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INTEGRATED PROTECTED AREA CO-MANAGEMENT (IPAC)

SUMMARY

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

August 26, 2010

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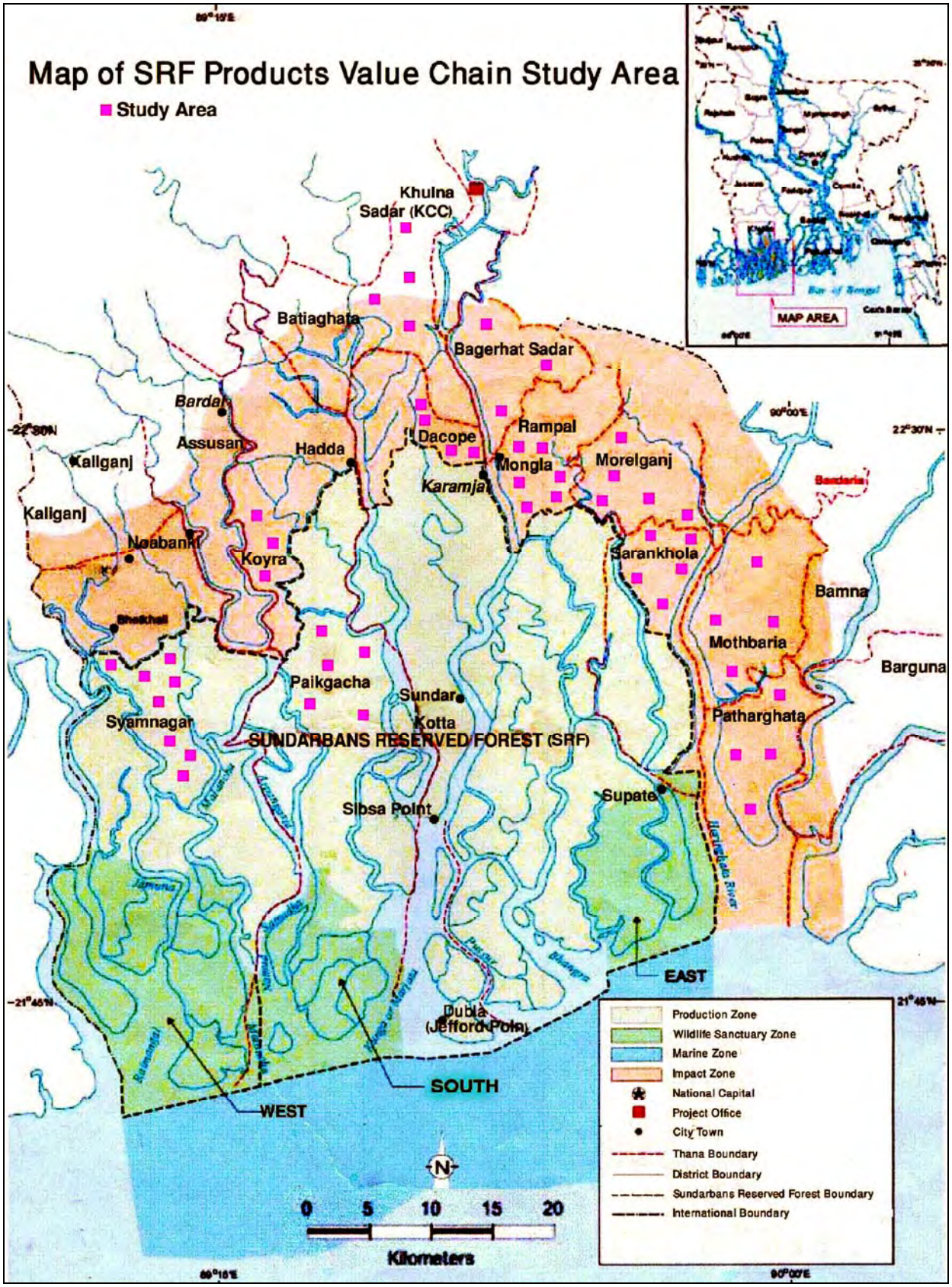

Map of SRF Products Value Chain Study Area
Study Area
Khulna Sadar (KCC)
Batiaghata
Bagerhat Sadar
Bardal
Assusan
Hadda
Dacope
Rampal
Mongla
Morelganj
Karamjal
Kaliganj
Kaliganj
Nalbanki
Koyra
Sarankhola
Bamna
Mothbaria
Barguna
Paikgacha
Sundar
Kotta
Patharghata
Syamnagar
SUNDARBANS RESERVED FOREST (SRF)
Supate
Sibsa Point
Dublá (Jefford Point)
EAST
SOUTH
WEST
MAP AREA
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
N
0 5 10 15 20
Kilometers

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 report is concerned with the summary 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 conducing 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

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 Program
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 Program

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

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 investigations have been carried out in details. Of these, for various reasons, the products such as sundri or goran (banned items), grass,

[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.

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:

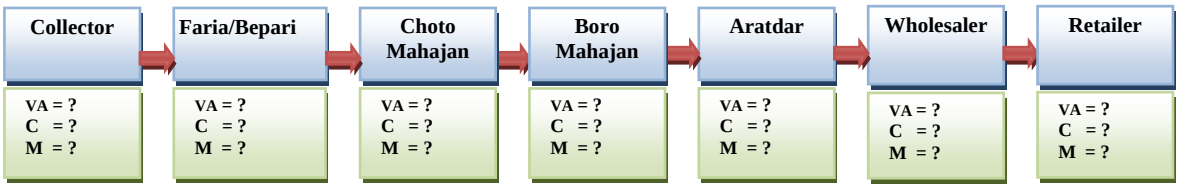
- Mapping for core steps in a value chain
- Mapping for actors
- Mapping for number of actors and jobs
- Mapping for volume of products
- Mapping for geographical flows, and finally
- Mapping for the values at different levels of the value chain.

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

available in Volume 2 of the study report). 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.

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

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].

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).

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[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.

[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.

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.

Chapter 2:

