



Leave no one behind

Power and profits in Bangladesh's hilsa fishery: a value chain analysis

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Bangladesh has seen a recovery in stocks of its national fish, the once-plentiful hilsa, since the government introduced measures to protect it in 2003. The most important of these is a seasonal fishing ban during key stages of fish development, with food compensation for affected fisher families.

While the conservation measures affect first and foremost the fishers who catch hilsa, there are implications on actors across the whole value chain – such as intermediaries, traders and service providers. What are the impacts on each link in the chain – who gains and who loses? This paper aims to unpack systemic constraints along the hilsa supply chain and to inform policymakers on how the ‘leave no one behind’ agenda may be achieved.

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Acronyms and abbreviations

BCAS	Bangladesh Centre for Advanced Studies
BDT	Bangladeshi taka
DoF	Department of Fisheries
FGD	focus group discussion
GDP	gross domestic product
HCP	Hilsa Conservation Programme
INR	Indian rupees
LNOB	leave no one behind
NGO	non-governmental organisation
PES	payment for ecosystem services
SDG	Sustainable Development Goals

Glossary of terms

<i>Arat</i>	A fish landing centre-cum-wholesale market for fish.
<i>Aratdar</i>	Directly translated, 'a man who has a place to keep fish, in order to sell by auction'. Fishers give <i>aratdars</i> their whole hilsa catch to sell by auction. <i>Aratdars</i> have their own place in fish landing centres since most hilsa landing centres are outside government jurisdiction. They sell fish to wholesalers and sometimes large retailers.
<i>Bepari</i> (also known as <i>Bapari</i>)	Translates as 'businessman'. <i>Beparis</i> buy large quantities of hilsa from fishers or <i>aratdars</i> to sell to other hilsa traders. They make contacts, load fish to transport, etc.
<i>Dadon</i>	Loan.
<i>Dadondar</i>	Money lender. <i>Dadondars</i> give loans or credit to others for investments in productive/ business activities (as opposed to loans for consumption).
<i>Faria</i>	Fish brokers. <i>Farias</i> usually buy fish from the fishers and sell at <i>arats</i> (wholesale markets) in the landing centre. They also lend money to fishers at high interest rates (Shahajat, 2016). They often purchase small quantities of fish from fishers at a distance from the market, bring it to the terminal point and sell it to the <i>aratdar</i> or retailer.
<i>Jatka</i>	Juvenile hilsa fish.
<i>Mahjee</i>	Head fisher or boat captain (who may own the boat or hire it)
<i>Mohajon</i>	Literally 'big man', or 'man with higher status', used to refer to those who loan money and collect interest. Loans from <i>mohajons</i> can be used for productive/non-productive uses as long as it is paid back. They want the interest for the loan, not the catch, unlike the <i>aratdar</i> .
<i>Nikari</i>	Middlemen who trade in information for buyers rather than products. <i>Nikaris</i> receive commission from fishers and <i>aratdars</i> .
<i>Paikar</i>	Wholesale trader. <i>Paikars</i> usually buy fish from <i>arats</i> (wholesale markets) and sell to retailers and other intermediaries. Some <i>paikars</i> are licensed traders or exporters who purchase hilsa from fishers through <i>aratdars</i> and export the entire product to overseas markets (Islam and Habib, 2013). International trade is however heavily regulated, and most hilsa is for domestic markets.
Payment for ecosystem services (PES)	In Bangladesh, PES takes the form of a direct incentive for fishers to compensate for the loss of their fishing income during seasonal fishing bans, which were imposed to increase the size and quality of the hilsa stock (an ecosystem service).
Retailers	The last intermediaries in the distribution channel. Some have fixed places in markets, or sell fish from door to door.

Summary

The hilsa fish is an important cultural symbol in Bangladesh. Once a staple food across society, overfishing and the degradation of its freshwater nursery sites have made hilsa scarce and more valuable. Realising its importance to the economy, the Bangladeshi government introduced a series of measures to restore hilsa stocks. The most important of these is a seasonal fishing ban during key stages of fish development.

These measures affect first and foremost the fishers who catch hilsa, but have wider implications on actors across the value chain – such as intermediaries, traders and service providers. The government offers food compensation to the fishers directly affected, but it is not clear what the impacts are for these other actors: who gains and who loses.

There is much debate and increasing knowledge in Bangladesh of the power imbalances across the hilsa trade. Yet there is insufficient data to support the arguments. With this in mind, we set out to explore the economic relations across the full hilsa value chain, from the river to the consumers in Dhaka and other places in the country. Following desk-based research and focus groups of key informants in Dhaka, we mapped out the hilsa value chain, identifying the main actors and knowledge gaps. We then conducted a stratified survey based on a business model with 250 observations, and four focus groups with hilsa traders in Bhola, Barisal and Dhaka.

Our study reveals the extent of fishers' vulnerability to weather patterns and market access, as well as the potential benefits that could be derived from a more equitable distribution of benefits, risks and costs along the chain. The five main points of discussion are summarised here:

1. A high-value market with guaranteed demand

Hilsa fish is highly valued, both for its flavour and as a traditional fish during Bengali festivities across all levels of society, at home and abroad. The prices hilsa fetches are significantly higher than other types of fish, and there is a guaranteed market for its supply.

In theory, this high demand should benefit the fishers as the key suppliers of fish. However, the hilsa fish market is divided into two very different trading systems. Fishers are under a monopoly, which obliges them to sell all their catch to a pre-agreed buyer. In many cases these buyers have provided upfront loans in exchange for the catch, effectively lowering the fishers' bargaining power to zero. Wholesalers, on the other hand, trade through instant auctions, where tight networks of informants supply information about fish in other markets in the city. This offers many opportunities to make healthy profits from the high consumer demand.

Better governance of markets can help break this monopoly and pass profits down the value chain to fishers, making the activity more profitable and bringing costs in line with revenues.

2. Fair payment for ecosystem services: while ecosystem investments can help the quantity and size of hilsa, the cost is borne by fishers

Overfishing, especially of juvenile and mother fish, has a direct impact on the size and quality of the hilsa stock. Recent reports suggest that the introduction of the temporary ban in Bangladesh is helping hilsa juvenile fish achieve bigger and better sizes. Other instruments used elsewhere to promote ecosystem enhancement in fisheries could also improve the health of the fish stock, for example the reduction of land-based pollution, use of improved technologies, and fishing quotas.

Our study shows that intermediaries and retailers are more likely to directly benefit, as better-graded hilsa gets significantly higher prices in the markets. With better access to cold storage, some intermediaries are able to freeze hilsa during the high season and sell it during the low and ban seasons, using supply and demand to their advantage to maximise profits. They are also able to switch to trading in other fish that are not affected by the ban.

But the cost of this fishing prohibition falls almost completely on the fishers. Income varies a lot across the chain, and the lowest incomes are for fishers (and the lowest service providers, eg ice and packaging). Some intermediaries make about five times more income than fishers.

Already poor, uneducated and in debt, fishers are not bearing this easily. Lacking access to fish protein, the rice compensation they receive is welcome; but is not enough to provide nutrition to their large families (40 kilogrammes per family, of which 5–10kg are lost as informal transaction fees). Importantly, incentives should be extended to all fishers affected by the ban: at the moment only hilsa fishers are entitled to compensation, even though non-hilsa fishers cannot operate during the ban (Islam *et al.*, 2016). The lack of suitable compensation to other people affected across the chain puts further pressure on fishers to attempt illegal fishing. Fishers' low level of education prevents them from finding alternative incomes. Although a programme of alternative income-generating activities has been offered to households receiving rice compensation, take-up is very low: 7,785 fishers in 2013 and 1,743 in 2014, out of 186,000 households receiving compensation. This urgently points to the need to review the type of training on offer in a way that responds to the needs and skills of the fishing families.

3. Opportunities to invest in improved infrastructure

Artisanal fisheries operate with relatively low technical costs (about US\$3,000/year variable costs). This means that relatively small amounts of investment at the beginning of the chain can have a significant impact on the fishers' ability to operate. For example, respondents to the survey mentioned the need to invest in better technologies, like *current jal* (monofilament fishing net) as it can be a problem for juvenile hilsa.

Investment is a pressing need for trading in the form of good landing centre facilities. Investing in these markets or bazaars makes a lot of economic sense, as they are already important trading locations near Dhaka. They are:

- Well-known points with high levels of year-round demand for hilsa; fish retailers, including hawkers/vendors of Dhaka city collect their fish from these markets
- Easily accessed: Kawran Bazar is situated in the middle of Dhaka city. Traders from Dhaka and adjacent districts have easy access by road, train and waterway to this market from around the city to collect the fish and move on to their own market
- Equipped with cold storage in some cases, with ice factories available nearby to meet demand for ice to preserve the fish.

Specific strategies for investment could include improving services along the value chain (such as transport, storage) that affect fish quality, reducing costs and increasing profits. For example:

- Modern facilities: larger landing centres to accommodate more intermediaries and facilitate the provision of other services on site (eg electricity, roof, water) as well as safe access for consumers
- Cold storage systems: these could be rented to supply fish during the ban season and festivals
- Affordable technologies for preservation: eg steel or wooden boxes
- Better road systems with less congestion: markets are in good locations close to the city, but traffic jams around markets increase transport time and affect fish freshness
- Increased stall fees: to pay for better facilities. At the moment the existing fee or taxes are low (in line with the basic provision of services). Hilsa is a very profitable trade; traders would be open to higher fees if they were earmarked to be reinvested in better landing facilities.

4. Inclusive financing to leave no-one behind

According to most respondents in the survey, there is little government investment to improve artisanal fisheries, or the marketing facilities along the value chain. Fishers have no access to finance for outfitting their boats. Intermediaries are affected by the lack of suitable trading facilities with services, some basic – like a roof or water – others more technical, like cold storage and better and quicker transport to ensure freshness of this valuable yet perishable commodity.

This represents a good opportunity for the Government of Bangladesh to develop an impact investment strategy to promote the sustainable provision of hilsa. These investments would complement the existing fishing ban that helps prevent overfishing of juvenile hilsa.

This could include combining funds from a variety of sources – such as the central government central budget, philanthropic sources and private sector investments – in a collective fund to invest in the hilsa trade. See for example Bladon *et al.* (2014) for a discussion of trust funds for marine resource conservation. This could make small-enterprise loans available for fishers and processors, such as loans and equity investments in relatively inexpensive processing

improvements (nets, boat fitting, ice and packaging for boats), as well as cold storage and distribution investments, such as trucks and local storage depots for intermediaries. There is also potential for larger amounts for public-private fisheries infrastructure, like modern, well-connected landing centres and better road systems.

There are clear possibilities for repayment along the chain. For example, the government could repay investors under long-term investment contracts, such as long-term purchasing contracts with wholesalers and retailers, especially high-value retailers like exporters. This would also mean lifting the ban on hilsa exports, while ensuring that high profits could be shared along the rest of the value chain. For exporters, lifting the ban could be accompanied by a system that would allow them to differentiate their product in international markets: according to the survey, Bangladeshi hilsa is renowned and highly valued for its taste, yet there is no official label to differentiate and capitalise on this niche product. A form of eco/fairtrade labelling, for example, could improve traceability across the value chain as well as help to target high-end buyers.

5. Risk reduction and insurance

Risk is a major problem in artisanal fisheries. At the moment there is major gap in insurance against losses. Most investment comes from *aratdars*, or wholesalers. They can lose the money invested as loans if their local facilitator (*bepari*) fails to collect it, or if the fishers are not able to deliver (due to illness, illegal fishing, loss of nets, boats, and so on). There is a palpable sense of use and abuse among survey respondents: fishers feel oppressed by the lack of alternative buyers and the loan conditions, and *aratdars* feel that they pay a high price in sharing the risk of failed fishing when things go wrong.

Fishing insurance can provide many benefits and support connectivity across the value chain, according to FAO (2017):

- For fishers:
 - Protects against accidents and natural hazards beyond fishers' control
 - Compensates (fully or partially) for the loss of or damage to fishing vessels, gear and catch (or harvest), thus helping to stabilise incomes in the fisheries sector
 - Reduces the individual's risk when adopting new technologies and buying improved equipment.
- Throughout the chain:
 - Reduces the risk to investors or financial institutions (such as a fund targeting artisanal fisheries) that provide credit to fishers and fish farmers
 - Fosters mutual assistance and co-operation among fishers, fish farmers and their organisations, and reduces friction between existing loans/ repayments.
- At the macro level:
 - Reduces the government's role and burden in terms of emergency relief in natural disasters
 - Promotes stability in fishery enterprises and the wellbeing of fishing communities, contributing to the government's commitments to poverty alleviation, food security, 'zero hunger' objectives, and sustainable development
 - Helps to stabilise the fisheries sector's contribution to the national economy, supporting multiple jobs and livelihoods across the rest of the value chain.

1

Introduction

Hilsa fish (*Tenulosa ilisha*) is an important source of income and cultural identity in Bangladesh. Hilsa represents 11 per cent of the total fish catch in the country, and provides jobs to over 2.5 million people (Islam *et al.*, 2016).

