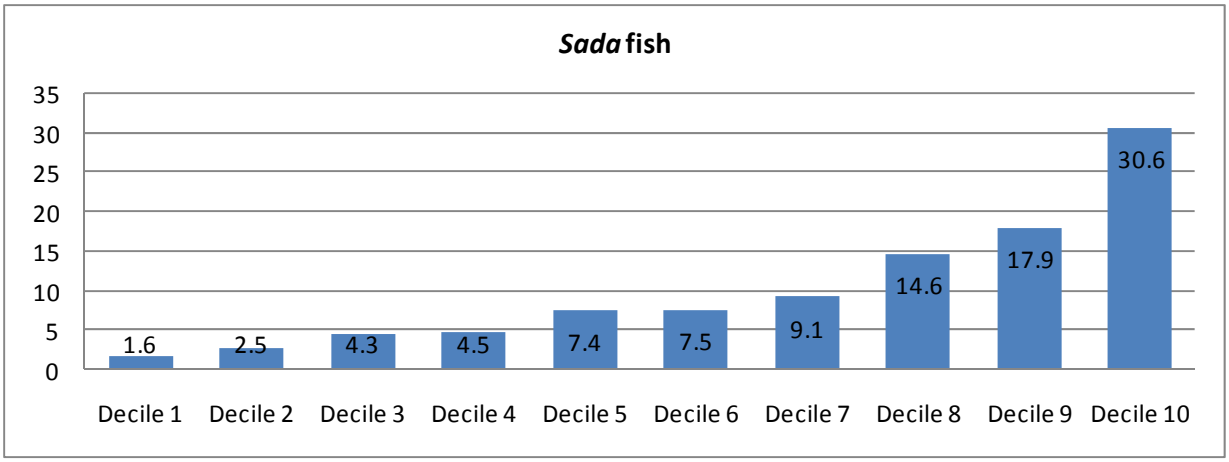
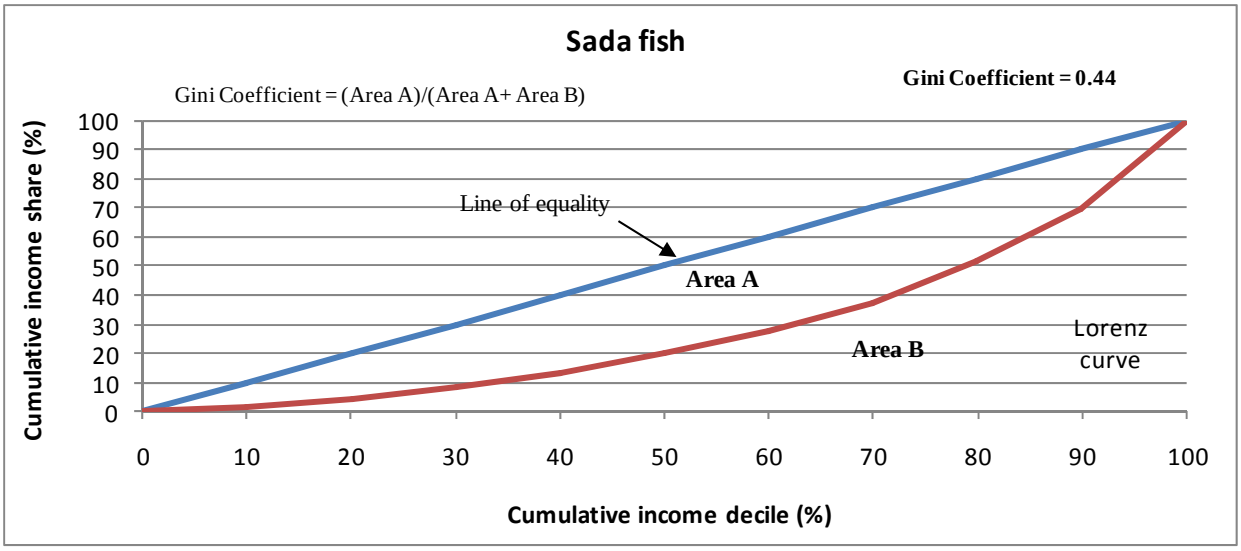


Figure 5.62: Lorenz curve: Sada fish



5.3.4 Hilsha

Hilsha is country's national fish. It is also important for its contribution to exports. However, the study has contemplated value chain across only domestic actors or agents. An average collector of hilsha fish earns annual income in the range of only Tk 40,413, almost progressively followed by Majhis/Beparis (Tk 97,308), Choto Mahajans (Tk 187,517), Boro Mahajans (Tk 316,195), Aratdars (305,473), wholesalers (Tk 132,692) and retailers (Tk 71,722) (Table 5.19). Unlike in other products such as golpata and gura fish, Boro Mahajans, rather than Aratdars, in this value chain earn the highest amount of income, as presumably they play as Aratdars too. The degree of inequality in the value chain appears to be quite high in that the average annual income earned by the collectors, for example, estimates as nearly 8 times as less as earned by a Boro Mahajan.

In terms of total income aggregated for all actors, only 3.5 percent accounts for collectors, followed by Majhis/Beparis (8.5%), Choto Mahajans (16.3%), Boro Mahajans (27.5), Aratdars (26.5%), wholesalers (11.5%) and retailers (6.2%).

In terms of the distribution by deciles, as is the case with other products, the income distribution appears to be skewed (Table 5.20). That means, the degree of inequality is found to be worse. Considering two deciles, Decile 1 for the bottom-ranking actors and Decile 10 for the top-ranking actors, it can be seen that the top 10 percent of the actors earn as high as 42 times as

much income as the bottom 10 percent (i.e.,1:43)[83] (See Figures 5.64 and 5.65). Gini coefficient for hilsha fish estimates as 0.48, which is a bit lower compared to gura and sada fish.

Table 5.19: Annual income level of SRF Actors: Hilsha

Actors	Monthly income		Duration (Month)			Annual income	% of total income
	Peak	Non-peak	Peak	Non-peak	Adjusted non-peak		
Collector	8,160	6,034	3.50	2.50	1.96	40,413	3.51
Majhi/Beparis	14,138	9,214	5.00	4.00	2.89	97,308	8.45
Choto Mahajan	40,890	22,149	3.00	3.40	2.93	187,517	16.29
Boro Mahajan	60,896	37,873	3.67	2.67	2.45	316,195	27.46
Aratdar	45,000	21,151	4.33	7.67	5.23	305,473	26.53
Wholesaler	16,973	9,656	4.33	7.67	6.13	132,693	11.53
Retailer	8,690	5,561	4.33	7.67	6.13	71,722	6.23
Total	194,747	111,638	-	-	-	1,151,321	100.00

Note: Non-peak months are standardized with corresponding number of days worked.

Figure 5.63: Annual income level (%) of SRF Actors: Hilsha

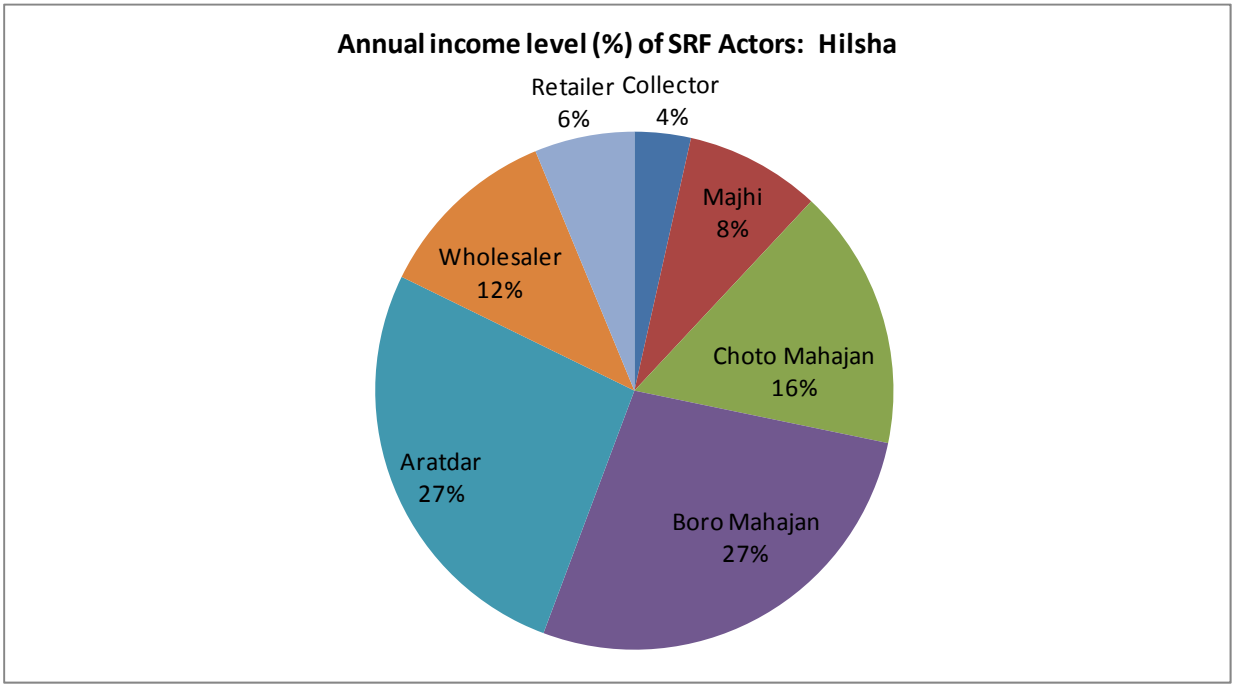


Table 5.20: Distribution of SRF actors income by product (Hilsha)

Income decile of actors	Percentage share of income
	Hilsha
Decile 1	0.7
Decile 2	1.5
Decile 3	3.3
Decile 4	4.9

[83] Such inequality should be used with care as the sample size was small.

Decile 5	5.8
Deciles: 1-5	16.2
Decile 6	7.6
Decile 7	10.5
Decile 8	14.4
Decile 9	20.1
Decile 10	31.0
Deciles: 6-10	83.6
Proportion of Decile 1 to Decile 10	1:42.9
Gini coefficient	0.48

Figure 5.64: Distribution of income hilsha

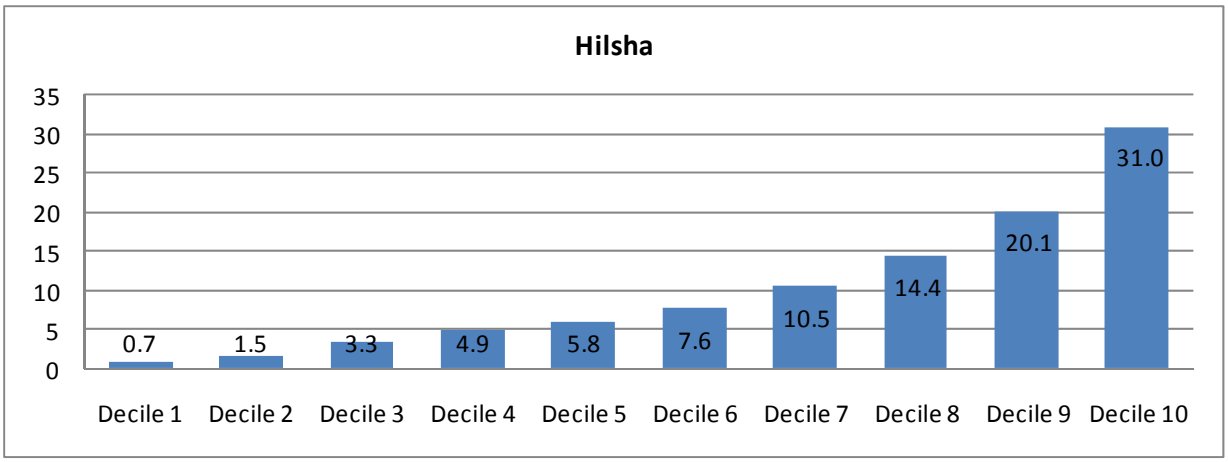
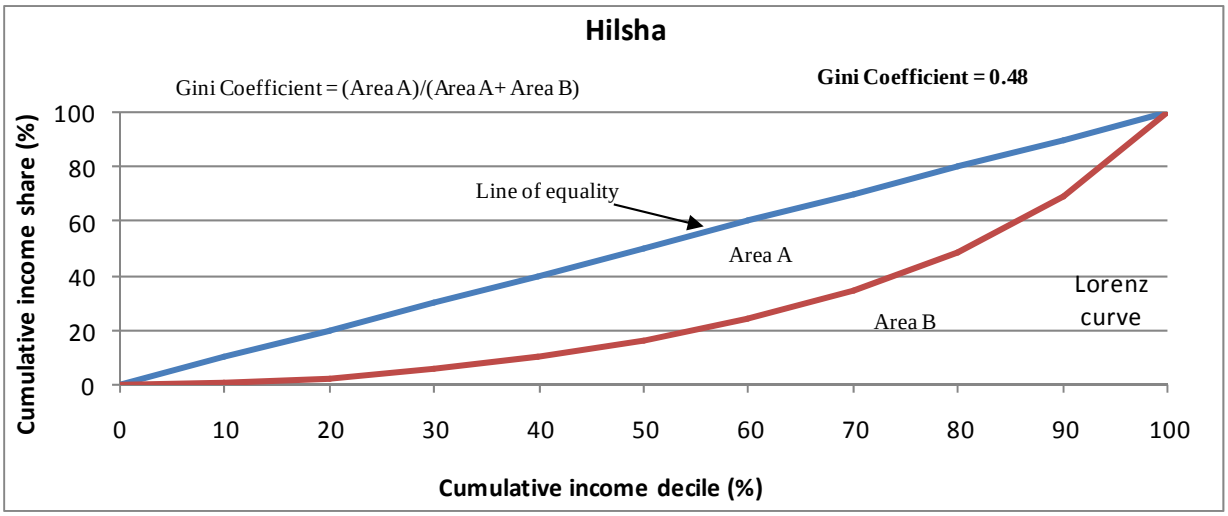


Figure 5.65: Lorenz curve: Hilsha



5.3.5 Shrimp Large (galda and bagda)

Shrimps have been divided into four categories: shrimp large (galda), shrimp large (bagda), shrimp small (galda) and shrimp small (bagda) according to their importance in terms of consumption by different socio-economic groups of people.