SIZ District and Upazila Profile

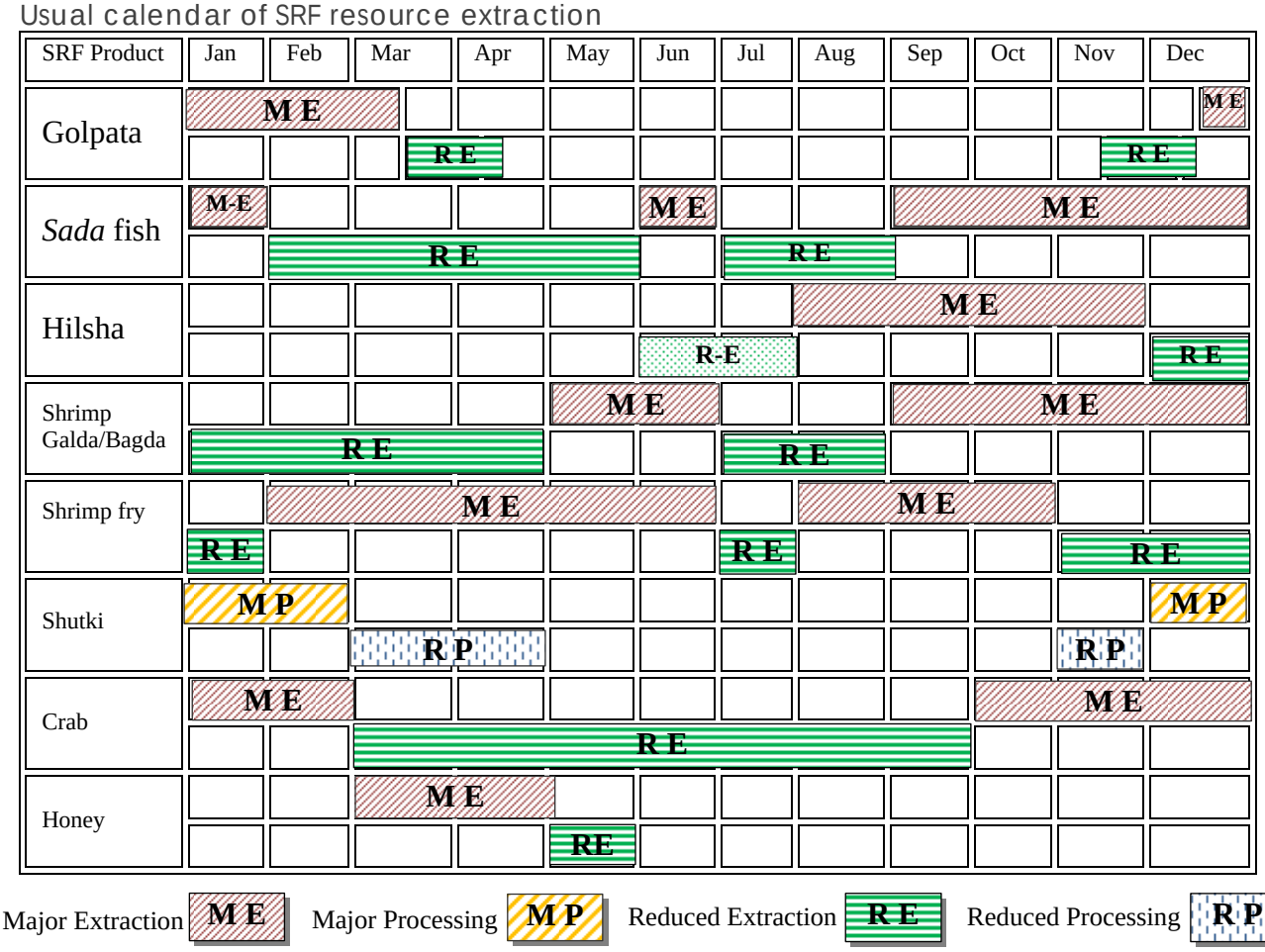
Selected Socio-economic Indicators

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 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 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 available in Volume 2 of the study report.

[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.

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 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. 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

[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.

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 (available in Annex B of Volume 2 of the study report).

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 available in Volume 2 of the study report.

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 %).

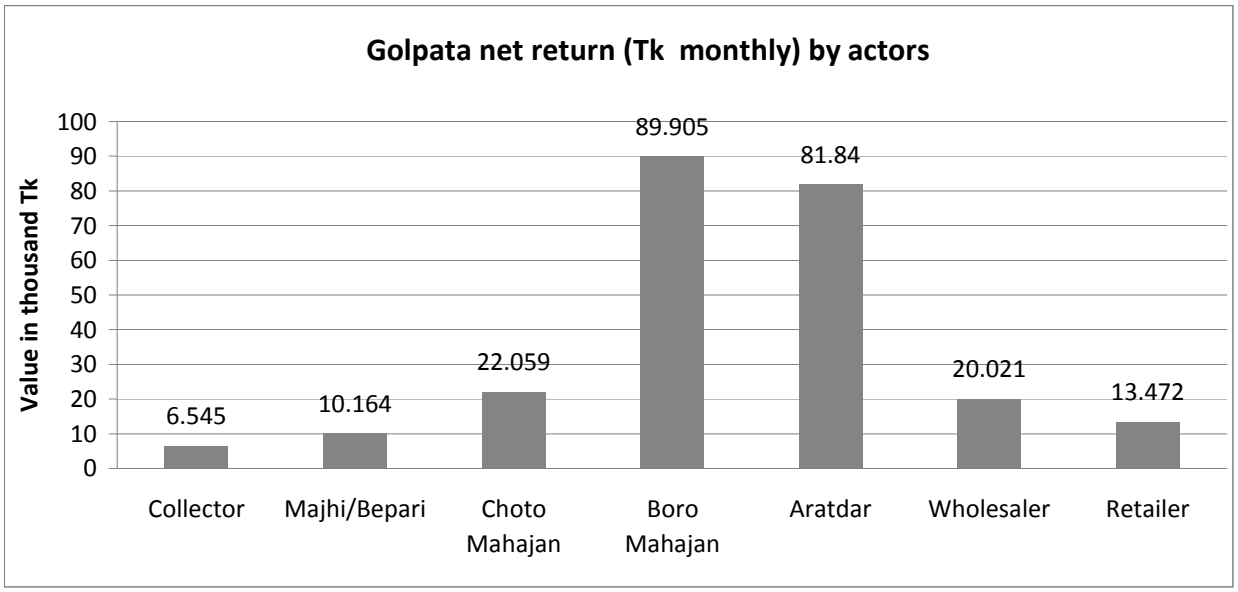
Value Addition and return for golpata

	% 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 (Volume 1)

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

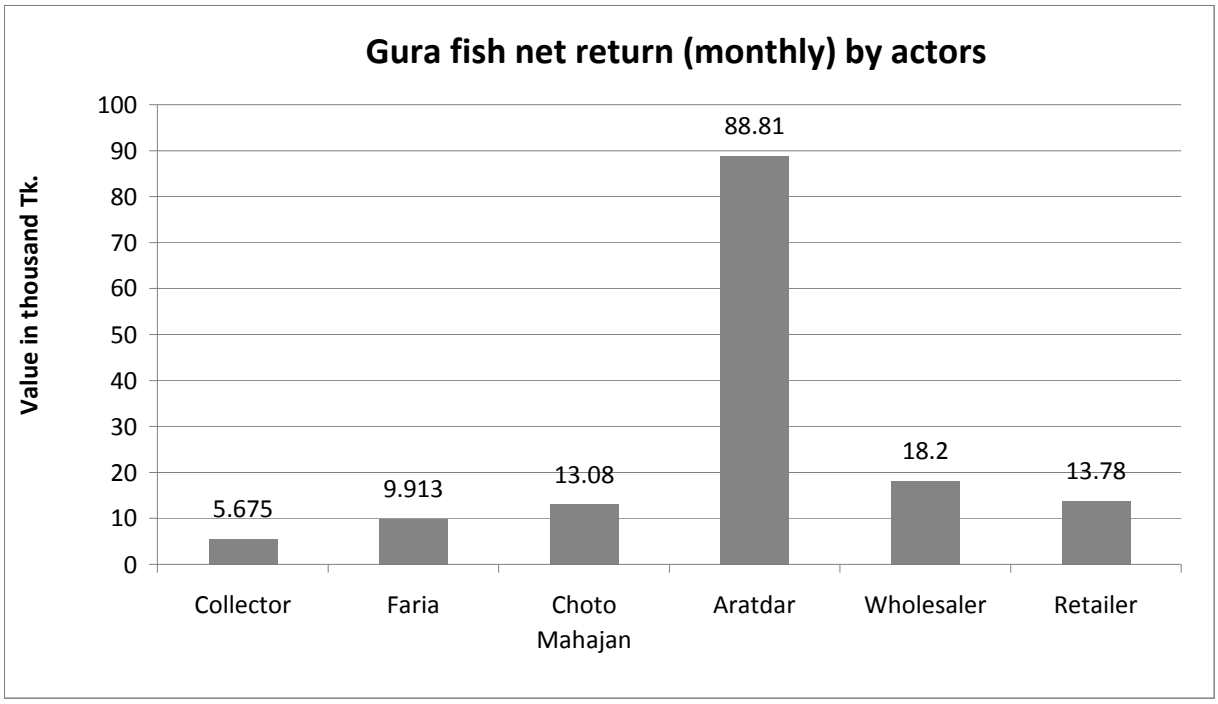
	% of value addition & return for *gura* fish			
	Price Value Addition (%)	Av. volume Per month (Kg)	Net Return (Tk/month)	Net Return as % WC
Collector	64.6	0.6	3.8	72.4
Faria	9.2	4.7	6.6	12.9
Choto Mahajan	1.5	5.0	8.8	10.9
Aratdar	4.6	72.7	59.4	11.1
Wholesaler	7.7	11.8	12.2	9.1
Retailer	12.3	5.2	9.2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