Declining hilsa stocks led to the government's decision to introduce drastic measures, both to improve the health of the stock and to reduce poverty in fishing families. Some of the measures included restrictions on fishing gear, regulating types of vessel, and seasonal fishing bans. The bans are designed to allow mature fish to reproduce and juvenile hilsa (*jatka*) to grow, thus achieving better sizes (and prices). It also allows juvenile fish to mature and reproduce to replenish the overall stock. As a compensatory measure, the government distributes rice to fishing families. This is a form of **payment for ecosystem services** (PES). The programme also provides capacity building for alternative income-generating activities, to partially compensate for the temporary loss of fishing income, and improve household diets.

This set of measures seems to be working, as the reported hilsa stock shows signs of recovery. Bigger and better fish sizes sell at much higher prices, bringing larger profits across the value chain. The flavour and characteristics of Bangladesh hilsa make it a valuable commodity, fetching as much as US\$25 per kilo in niche Dhaka and foreign markets. This is good news for the fishing industry and exports in Bangladesh, which already represents 4.3 per cent of the country's gross domestic product (GDP).

Yet, while environmental sustainability and sustainable economic growth should be fair and inclusive, fishers at the very bottom of the ladder remain poor, permanently in debt and bearing the full cost of the fishing restrictions.

There is a clear lack of equity and fairness in the fisheries sector, not only in Bangladesh but in small-scale and artisanal fisheries across the global south. Policymakers and development practitioners alike have constantly grappled with the conflicting interests of different actors, and the persistent problem of uneven distribution of benefits to actors across and within supply/value chains. In some cases, some groups (especially fishers) miss out from the benefits entirely. It is evident that fish value chains raise some serious distributional issues. Therefore, it is more timely now than ever to enhance our understanding of fish value chains, assess power structures and identify some systemic constraints that poor fishers face. This offers an opportunity for governments to design and implement approaches that put poverty, equity and sustainability at the core – or in other words, to meet the core aim of the Sustainable Development Goals (SDGs): to ensure that those furthest behind do not lose out.

The 'leave no one behind' (LNOB) idea has gained significant traction in the SDG process with government leaders, civil society and donor agencies. For instance, the SDGs were introduced by the representatives of 193 nations at the United Nations in September 2015 with the preface:

“As we embark on this great collective journey, we pledge that no one will be left behind. ... We wish to see the Goals and targets met for all nations and peoples and for all segments of society. And we will endeavour to reach the furthest behind first.”

However, despite its aspirational nature, the concept of LNOB remains poorly defined – lacking both measurable attributes and the concrete action necessary to achieve LNOB in practice (Dunning 2015; Melamed 2015).

In this study we focus on value chain analysis to assess the different levels of profits and limitations for multiple stakeholders, as ways to ensure that no one is left behind. We provide hard data and evidence on processes, power, and profits to help understand who is affected and how, and the best strategies to re-govern markets in more inclusive ways.

1.1 Bangladesh's Hilsa Conservation Programme

Fisheries in Bangladesh are extremely important for the national economy. They provide direct jobs to about seven million fishers and fish/shrimp farmers, and contribute 4.43 per cent of Bangladesh's GDP (DoF, 2012). Hilsa fish represent about 11 per cent of the total catch. Because of the nature of the species, it is caught both at sea and in inland freshwaters where the fish come to spawn. Most of the capture is small-scale.

Once a cheap, plentiful fish affordable even for the poor, hilsa catches declined gradually over 30 years to reach a low point of only 0.19 million tonnes in 1991–2, then stagnated until 2001–2. This prompted the government of Bangladesh to declare five hilsa sanctuaries at inland freshwater sites in 2003 and seasonally ban hilsa fishing at important stages of its life cycle. To compensate for lost earnings during the bans, and to incentivise compliance with the new regulations, the government started providing affected fishing communities with rice and training in alternative income-generating activities.

The primary goal of the Hilsa Conservation Programme (HCP) is the conservation of hilsa and associated biodiversity, but, given that it is funded through a national Vulnerable Group Feeding programme that aims to reduce food insecurity (Ahmed *et al.*, 2009; Uraguchi, 2011), it is also intended to improve the socioeconomic conditions of affected fishers living inside and around the hilsa sanctuary areas (DoF, 2012; Haldar and Ali, 2014). The programme combines: a seasonal fishing prohibition; food transfer to the fishers directly affected by the restriction; capacity building to support fishers' income generation from alternative activities; and a fund which combines various sources of income, including government contributions and instruments that promote rent-capture from beneficiaries of protected fisheries.

Evidence of the programme's impact has so far been anecdotal, as no counterfactuals or before/after impact evaluations exist. There is an agreement that the hilsa catch had declined in the pre-intervention period, both in the volume of the catch and the size of individual fish. It has been assumed that the management interventions have increased the availability of large hilsa and a large number of brood stocks, both of which have positive impacts on population regeneration. According to fish catch statistics, the production of hilsa has increased over the years since the HCP started, suggesting that the ban has had a positive impact on stock:

- There is a higher number of hilsa fish at mature stages (stages V and VI) in the hilsa sanctuaries than in adjacent areas (Rahman *et al.*, 2012), as well as a higher number of 'spent' fish (fish that have recently completed spawning) (Rahman, 2013).
- The production of hatchlings and juveniles has increased: Rahman *et al.* (2013) recorded about eight times as many eggs and *jatka* in 2011 than in the base year 2007/8, attributed to the 11-day fishing ban in hilsa spawning grounds during the peak spawning period.
- Two new studies have reported a positive impact of the HCP on finfish and shellfish biodiversity. Islam *et al.* (2016) evaluated the impacts of the temporal and spatial fishing ban on fish and shellfish biodiversity in Bangladesh's Shariatpur and Chandpur fish sanctuaries. Islam *et al.* (2016b) looked at the same subject in Paatuakhai and Bhola fish sanctuaries, also in Bangladesh. The findings of the two studies suggest that the temporal fishing ban is impacting positively on fish and shellfish biodiversity within all the four sanctuary areas.

However, what is not fully clear is how or whether the HCP has contributed to poverty reduction. Better research is needed on the environmental impacts of the ban, as many things could affect the size of the fish stock. Conditionality and monitoring are difficult to enforce and measure, due to: the open-access nature of the resource; fishers breaking the ban at night to elude the coast guards; or pirates attacking fishers and taking their catch away. There is a 'mobile court' to monitor at sub-district level, but it is heavily under-funded. It can ask for police support to punish offenders, but this assistance is not always available. It also lacks enough physical resources to patrol the areas. Most importantly, the incentive that fishers receive is inadequate to compensate for their loss in income during the ban. Proposals for local communities and fishers to have a more active role in monitoring are put forward to try to tackle these issues.

Both the ban and the compensation mechanism directly target the fishing families and there are significant efforts to ensure the precision of this targeting strategy.

The impact across the economy from these initiatives is less known. While there are some partial studies that have looked at the value of hilsa fish across the economy, few have achieved the necessary scale, or been able to provide evidence of ripples across the economy of the HCP's impacts.

1.2 Objectives of this study

Using value chain analysis, focus groups and personal interviews with key informants, the research seeks to:

- Provide a better understanding of the state of the hilsa fish value chain in Bangladesh
- Identify and measure economic impacts on fishers and other stakeholders along the value chain
- Identify the constraints and opportunities to improving hilsa fisheries in a fair and inclusive way.

2

Methodology

2.1 Indicators and methods

Using a desk-based review of the relevant literature and interviews with experts at the Bangladesh Centre for Advanced Studies (BCAS) and WorldFish in Bangladesh, we developed a methodology for collecting information, outlined in Table 1.

In this paper we focus on describing the different stages of the hilsa market in Bangladesh, and the opportunities and challenges for improving the sector in a more inclusive way. The links to a PES fund will be explored in a separate report.

Table 1. Summary of research objectives, indicators and methods

OBJECTIVE	INDICATORS	METHOD
Identify key actors in the hilsa value chain	<p>What are the key stages of the hilsa supply chain? Who are the main stakeholders involved?</p> <p>What is their position on the fishing ban issue?</p> <p>What level of power or influence do they have? What is their level of interest/knowledge?</p> <p>What efficiencies/inefficiencies can be observed? (eg post-harvest losses)</p>	Participatory stakeholder mapping with key informants
Identify the economic value of different stages of hilsa value chain	Basic economic model: amount of catch, seasonality, costs, revenues. How are fishers affected during/before/after the ban? Key opportunities and challenges	Business model canvas for artisanal fishing households, <i>aratdars</i> , traders and fish exporters
Identify the constraints and opportunities to improve hilsa fisheries in a fair and inclusive way	Power structures along the chain – what determines revenue allocation? What key opportunities and obstacles exist to improving profitability in a fairer way, especially from the fishers' point of view (eg access to credit, better bargaining capacity, insurance)?	Information from business model canvas (costs and revenues), and structured interviews with key informants
Identify and value forms of rent capture for PES fund	Costs and revenues along value chain at each link and amounts paid as VAT (formal markets) and amounts paid to land taxes (for local stakeholders)	Information from business model canvas (costs and revenues), and structured interviews with key informants

2.2 Value chain and business canvas

We use the value chain approach to identify and characterise the key actors of the hilsa trade, with a strong focus on the artisanal fishing family enterprise ('value chain' refers to the process of adding value to a product, from raw material to final customer). We combine Oostervalds' business model canvas (Lundy *et al.*, 2012) and field surveys to identify the main value proposition by each actor (eg what they sell); the inputs required for this activity (and who provides them); and to whom the product is sold.

The value chain approach is useful for identifying partner networks that support, intervene, or assist different links of the business. It helps to define relationships and interconnections; to understand the flow of products, services, information and payment; to enhance communication between different actors; and to identify entry points or key leverage points to improve the value chain.

A business model canvas shows how an individual firm creates, captures and delivers value. It uses straightforward language at each stage, asking (based on Lundy *et al.*, 2012):

- **WHAT** is the value proposition? The value delivered to the customer, eg speciality coffee, timber, crops, fish

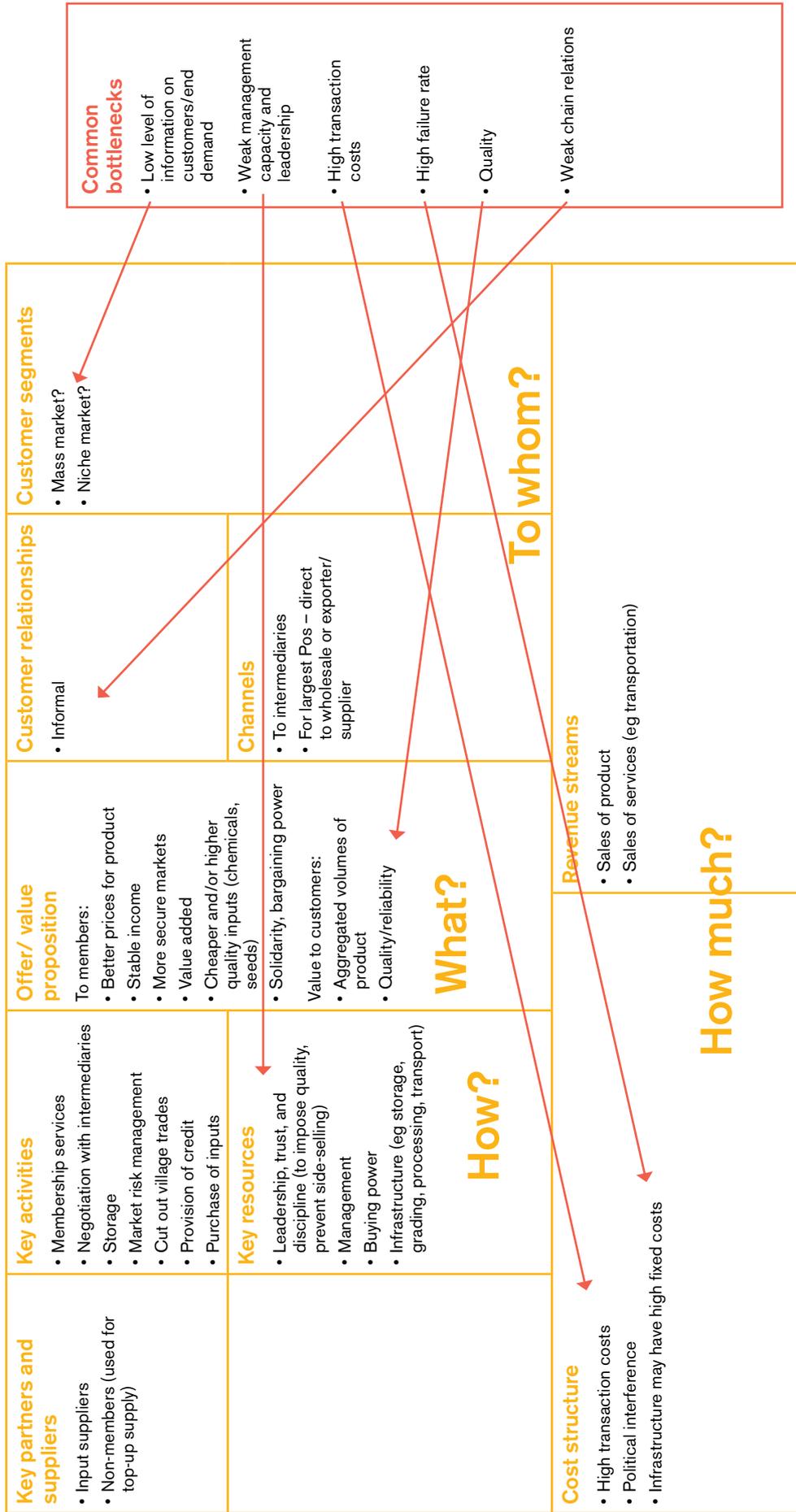
- **HOW** is value created? The key partners, resources, inputs, and activities necessary to capture and create value
- **To WHOM?** The buyers of the products (including self-subsistence) and the channels needed to reach them, eg intermediaries, certification
- **HOW MUCH** are the costs and benefits? The costs of the key activities and resources, and income streams received.