.
Shrimp large, both galda and bagda, is also important for its contribution to foreign exchange earnings. However, an average collector of shrimp large (galda and bagda) earns annual income in the range of only Tk 60,000 to 66,000 (but much higher compared to golpata or gura fish), almost progressively followed by Majhis/Beparis, Choto Mahajans, Boro Mahajans, Aratdars, wholesalers and retailers. Aratdars in this value chain are the highest income earners, in the range of Tk 326,000 to 467,000 (Tables 5.21 and 5.22).The degree of inequality in the value chain appears to be quite high in that the average annual income earned by a collector, for example, estimates as more than 5 to 7 times as less as earned by an Aratdar.

Table 5.21: Annual income level of SRF Actors: Shrimp (large) galda

Actors	Monthly income		Duration (Month)			Annual income	% of total income
	Peak	Non-peak	Peak	Non-peak	Adjusted non-peak		
Collector	6,450	4,065	6.33	5.67	4.65	59,737	6.15
Majhi/Bepari	7,200	4,248	8.00	4.00	3.38	71,972	7.41
Choto Mahajan	7,750	5,428	7.00	4.00	3.43	72,860	7.50
Boro Mahajan	14,440	7,220	6.00	6.00	6.00	129,960	13.38
Aratdar	34,154	25,616	5.00	7.00	6.07	326,174	33.58
Wholesaler	22,800	13,995	5.00	7.00	6.07	199,007	20.49
Retailer	12,477	8,110	5.00	7.00	6.07	111,646	11.49
Total	105,271	68,682	-	-		971,356	100.00

Note: Non-peak months are standardized with corresponding number of days worked.

Table 5.22: Annual income level of SRF Actors: Shrimp (large) bagda

Actors	Monthly income		Duration (Month)			Annual income	% of total income
	Peak	Non-peak	Peak	Non-peak	Adjusted non-peak		
Collector	7,150	4,506	6.33	5.67	4.65	66220	5.50
Majhi/Bepari	10,580	5,925	8.00	4.00	3.38	104686	8.70
Choto Mahajan	11,150	7,090	7.00	4.00	3.43	102359	8.51
Boro Mahajan	14,110	7,902	6.00	6.00	6.00	132072	10.97
Aratdar	48,950	36,713	5.00	7.00	6.07	467476	38.84
Wholesaler	25,050	15,376	5.00	7.00	6.07	218646	18.17
Retailer	12,520	8,138	5.00	7.00	6.07	112031	9.31
Total	129,510	85,650	-	-	-	1203490	100.00

Note: Non-peak months are standardized with corresponding number of days worked.

Figure 5.66: Annual income level (%) of SRF Actors: Shrimp (large) galda

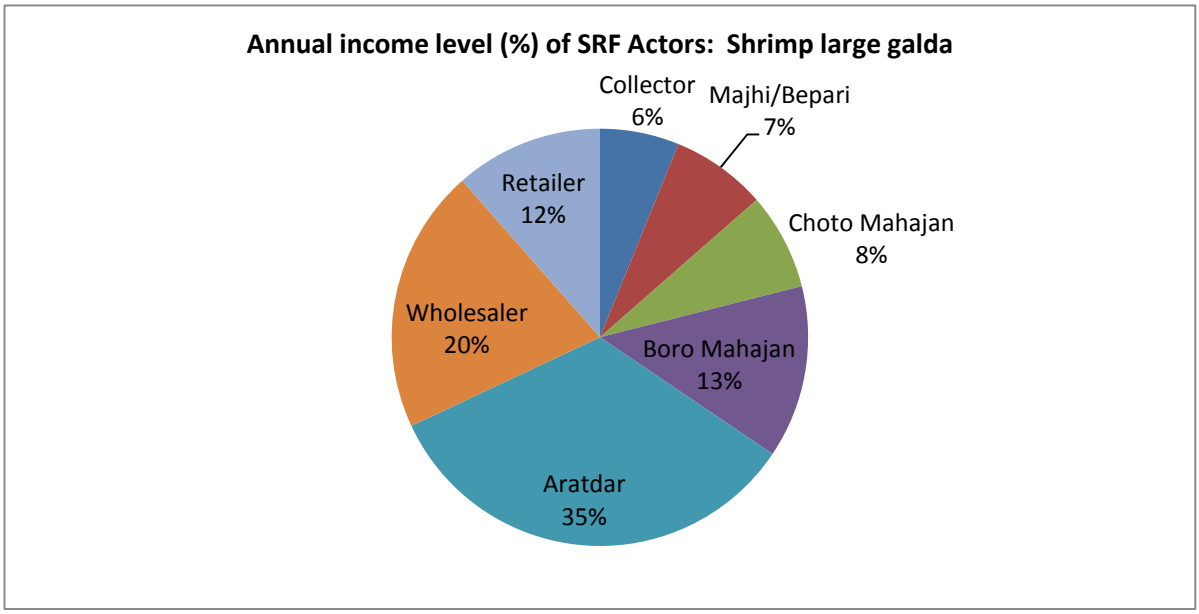
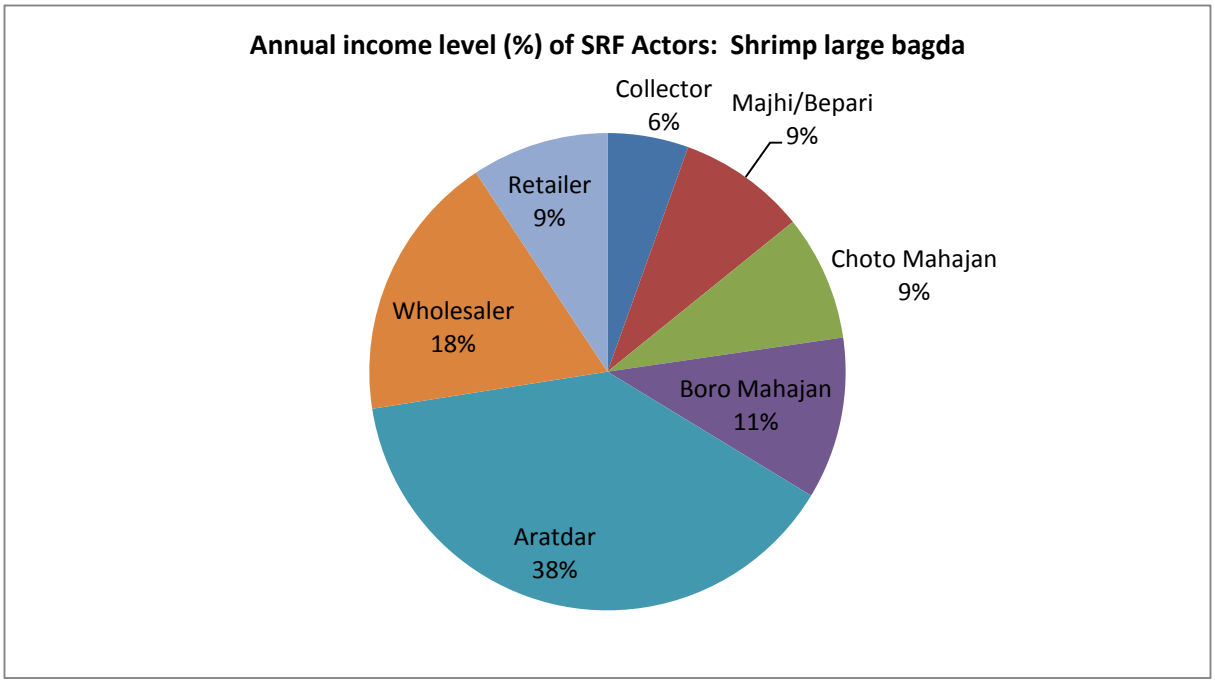


Figure 5.67: Annual income level (%) of SRF Actors: Shrimp (large) bagda



5.3.6 Shrimp Small (galda and bagda)

The fish catch of shrimp small (galda and bagda) is important in the context of relatively higher consumption by mass people. It appears that the galda and bagda types of shrimp have similar income diminution. An average collector of shrimp small (galda and bagda) earns annual income in the range of only Tk 62,000 to 70,000, while a Boro Mahajan earns highest annual income, which is in the range of as high as Tk 523,000 to 529,000 (Table 5.23). The degree of inequality in the value chain appears to be quite high in that the average annual income earned by the collectors, for example, estimates as more than 7 to 8 times as less as earned by a Boro Mahajan for galda and bagda shrimp respectively. The analysis of decile income distribution on shrimp small (galda and bagda) is not feasible due to small size of sample.

Table 5.23: Annual income level of SRF Actors: Shrimp small galda

Actors	Monthly income		Duration (Month)			Annual income	% of total income
	Peak	Non-peak	Peak	Non-peak	Adjusted non-peak		
Collector	7,540	4,752	6.33	5.67	4.65	69,833	5.82
Majhi/Bepari	11,000	7,150	8.00	4.00	3.38	112,191	9.36
Choto Mahajan	16,150	10,269	7.00	4.00	3.43	148,258	12.37
Boro Mahajan	58,090	29,045	6.00	6.00	6.00	522,810	43.61
Aratdar	14,984	11,238	5.00	7.00	6.07	143,097	11.94
Wholesaler	14,600	8,962	5.00	7.00	6.07	127,436	10.63
Retailer	8,417	5,471	5.00	7.00	6.07	75,316	6.28
Total	130,781	76,887	-	-	-	1,198,941	100.00

Note: Non-peak months are standardized with corresponding number of days worked.

Table 5.24: Annual income level of SRF Actors: Shrimp small bagda

Actors	Monthly income		Duration (Month)			Annual income	% of total income
	Peak	Non-peak	Peak	Non-peak	Adjusted non-peak		
Collector	6,740	4,248	6.33	5.67	4.65	62,424	5.38
Majhi/Bepari	10,540	7,905	8.00	4.00	3.38	111,065	9.57
Choto Mahajan	14,010	8,908	7.00	4.00	3.43	128,612	11.08
Boro Mahajan	58,780	29,390	6.00	6.00	6.00	529,020	45.57
Aratdar	16,450	12,338	5.00	7.00	6.07	157,101	13.53
Wholesaler	10,710	6,574	5.00	7.00	6.07	93,481	8.05
Retailer	8,837	5,744	5.00	7.00	6.07	79,075	6.81
Total	126,067	75,107	-	-	-	1,160,778	100.00

Note: Non-peak months are standardized with corresponding number of days worked.
*As working capital for shrimp small (bagda) was not available, that for galda is used for bagda.