Source: Table 5.2(Volume 1).

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.

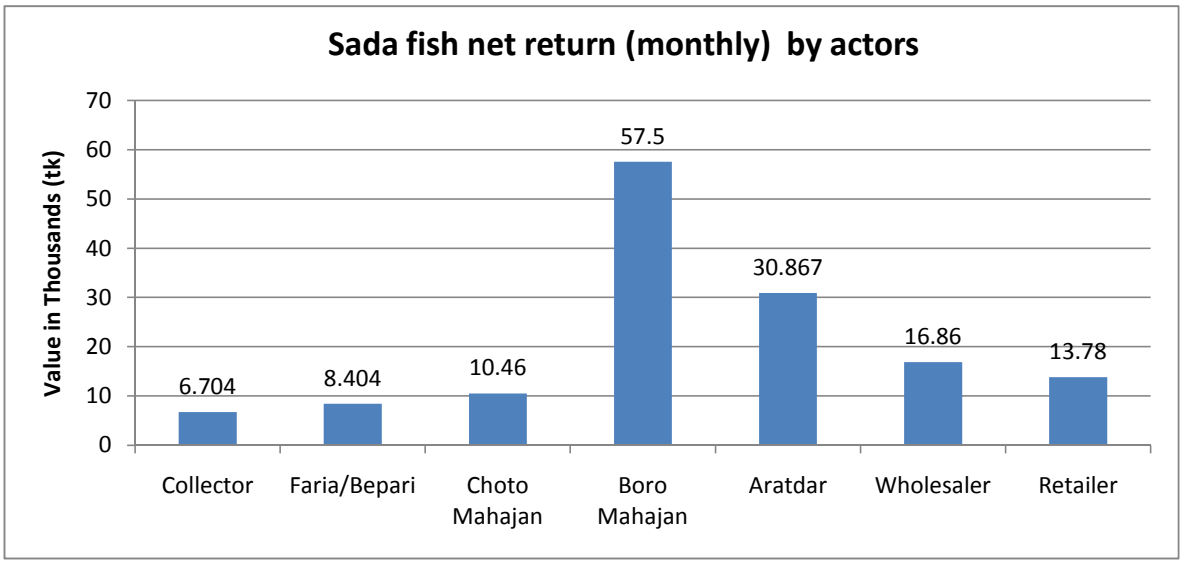
Value addition and return for *sada* (large) fish

	% 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(Volume 1)

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.

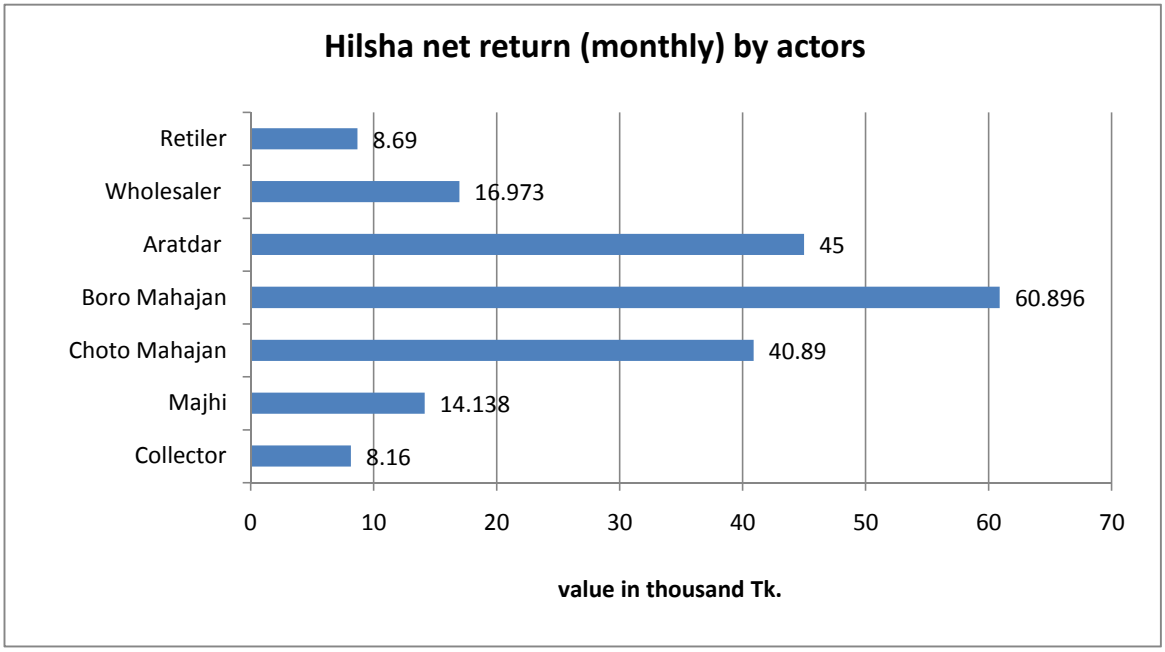
Value addition and return for hilsha

	% 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 (Volume 1)

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 (Volume 1)