The business canvas helps to identify opportunities, gaps and distributional impacts, and to develop reasonable monitoring strategies. We develop business canvases for key stakeholders along the value chain to identify entry points and bottlenecks.

2.3 Power analysis

Importantly, the survey will show the key costs and revenues during each stage of the chain to help understand how value is added, as well as the opportunities and bottlenecks to creating value (see Figure 1). We complement this information with interviews with key stakeholders as part of a power analysis, to understand the formal and informal rules determining how costs and benefits are distributed for the different actors.

Figure 1. Using the business model canvas to identify bottlenecks



2.4 Sources of information

We used a combination of desk-based literature review; personal surveys; interviews with key informants; and focus groups.

During a field trip on 7–12 March 2016 we sought to identify the key information gaps for hilsa fisheries, the indicators required, and the most appropriate methodology to obtain the information. The team also designed the survey questionnaire and identified the sample. We held several focus groups with fishers, intermediaries, members of government, the university and non-governmental organisations (NGOs) working in the fishing sector. We also carried out several interviews with key informants and visited local fish markets in Dhaka.

The four key market stages addressed in this study are presented in Table 2. We define each stage as the point where the fish is bought and sold (or in the case of fishers, caught and sold to the first stage intermediary). In each stage we collect information on inputs and costs incurred.

Summary of information sources:

- **Personal survey.** We surveyed a total of 249 fishers and their direct input suppliers located mostly in Barisal, Bhola and Dhaka. Taking their dependents

into consideration, the information we collected on the hilsa value chain affects 1,480 people in Bangladesh. The interviews were conducted between March and October 2016.

- **Personal interview: fish exporter.** See details and a full report of the interview in Appendix 3.
- **Focus groups with *aratdars*** (wholesalers by auction, defined in Section 3.1):

1. **Five *aratdars* from Kawran Bazar.** See details and a full report in Appendix 2.1.

Kawran Bazar is one of the biggest wholesale fish markets in the country. The fish *aratdars* (wholesalers by auction) facilitate the sale of fish to *beparis* (wholesalers) and retailers through open auction, charging 5–8 per cent commission from the suppliers. There are more than 300 fish *aratdars* engaged in fish trading in this market.

2. **Six *aratdars* from Suwarighat fish market.** See details and a full report in Appendix 2.2.

Suwarighat fish market is one of the oldest wholesale fish markets, situated next to the River Buriganga dam near Chawkbazar. The market is run by Dhaka South City Corporation. Apart from the physical space, it has little infrastructure or facilities. There are over 40 fish *aratdars* at this venue.

Table 2. Information gathered at main market stages and stakeholders

STAGE	INFORMATION GATHERED	STAKEHOLDERS
1. The fishing families	Looks at the fishers, their links to suppliers and to the point where they sell their fish	Fishers (provide labour, own or hire the boat, operate as crew) Finance input providers Technical input providers – boat supplies
2. The landing centre	Looks at suppliers. Suppliers of fish can be the fishers, or other intermediaries like <i>beparis</i> . We look at the main operating costs and price structures (eg auctions) at this stage	<i>Aratdar</i> Input providers (finance, labour, storage, transport) Others
3. Wholesalers/ resellers of fish	Looks at this second or third stage in the distribution markets: those buying fish at landing centres and selling to other distributors (rather than to retail)	Intermediary Input providers (finance, labour, storage, transport) Others
4. Retail market	Looks at sales to households, restaurants, and exports	Restaurants Market stalls for final consumers Export sector

Note: *Aratdar*: wholesaler by auction; *bepari*: wholesaler; see Section 3.1 for full definitions

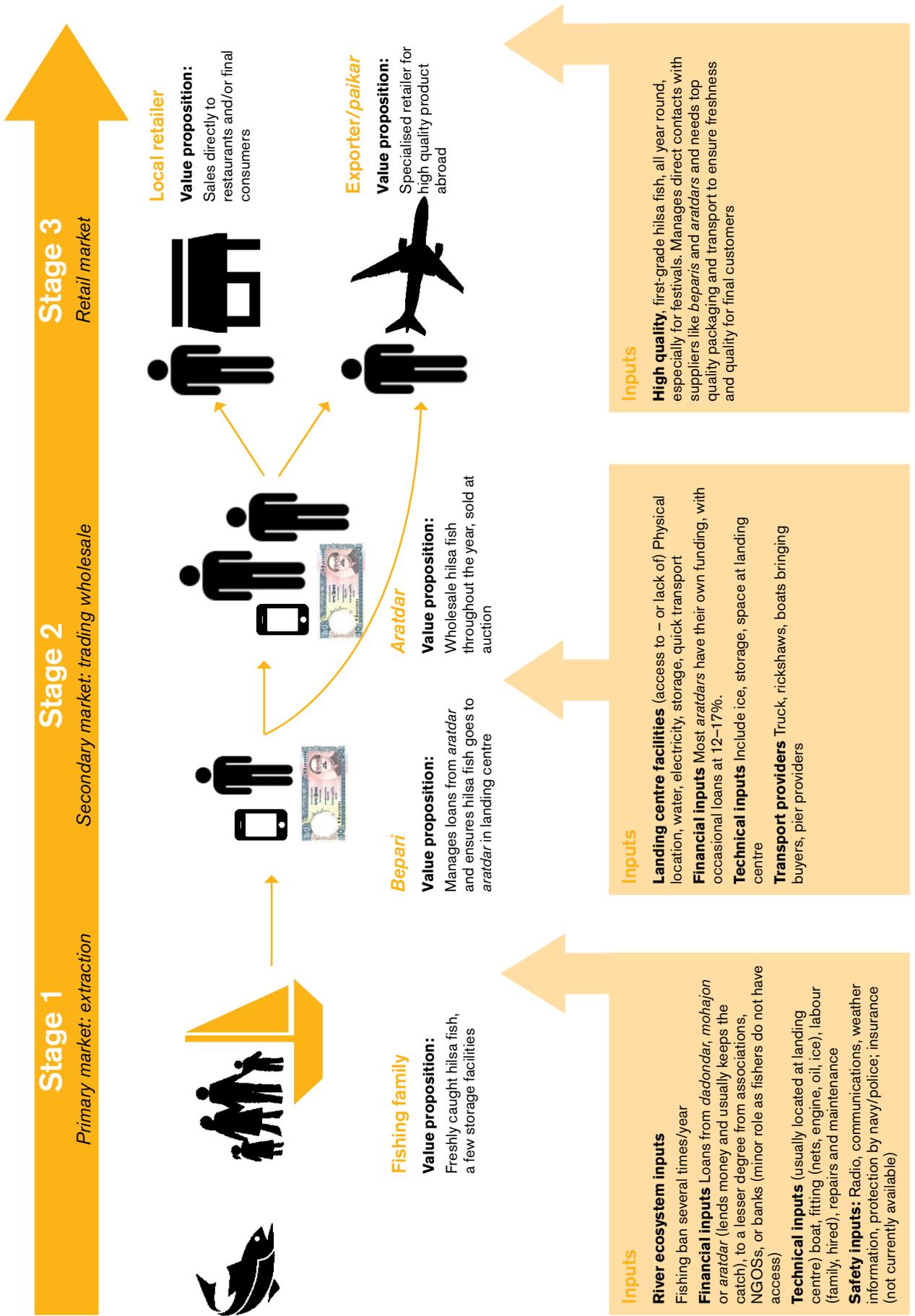
3

The hilsa fish value chain

Figure 2 presents a simplified value chain for the hilsa fish in Bangladesh. It presents four main stages: fishing families, landing centres, wholesalers and the retailers who reach the final consumers (including the export sector). The figure also identifies where the actors are

in relation to primary, secondary and retail markets, as well as some of the main inputs needed for their value proposition. It is important to highlight that the focus of this study is on the fishing families.

Figure 2. A stylised value chain for hilsa fish in Bangladesh



3.1 Who? The key players

Fishers are on the first rung of the hilsa value chain. For the most part they are poor, largely uneducated, and have large households with many dependents.

The main roles at this level are (Islam *et al.*, 2016):

- Boat owning or renting (usually male)
- Fishing as crew leader or captain (male only)
- Fishing as crew member (male only)
- Fish processing (both male and female)
- Fish trading (mainly male; some female)
- Boats and gear making and mending (both male and female).

Fishing is mostly a job for life. The average age across the sample group of fishers surveyed for this research was approximately 37 with a median of 35, ranging between 15 and 70 years old. Young fishers begin early, either as hired crew labourers or family members. Fishers (labourers and boat captains) had the largest proportion of experience to age in the sample, spending well over most of their life (irrespective of age) on their activity.

Fishing is mostly a job for life, where fishers are at the bottom of the chain with little education and many dependents

One of the reasons for staying in the industry is the **lack of education to access alternatives**. The average education level in the whole group (fishers and other actors in the value chain) is 3.3 years of schooling. Yet this low number masks wide variations within the group. The fishers in the sample attained on average only 1.6 years of schooling. *Aratdars* and specialist input suppliers (eg of freezing and transport) had the most schooling in the group (7–9 years).

Fishing household size. In our survey sample across the value chain, there are on average 6–17 members per household. The smallest household sizes are linked to specialist jobs: transport, storage, preservation. The largest households are found in the higher levels of the supply chain: *aratdar*, *mohajan*, *mahjee* and *dadondar* (wholesalers, moneylenders etc; explained in detail below) with over 12 household members. Fisher labourer households have on average five members (with a maximum of seven).

Less than two wage-earners per household. While the families tend to be large, the average number of members earning a wage is 1.8. Family fisher labourers reported only one person in each household bringing in wages. Again, people involved in the more technical parts of the value chain have more wage-earning family members (2.5 to 4 wage-earning members, in small family groups). Previous studies of the sector also show that fishers live in very poor socioeconomic conditions, with little physical infrastructure and moderate access to public education and health (Islam *et al.*, 2014a; Islam *et al.* 2014b; Islam *et al.* 2016).

Table 3. Age and experience of fishers

STAKEHOLDER	AVERAGE AGE	MEDIAN AGE	LOWEST AGE	AVERAGE EXPERIENCE
Head fishers (<i>mahjee</i>)				
Own boat	40.5	36.5	25	23.7
Hired	28.6	25	23	14.6
Fishers (all)	37.7	35	20	20.7
Family fisher labourer	31.1	26.5	18	16.9

Note: Based on a sample of 249 fishers and suppliers

There is **wide variety of intermediaries** along the hilsa trade. The main ones are:

- *Aratdar*: directly translated, 'a man who has a place to keep fish, in order to sell by auction'. Fishers give *aratdars* their whole hilsa catch to sell by auction. *Aratdars* have their own place in fish landing centres since most hilsa landing centres are outside government jurisdiction. They sell fish to wholesalers and sometimes large retailers.
- *Bepari* (also known as *bapari*): translates as 'businessman'. *Beparis* buy large quantities of hilsa from fishers or *aratdars* to sell to other hilsa traders. They make contacts, load fish to transport, etc.
- *Dadondar*: money lender. They give loans or credit to others for investments in productive/business activities (as opposed to loans for consumption).
- *Faria*: fish broker. *Farias* usually buy fish from the fishers and sell at *arat* (wholesale markets) in the landing centre. They also lend money to fishers at high interest rates (Shahajat, 2016). They often purchase small quantities of fish from fishers at a distance from the market, bring it to the terminal point and sell it to the *aratdar* or retailer.
- *LC paikar*: licensed hilsa fish exporter or trader. *Paikars* purchase hilsa from fishers through *aratdars* and sell (export) the entire product to overseas market (Islam and Habib, 2013). International trade is however heavily regulated and most hilsa is for domestic markets.
- *Mohajon*: literally 'big man', or 'man with higher status', used to refer to those who loan money and collect interest. Loans from *mohajons* can be used for productive/non-productive uses as long as it is paid back. They want the interest for the loan, not the catch, unlike the *aratdars*.
- *Nikari*: informer; a middleman who trades in information for buyers rather than in products. *Nikaris* receive commission from fishers and *aratdars*.
- *Retailers*: the last intermediaries in the distribution channel. Some have fixed places in markets, or sell fish from door to door.