Figure 5.68: Annual income level (%) of SRF Actors: Shrimp small galda

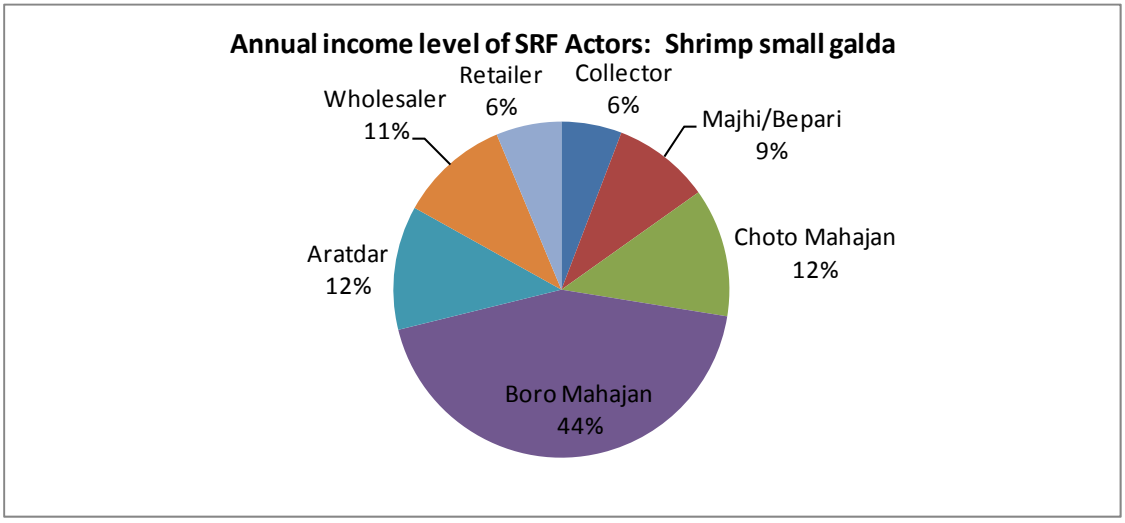
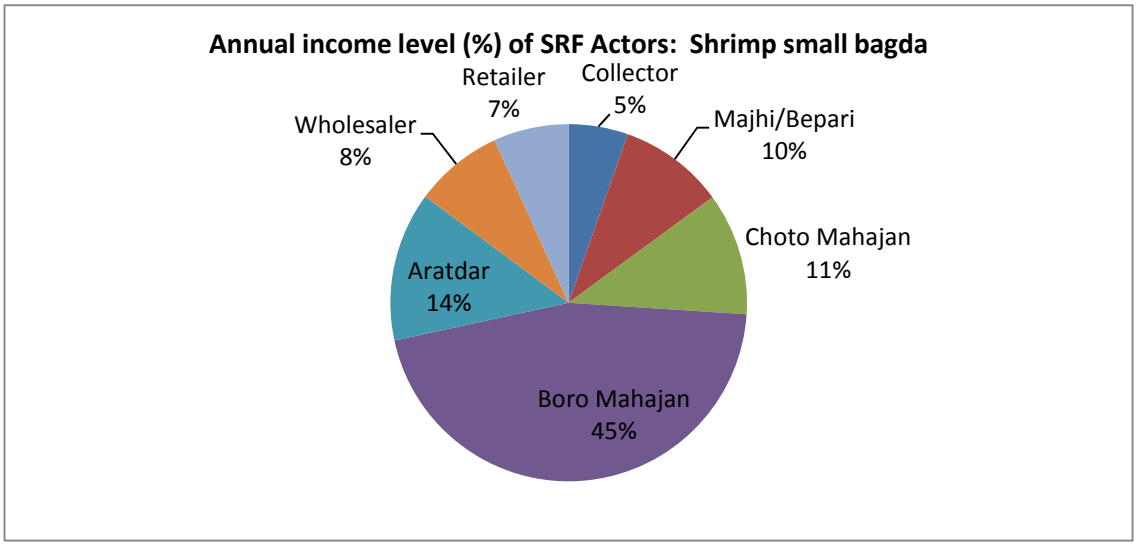


Figure 5.69: Annual income level (%) of SRF Actors: Shrimp small bagda



5.3.7 Shrimp Fry (galda and bagda)

Shrimp fry catch takes place for a longer period of year, more so for galda. The income level of shrimp fry (galda) is much higher than that of shrimp fry (bagda). An average collector of shrimp fry (galda) and shrimp fry (bagda) earns annual income in the range of only Tk 63,368 and Tk 46,505 respectively. An average Aratdar, on the other hand, earns annual income in the range of Tk 586,334 and Tk 115,204 respectively (Tables 5.25 and 5.26). The degree of inequality in the value chain appears to be high in that the average annual income earned by the collectors, for example, estimates as more than 9 times and 2.5 times as less as earned by an Aratdar for galda and bagda respectively. Gini coefficient for shrimp fry estimates as 0.44, which is a bit lower compared to those of other SRF products.

Table 5.25: Annual income level of SRF Actors: Shrimp fry galda

Actors	Monthly income		Duration (Month)			Annual income	% of total income
	Peak	Non-peak	Peak	Non-peak	Adjusted non-peak		
Collector	13,593	5,842	3.67	8.00	2.31	63,368	7.20
Bepari	63,375	28,563	3.00	3.00	1.40	230,113	26.15
Aratdar	134,300	91,717	3.00	4.80	2.00	586,334	66.64
Total	211,268	126,122	-	-	-	879,815	100.00

Note: Non-peak months are standardized with corresponding number of days worked.

Table 5.26: Annual income level of SRF Actors: Shrimp fry bagda

Actors	Monthly income		Duration (Month)			Annual income	% of total income
	Peak	Non-peak	Peak	Non-peak	Adjusted non-peak		
Collector	8,460	3,299	4.40	5.67	2.81	46,505	22.10
Bepari	11,075	5,180	3.00	3.00	3.00	48,765	23.17
Aratdar	30,720	17,146	3.00	3.00	1.34	115,204	54.74
Total	50,255	25,625	-	-	-	210,474	100.00

Note: Non-peak months are standardized with corresponding number of days worked.

Figure 5.70: Annual income level of SRF actors: Shrimp fry galda

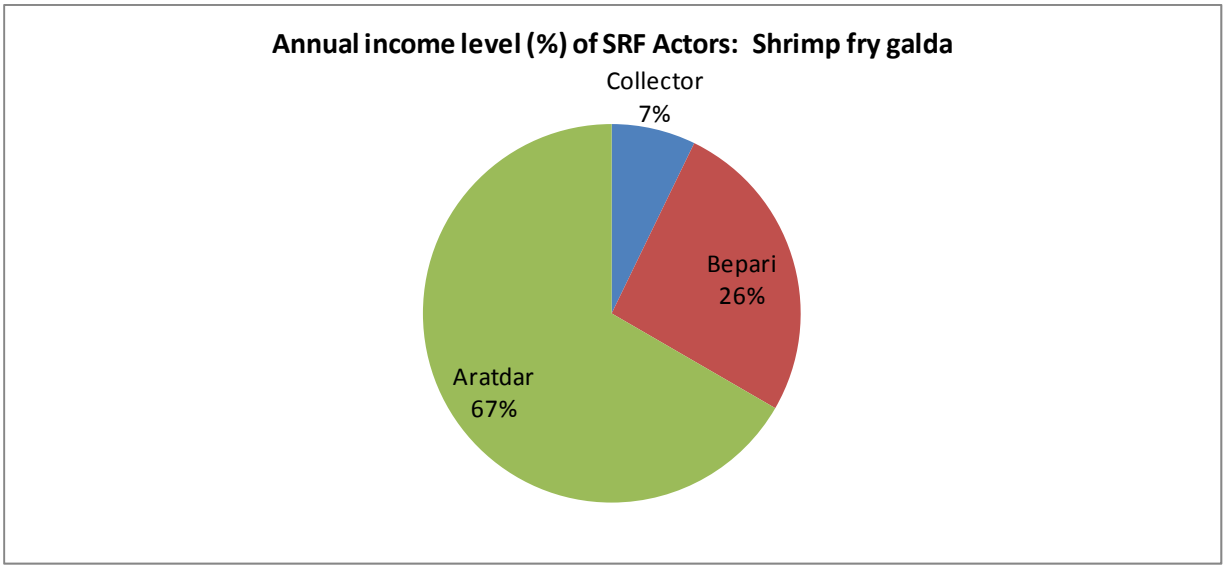


Figure 5.71: Annual income level (%) of SRF Actors: Shrimp fry bagda

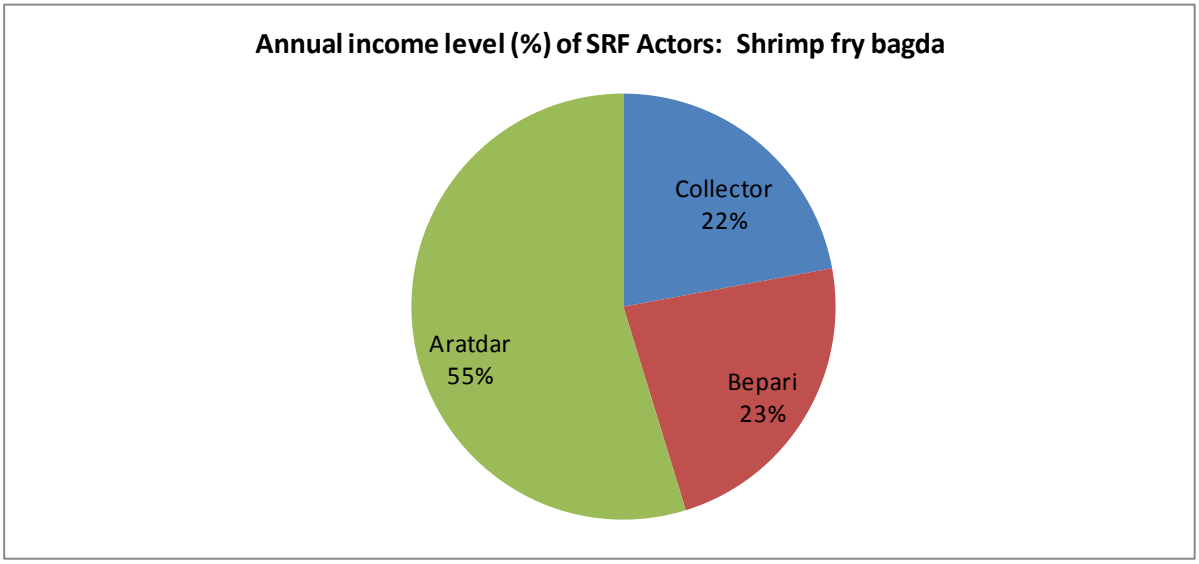


Table 5.27: Distribution of SRF actors income by product (Shrimp fry)

Income decile of actors	Percentage share of income
	Shrimp fry
Decile 1	0.9
Decile 2	3.5
Decile 3	4.8
Decile 4	6.0
Decile 5	6.3
Deciles: 1-5	21.5
Decile 6	7.3
Decile 7	9.0
Decile 8	11.2
Decile 9	14.2
Decile 10	36.8
Deciles: 6-10	78.5

Proportion of Decile 1 to Decile 10	1:40.9
Gini coefficient	0.44

Figure 5.72: Distribution of income shrimp fry

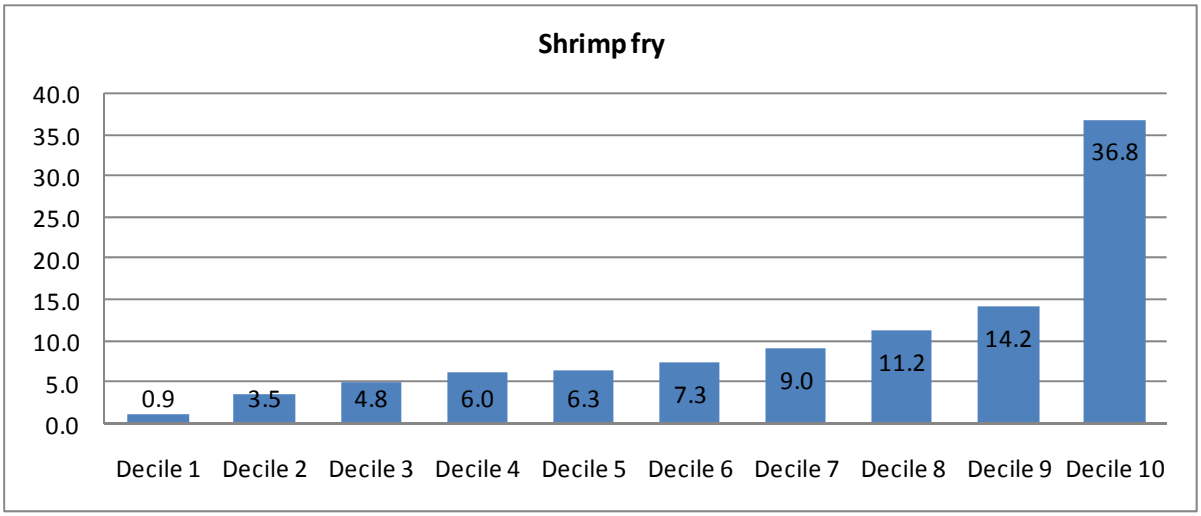
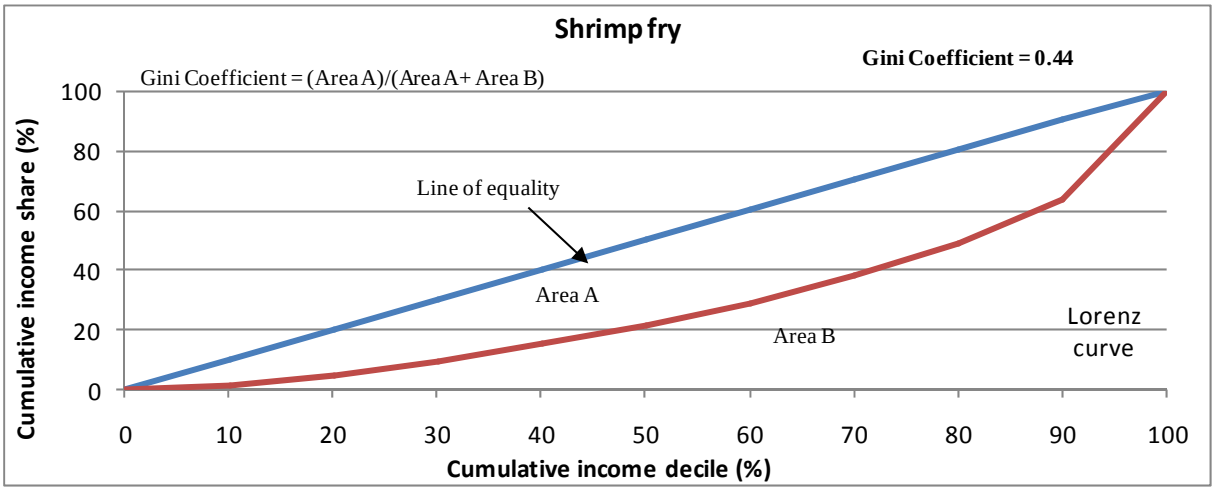


Figure 5.73: Lorenz curve: Shrimp fry



5.3.8 Crab

Crab extraction is a relatively more prospective from economic point of view. It is almost an annual activity. An average crab collector earns annual income in the range of Tk 86,334 (much higher compared to products such as golpata or fish), almost progressively followed by Majhis/Farias (Tk 158,582), Choto Mahajans (Tk 231,264), Boro Mahajans (Tk 487,307), Aratdars (813,512) and wholesalers (Tk 632,490) (Table 5.28). Like in most other products, Aratdars in this value chain earn the highest amount of income. The degree of inequality appears to be high in that the average annual income earned by the collectors, for example, estimates as more than 9 times as less as earned by an Aratdar.