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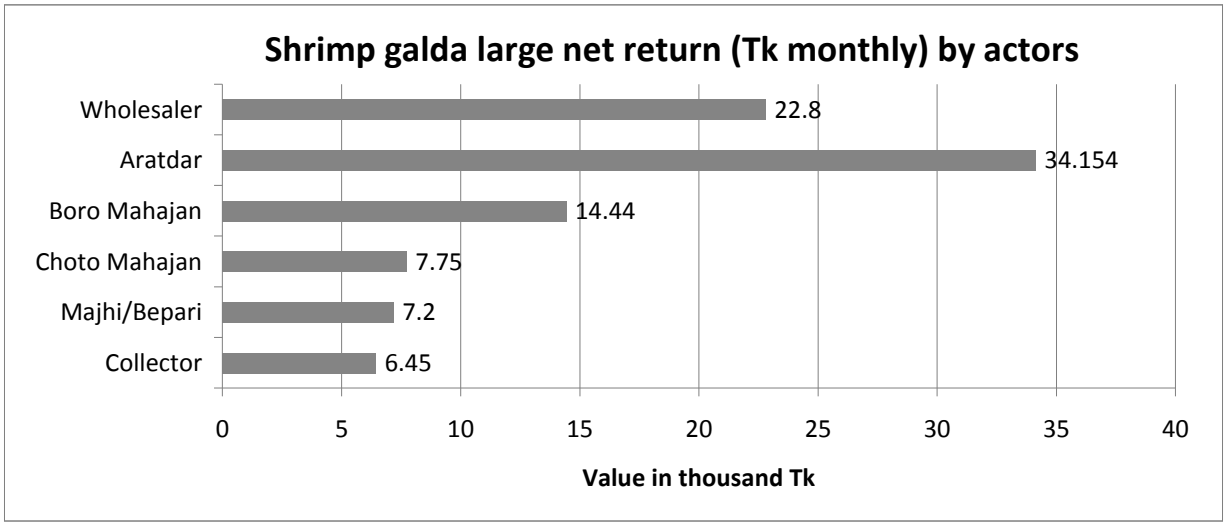
Aratdars, again, have the highest proportion of gross or net returns (around 31-32%), followed by wholesalers (around 20-21%), Boro Mahajans (around 14%) and Choto Mahajans (7-8%). As usual, collectors have the lowest proportions of both gross and net returns (6-7%). In absolute

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%).

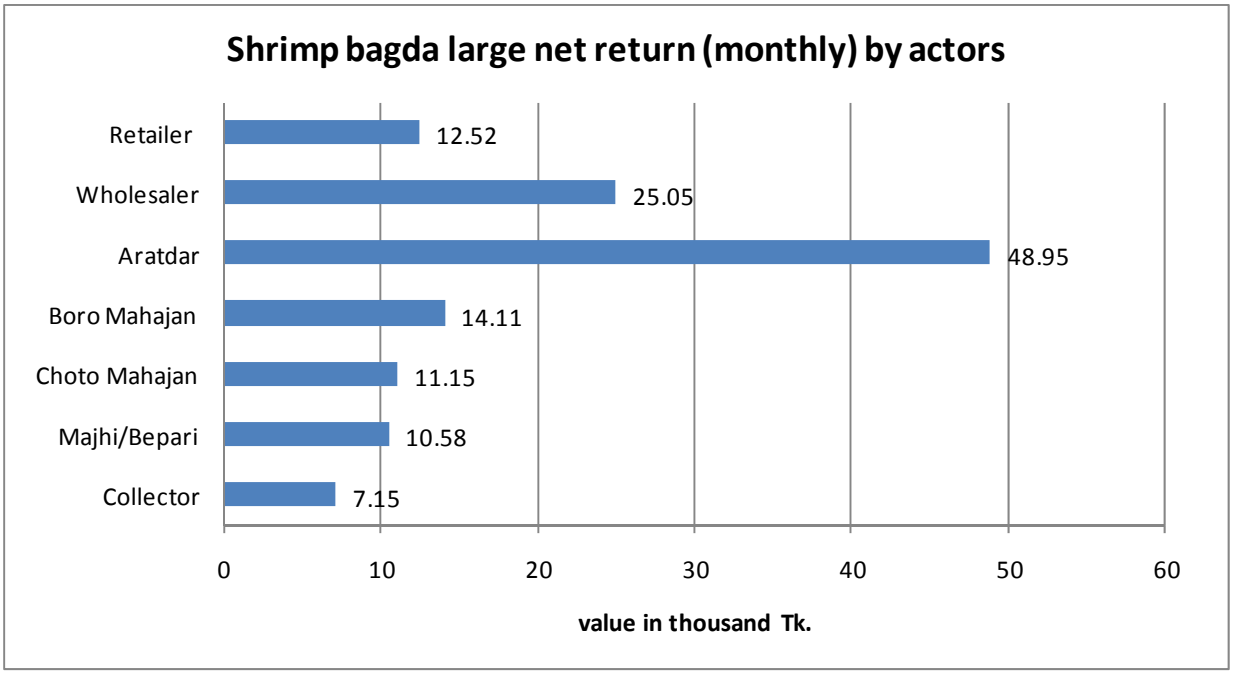
Value addition and return for shrimp large (bagda)

	% 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 (Volume 1).

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



Shrimp Fry (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 (Volume 1).

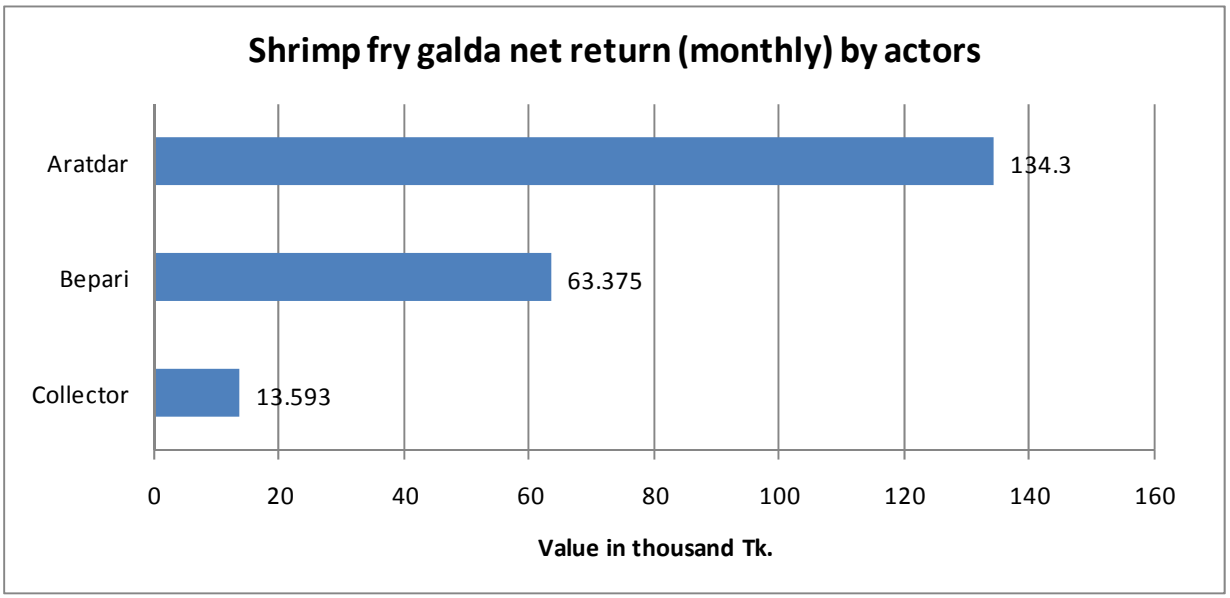
Value addition and return for shrimp fry (bagda)

	% of value addition & return for shrimp 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	-