In this study we focus on *aratdars*, as main wholesalers of hilsa fish, and *paikars*, exporters of hilsa fish with high-value end market potential.

The *aratdars* we interviewed were below middle age in the first group (aged 29–45) and ranged more widely in the second group (28–75). They were professional fish traders, with fisheries representing all of their household income. Their fish trading experience varied between 5 and 50 years. Half of each of the group respondents reported other businesses as well: transport, groceries

and vegetables trade. Their households tend to be smaller, but they hold strong ties and responsibilities with their extended families at the local villages.

They have relatively high annual incomes, ranging from 0.5 million Bangladeshi taka (BDT; US\$6,400) to BDT1.5 million (US\$19,000) in both groups. According to the interviews, these values are fairly representative of other *aratdars* in both landing centres. They were also fairly confident of their market prospects, reporting increases in household income during the past five to ten years. All of them owned land, either homestead or agricultural land. Every participant was a tax payer, paying Union Parishad (local council) tax and trade license fees.

The *paikars* (fish exporters) are at the top of the value chain, selling hilsa to other countries (see Appendix 3). Their educational level is high, and they have significant experience in the fish export business: the fish exporter we interviewed had 25 years' experience. Fish exports represent more than 50 per cent of his income, but this is also diversified to include exports of vegetables, and fresh and frozen fruits. His annual income is more than BDT2 million (US\$34,250). He owns homestead and agricultural land assets, and pays taxes (licence fees and income tax).

3.2 What? Value proposition along the chain

Although in essence a hilsa fish does not change from the river to the plate, perceptions of its value as a commodity varies enormously as it travels along the value chain (see Table 4).

Hilsa is a highly valuable but perishable commodity. On average, the fish can be kept fresh using basic preservation methods (ice box) for about 10–14 hours. This requires fast and organised control of storage and transport to ensure the quality of the fish. Fishers sell their catch immediately on landing to avoid spoilage, lacking an adequate supply of ice and cold storage. Catch quality is linked to freshness and its size, with larger fish (over 800 grams) obtaining better prices. The high demand, however, pushes the market towards smaller juvenile fish ('jatka').

Capacities, options and wealth increase significantly along the value chain

Table 4. Hilsa value proposition and diversification along value chain

PLAYER	VALUE PROPOSITION	PERCENTAGE OF HILSA IN CATCH OR TRADED FISH															
Fishing family	<p>Freshly caught hilsa fish. Because of their highly specialised inputs and skills, fishers only catch hilsa, especially in peak season. Daily average: 1–6kg peak season, 0.3–3kg lean season, 0 during ban period. 'Good quality' hilsa must be over 1kg. Average fishing days: 140 days peak season; 75 lean season.</p>	<p>hilsa as % of catch</p> <table border="1"> <caption>hilsa as % of catch</caption> <thead> <tr> <th>Season</th> <th>Less than a quarter</th> <th>Quarter to less than half</th> <th>Half to three quarters</th> <th>All of the catch</th> </tr> </thead> <tbody> <tr> <td>Peak</td> <td>6%</td> <td>0%</td> <td>0%</td> <td>93%</td> </tr> <tr> <td>Lean</td> <td>31%</td> <td>34%</td> <td>24%</td> <td>10%</td> </tr> </tbody> </table>	Season	Less than a quarter	Quarter to less than half	Half to three quarters	All of the catch	Peak	6%	0%	0%	93%	Lean	31%	34%	24%	10%
Season	Less than a quarter	Quarter to less than half	Half to three quarters	All of the catch													
Peak	6%	0%	0%	93%													
Lean	31%	34%	24%	10%													
Wholesaler intermediaries (<i>Aratdars, bebaris, paikers</i>)	<p>Hilsa fish purchased at hilsa entry ports in Dhaka. There are networks of over 300 fish <i>aratdars</i> in Kawran and over 40 in Suwarighat. An average sale amount per <i>aratdar</i> is 90kg (lean season) 300kg (peak) of fish per day. Main trade is hilsa due to its high prices and profits. When hilsa supplies decrease they trade other fish, eg carp, catfish, shrimps; or other trading activities (transport, groceries). There are around 6,500 fish markets scattered across the country, of which 4,500 are small primary village markets (Islam <i>et al.</i>, 2016).</p>	<p>Intermediary and services</p> <table border="1"> <caption>Intermediary and services</caption> <thead> <tr> <th>Season</th> <th>Less than a quarter</th> <th>Quarter to less than half</th> <th>Half to three quarters</th> <th>All of the catch</th> </tr> </thead> <tbody> <tr> <td>Peak</td> <td>8%</td> <td>0%</td> <td>0%</td> <td>90%</td> </tr> <tr> <td>Lean</td> <td>45%</td> <td>39%</td> <td>11%</td> <td>5%</td> </tr> </tbody> </table>	Season	Less than a quarter	Quarter to less than half	Half to three quarters	All of the catch	Peak	8%	0%	0%	90%	Lean	45%	39%	11%	5%
Season	Less than a quarter	Quarter to less than half	Half to three quarters	All of the catch													
Peak	8%	0%	0%	90%													
Lean	45%	39%	11%	5%													
Exporter (licensed <i>paikar</i> & fish processing plant owner)	<p>Hilsa fish for international markets. Bangladeshi hilsa fetches a high price in international markets and the Bengali community abroad. <i>Paikars</i> enter a pre-agreed contract to satisfy the customer: quality, amount, weight of individual fish, packing materials, price. The fish is tested in the DoF's Fish Quality Control laboratory to fulfil the importing country's quality control criteria and regulations. Our informer reports that he exported more than 180 million tonnes of fish during 2011 in 12–15 consignments to different countries.</p>	<p>Hilsa exporters also export other products, including fresh and frozen vegetables and fruit. However, fish exports account for more than 50% of their profit.</p>															

Note: Based on the following sample: Fishers: 117 responses in peak season, 119 responses in lean season; intermediaries and services: 130 in peak, 110 in lean. Two fishers reported catching hilsa in the ban season (less than a quarter of the catch), and 13 traders reported dealing with hilsa in the ban season, most of them less than a quarter of the total sales.

Because of its value, fishers consume and lose relatively few hilsa fish. On average fishers reported catching 2.88 kilograms (between 0.8 and 6kg) of hilsa per day during the peak season, and 0.95kg (0.8–3kg) during the lean season. The difference between caught and sold is 4 per cent in peak season, and 7 per cent per cent in lean season. The individual amounts are small – and even a 5 per cent loss in the amount of fish can have an impact on income at the end of the day.

The hilsa marketing channel is complex. There are many actors who play a vital role in collecting, trading and transporting the fish before it reaches consumers – each adding value as it goes another rung up the ladder.

The amount of fish traded by the *arat* (wholesale market at the landing centre) depends on the amount of fish caught by the hilsa fishers, and also the level of demand in Dhaka and other district (local) markets. *Beparis* purchase the hilsa from the local landing or *arat* and pack the fish, preserved with ice, in a suitable container (like a basket, drum, wooden, plastic, or Styrofoam box) and send it to Dhaka or other district *arats* by road or waterways. As Dhaka is a big market, the hilsa fish from the fishing grounds situated in the southern parts and marine catch is supplied to Dhaka market to get higher profits.

3.2.1 Seasonality along the value chain

There are three main fishing seasons for hilsa: the peak season, the lean season, and the ban period. Apart from the ban period, which is fixed, the concepts of 'lean' and 'peak' are subjective (see Figure 3).

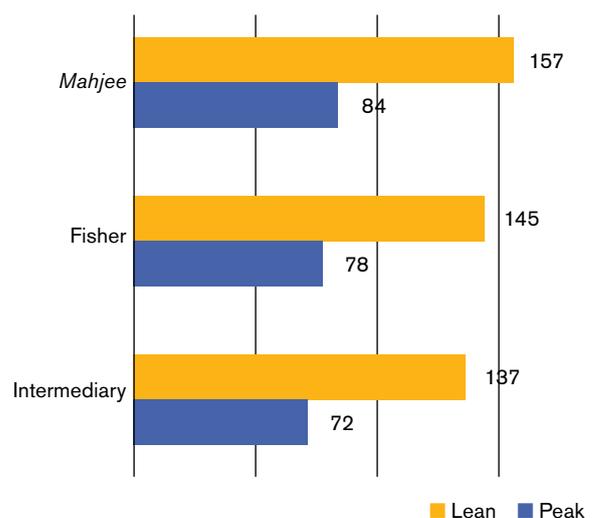
Number of trading days. On average, the peak season lasts 75 days and the lean season 137, as reported by all respondents in the sample. However, because they bear the burden of loans and credit, boat captains (*mahjee*) tend to perceive the peak season

'Peak' and 'lean' seasons are real but also subjective – affected by the actors' expectations and responsibilities

as shortest, and the lean season as longest. With better access to alternative incomes, intermediaries (*arats*, *beparis* etc) perceive the lean season as shortest. When asked how many days each person works during both peak and lean seasons,

intermediaries work the longest proportion in the group. Fishers and boat captains work less, and roughly the same proportion.

Figure 3. Number of days in trading seasons, as perceived by actors



For *arats* and other intermediaries there is a clear difference in the amounts of hilsa fish trading during the peak and lean hilsa seasons. Demand for hilsa as a popular fish always remains high, so it is traded throughout the year, with no closure of fish markets. The average amount of fish sold per day by a single *aratdar* is 700kg in the peak season and 200kg in the lean season. During the ban period hilsa is sold irregularly, with supplies coming from cold storage and outside the ban area.

3.2.2 Diversification strategies

Hilsa constitutes all of the catch during the peak season for the vast majority of the fishers (93 per cent) and tradesmen (90 per cent). Only 6 per cent of fishers and 8 per cent of traders report less than full hilsa catches or sales. A few fishers (23 respondents) reported catching other type of fish, such as pangas. Beside pangas and others, traders also sell tilapia (8 respondents), catla (6) and rohu (7). See Table 5.

The lean hilsa season presents a more varied picture. Hilsa constitutes the full catch for only 10 per cent of fishers and 5 per cent of traders. For the majority, hilsa represents less than half of their catch (65 per cent for fishers and 85 per cent for traders). During the lean and ban seasons fishers tend to catch only pangas or other types of fish in small quantities from outside the

Hilsa represents the full fish catch and trade in the peak season. Tradesmen are more diverse during lean and ban season. 40% of fishers do not fish at all during ban.

Fishers are significantly more likely to need a second job

sanctuary/ban area, and during the ban period 40 per cent of fishers report that they do not fish at all – with a direct impact both on cash income from sales and protein

intake at home. Only 15 per cent of the traders report that they do not trade at all during the ban period – see Table 5. While they do not consume hilsa fish within their households, by-catch fish is an important source of nutrition for the fisher households. This source of protein is usually forfeited during the ban period, when hilsa fishers stop fishing.

Intermediaries reported that they mainly trade hilsa as its demand and price is comparatively high and they earn a good profit from it. When the supply of hilsa decreases during lean and ban periods, they trade other fishes like carp, big catfish, shrimps, and so on.

Fishing was reported as the main economic activity by all respondents in the sample. Fishers, either crew (28 per cent) or captain of the fishing craft (*mahjee*, 30 per cent) are significantly more likely to need a second job in the sample. The main second occupation is working as a labourer (46 per cent). Those who reported a second income are mostly linked to small businesses, or working as labourers (see Figure 4).