In terms of total income aggregated for all actors, only 3.6 percent is due to collectors, followed by Majhis/Farias (6.6%), Choto Mahajans (9.6%), Boro Mahajans (20.2%), Aratdars (33.8%), and wholesaler (26.3%).

In terms of distribution by deciles, the income distribution appears to be much skewed (Table 5.29). Considering two deciles, Decile 1 for the bottom-ranking actors and Decile 10 for the top-ranking actors, it can be seen that the top 10 percent of the actors earn as high as 35 times as much income as the bottom Decile 1 (i.e., 1 : 35) (See Figures 5.75 and 5.76). Gini coefficient estimates as high as 0.52.

Table 5.28: Annual income level of SRF Actors: Crab

Actors	Monthly income		Duration (Month)			Annual income	% of total income
	Peak	Non-peak	Peak	Non-peak	Adjusted non-peak		
Collector	12,130	5,820	5.00	6.27	4.41	86,334	3.58
Majhi/Faria	18,859	10,560	6.00	5.64	4.30	158,582	6.58
Choto Mahajan	36,123	11,768	5.29	4.17	3.41	231,264	9.60
Boro Mahajan	64,034	21,558	6.00	5.50	4.78	487,307	20.22
Aratdar	86,262	60,944	5.67	6.11	5.32	813,512	33.76
Wholesaler	80,100	32,104	5.67	6.11	5.55	632,490	26.25
Total	297,508	142,754	-	-	-	2,409,489	100.00

Note: Non-peak months are standardized with corresponding number of days worked.

Figure 5.74: Annual income level (%) of SRF actors: Crab

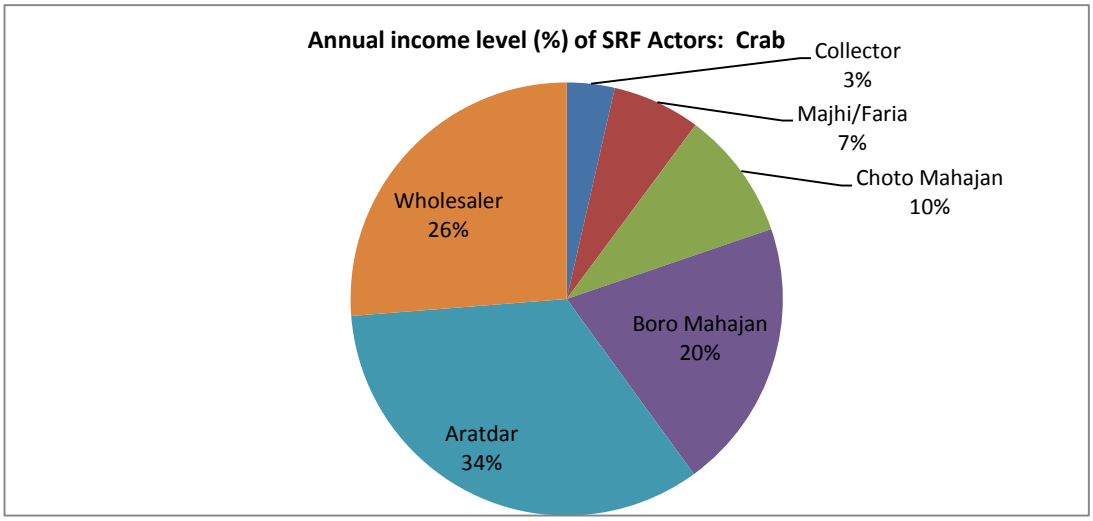


Table 5.29: Distribution of SRF actors income by product (Crab)

Income decile of actors	Percentage share of income
	Crab
Decile 1	1.2
Decile 2	2.6
Decile 3	2.9
Decile 4	4.3
Decile 5	4.5
Deciles: 1-5	15.5
Decile 6	6.7
Decile 7	9.1
Decile 8	9.2

Decile 9	17.8
Decile 10	41.7
Deciles: 6-10	84.5
Proportion of Decile 1 to Decile 10	1: 34.8
Gini coefficient	0.52

Figure 5.75: Distribution of income crab

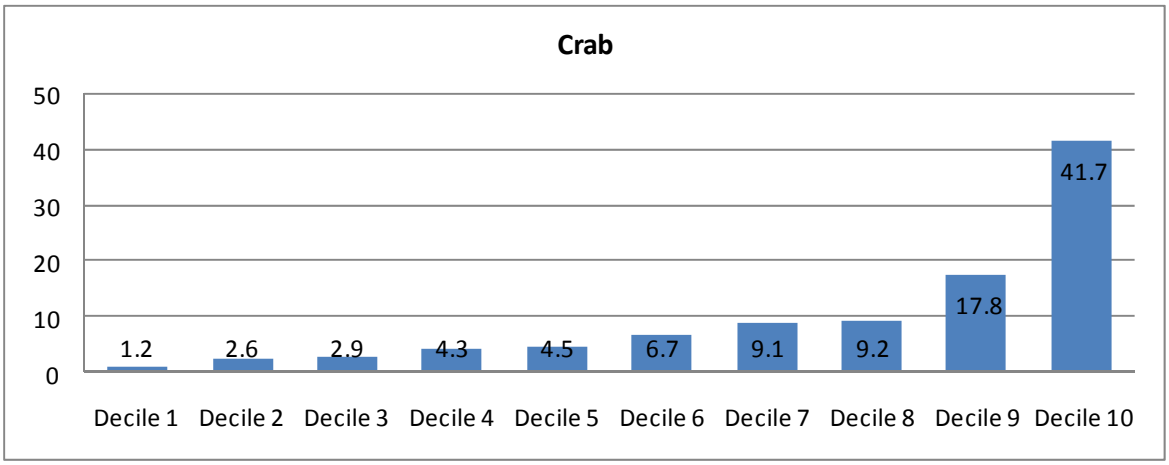
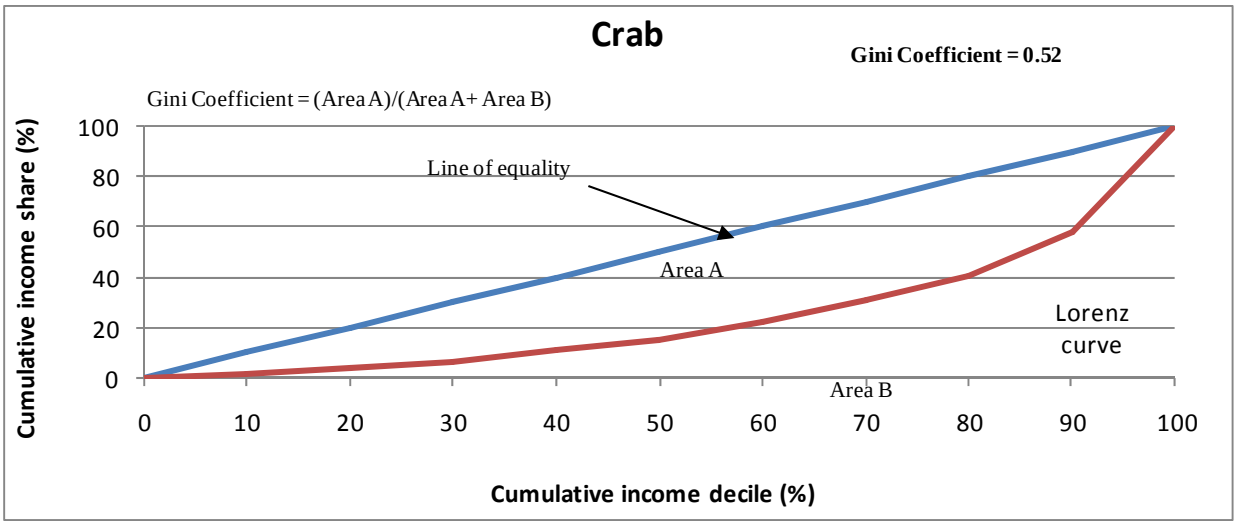


Figure 5.76: Lorenz curve: Crab



5.3.9 Honey

Honey is a seasonal activity carried out for relatively a shorter period over the year. An average honey collector earns annual income in the range of only Tk 14,830 (almost the lowest among all the SRF activities), almost progressively followed by Farias/Majhis (Tk 32,725), Choto Mahajans (Tk 51,489), Boro Mahajans (Tk 49,760), wholesalers (Tk 53,664) and retailer (Tk 54,068) (Table 5.30). The degree of inequality in the value chain appears to be relatively less in that the average annual income earned by the collectors, for example, estimates less than 4 times as less as earned by a wholesaler.

In terms of total income aggregated for all actors, only 5.8 percent is earned by collectors, followed by Farias/Majhis (12.8%), Choto Mahajans (20.1%), Boro Mahajans (19.4%), wholesalers (20.9%) and the highest by retailers (21.1%).

In terms of distribution by deciles, the income distribution appears to be relatively less skewed (Table 5.31). Decile 1 for the bottom-ranking actors and Decile 10 for the top-ranking actors suggest that the top 10 percent of the actors earn as 17 times as much income as the bottom Decile 1 (1 : 17) (See Figures 5.78 and 5.79). Gini coefficient estimates as 0.40 among the SRF products.

Table 5.30: Annual income level of SRF actors: Honey

Actors	Monthly income		Duration (Month)			Annual income	% of total income
	Peak	Non-peak	Peak	Non-peak	Adjusted non-peak		
Collector	6,365	4,497	2.33	-	-	14,830	5.78
Faria/ Majhi	14,045	6,102	2.33	-	-	32,725	12.76
Choto Mahajan	16,820	3,933	2.50	6.00	2.40	51,489	20.07
Boro Mahajan	24,880	8,217	2.00	4.00	-	49,760	19.40
Wholesaler	26,832	7,505	2.00	-	-	53,664	20.92
Retailer	7,400	3,182	7.00	5.00	0.71	54,068	21.08
Total	96,342	33,436	-	-	-	256,536	100.00

Note: Non-peak months are standardized with corresponding number of days worked.

Figure 5.77: Annual income level (%) of SRF actors: Honey

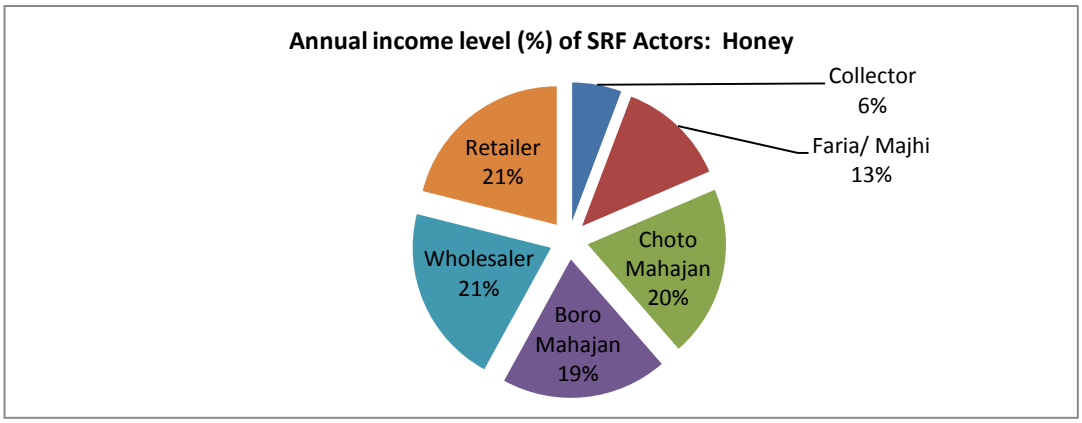


Table 5.31: Distribution of SRF actors income by product (Honey)

Income decile of actors	Percentage share of income
	Honey
Decile 1	1.5
Decile 2	2.3
Decile 3	3.9
Decile 4	5.5
Decile 5	9.0
Deciles: 1-5	22.2
Decile 6	9.1
Decile 7	13.6
Decile 8	13.8
Decile 9	15.6
Decile 10	25.7

Deciles: 6-10	77.8
Proportion of Decile 1 to Decile 10	1: 17.1
Gini coefficient	0.39