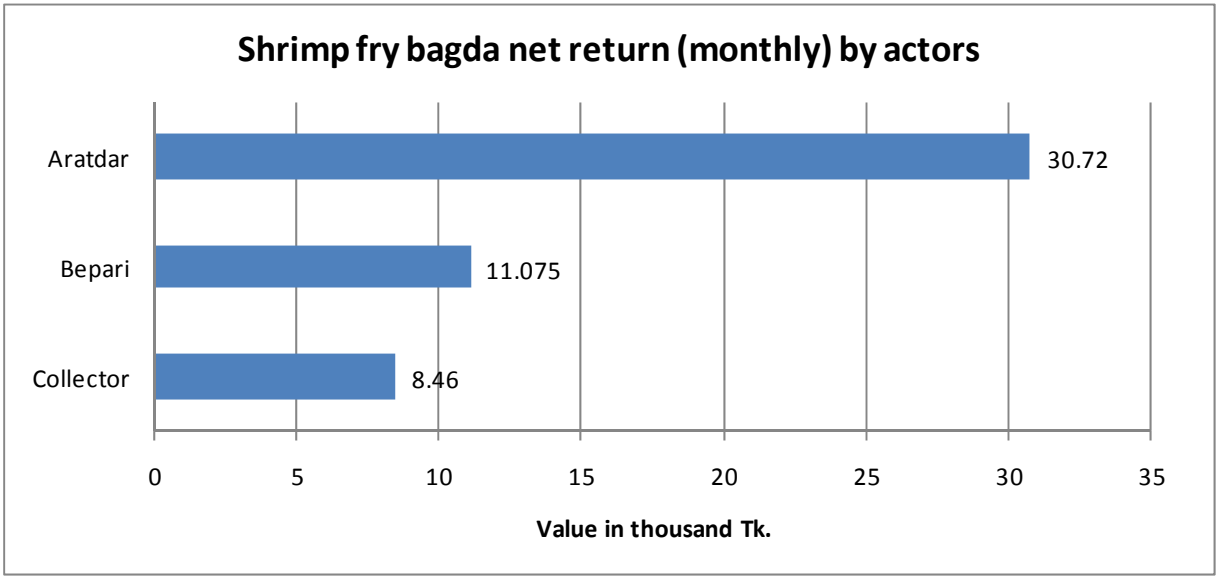
Source: Table 5.10 (Volume 1).

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.

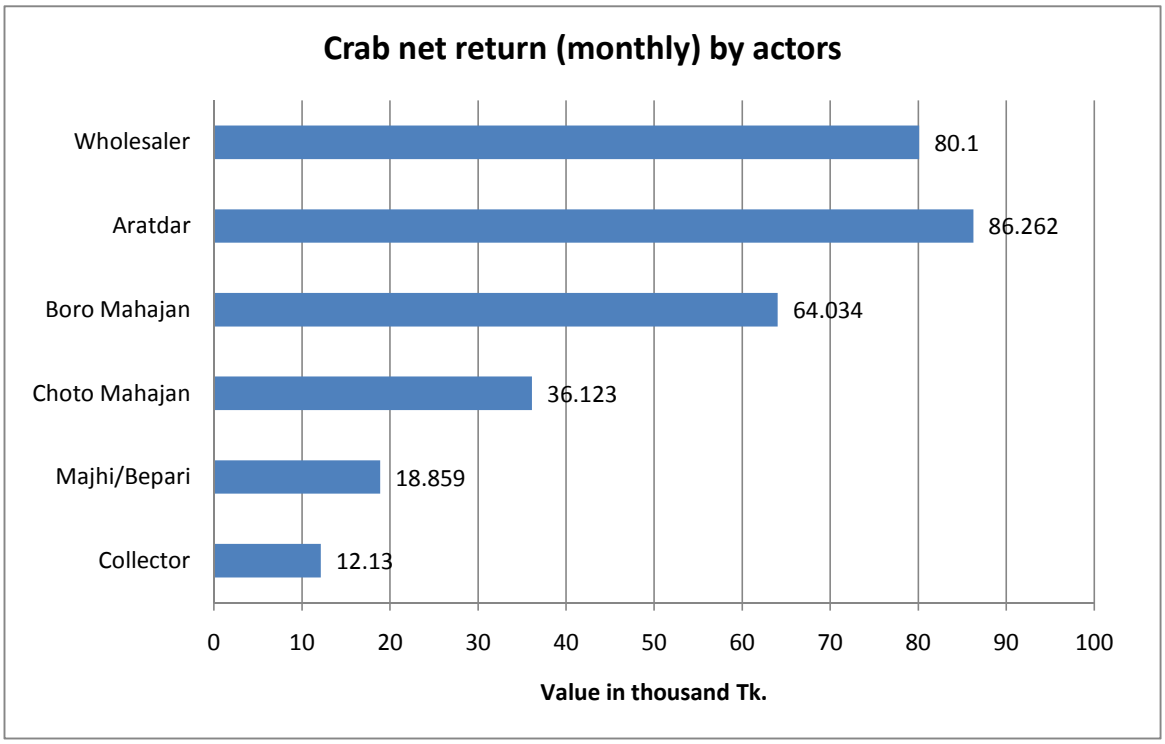
Value addition and return for crab

	% 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(Volume 1).

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.

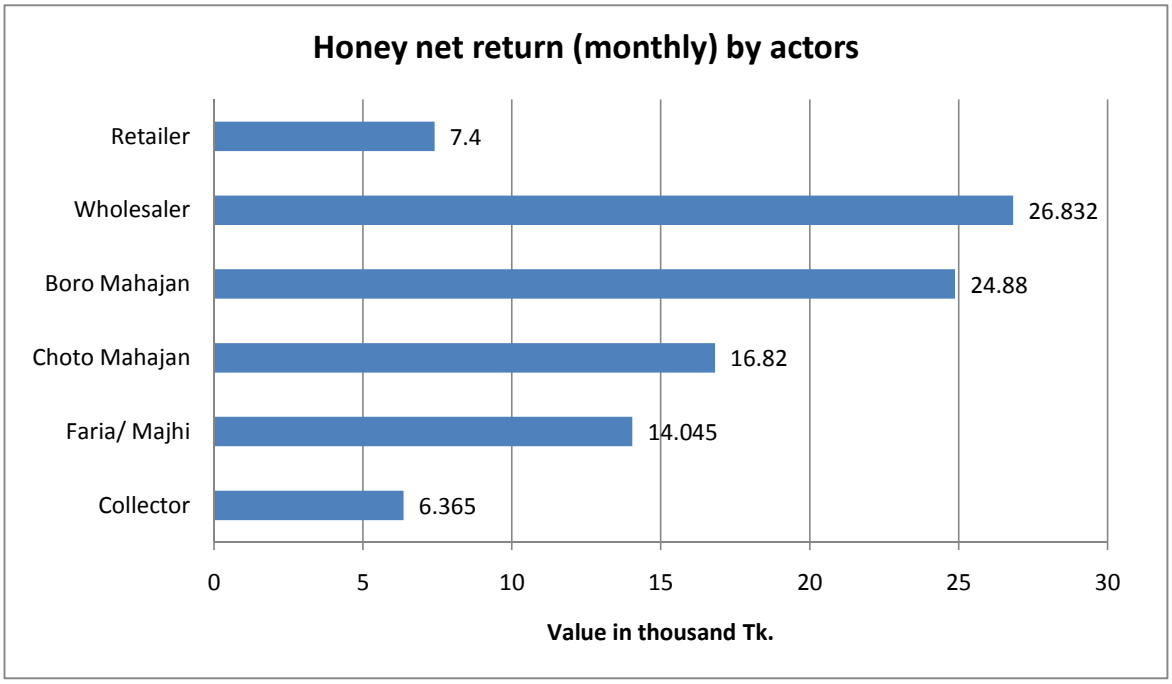
Value addition and return for honey

	% 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 (Volume 1).