3.3 How? Technologies and trade strategies

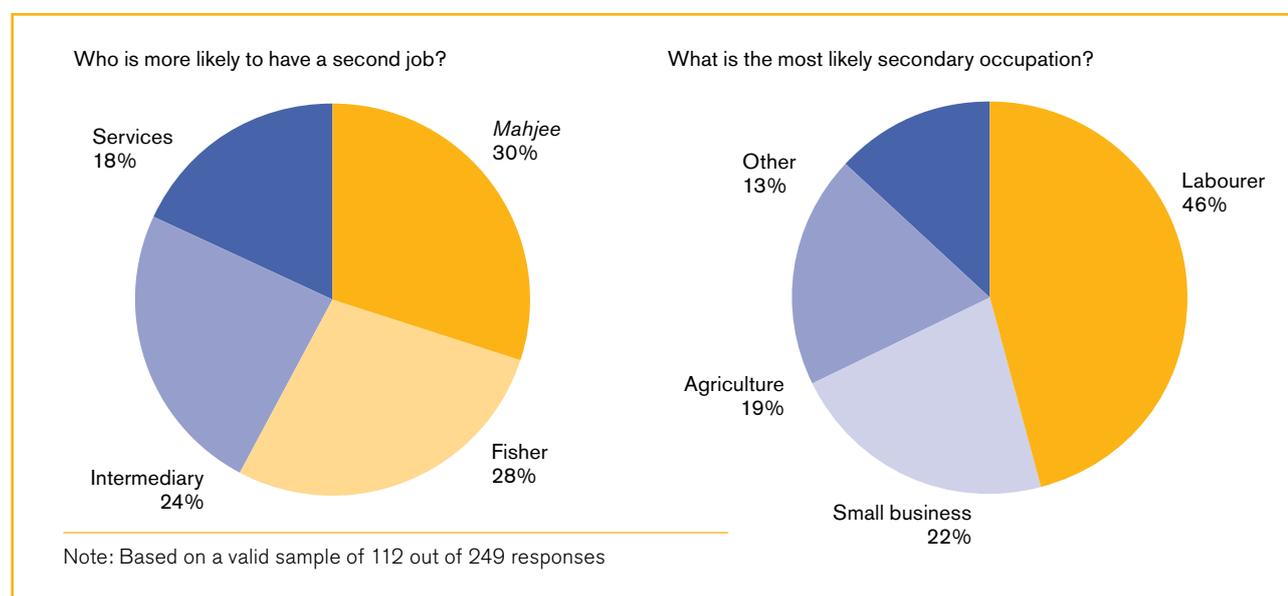
Figure 4 summarises the main inputs, suppliers, activities and resources available to the key players in the value chain.

Table 5. Diversification: other types of fish

	PEAK		LEAN		BAN	
	FISHERS	TRADERS	FISHERS	TRADERS	FISHERS	TRADERS
Rohu	0	7	1	34	0	32
Catla	0	6	0	27	0	26
Tilapia	0	8	0	35	0	33
Pangas	9	18	20	46	16	42
Others	14	18	84	58	43	43
Nothing	0	0	0	0	49	20

Note: Based on a sample of 119 fishers 119 and 130 traders/service providers

Figure 4. Second occupation reported in sample



3.3.1 Fishers: key suppliers, activities and reported costs

Fishers heavily rely on healthy freshwater ecosystems to catch sufficient hilsa of good quality and size. Over-fishing and catching juveniles has been reducing the size of the hilsa stock and the fishers' daily and annual catch size.

Technical inputs

Small-scale fishers use motorised boats to catch hilsa. Each boat has a crew of approximately 15 members, either family or hired. Each boat has a *mahjee*, who acts as head fisher or captain of the boat, and is responsible overall for the activity. They could be the *mahjee* of their own boat or have a hired boat. Technical inputs vary and include, apart from the boat: fittings (nets, engine, oil, ice); repairs and maintenance tools; and food for the fishing crew while at sea. This requires significant upfront cash investments before each trip.

Table 6 presents a summary of median costs reported during the survey. They are indicative, as the values varied widely across the sample. For those who have a boat (average reported cost BDT112,000, or about US\$1,500) the total annual technical cost is not very high – in the order of BDT250,000 (about US\$3,200). Artisanal fishers, however, with virtually no savings or financial resources of their own, find it very difficult to finance the materials needed for fishing trips.

Financing

Fishers do not have access to credit or conventional banking systems. They finance the operations through their own resources – which few of them have – and often get loans from a *dadondar* or *aratdar* in exchange for the catch. Associations and NGOs are extremely useful for providing more independence, but few fishers have access to them.

Table 7 presents the main sources of finance for different stakeholders in our sample. Fishers rely primarily on their own resources to finance their operations, during the peak, lean and ban seasons (60, 44 and 46 per cent respectively). Fishers also take loans from *dadondars* (15 per cent of fishers in peak season, 13 per cent in the lean season and 9 per cent during ban period) or get loans from *aratdars* in exchange for the catch (14 and 18 per cent in peak and lean periods and only 5 per cent during the ban period). There are other sources of finance, like fisher associations, conventional banks and NGOs, which play an important role during the lean and ban season, together financing about a quarter of fishers. Intermediaries mostly depend on their own resources across the three seasons, as well as some accessing, in smaller amounts, other sources such as associations and banks. The interest reported varied depending on the source: loans or credit from *dadondars* was on average 10 per cent, as was the equivalent of exchanging the catch for a loan with *aratdars*. According to the survey, associations charged the highest interest rate (14 per cent).

Table 6. Annual median technical costs for fishers

ANNUAL COSTS	BDT (MEDIAN)	US\$ (MEDIAN)
Engine	30,000	383
Nets, etc	70,000	893
Repairs	9,000	115
Fuel	120,000	1,531
Food (for boat)	12,000	153
Preservation (ice)	8,000	102
Total	249,000	3,176

Table 7. Source of financial inputs across seasons

		SAVINGS (OWN)	LOAN FROM DADONDAR	CATCH FOR LOAN	OTHER (ASSOCIATION, BANK, NGO)	RELATIVES	VALID N
Peak season	Fishers	60%	15%	14%	10%	1%	87
	Intermediaries	76%	3%	8%	13%	0%	62
	Service providers	64%	2%	7%	24%	2%	45
	Valid N	128	16	20	28	2	194
Lean season	Fishers	44%	13%	18%	25%	0%	71
	Intermediaries	66%	2%	2%	27%	4%	56
	Service providers	61%	0%	2%	36%	0%	44
	Valid N	95	10	15	49	2	171
Ban season	Fishers	46%	9%	5%	23%	16%	111
	Intermediaries	91%	0%	0%	5%	5%	74
	Service providers	94%	0%	0%	6%	0%	59
	Valid N	81	5	3	16	11	116

Note: Intermediaries: *aratdars*, *beparis*, *dadondars*, *mahajons*; service providers: provide ice, transport.

Safety and risk

There is little to no back-up if the fishing trip goes wrong (see Box 1), and fishers are constantly at risk of losing their few household assets to repay loans. These risks are absorbed primarily by the fishing household: they forfeit the next fishing trip, or lose their family assets to repay loans. When fishers are not able to pay (due to death, or they are forced to leave) the lost debt is taken by the lender.

Fishers in our study report the urgent need for safety inputs – which constitutes a large gap at present. This includes radio communications; weather information; protection by navy/police against piracy; and insurance against natural disasters.

3.3.2 Wholesale intermediaries: key suppliers, activities and reported costs

Intermediaries operate at different levels. Wholesalers obtain fish and sell it at an open auction, charging a 5–8 per cent commission to the suppliers. The amount of fish received depends on the money invested as a loan (*dadon*) in the fishing communities. The average investment is BDT0.2–1.2 million per year, by *beparis* and *paikars* in the fishing communities, with the understanding that the fishers will supply fish only to the *aratdars*.

Respondents in our sample report that they use their savings in fish trading in the *arat* (wholesale market) – see also Table 7. Lack of capital in the business is an acute problem. A small amount is invested by commercial banks, *aratdar* associations and relatives as short-term loans. *Aratdars* have access to loans from banks, at an interest rate of about 12–17%.

BOX 1. RISKS AND DANGERS TO ARTISANAL FISHERS

- **Inadequate/old boat:** while there are many advances in technologies for small vessels, most artisanal fishing boats in Bangladesh have inadequate safety standards, are old and may not have accessible shelter and sanitation facilities on board.
- **Loss of power:** due to engine breakdown or insufficient fuel, and most artisanal boats do not have a spare outboard motor or sailing rig. There is a significant risk of fire when carrying large amounts of fuel for long trips.
- **Bad weather:** small boats are at higher risk to sudden gales, heavy rainfall and fog, which reduces visibility and can cause capsizing, grounding, collisions and getting lost. The risks are higher when fishers have little access to weather warning systems or radio communication.
- **Lack of communications:** this is also a problem in the event of piracy, and to report other fishers breaking regulations
- **Risks to crew:** fishing is notorious for being a high-risk operation. Vessels of any size can capsize due to various reasons, from bad weather to weight imbalances while hauling in a large catch. There can be injuries to the crew while operating equipment and people can be swept overboard.

Source: Survey and discussions with key informants.

Some of the reported costs include:

- **Labour:** staff to handle the fish in the *arat* on a daily basis paid at BDT250–300 a day; specialised labour like auctioneers, account keepers and managers are paid BDT14–15,000 a month to run the *arat*. The amounts invested per year vary depending on the size of the operation, but respondents in our sample reported an average of over BDT230,000 a year (US\$3,000) in total for labour.
- **Transport:** suppliers use launches/steamers or covered vans to transport the fish. Average annual reported costs are about BDT23,500 (about US\$300).
- **Taxes:** trading licenses for Dhaka North City Corporation: BDT5–6000/year (US\$65–80) reported in Kawran, and BDT2,500–3,500 in Suwarighat.
- **Market stall fees:** these cost BDT2–300 a day (electricity, water, cleaning, etc) in Kawran, and BDT20,000 a year (US\$30–40) in Suwarighat.

But delays in transport, eg due to traffic, cause deterioration in the quality and price of the fish. There is no loss of fish due to any reason whatsoever after the fish reached the *arat*. The *aratdars* also rely heavily on the conditions offered by the landing centres, which affect their capacity to operate at different scales,

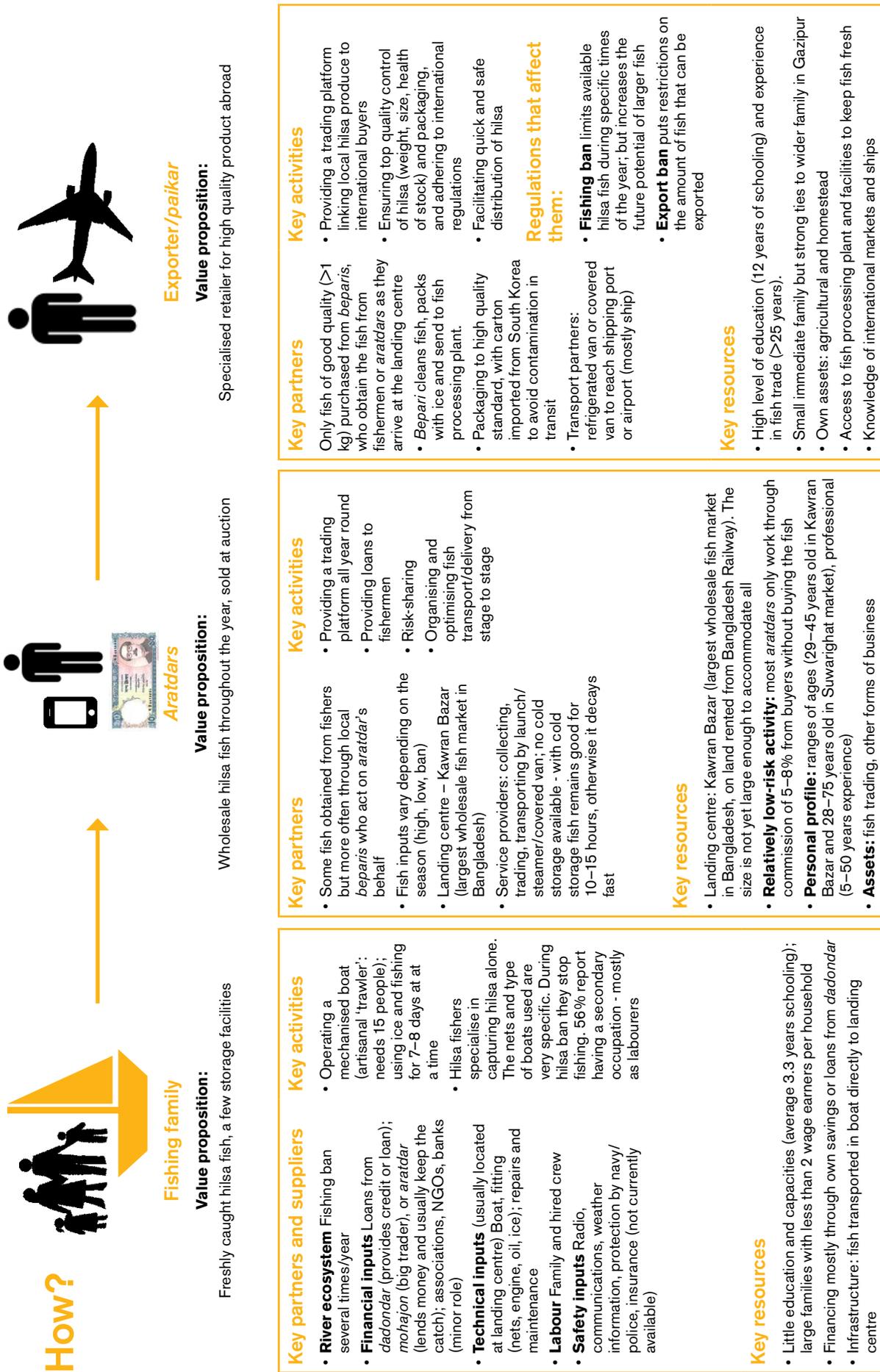
engage with customers, and offer other services. The Suwarighat fish market for example is extremely basic, with no protection from weather, access to electricity or running water. The availability and ease of access to cold storage, for example, can help traders manage the fluctuations in peak/low/ban seasons and maximise profits.