Figure 5.78: Distribution of income honey

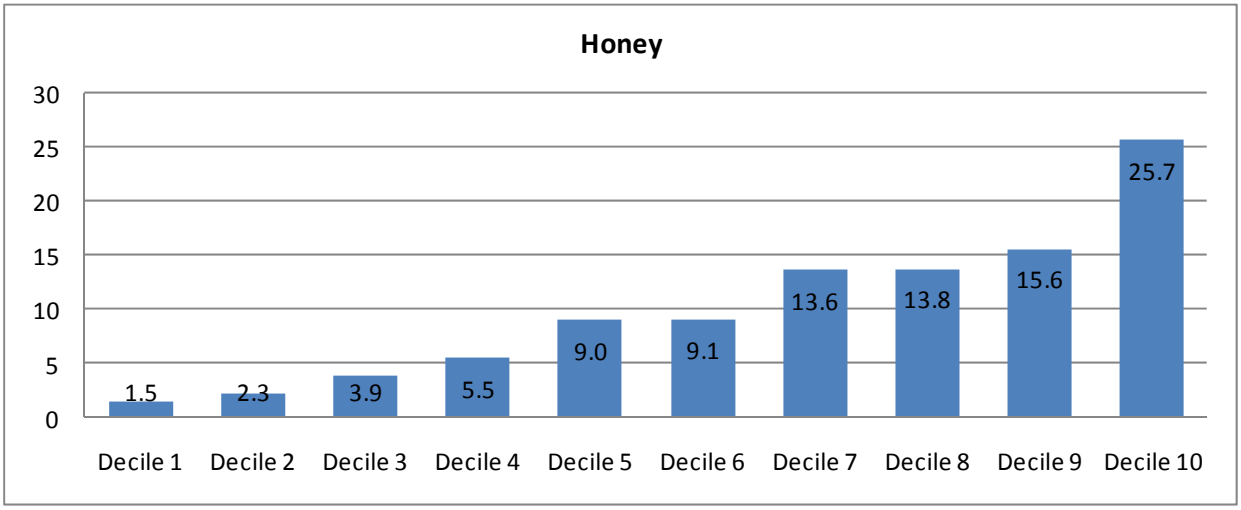
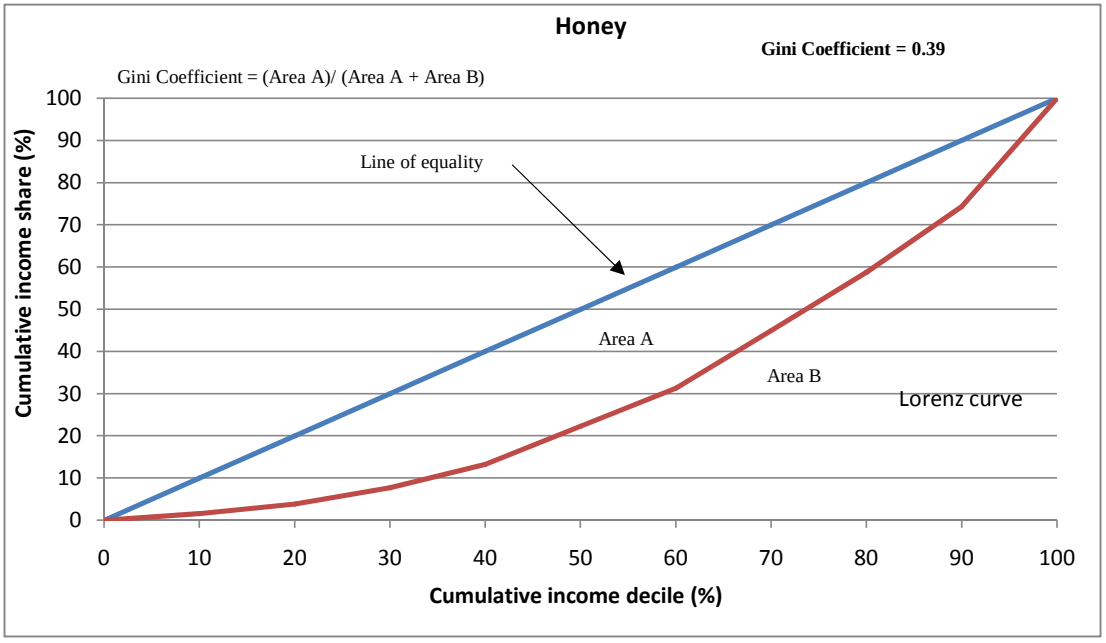


Figure 5.79: Lorenz curve: Honey



Summary for All Products

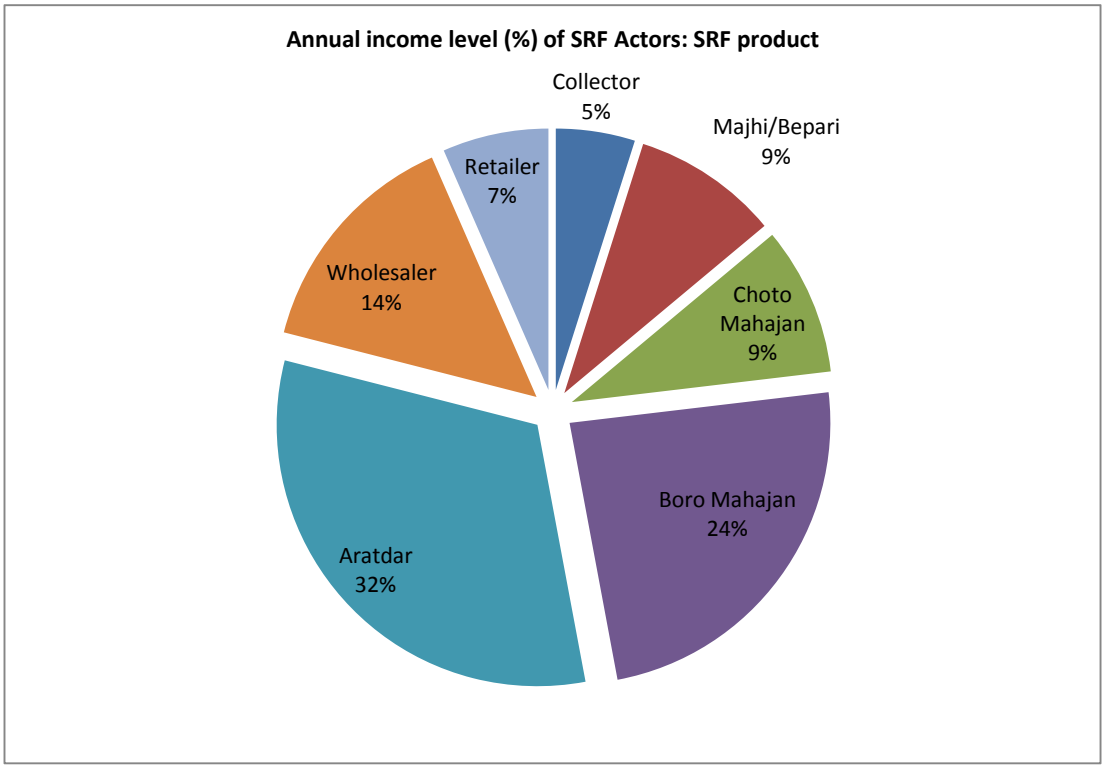
In summary, as reported in Table 5.32, the degree of inequality has been worse in some activities than the others. Taking all SRF products together, the average income earned by an Aratdar or a Mahajan is found to be nearly 5 to 7 times as much as earned by a collector. Inequality is demonstrated in that the income of a collector constitutes, in terms of total income of all actors, only 4.9 percent, followed by Majhis/Beparis (9.5 %), Choto Mahajans (9.2 %), Boro Mahajans (23.9 %), Aratdars (31.9 %), wholesalers (14.5 %) and retailers (6.6 %).

Table 5.32: Annual income level of SRF actors: All products

Actors	Annual Income (SRF product)	%
Collector	53632	4.90
Majhi/Bepari	98936	9.05
Choto Mahajan	100361	9.18
Boro Mahajan	261664	23.92
Aratdar	349197	31.93
Wholesaler	158195	14.46
Retailer	71813	6.57
Total	1093799	100.00

Note: Non-peak months are standardized with corresponding number of days worked.

Figure 5.80: Annual income level (%) of SRF actors: All products



The skewness in income distribution can also be looked at from the sub-aggregate levels. The income distribution appears to be highly skewed in the SIZ area (Table 5.33). While the bottom half (Deciles 1 to 5) of the actors have 15.4 percent of the total income, the top half (Deciles 6 to 10) of the actors accounted for as much as 84.5 percent of the total income. It can be seen that ,

the proportion of decile 1 to decile 10 is as high as 1:29. Across various products, the proportion of decile 1 to decile 10 varies from 1:17 to as high as 1:43 (See Figures 5.81 and 5.82). The estimate of Gini coefficients varies from 0.40 to 0.53.

The gini coefficient, measuring income inequality, for the SIZ area as a whole is estimated as 0.52. As was evident from previous section, the gini coefficients for individual products estimated in the range of 0.40 to 0.52. One can mention, in this context, findings from a study conducted by BIDS (where the author was involved as Team Leader). It was found that in the coastal districts the gini coefficients vary from 0.19 to 0.36. In no cases, gini coefficients for any of the coastal districts is higher than or close to that in the SIZ area. In fact, the coefficients in the SIZ estimate much higher, indicating that so far the SRF actors' income is concerned the SIZ area is characterized by severe inequality in income.

Table 5.33: Income distribution and income inequality in SIZ area

SRF Products	Proportion of income (%) at		Proportion of Decile 1 to 10	Gini coefficient
	Bottom half (Decile 1 to 5)	Top half (Decile 6 to 10)		
Golpata	16.6	83.4	1 : 20.5	0.51
Gura fish	14.2	85.8	1 : 33.5	0.53
Sada (white) large fish	20.3	79.7	1 : 19.1	0.44
Hilsha	16.4	83.6	1 : 42.9	0.48
Shrimp large (galda)	NA	NA	NA	NA
Shrimp large (bagda)	NA	NA	NA	NA
Shrimp small (Galda)	NA	NA	NA	NA
Shrimp small (bagda)	NA	NA	NA	NA
Shrimp fry (galda and bagda)	21.5	78.5	1 : 40.9	0.44
Crab	15.5	84.5	1 : 34.8	0.52
Honey	22.2	77.8	1 : 17.1	0.40
All products	15.5	84.5	1 : 29.3	0.52

Table 5.34: Findings on income inequality (gini coefficients) for selected coastal districts

Coastal districts	Area 1 (2 villages)		Area 1 (1 village)	
	Proportion of Decile 1 to 10	Gini coefficient	Proportion of Decile 1 to 10	Gini coefficient
Jessore	1 : 6.5	0.34	1 : 4.5	0.26
Khulna	1 : 4.7	0.27	1 : 3.2	0.19
Barisal	1 : 9.1	0.36	1 : 5.4	0.26
Patuakhali	1 : 9.1	0.36	1 : 7.3	0.34
Gopalgonj	1 : 5.3	0.28	1 : 4.6	0.27
Laxmipur	1 : 9.8	0.36	1 : 8.2	0.36
Cox's Bazar	1 : 6.8	0.33	1 : 4.0	0.22

Source: Islam *et al* (2008), BIDS.