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

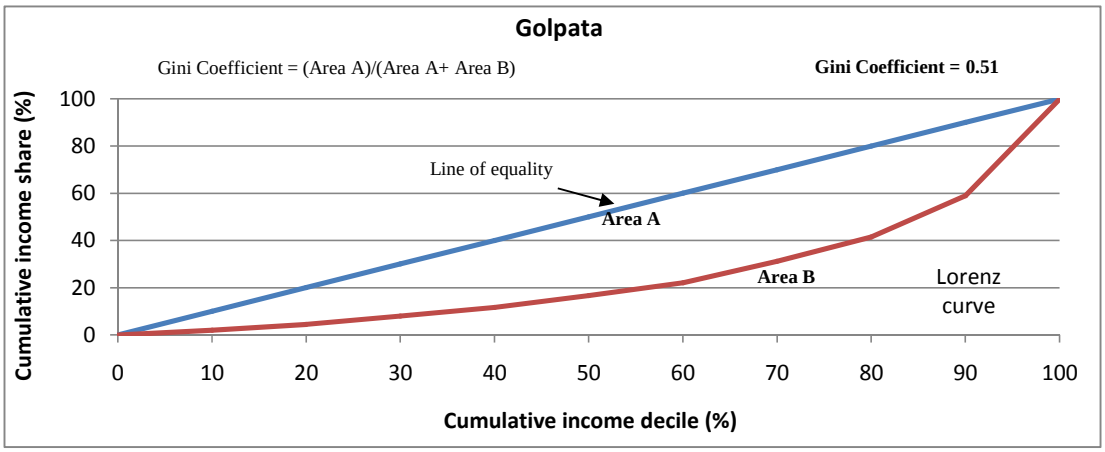


Distribution of Actors Income – Income Inequality

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.

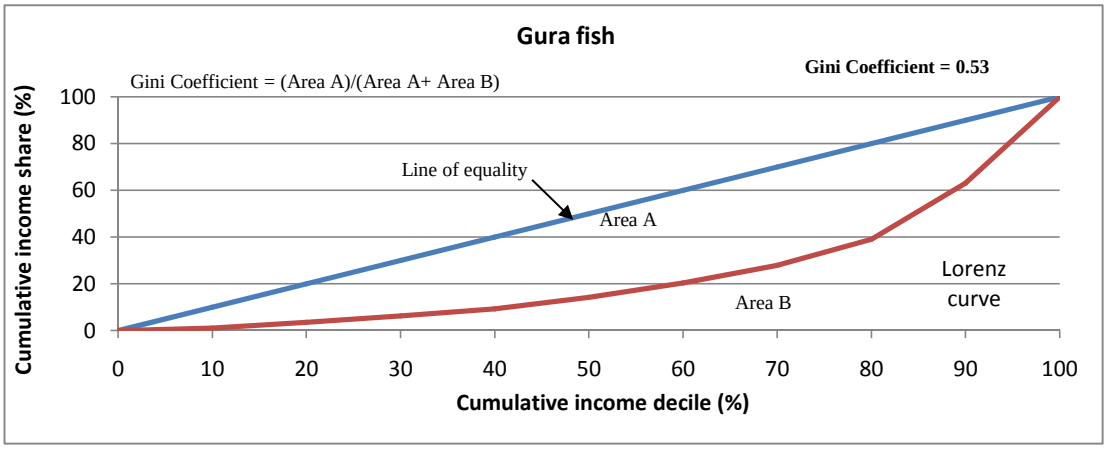
Lorenz curve: Golpata



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.

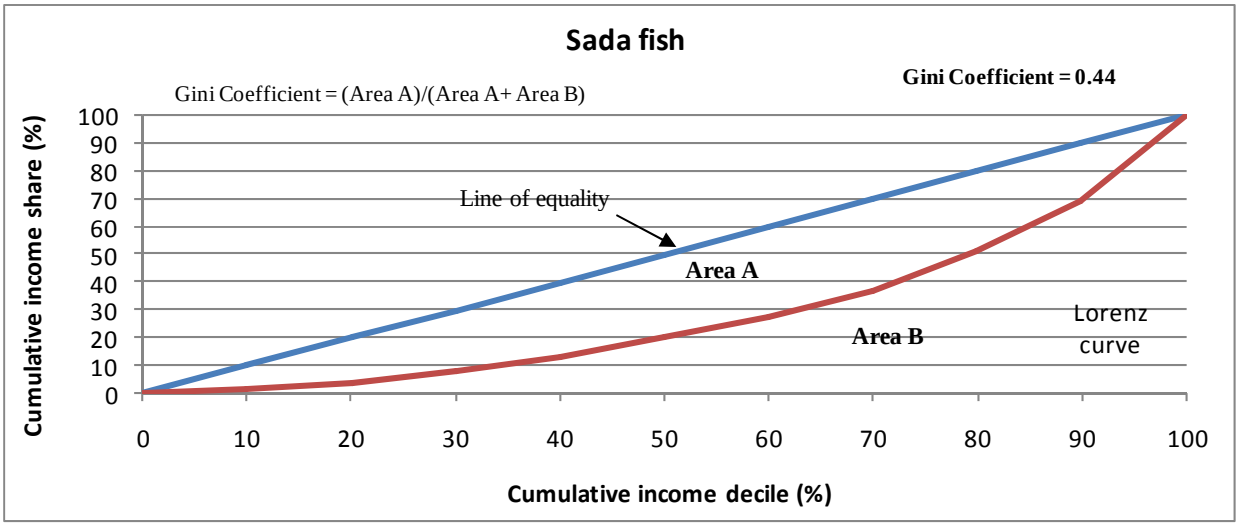
Lorenz curve: Gura fish



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.

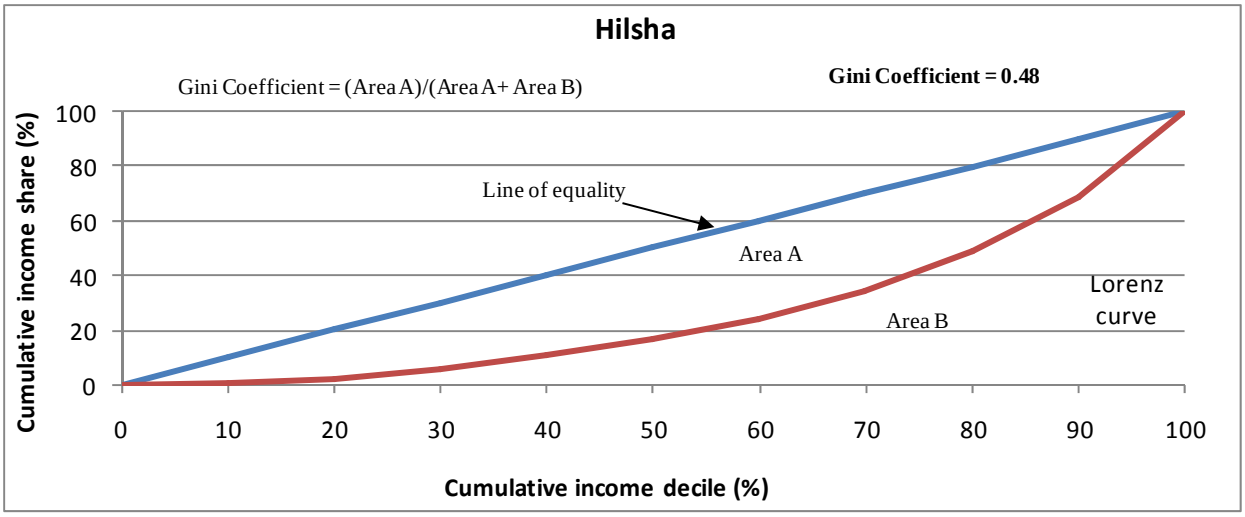
Lorenz curve: Sada fish



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.