3.3.3 High-value retailer: the exporters' suppliers, activities and reported costs

The fish exporters' inputs and suppliers include *beparis*, who collect the good quality exportable bigger sized hilsa (1 kilogram and above) directly from the fishers as soon as they reach the landing centre, preserve them in ice, and send them to the fish processing plant. Before export, the fish are tested at the Department of Fisheries' Fish Quality Control laboratory in order to meet the importing country's quality control criteria and regulations.

Cardboard boxes are used to pack the fish at 5–10 kilograms per box, depending on box size. The price for imported, high-quality cardboard boxes is about BDT30–40 per unit; these are needed to avoid any contamination during transit. Exporting requires a refrigerated van or covered van to transport the fish, preserved in ice, from landing centre to airport or sea port. International transport is mostly by ship.

Figure 5. How? Key activities, inputs and resources along value chain



Note: Most hilsa is currently traded within the country. In this study we highlight the potential of exporting hilsa as a high end-value product.

3.4 To whom? Hilsa buyers

The type and number of buyer – and the power to determine price – varies strongly between the initial stage of marketing (fisher to *bepari* or *aratdar*) and all subsequent stages.

Fishers tend to sell their fish as soon as they land, mostly due to pre-agreed contracts with intermediaries like *aratdars*, *beparis* or *mohajans* (money lenders) who act as commissioning agents and deal with the fish marketing. Each of these commissioning agents has a chain of suppliers who bring in regular catches of hilsa. They provide advance money (*dadon*) to boat owners on condition of exclusive rights to buy their catch. They charge a commission (3–8%) and take 2–4 fish for every 80 fish sold (Islam *et al.*, 2016).

3.4.1 Monopolies for fishers, open markets for intermediaries

Fishers do not have the liberty to sell their catch to anyone who offers the best bid. Ninety per cent (224 observations) of respondents in our sample (including fishers, intermediaries and service providers) reported that they sell to only one buyer, 26 per cent (64

observations) reported 2 buyers, and only 8 per cent of respondents (20 persons) reported 3 types of buyer – see Table 9. This indicates a high degree of monopoly, especially here at the start of the chain, which in turn affects fishers' opportunities to get a fair price for their catch and make a decent profit. This is a classic characteristic of market failure.

All the fishers report only one buyer, and only two boat captains (*mahjees*) reported two buyers. Intermediaries, and to a lesser extent service providers, are more likely to have different buyers for their product.

Table 9 presents the summary of the main outlet for selling fish according to who is selling it. Nearly three quarters of the fishers in the sample sell all their catch to the *aratdar* (73 per cent), and 25 per cent to a *dadondar*. As discussed in the previous section, *dadondars* and *aratdars* who provide money upfront are the only point of call for fishers who are obligated to sell them their catch.

While there are many players along the hilsa chain, most of them only have one buyer

Table 8. Number of outlets for fish across value chain

	ONE BUYER	TWO BUYERS	THREE BUYERS	TOTAL OBSERVATIONS
Fishers	100%	2%	0%	116
Intermediaries	97%	64%	27%	74
Service providers	62%	26%	0%	58
Number of respondents	224	64	20	248
%	90%	26%	8%	

Table 9. Who do actors sell to in the hilsa value chain?

	Aratdars	Dadondars	Market	Beparis	Retailers	Others	Number of respondents	% of total respondents
Fishers	73%	25%	0%	0%	0%	2%	91	52%
Intermediaries	26%	1%	22%	36%	3%	11%	72	32%
Service providers	6%	0%	53%	0%	25%	17%	36	16%
Total	47%	13%	16%	12%	5%	7%	224	100%

Figure 6. Intermediaries and their share of the market

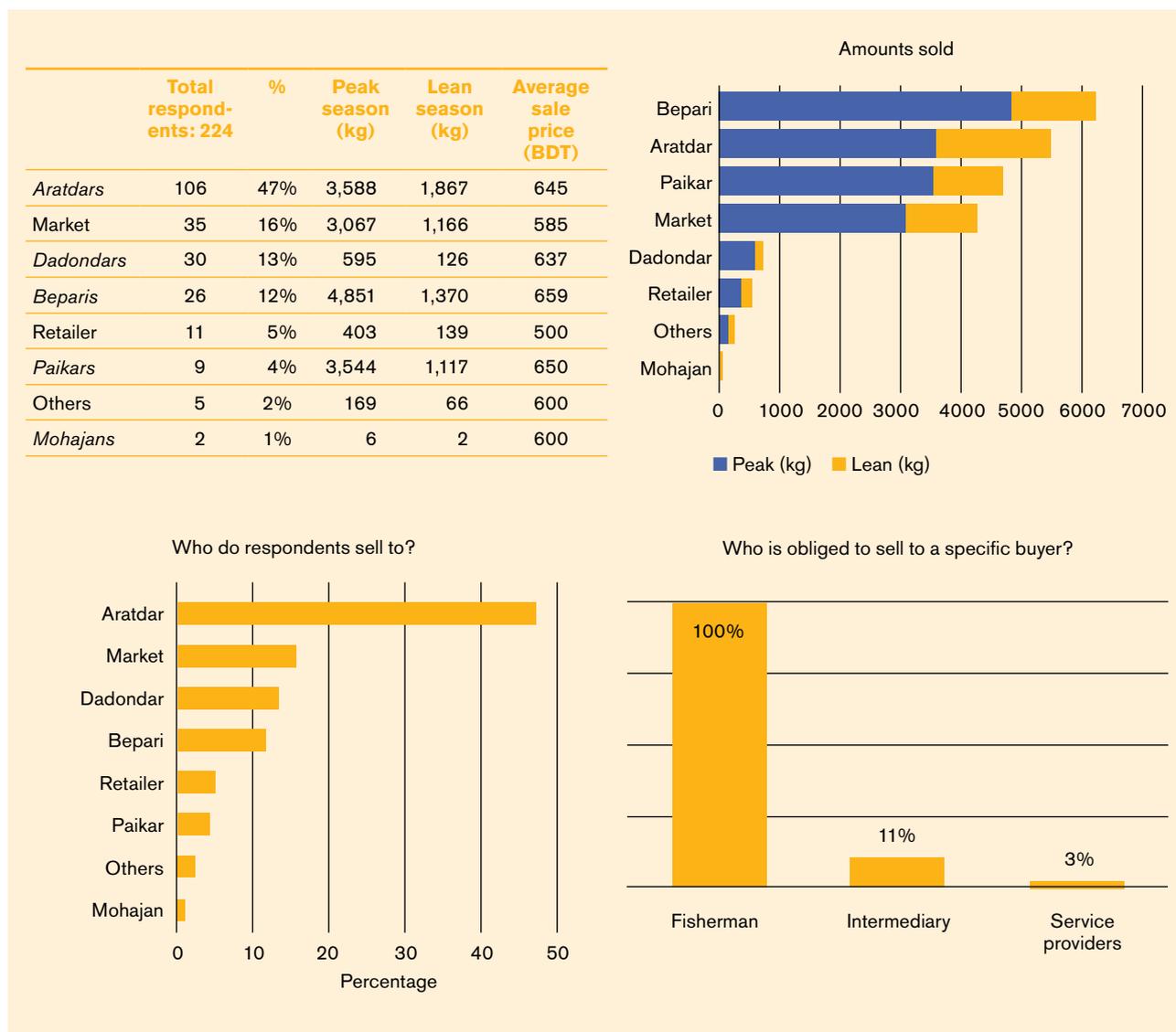


Figure 6 describes the different buyers in more detail. *Aratdars* are the main type of buyer reported by fishers, but *beparis* (reported as buyers by 12 per cent of the sample) buy 28 per cent of the total catch, followed by *aratdars* who buy 25 per cent. The average sale prices do not vary much across the different buyers – with the exception of final retailers, but our sample has few observations on retailers (11 observations).

All fishers (crew and captains) reported that they are obliged to sell their catch to one buyer; while 90 per cent of intermediaries and 97 per cent of service providers do not feel any obligation to sell their product to any one particular buyer.

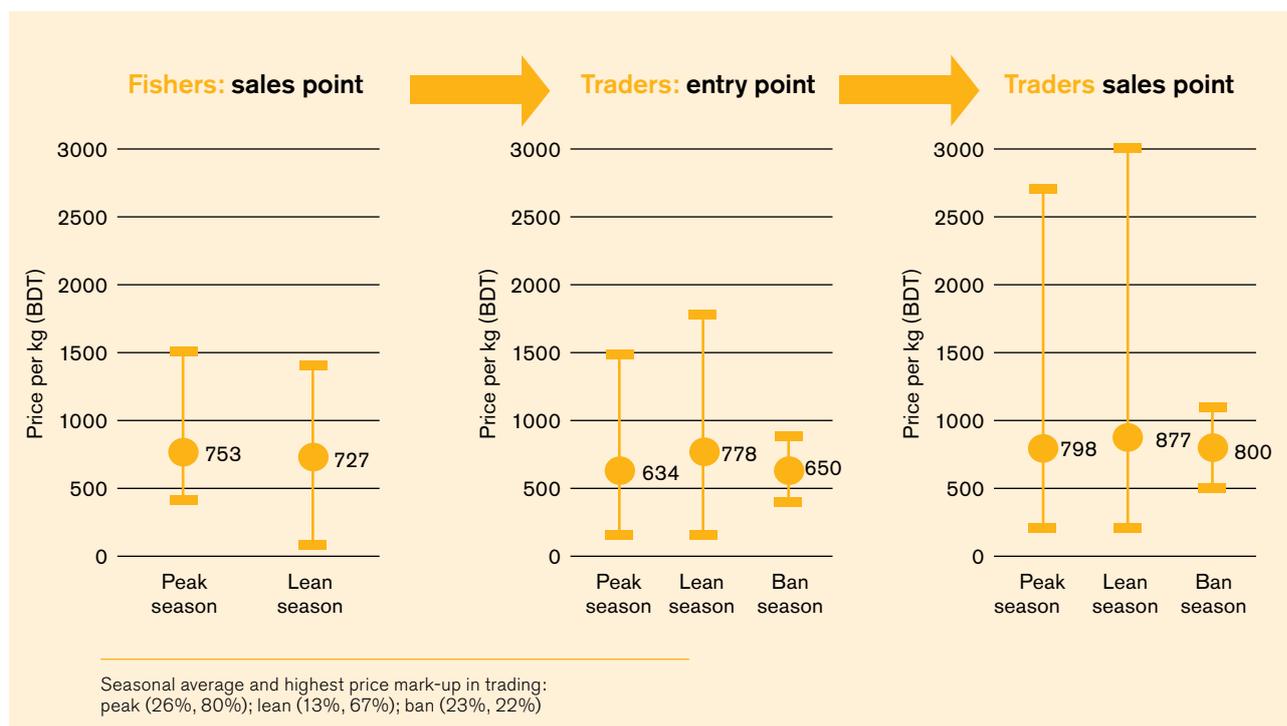
Unequal power: all fishers are obliged to sell their catch to one buyer. Intermediaries and service providers feel no obligation to a particular buyer

3.4.2 Prices along the chain and across seasons

The amounts sold (by weight), the range of prices obtained and the price mark-up all vary depending on the seasons. Respondents in our survey shifted 2,025 tonnes of hilsa fish during the peak season, 1,085 tonnes during the lean season and 28 tonnes during the ban season.

Prices vary across seasons (see Figure 7). The prices reported by fishers did not vary much between peak and lean season (BDT753 and BDT727 per kilogram respectively – see ‘Fishers, sales point’ in Figure 7), although the variation in prices was larger within the lean season. Traders purchased fish at an average of BDT706 per kilogram across the year, but the price varied depending on the season (peak, lean or ban), and it also presented important variations, with the highest

Figure 7. Price variations at entry and sales points, across fishing seasons



prices paid during the lean season (see 'Traders: entry point' in Figure 7).

There is also a significant price mark-up along the value chain. The average price (see 'Traders: sales point' in Figure 7) at which traders sold through the year (to other traders, and to final customers) was BDT838 per kilogram. There is also significantly more variation at sales point, with prices reaching over BDT2,500 per kilogram during the peak season and BDT3,000/kg during the lean season.

There is some information about hilsa trading during the ban season, mostly from actors involved in providing services like ice. The average prices during the ban season were BDT650 per kilogram at entry point and BDT800/kg at sales point.

Fishers received the lowest prices in the sample (BDT275 per kilogram across the seasons, and as low as BDT200/kg in peak season). This is 36 per cent of the average low values reported by all traders (BDT430/kg).