Table 5.35: Distribution of SRF actors income (All SRF Products)

Income decile of actors	Percentage share of income
	All SRF products
Decile 1	1.4

Decile 2	2.1
Decile 3	2.9
Decile 4	3.9
Decile 5	5.1
Deciles: 1-5	15.4
Decile 6	6.5
Decile 7	8.2
Decile 8	11.1
Decile 9	17.7
Decile 10	41.0
Deciles: 6-10	84.5
Proportion of Decile 1 to Decile 10	1: 29.3
Gini coefficient	0.52

Figure 5.81: Distribution of income – All SRF products

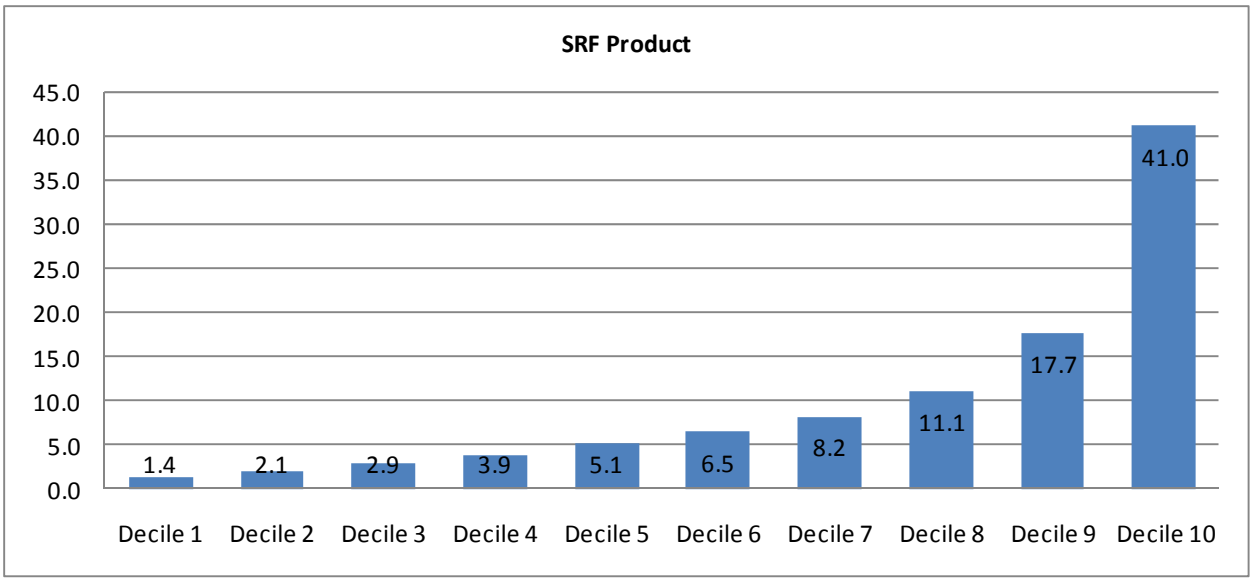
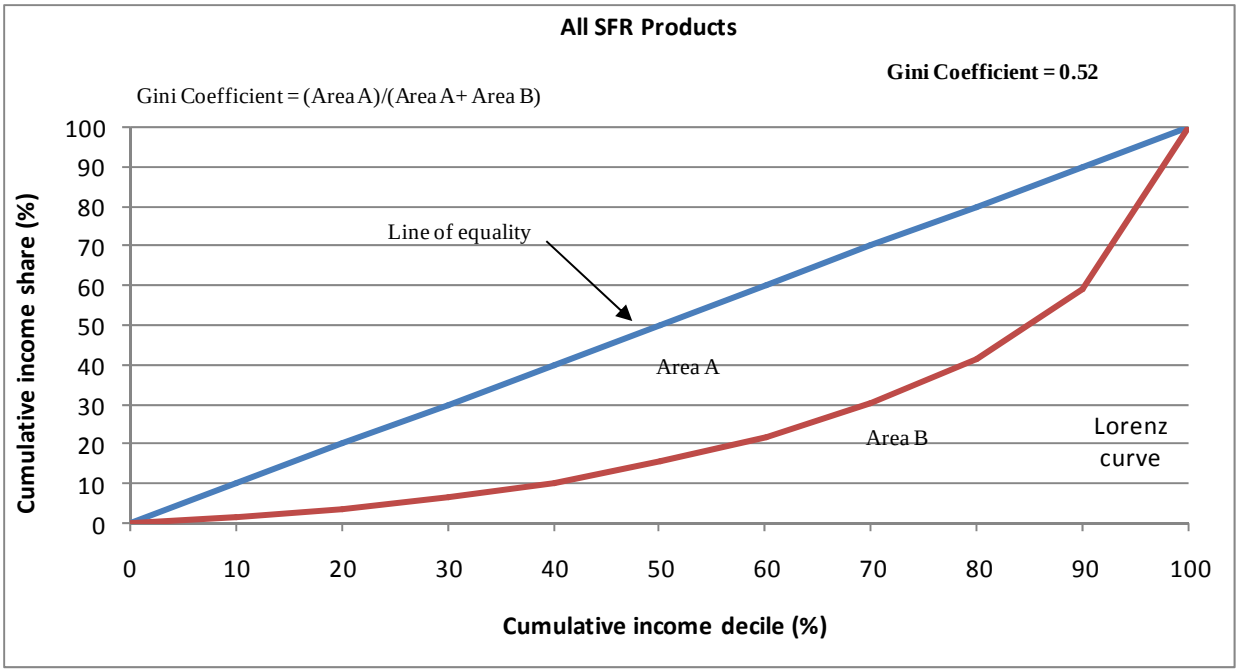


Figure 5.82: Lorenz curve: All SRF products


All SFR Products
Gini Coefficient = 0.52
Gini Coefficient = (Area A)/(Area A+ Area B)
Line of equality
Area A
Area B
Lorenz curve
Cumulative income share (%)
Cumulative income decile (%)
0
10
20
30
40
50
60
70
80
90
100

CHAPTER 6

CONCLUDING REMARKS AND POLICY IMPLICATIONS

Chapter 6:

Concluding Remarks and Policy Implications

This study aimed to investigate aspects related to economics of SRF resources extraction, particularly value chain analysis marketed SRF products. This concluding chapter summarizes and reviews the major findings obtained from the previous chapters, and relates them to a few major issues. These issues may be crucial to the improvement of value chains, in terms of return and equity, conservation and co-management, and overall improvement of the quality of life of the people involved with SRF resource collection. Where possible, it also suggests policy implications and discusses some relevant interventions [84].

Above all, the local people, involved as actors in the value chains, gave reflection on the importance of strong and favorable policies necessary to devising a pro-poor value chain and uplifting the income situation of the SRF collectors.

6.1 Uniqueness of the Sundarbans Economic Zone

The economy of the Sundarbans is unique for its several characteristics. The SRF accounts for over half of all reserve forest area in Bangladesh and is the single largest source of forest products - supplying nearly half of all timber and fuel wood output, directly providing income and subsistence for at least half a million people, maintaining a similar number of households in the buffer area. It is estimated that the Sundarbans currently contributes about Taka 7 billion (US$ 93 million) to GDP at current prices [85]. Most of the value is currently derived from fishery, aquatic resources, timber and non-timber products, and eco-tourism. A substantial value is contributed to national GDP derived from foreign earnings on account of fishery and aquatic resources.

The Sudarbans economy is centered around SRF collection activities which enjoy uniqueness in that it comprises unique financial networks across its buffer area, centered around an informal financial credit system, which is called dadon. Incidentally, this informal and traditional social network is now the heart of the SRF economy.

Dadons are playing a very important role in the economy of the Sundarbans as it is providing the major bulk of finance for the SRF resource collection. It is a system where people from bottom to top layers in the value chains are involved. Few institutional sources (banks or NGOs) are closer to the competitiveness with the dadon system. A similar feature can hardly be experienced outside the Sundarbans buffer areas.

The present study shows that the Sundarbans economy, centering around this informal credit arrangement, is a sort of unique system heavily accessible based on Relationships (social connection), Linkages (business connections) and Trust level (social capital formed among actors community). Our survey findings suggest that the network has created moderate to strong

[84] The identified interventions may not all be feasible and implementable in the short run, but reported here to reflect the views of the respondents of the study surveys, FGDs, Case Studies and Problem Analyses.

[85] *ADB Fact Finding Missions Report* (1997) estimated it as Tk 4 billion, which is approximately Tk 7 billion now.

scale of both vertical (between actors along value chains) and horizontal (between actors at the same level of value chains) linkages [86].

Dadons - Capital for SRF Resource Collection

The source of capital is a major issue for the collectors. As they face lots of difficulties in obtaining loans from formal institutions, they take dadons from the Mahajans or the Aratdars. At the lower level of value chains (e.g., collection) it is more of a 'social relationship', and at the upper level of the chains it is more of a business relationship and trust. Although it is a source of exploitation for the bottom layer actors, particularly the collectors are left with few other choices.

As the dadon takers, more often the harvesters, usually cannot pay off the debt, the whole cycle is never ending and they remain locked for a long time, sometimes for ever. Some of the dadondars (dadon givers) charge interest (usually 2-10% on a trip basis) on sales. They also take additional share of profit for their investment, apart from making pilferage in terms of weights on the purchased quantity. Our survey findings demonstrate that in a few places, the commission becomes as high as up to 20 percent, in aggregate, on sales. In spite of the above, dadons are preferred to bank or NGO loans as they are easily available in adequate amounts.

Our survey indicates that more than 95 percent of the working capital by SRF collectors is derived from dadons, whereas only 4 percent derived from the NGOs. For all the actors together in the value chains, dadons account for 37 percent, the banks and the NGOs accounting for 4.8 percent and 12.4 percent of total finance respectively. The remaining capital is derived from either own or personal sources [87]. There are obvious reasons for which SRF actors such as the collectors prefer dadons to all other sources. One of the major reasons is that dadons provide physical security (e.g., from pirates), social security (in lean and hazard periods) and financial securities (fund for running extraction activities) to the collectors, a feature institutional sources seldom can provide. So, the SRF economy is characterized by a unique market and financial system, indeed.

6.2 Pressure on SRF and Poverty Situations

The increased population with few alternative livelihood opportunities poses a serious threat to the Sundarbans, which is the main cause of mangrove destruction (FAO 2003; Waggoner and Ausubel 2001; Ong 1995). Moreover, dependence of local people on the forest is high (18% of the households in the impact zone are dependent on the forest) and in future this dependence will increase (Anon 2001), which is likely to aggravate the existing pressure on the government mechanisms for forest management and protection [88].

The present study suggests that there are more than one million people directly involved with the resources extraction from the SRF [89] (Chapter 4). The pressure on SRF for resources extraction

[86] Such features are likely to have enabled the value chain actors to arrive at a more efficient linkage, through reduction of transaction costs, but this needs to be verified through further investigations.

[87] Personal sources are also not always free of costs, at times, offered at some "invisible" profit and interest.

[88] The present study suggests that more than 28 percent of SIZ population are dependent on SRF (Chapter 2).

[89] The involvement of more than one million people (1.07 million) in various SRF extractions over the whole year., however, comprises overlaps across extraction of various products, a large majority of which are fishers including

has increased tremendously as the number of collectors has increased many fold over the past decades, resulting in huge reduction in per capita resource collection from the SRF [90]. With the high increase in living cost added to that scenario, the people and the community, especially that of the bottom layer actors in the value chains, tend to fall in the process of pauperization. The bottom layer actors, that is, the harvesters are deprived of in terms of income from the resource collection, but they had to accept the deprivation as they have few other choices.

Income and Poverty in SIZ

The present study demonstrates that the SIZ, comprising ten upazilas of five districts, is a severely poverty-stricken region. The findings reveal a very dismal picture on poverty levels in the region. Referring back to Chapter 2 (District and Upazila Profile), although the SIZ is endowed with natural and environment resources, the SIZ upazilas have a much higher extreme poverty rates (0.42), compared to an average non-SIZ upazila in Bangladesh (0.26). In fact, nine out of ten SIZ-upazilas (except Patharghata, Barguna), have a much higher extreme poverty levels than the corresponding non-SIZ upazilas of five SIZ districts, in terms of Head Count Ratio (HCR) [91].

Income inequality

The average monthly income of the SRF harvesters is in the range of Tk 5,000 to 6000 only during harvest seasons. There are months when they have hardly any income at all. The study demonstrates huge income inequality among actors. The empirical evidence also suggests that the top 10 percent of the SRF actors earn as high as up to 43 times as much income as the bottom 10 percent (Estimated Gini coefficients for various SRF products range from 0.42 to 0.53, which are on a much higher side in Bangladesh context). Thus, the poverty situations in the SIZ appear to be severe, which have immense policy implications.

Ironically, the sample harvesters earn net returns in the range of only 3 to 7 percent while they create price value additions by as high as 50 to 75 percent, depending on the products. Intuitively, given the existing economic situation, SRF extraction is deepening poverty levels, which may help widen the income gap between the rich and the poor. The distributional effects of SRF extraction are important because these are associated with sustainability of development. Many problems of sustainable development and environment "arise from inequalities in access to resources" [92], and presumably these problems are being worsened by existing poverty and the skewed distribution of resources in the SIZ. It is, therefore, important to address the vulnerability of the SRF actors in the context of their existing poverty situation. This is yet more important in order to deal with the problems relating to improvement to value chains, management and conservation of SRF.

The foremost policy, therefore, will be to address the poverty of the bottom layer forest resource actors which will effectively help the management and conservation of the SRF. To sum up, as the Problem Analysis (Annex G) demonstrates, this demands a special attention because of the following:

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about 2 lacs of shrimp fry fishers. Our survey indicates that, on an average, a collector harvests 1.8 products over the year; then the number of SRF collectors estimates as about 0.59 million (Chapter 4).

[90] This is true especially for fishers, following that the extraction of other products is highly seasonal and the pressure on the fishery sector is becoming more and more acute.

[91] Based on Cost of Basic Needs (CBN) method, the present study made the estimates incorporating BBS-2005 data that are yet to be published.

[92] Brundtland Report (1987), *Our Common Future* (The World Commission on Environment and Development).

- The SRF collection quantity has significantly declined. Some of the species are getting rarer. This is more so in fishery sector [93] and that is why the fishery sector demands a special focus.
- Number of harvesters (e.g., fishermen or golpata collectors) has increased many fold (present study estimates over 0.9 million fish collectors, most of whom are fisher laborers; other actors in the fish sector estimate as more than 0.2 million, most of whom are Farias/Beparis.
- Due to the gradual displacement from agriculture through salinity in the lands, more numbers of people are pouring into SIZ as collectors. Most SRF extractions are merely seasonal and, consequently, there is high pressure on the fishery sector for subsistence and per capita collection has been reduced to a large extent.
- The major income share of the harvesters is taken away by the higher-level intermediaries such as the Mahajans or the Aratdars due to dadons. Dadons and poverty operate in a vicious circle.
- Transportation cost, especially for the fishers, is very high. And the time needed for the transportation/collection is also long to render the collectors more vulnerable.
- One of the major extraction costs is due to ransom to the pirates, and unofficial payments to officials of various departments [94].
- The household expenditure has increased a lot compared to their income due to price hikes, which has contributed to further reduction of income making the poor community more vulnerable.
- Historically, institutional credit has been available in the sector but has been targeted at the higher end of the value chains.