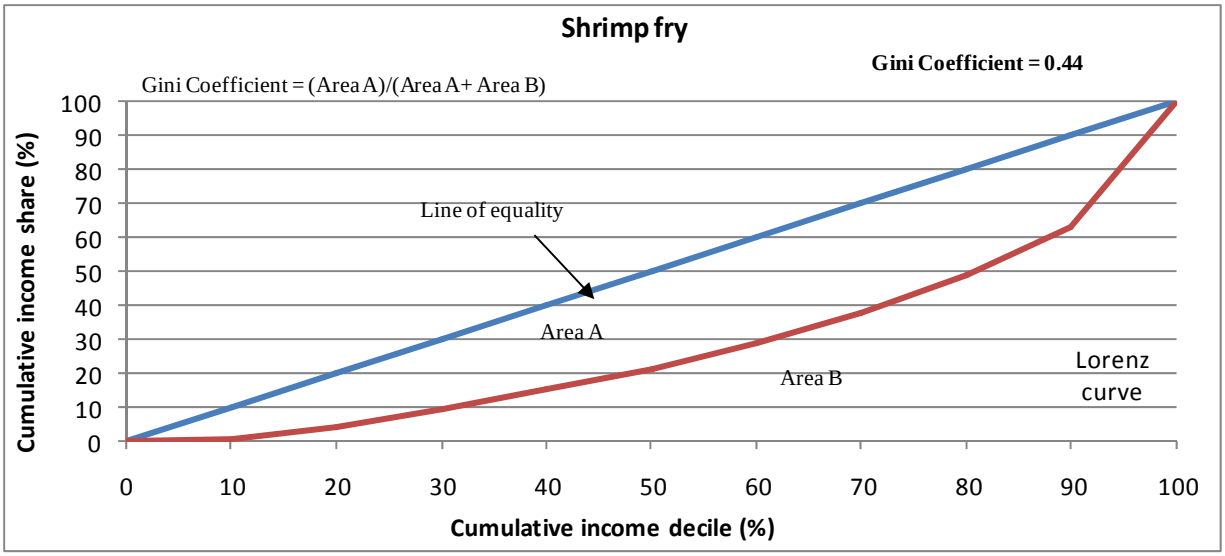
Shrimp Small (galda and bagda)

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.

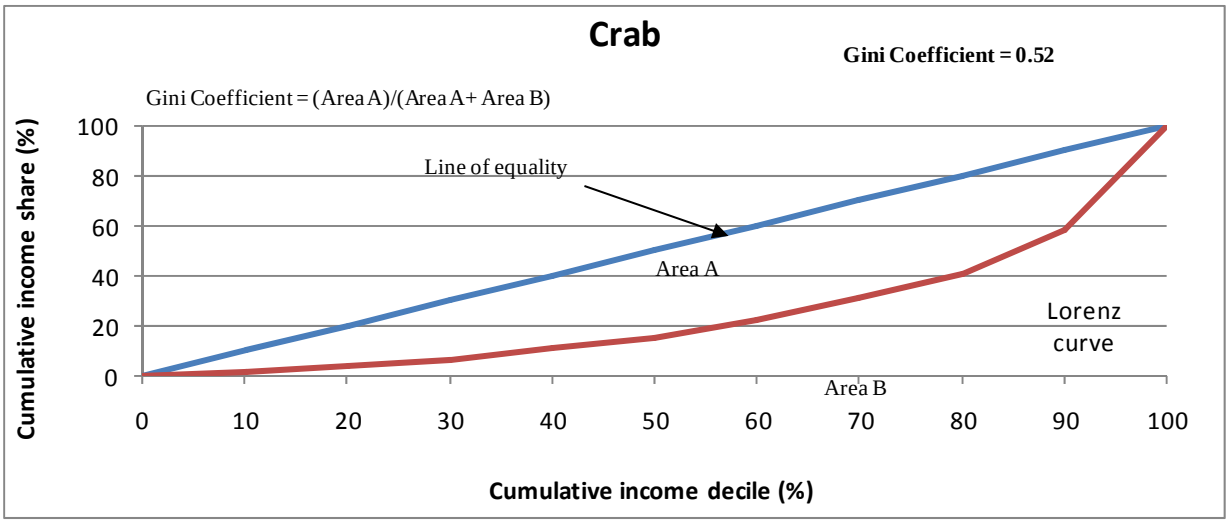
Lorenz curve: Shrimp fry



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

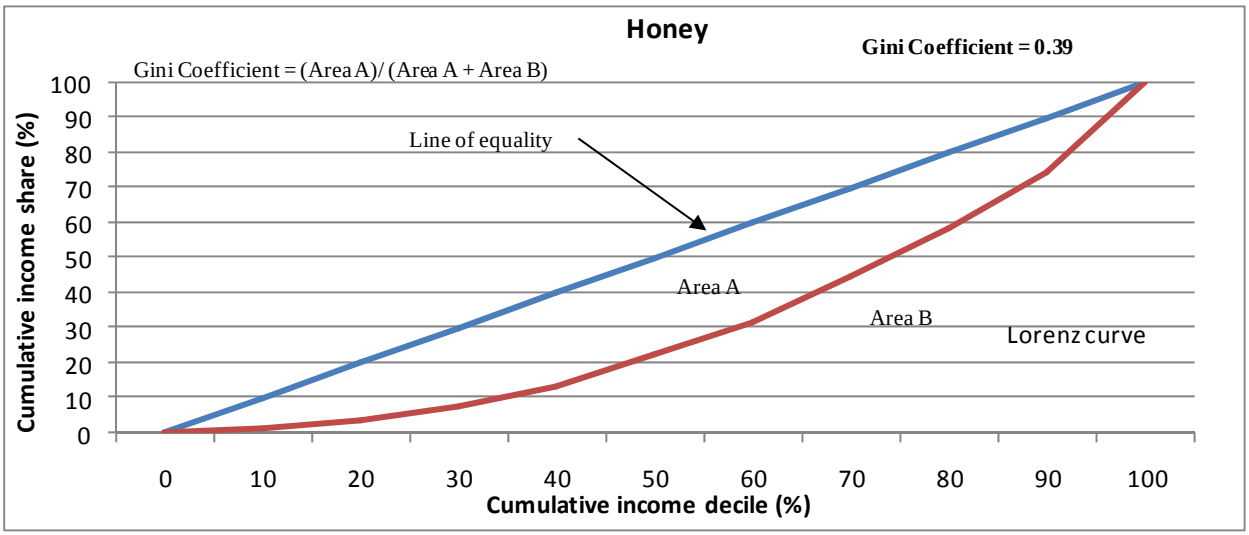


Honey

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



Summary

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.