Average and highest price mark-up in trading: Peak (26%, 80%); Lean (13%, 67%); Ban (23%, 22%)

3.4.3 Determinants of price: regression analysis for fishers' prices

We run several models looking at the determinant of hilsa price, summarised in Table 10. The main results of the statistical regressions are:

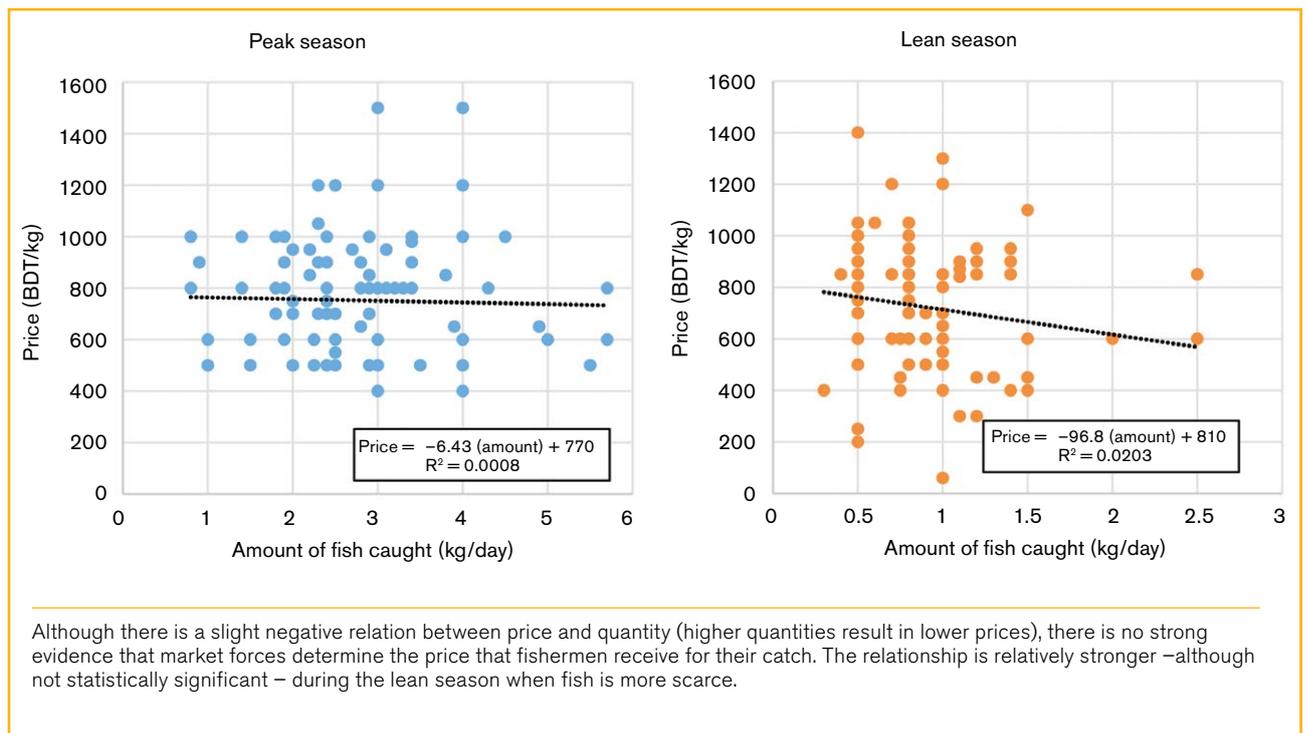
- 'Quantity of fish' does not appear to be a significant variable in determining the price of hilsa fish throughout the year. This variable is statistically significant, and it does not vary for any of the model specifications. The main determinants of price are linked to demand, for example festivals when hilsa is traditionally consumed.
- Being a fisher reduces the prices received at sales point, irrespective of demand. This variable is statistically significant.
- Age is negatively related to the prices obtained. This is linked to actors' characteristics. According to our sample, fishers remain in the trade for longer than other traders or service providers who are located higher in the value chain.

Overall, we did not find strong statistical relations in determining hilsa prices. This suggests that prices are determined in other ways. These findings are in line with the analysis of outlets or buyers (see Section 3.4.1), which shows that despite the number of players in the market, the number of actual buyers is limited, and each one has a strict control on their sources of fish – with a direct impact on the prices paid.

Table 10. Determinants of price: model specifications

MODEL 1. PRICE AGAINST QUANTITY								
	Coef.	Std. Err.	t	P>t	[95% Conf-lower)	[95% Conf-upper)	F(1, 422)	6.93
Quantity	0.002	0.000574	2.63	0.009	0.0004	0.0026	Prob > F	0.0088
Constant	771.326	12.00192	64.27	0	747.73	794.92	R-squared	0.0161
							Adj R-squared	0.0138
<i>Note: Quantity of fish does not appear to be a significant variable in determining price of hilsa fish throughout the year. The variable is statistically significant, and it does not vary for any of the model specifications.</i>								
MODEL 2. INTRODUCING SEASONALITY								
	Coef.	Std. Err.	t	P>t	[95% Conf-lower)	[95% Conf-upper)	F(1, 422)	3.5
Quantity	0.0006	2.62	0.009	0.0004	0.0026	0.0015	Prob > F	0.031
Season (lean)	7.25	23.52	0.31	0.758	-38.99	53.48	R-squared	0.0164
Constant	767.95	16.26	47.23	0	735.99	799.91	Adj R-squared	0.0117
<i>Note: The model shows that prices increase during the lean season. The specification is however not statistically significant.</i>								
MODEL 3. INTRODUCING ACTOR								
	Coef.	Std. Err.	t	P>t	[95% Conf-lower)	[95% Conf-upper)	F(1, 422)	4.48
Quantity	0.0014	0.001	2.46	0.014	0.0003	0.0025	Prob > F	0.0041
Season (lean)	5.20	23.387	0.22	0.824	-40.8	51.2	R-squared	0.031
Fisher	-61.13	24.276	-2.52	0.012	-108.8	-13.4	Adj R-squared	0.0241
Constant	791.68	18.705	42.32	0	754.9	828.4		
<i>Note: Being a fisher reduces the prices received. The variable is statistically significant.</i>								
MODEL 4: INTRODUCE CHARACTERISTICS OF ACTOR (AGE)								
	Coef.	Std. Err.	t	P>t	[95% Conf-lower)	[95% Conf-upper)	F(1, 422)	3.51
Quantity	0.0015	0.001	2.52	0.012	0.0003	0.0026	Prob > F	0.0079
Season (lean)	4.97	23.400	0.21	0.832	-41.02	50.97	R-squared	0.0324
Fisher	-60.51	24.301	-2.49	0.013	-108.28	-12.74	Adj R-squared	0.0232
Age	-0.75	0.972	-0.78	0.438	-2.66	1.16		
Constant	819.9	40.856	20.07	0	739.57	900.18		
<i>Note: Age is negatively related to the prices obtained. This is linked to actors' characteristics. According to our sample, fishers remain in the trade for longer than other traders or service providers who are located higher in the value chain.</i>								

Figure 8. Price and quantity linkages for hilsa fishers

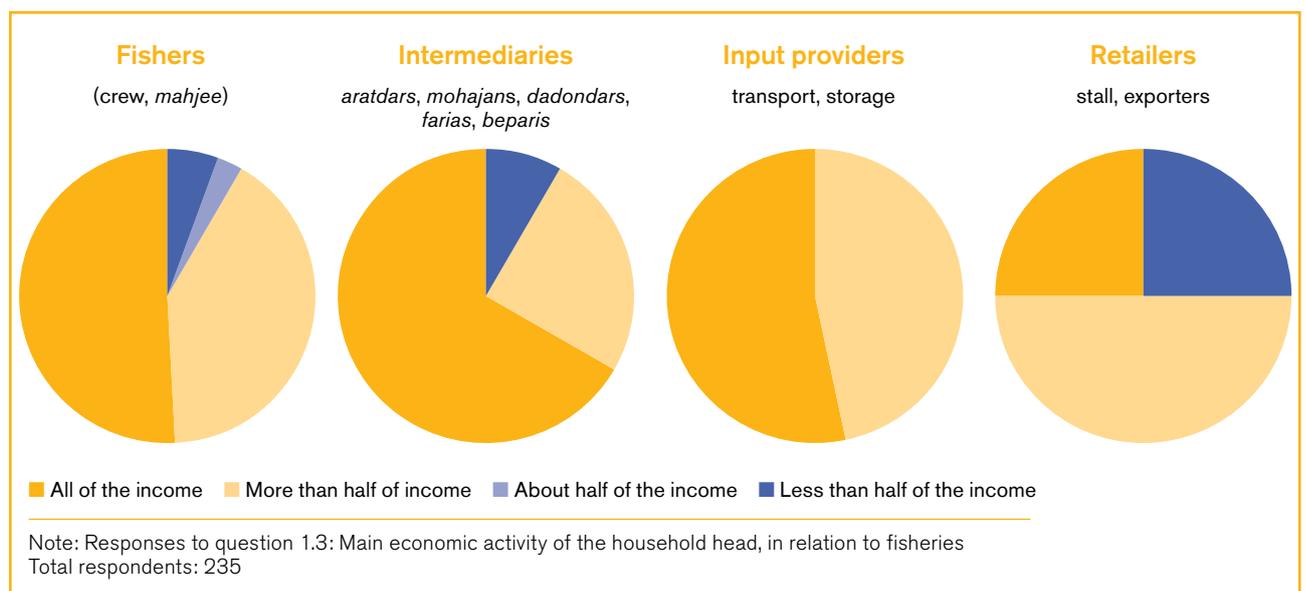


Focusing on the fishers alone, we see a lack of quantity-price relationship holding – see Figure 8. Although there is a slight negative relation between price and quantity (higher quantities result in lower prices), there is no strong evidence that market forces determine the price that fishers receive for their catch. The relationship is stronger – although not statistically significant – during the lean season, when hilsa is scarcer.

3.4.4 Household incomes along the value chain

Fish trading is a highly specialised activity, representing well over 50 per cent of the household head's income along the majority of the value chain. The key input providers – of transport and storage – cater nearly in their totality for fishing. Retailers have a more varied source of income, as shown in Figure 9.

Figure 9. Income from fisheries: main economic activity of household head



We asked people's perceptions of how their incomes have changed over the past five to ten years. At first glance, the proportion of people across the fisheries' value chain is evenly split between those whose incomes decreased (33 per cent), remained the same (34 per cent) or increased (33 per cent) over the past five to ten years, suggesting fairly stable economic activity.

The situation varies, however, when disaggregated along the value chain (see Figure 10). While national level statistics show that inflation has been oscillating widely in Bangladesh.

The average income of people associated with fisheries (fishing, trading and providing services) is about US\$2,560 per year (approximately BDT200,000). However, the income varies widely depending on the stage of the value chain (see Figure 11). Fishers have the lowest annual income of the sample, along with providers of the simplest services such as preservation

and cold storage. Hired fishers have the lowest income rank. Importantly, the annual income is not enough to cover the annual costs of outfitting the fishing boat: the results from this analysis suggest that fishers constantly operate at a financial loss.

The fish exporter in our study reports the highest income, approximately BDT2 million (over US\$25,000), which has remained roughly the same over the past five to ten years. Between 50 and 75 per cent of his annual income comes from exporting fish.

Fishers' annual income is not enough to cover the annual costs of outfitting the fishing boat: the results from this analysis show that fishers constantly operate at a financial loss