Keeping the above in perspectives, some of the policy interventions are discussed in the following sections. Following reasons, among others, restrictions in timber extractions, limited activities of other seasonal products, relatively less seasonal effects and huge employment pressure fisheries sector appear to be the most vulnerable. That is why, the sector demands closer attention.

6.3 Improving the Value Chains and Poverty Situations of SRF Actors

Credit and Financial Support

Access to capital has been the most crucial issue, especially among the collectors. Although dadon is a source of exploitation for the collectors, hardly they are left with other choices. There are two major reasons for which they take dadons: (1) dadons are easily accessible and available in adequate amounts (2) dadons provide immense support during lean periods which appears to be a social safety to the harvesters. Consequently, as our survey shows, more than 95 percent of the harvesters have taken dadons to meet their livelihoods. However, dadons act as physical,

[93] In fact, so far as BBS (*Fisheries Statistical Yearbook of Bangladesh*, 2007-08) is concerned, fish production has increased (at the rate of 6.3% for SRF, and 6.5% for the country as a whole per year based on data for 1998-99 to 2007-08. But due to increased pressure on the fishery sector, per capita catch has declined.

[94] According to FGDs participants, all such costs together constitute as high as up to 25% of total costs, depending on products in question.

social and financial safety. On the other hand, however, it is a source of exploitation to the bottom layer actors in the value chains.

Financing the SRF actors particularly for the collectors (numbering some few lacs) is a major issue. Clearly, a cycle of indebtedness and sub-optimal contracting system prevail along the value chains. The bottom layer SRF actors such as harvesters and Farias are locked into contracts that perpetuate this cycle of debt. High interest rate, high commission and never-ending dadon repayment have been cited by SRF collectors (63%) as some of the main bottlenecks in securing value of their products. A pertinent question is how to break or whether to break the system. Nevertheless, it is difficult to break the deep-rooted dadon system as there are both positive and negative sides to this business, which need to be considered when planning new interventions geared at improving value chains.

Access to Capital - Setting up of Specialized Banks and Specialized Programs

Specialized banks or specialized micro-credit organizations should be set up to save the harvesters of the Sundarbans. Like agriculture loan, share cropper loan and SME loan programs some credit programs need to be lunched where SRF actors should be given a special attention. The central bank can take initiatives in this respect [95].

Service Centers and Financial Support

Government should recognize Sundarbans Reserved Forest (SRF) activities as a separate and important economic sector, just as Agriculture or Industries as SIZ districts consist of nearly 9 million people, whereas the currently defined 10 SIZ upazilas consist of 2.4 million people. Pending the establishment of the Specialized Bank, a few selected public and private banks in the SIZ should be requested to set up SRF service centers/SRF cells to channel funds to the SRF sector and to cater the special needs of the SRF actors, especially the harvesters in a better way and on softer terms. It is important to simplify rules and procedures as the SRF actors relatively lack education. Collateral free loans should be considered for the collectors. Even the Mahajans or similar other actors should be encouraged to access credits, with their boats/nets kept as collaterals, the impacts of which are expected to be trickled down to value chains of collectors.

Targeting programs

The banks should fully consider the issues and realities of the harvesters and set their policy and procedures accordingly. They should target programs to providing social securities and "safety-nets" to the collectors, along with adequate amount of credits for the collectors on favorable terms [96]. At the same time, the banks can also help promote the effort of conservation while sanctioning loans. Repayment schedules and horizons should be flexible and reflect the likely cash flow of the activities in question. Proper monitoring mechanism should be in place that would assess that their incomes have been raised and debt burdens have been reduced.

[95] Only recently, the Central Bank launched a several credit programs to support agriculture, in general, and share croppers, in particular. A discussion of the author with the Bangladesh Bank Governor, who is very proactive in launching pro-poor programs, indicates that the Bank might consider similar credit programs for the lower-level SRF actors in a short span of time.

[96] Currently, the government has a number of safety-net programs implemented in coastal areas but hardly any of these are specifically targeted to SRF stakeholders, except only a few targeted to fishermen in lean seasons.

At the first stage, some priority sectors can be taken up for the purpose on a pilot basis. At the same time, appropriate authority should take safety net programs for the SRF actors, particularly the collectors, and extend support during lean periods or at the time of crisis such as natural hazards. Like what was taken up with SMEs, the Bangladesh Bank can take the initiatives in this respect through, for example, launching refinancing schemes.

Improving Terms of Trade and Marketing System

Our field survey shows there are many ways of debt repayment in practice - repayment in cash with interest (47.6%) or without interest (4.0%), repayment in goods at market price (16.7%) and repayment at reduced market price (33.3%) (See Chapter 3). Our investigation reveals that the collectors have to sell their collected products at a price reduced by approximately 22.5 percent compared to prevailing market price.

In order to pull the SRF harvesters out of poverty better contracting arrangements would be helpful. There can be several ways of improving terms of trade and marketing systems for the SRF products.

Transportation and Storage/Depot Facilities

The cost of transportation and the time needed in transportation are very crucial for the collectors, especially the fishers, golpata or honey collectors. The study reveals that economics of SRF extraction is directly related to distance of primary landing place from harvest place (which is 41 Km), which enhances transportation costs (See Chapter 3). One important way in this regard is to foster and expand spot markets and auctions, which will reduce transportation costs and at the same time ensure offering lower level actors higher prices [97] . Increasing the number of depots and landing places could also minimize the transaction costs in the value chains and the time for transportation to ensure that the returns are evenly distributed. This would help particularly fishery sector. The Department of Fisheries needs to identify regions lacking depots and arrange accordingly. Increasing the number of depots and landing places was suggested by a large number of poor harvesters (See Chapter 3). It is also important to develop linkages between collectors and relevant processing plants, which is expected to reduce the number of intermediaries.

Enhancing Bargaining Power of the Collectors

During our survey, a large number of collectors (66%) complained that they were not getting fair prices for the harvested products (See Chapter 3) while 47 percent reported that there were limited number of buyers (e.g., Aratdars) so that the buyers could easily monopolize. In consequence, the harvesters especially the fishermen cannot negotiate price as the fish products are purchased by the Aratdars through Mahajans or Paikars. In fact, the bottom layer actors of the value chains have nothing much to bargain or negotiate prices or fixing up wages at the least.

They have to sell their collected products at a price determined by the Aratdars, in most of the cases. Our field survey shows that the collectors have to sell their collected products at a price reduced by approximately 22.5 percent compared to the prevailing market price. Besides, the

[97] This was also suggested by a study by USAID (2006)

purchasers also take additional share for the dadons apart from making pilferage in terms of weights of quantity of the purchased products, especially aquatic products (crab, fish).

Hence, enhancing bargaining power of the harvesters is imperative.

Access to Market Information
The bottom layer actors are not much aware of the market situation. They have to depend on the Aratdars. So, better access to the current market information has to be ensured. Barriers to entry, poor infrastructure, inadequate communications, and high transaction and transport costs make the markets in favor of buyers.

Form Collectors' Organization
In order to safeguarding the rights of the collectors and capacity of the collectors to negotiate selling prices, it is important to form collectors' organizations, similar to that of the higher-level intermediaries such as Aratdars.

Involvement of NGOs
The involvement of NGOs in SRF activities, particularly in remote areas (where there is no bank), would be a step forward.

Awareness on access to loans and market information
Collectors have to be made well informed regarding opportunities. Awareness on bank loans, market information and aspect related to SRF extractions has to be raised among the actors. Banks, government or NGOs can design media campaign or use the benefit of mobile technology and SMS generations.

SRF Actors Groups/Cooperatives/Associations

One way of reducing vulnerability of the lower-layer actors of value chains is to organize Groups or Cooperatives. In effect, this is expected to also reduce exploitations. Greater returns could also be secured for harvesters through organizing and pooling their resources [98]. This would help create storage, post-harvest processing, and refrigeration facilities and encourage shared transportation on a collective and cooperative basis [99]. One can mention, in this respect, the success story of Center for Coastal and Environmental Conservation (CCEC) in organizing the SRF harvesters (Bawalis and Mawalis) to form cooperatives for the betterment of their members in terms of investment and profits out of their harvests. Not only these cooperatives have proved beneficial in income generation but also contributed to their confidence building, empowerment, awareness and overall sustainable harvest management of the SRF, apart from coping with natural disasters.

[98] In West Bengal Sundarbans, honey is reportedly bought and marketed by FD.

[99] Although our overall experience with cooperatives has not been very good, but one can also cite Milk Vitae as an example of success based on cooperatives.

6.4 Improving the Socio-economic Conditions of Bottom Layer Actors

The study estimates the total number of actors in SIZ as approximately 10.8 lacs (Chapter 4). Since there are overlaps between actors of various products, and assuming that an average collector harvests 1.8 products in a year, the total number of collectors estimates as 6 lacs.

Improving the socio-economic conditions of these vast bottom-layer actors should be a major policy concern. Loss of lives and properties due to natural disasters such as Aila and Sidr also has worsened poverty situations. A range of options may be available to improving the socio-economic conditions of bottom layer.

Food subsistence to the poor collectors: Rationing system for foods for collectors will be beneficial. Designing programs such as Vulnerable Group Development (VGD), Vulnerable Group Feeding (VGF) or Food for Employment during lean seasons may be good initiatives to benefit the marginal collectors. Obviously, this will also facilitate sustainable resource management of SRF.

Work Opportunities and IGAs

The per capita collection quantity from the SRF has tremendously declined over the last few years following increased number of actors and extinction of some species. Work opportunities and alternative income options, especially for the marginal harvesters (e.g., golpata, crab, fisher labors), have to be increased in the SIZ areas. Efforts should be made to enable collectors to switch over to other economic activities. Less investment oriented activities may include closed fisheries, handicrafts, closed crab culture, crab fattening, fish feed production, hogla and mat making, bee-keeping, coir industry, tree plantation, horticulture, tailoring, knitting, livestock, small and medium industries (SMEs) and social forestry for the bottom layer actors. Obviously, this will reduce the pressure on the SRF and they will be encouraged to conserve the forest. [100]. Developing a welfare fund for the collectors of various products would be a step forward.

In this context, mention may be made of this year's (20109-10) harvest of honey which has fallen by 16 percent as per the BLCs issued this year compared to last year [101]. The study team had an attempt to explore the reasons behind it. First, both quantity and quality have declined as honey plants (e.g., Khalisha) and their flowers reportedly declined due to climate change-induced low rain falls. Even quality is said to have fallen as a result of adverse impact on the honey flowers [102] . Second, which is more important, in the past two months (April and May, 2010) the repair work of Sidr-affected embankments undertaken by the Army has created massive employment in the locality, and the Mawalis have chosen to be employed there rather than traveling a long distance to forest area for honey extraction. The Mawalis reported that Tk 200 per day as wage was a far better option than what is earned from honey extraction amidst risk of forest pirates, river pirates and tigers. In consequence, dadon business in the locality has

[100] The Central Bank under its existing refinancing schemes can issue directives to the banks to include such activities in their loan provisions.

[101] This estimate is based on data supplied by DFO, West Division, as of today (15 September). Number of BLC issued by FD (West) this FY 2009-10 is 210, as compared to 250 in the previous year.

considerably declined. This gives a clear message that Mawalis or Bawalis would not exert pressure on the SRF providing they get alternative opportunities for employment and income.

Creating income options such as "closed fish culture" in the saline environment will not only reduce the pressure on the SRF but also increase the per capita collection for the fishers. The Fish Research Center at Paikgacha can take further initiatives apart from their existing activities in this regard.

Save the species from getting lost
Appropriate policy to conserve the fish resources has to be taken before it is too late. The fishes that are in the process of extinction are subject to conservation for the ecology of the forest and also to increase "per capita collection".

Fishing by trawling ship
The process, through which the trawling ships undertake catching fishes, needs serious consideration in the light of conservation and reproduction.

One of the major problems related to resource management in fisheries and aquatic resources is indiscriminate collection of shrimp and other aquatic fries, resulting in extinction of valuable aquatic species [103]. The exploitation of *jatka* fish and use of 'current' nets in fishing have no option asserted by fisher collectors themselves as they have little income support during lean periods. One other problem is related to additional pressure on SRF fisheries due to increase in the number of fishers and fishing trawlers catches.

Leasing Canals/Khals
Some of the khals or canals are leased out to big companies who use trawling ships for fishing. Some of these people use medicines and poisonous (chemical) substances to catch fishes, which kill all the living beings in those leased-out canals. There should be strict regulations to check this type of activities so that the reproduction of the fishes or other species is not hampered. The participants of FGDs, by and large, suggested stopping leasing out canals and khals around SRF [104].

6.5 Co-management and Conservation of the SRF

Co-management of SRF was not much a directly related topic in the context of the current value chain analysis study. While data and information on value chains of various SRF products were much demanding one had to be satisfied with limited feedback from the respondents on the issue of co-management. That co-management relates to integrating the value of conservation with benefits reaching the poor appears to be generally not within the knowledge of the SRF actors, particularly the lower-level actors. Only a few who knew about it admits that the co-management approach is likely to equip the poor to resist pressure from the powerful who destroy the natural resource base more often for personal benefit.