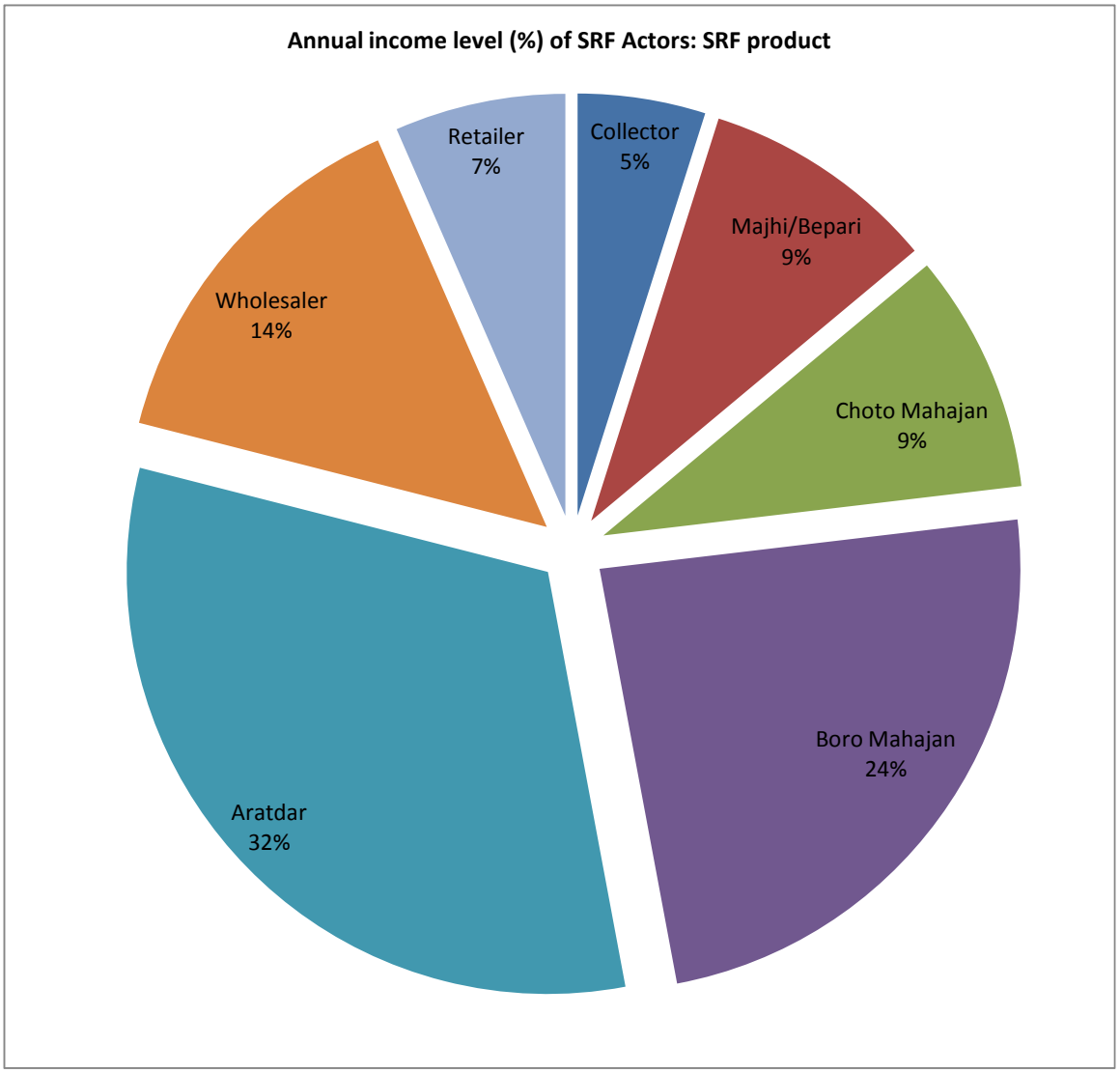
The degree of inequality has been worse in some activities than the others. Taking all SRF products together, the average income earned by an Aratdar or a Mahajan is found to be nearly 5 to 7 times as much as earned by a collector. Inequality is demonstrated in that the income of a collector constitutes,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


Annual income level (%) of SRF Actors: SRF product
Collector
5%
Majhi/Bepari
9%
Choto Mahajan
9%
Boro Mahajan
24%
Aratdar
32%
Wholesaler
14%
Retailer
7%

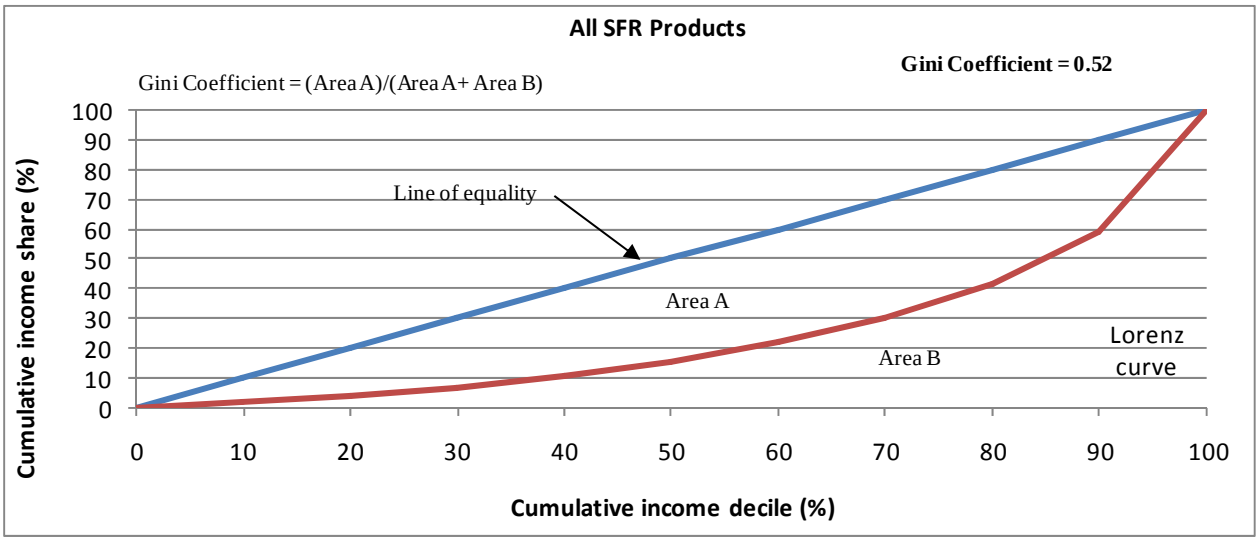
Income distribution and income inequality in SIZ area

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
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].

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[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.

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.

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

[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.

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].

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.

[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 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.

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.

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

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

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 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.

[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.

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.

Role of local institutions

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.

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

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

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.

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