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[102] Further study is needed on the impact of CC on honey production.

[103] This was also observed by Islam *et al* (2005), BIDS. During shrimp fry collection, for example, about 60-70 fry types of other species are caught. Besides, other growing aquatic plants and micro bio-diversity are destroyed under the feet of the fry collectors.

[104] This has long been felt by stakeholders of SIZ (Islam *et al* 2005, BIDS).

Those of the SRF actors who knew the approach, by and large, appear to be a bit critical about co-management as, according to some of them, this would not give them direct benefits to people at large but this might ultimately benefit a group of political and powerful section in stead. The culture of politicization would be a great bottleneck in the formation of council and other forums. The stakeholders asserted that the refutation culture of a current government's activities by the following new government, in turn, may not be helpful for co-management. Hence, as the SRF actors observed, the formation of forums, such as Co-management Council and Committee, People's Forum (PF), Village Conservation Forum (VCF) needs to be made with utmost care. Nevertheless, the concept of co-management is appreciated by some of the SRF actors – the only major issue to those who knew about it was their skepticism about its appropriate implementation and sustainability [105].

That sustainable use of the mangrove forest would yield higher welfare benefits than any other activities towards its development is well documented. A decision to develop SRF would be 'extremely damaging, not only to current population's welfare but for the future generations as well'[106]. This merely highlights the importance of protecting the SRF. While IPAC has enthusiastically initiated the process of protecting the environment through co-management, further mobilization of the grass-root level local people is necessary for the success of the approach. The effective integration of the interests and priorities of the local people into forest management and above all, coordinated efforts appear to be important. More importantly, the stakeholders, particularly the bottom layer actors, have to be offered adequate compensation and livelihoods. In order to help promote SRF co-management, the first basic needs (food and rehabilitation) of the community shall have to be served first, especially in the aftermath of the destruction through calamities.

"What" and "How" are among the important questions which were raised by some of the respondent actors while conducting the FGDs, in the context of conservation and co-management. The community needs to have their stake of the Sundarbans related benefits, along with the government or any other NGOs.

As our survey reveals, contrary to the basic approach, co-management of the SRF appears to have gained significance to relatively higher level actors in the value chains as they were aware that SRF would act like a "wall against the natural calamities". Hence, the purpose of the co-management was mostly the conservation and protection of the forest. Obviously, the people are aware that the conservation would be effective only if more local participation is ensured in the process. People, by and large, are also aware that the gradual depletion over the years has resulted in degradation of the Sundarbans. The SRF actors observed that increased population, loss of aquatic and other species, increased pressure on the Sundarbans, demand for fuel woods, climate change and disasters and lack of coordination of the government bodies have made the conservation a very complex job. These need to be taken in perspectives while designing co-management. While more than two-fifths of the population are in extreme poverty (Chapter 2), of all the issues, then the poverty situation needs to be tackled first for the success of co-management.

Role of local institutions

[105] The SRF actors, by and large, appear to be not yet much aware of the co-management initiative nor do they have much interest in it. Given their poverty conditions, they have one and only one concern in front of them, that is, their concern of livelihood.

[106] See, for example, Landell-Mills (1995).

The local government institutions (LGIs) such as Union Parishad and Upazila Parishad need to be strengthened as their role is very crucial in both protecting the forest and improving the situation of the collectors. The SRF actors are in the opinion that politicization and lack of integrity of these institutions are the major bottlenecks to managing and conserving the forest. Without strong participation of the LGIs the conservation of the SRF through co-management may not be successful and sustainable. Strong policies are also necessary for the UPs to function independently apart from enhancing their capacities.

Ownership of the local people

Sense of ownership has to be promoted so that people are engaged in conservation. It is important that the conservation project is a participatory one in its approach. It is important to make it clear to people that the project is meant for the community; and their stake into the project is ensured with the policy framework.

Natural hazards

The extreme poverty situation is further deteriorated by the incidence of natural calamities. The destruction by natural calamities inevitably makes the poor hungry, only to make them angry and get involved in indiscriminate extraction from the SRF, often illegally. So, addressing the issue of destruction due to natural calamities should also be integrated with forest co-management.

Alternative livelihood means for fish fry collectors

It is important to provide allowance or alternative livelihood means (e.g., interest-free micro-credit provision, skill development training) for those engaged in collecting fish fries to reduce dependency on fishing. A provision of special allowance for education of children involved in shrimp fry collection would also be helpful. Issuing permits and licenses to fry catcher would allow only the seasonal capture of fry.

Social Forestry Issues

Social forestry is a good option in the context of forest conservation. The beneficiaries of the social forestry programs should include only those who took part in plantation and nurture from the time of commencement. But the reported politicization at times in changing the list of the beneficiaries at the time when income is generated is a concern posed by FGD participants. Such activities will simply dismantle the effort of conservation through social forestry programs. This gives a message that co-management of SRF would also be jeopardized if potential political interference is not taken care of.

Insurance for the SRF resource collectors

The collectors take high financial and life risks during collection of products from the forest as the act of pirates (demanding high ransom) and tigers has been cited by a large number (30%) of SRF collectors as a major problem of extraction [107]. Insurance schemes particularly for the SRF harvesters will be beneficial and will minimize risks in this respect.

Exploitation and Unemployment

[107] It is tragic that the SRF collectors often become victims to pirates and tigers. During their departure for the travel to forests they often arrange for *Milad* (religious congregation of family members), seeking blessings from the Almighty so that they can return safely from tigers and pirates.

The exploitation of bottom layer actors by the upper hierarchy largely contributes to their low income as reported by the participants in the FGDs. The unemployment is getting more and more crucial in the SIZ areas, especially due to the massive destruction of agricultural lands. The natural calamities have also contributed much to unemployment. Sidr and Aila have done great damage to the community [108]. The exploitation of the collectors in the value chains is also evident from the survey findings (Chapter 5). The study reveals a dismal picture of the harvesters profitability as they earn net returns at best in the range of 3 to 7 percent while they create price value additions (in terms of price) by as high as 50 to 75 percent, depending on the products in question. High interest rate and never ending dadon repayment, the abuse by the Mahajans and lack of working capital are the major reasons that contribute to the exploitations.

Capacity of the FD

Almost all actors along the value chain, particularly the collectors and Mahajans, are affected by ransom and other unofficial payments to officials, which dramatically increases their costs of harvests, accounting for up to 10 to 25 percent of total costs of production, depending on products. As well recognized in many documents (e.g., SEALS), the shortage of personnel, equipment and other logistics (e.g., speed boats, fuel, etc) in the FD is a major constraint in protecting the forest from illegal harvests and protecting the collectors from forest and river pirates.

The law and order situation needs improvement to protect the SRF collectors from giving periodical ransoms to the forest and river pirates. Once the security is ensured, this will have some bearing on the production costs and subsequently some benefits are likely to be trickled down to the harvesters. The FD has to be given more advanced equipment and technology. More speed-boats, gun-ships and manpower are necessary. More trainings and exercises jointly by the FD and the Navy will benefit the effort to fight the pirates.

Low cost equipment and adoption of computer technology: Low cost equipment is to be installed for the conservation of the forest. Digital technology will add advantage in conserving the forest. Infrastructure of web-cam through out the SRF will bring low cost option for the FD in protecting and monitoring the sanctuaries and the overall conservation of the SRF.

Increase awareness on conservation and forest rules

The actors community appears to be not much aware of the conservation issues, risk of degradation, and the importance of the Sundarbans. Appropriate authority in collaboration with local NGOs needs to undertake more campaign programs to aware the community regarding the importance of conservation. Given the poor awareness level, arrangement of awareness programs on forest rules would also be a step forward.

Increase awareness on sanctuaries and fishing

The present study reveals that a large number of respondent actors were not aware of the prevailing sanctuaries of fish and other aquatic resources (See Chapter 3) as about 55 percent reported that they were not aware of the existence of sanctuaries. Even those fisher respondents, who were aware of the restricted areas of fishing grounds, confessed that they often harvest in restricted fish sanctuaries. The survey also shows that more than a quarter of the respondents had no knowledge if they were fishing at the sanctuaries. The awareness level of the community regarding the sanctuaries needs enhancement. Campaigns on public awareness in creating safe

[108] It was unfortunate that the infrastructure damage (roads, embankments and polders) done by Sidr and Aila largely remained unattended for a long time, making people more vulnerable. Only recently, efforts have been made to undertake repair and rehabilitations led by the Army.

habitat for fish and conserving fisheries resources to protect rare species through bill-board, handbills, leaflets, stickers, and mobile SMS generation need careful attention.

The use of the Information Technology (IT) should be further enhanced in protecting the sanctuaries that are crucial to conservation of the Sundarbans. Some experts strongly suggested allocation of special budget for the FD to incorporate IT in their monitoring mechanism. The options for IGAs for the people living in places surrounding the sanctuaries should be targeted.

Provide ID card to collectors

Apart from the ones described above, there are also a number of other issues. The collectors of the SRF should be provided identification cards which, the SRF actors observed, will improve the situation and status of the collectors. The FD would be able to ensure the total number of collectors and the amount of catch they are allowed per year, apart from providing some useful information on certain species.

Lifting restriction on goran

The pressure on fuel-wood comes mainly from poor actors of the SRF. Such actors also supplement some incomes through fuel wood sales. On the other hand, dung is getting scarce to be available for fuel, which is also likely to have impact on agriculture. Women have to spend greater time fetching fuel-wood to meet domestic cooking needs. The increase in time burdens is likely to have impact on the caring responsibilities of household members. Following this, it is difficult to stop illegal harvesting of goran. In this pretext, the poor community may also get involved in illegal logging activities. So, the ban on goran (imposed since Sidr) needs to be withdrawn.

Geographical flows of SFR products

Mapping of geographical flows of SRF products (Chapter 4), which have some policy implications, shows that so far the first stage movements are concerned, the SRF products are traded within SIZ upazilas to the extent more than one third (34.1%) while the proportion that are traded in other parts of the country [e.g., Khulna, Chittagong and Dhaka (presumably some for exports), and other parts of the country] estimates as about a little less than two-thirds (63.7%). The traded quantity directly from SIZ to outside the country is estimated as about only 2.3 percent.

6.6 Climate Change and Adaptation Measures

Like co-management of SRF, climate change and adaptations was also not much a related topic in the context of the current value chain analysis study. Based on whatever interactions we had with the respondents on the issue of climate change and adaptations, the study observes that the SRF actors, by and large, are quite aware of the ongoing climate change and their effects (See Chapter 3, Section 3.4). Generally, the SRF actors perceived that climate change has already resulted in abnormal increase in salinity. The percentage of respondents reporting the severity of the problem as very high is more than 57 percent. The problem has been compounded in that it has already resulted in severe shortage of fresh water in the SIZ area.

It is genially perceived that the Sundarbans mangrove, which is the country's natural protection against cyclone and tidal surge, will be threatened due to inundation [109]. The entire ecosystem

[109] In contrast to what our survey findings revealed, the FGD participants generally did not think that the Sundarbans will be going under the water due to sea level rise as lots of sedimentation process going on in the SRF area.

with their few hundred species is likely to be affected, as reported by 25 percent of the actors. Both yield and quality of SRF are expected to decline as reported by 41 and 27 percent of the SRF actors respectively. They have particularly mentioned about degradation of honey extraction, in both quantity and quality.

Adaptation/Mitigations/Preparedness Taken/Suggested

As presently the dykes and embankments are in a terrible state of physical condition, these can hardly provide defense against tidal surges due to the possible climate change and resulting sea level rise. As suggested by the SRF actors, one of the top priorities would be to strengthen these dykes, and construct much needed new ones, including cyclone shelters with basic facilities, in order to reduce vulnerability to population. Homestead raising is generally practiced by higher layer SRF actors.

Ensuring access to safe water supply would be one of the top priorities mentioned by the respondent actors. While rainwater harvesting and pond-sand-filter (PSF) techniques are currently practiced by them, it is important to re-excavate ponds and khals for conservation of adequate water [110]. This will at the same time help reduce water logging, which is a major issue in SIZ areas.

With regard to agriculture, specialized crops such as salt-tolerant and soil-less species should be promoted according to SRF actors. Although planting more trees (especially coconut trees, and even mangrove plantations) along embankments and roads is already practiced, further efforts need to be stepped up in this respect. The soil-less cultivation system (i.e. hydroponics system) is already practiced by some actors as an adaptation against potential sea level rise and climate change but this has not yet gained much popularity.

As a large majority of population in SIZ areas, particularly women community, heavily depends on livestock and poultry for their livelihood, it is important to widely cultivate livestock pasture in newly developed char areas in a bid to improve on food security, instead of leasing them out as a preparation to climate change and sea level rise in the future.

The actors suggested to undertaking further and massive social forestry program apart from what have already been implemented. It is important to strengthen afforestation program by planting salinity-tolerant and local species of trees in future to deal with climate change. The actors also suggested that massive public awareness campaigns be undertaken including preparedness training on potential sea-level rise and its impacts.

[110] Such observation was also made in Islam *et al* (2005).

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