Figure 10. Changing household income and capacity to buy

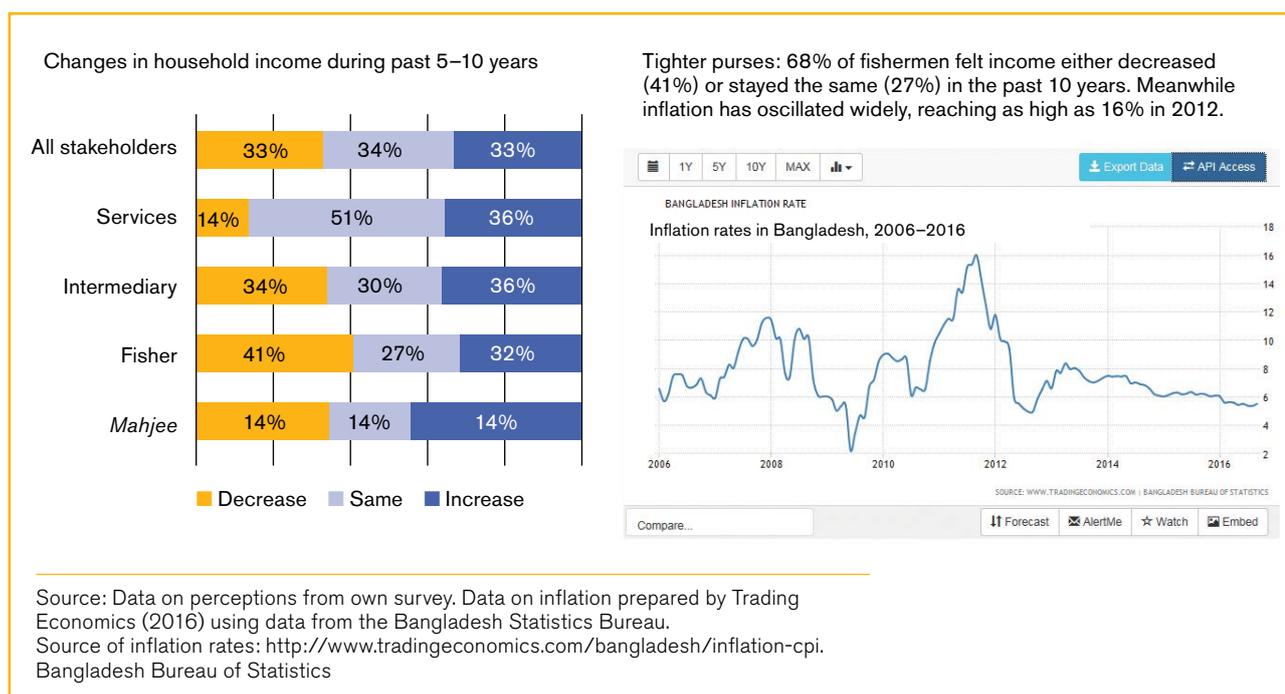
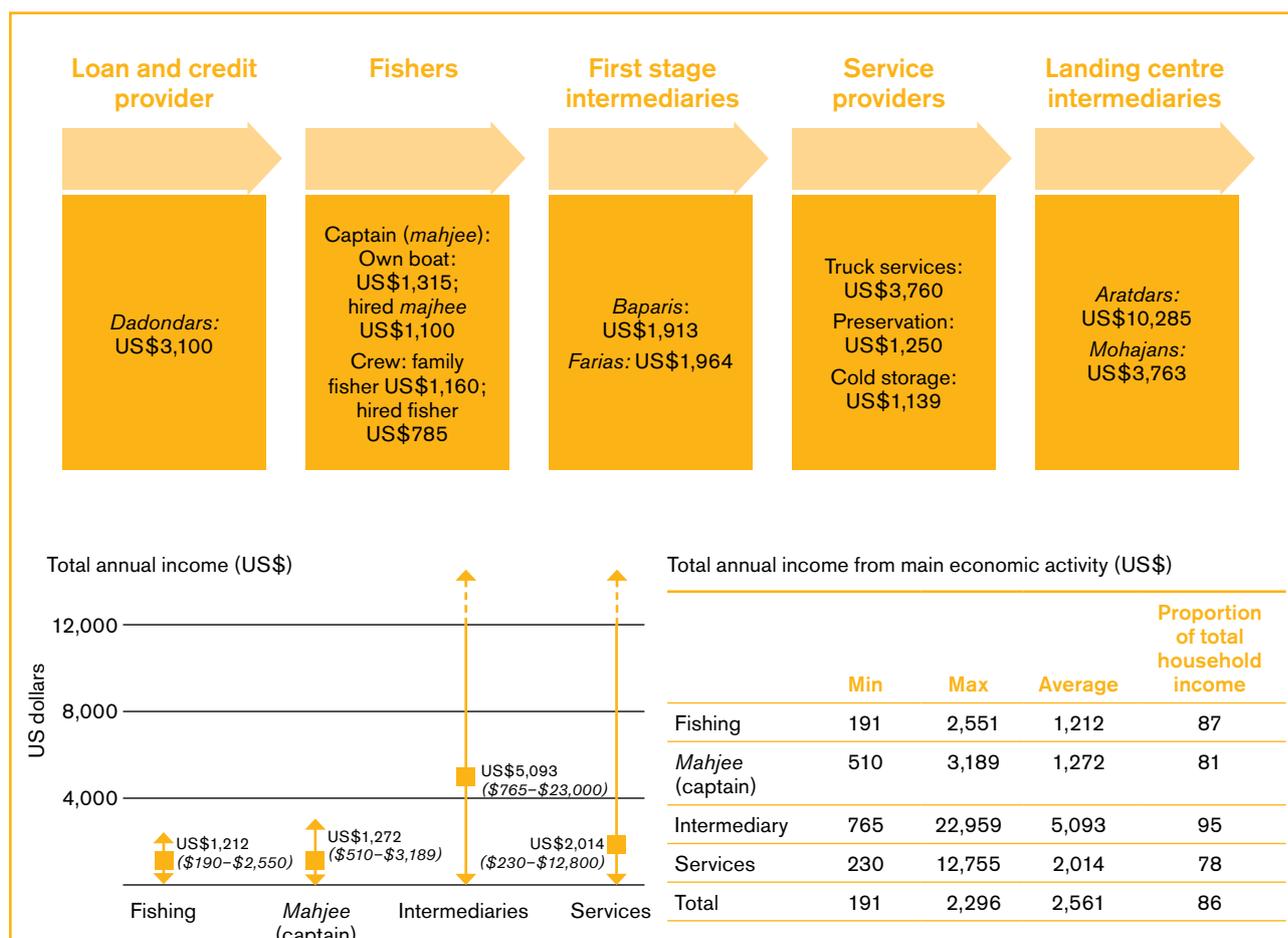


Figure 11. Annual income in fisheries along the value chain



4

Opportunities for a sustainable and inclusive hilsa value chain

This study shows the extent of fishers' vulnerability to weather patterns and market access, as well as the potential benefits that could be derived from more equitable distribution of benefits, risks and costs along the chain. Table 11 presents a summary of the main challenges and associated opportunities linked to three stages of the hilsa value chain: fishers, wholesalers (*aratdars*) and fish exporters. The full business models and opportunities for each group are presented in Annex 1. The main five points of the discussion are summarised here.

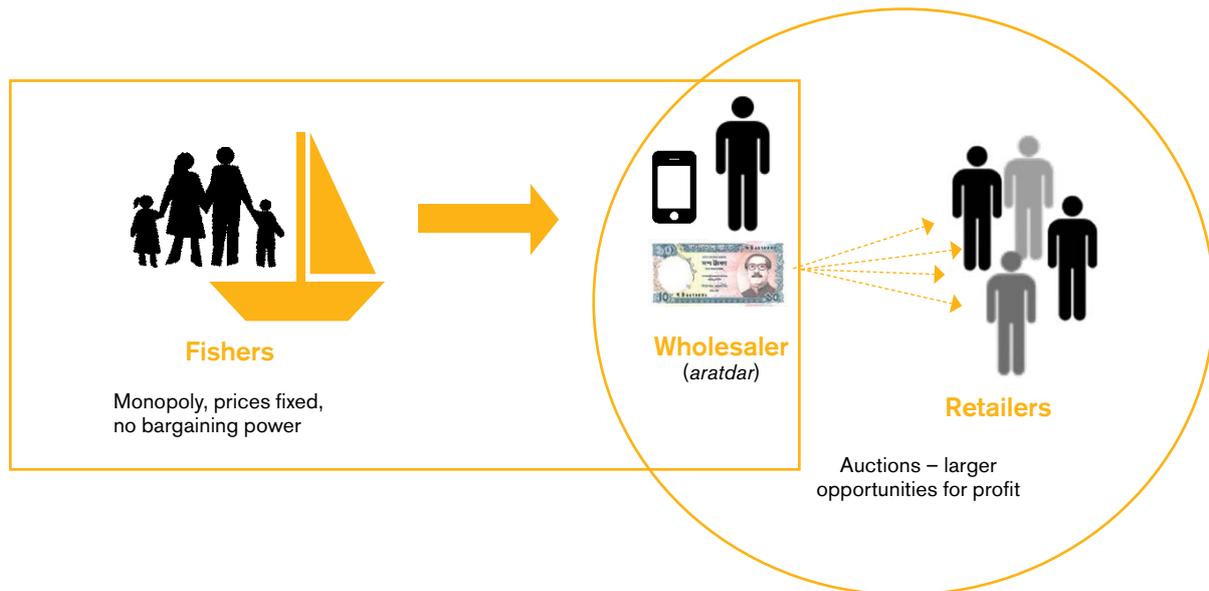
4.1 Hilsa has a high market value with guaranteed demand

Hilsa fish is highly valued – both in terms of its flavour and as a traditional food during Bengali festivities across all levels of society. The prices fetched for hilsa are significantly higher than other types of fish, and there is a guaranteed market for its supply.

In theory, this high demand should benefit the fishers, who are the key suppliers. However, the hilsa fish market is divided into two very different trading systems. Fishers are under a monopoly, forcing them to sell all their catch to a pre-agreed buyer. In many cases these buyers have provided upfront loans in exchange for the catch, effectively lowering the fishers' bargaining power to zero. Wholesalers, on the other hand, trade through instant auctions, where information about the supply of fish in other markets in the city is made immediately available through tight networks of informants. This offers many opportunities to make good profits from the high consumer demand.

Better governance of markets can help break this monopoly and help pass profits down the value chain to fishers, making the activity more profitable and bringing costs in line with revenues.

Figure 12. Market structures in the hilsa value chain



4.2 Fair compensation: conservation helps hilsa stocks, but fishers bear the cost

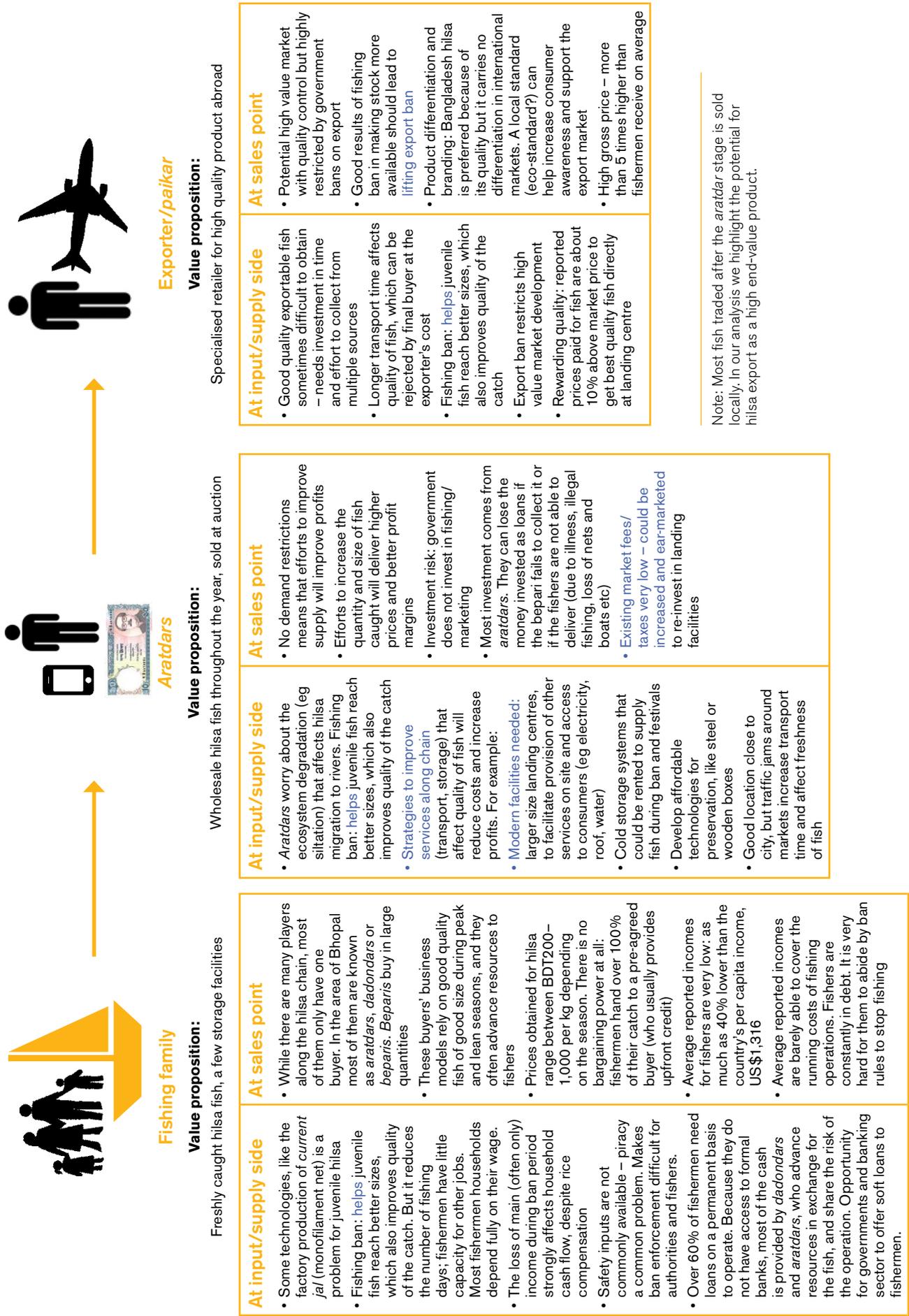
Overfishing, especially of juvenile and mother fish, has a direct impact on the size and quality of the hilsa stock.

Recent reports suggest that the seasonal fishing ban in Bangladesh is helping juvenile hilsa fish achieve better sizes. Other instruments used elsewhere to promote ecosystem enhancement in fisheries could also improve the health of the fish stock, for example reducing land-based pollution, using improved technologies, and introducing fishing quotas.

As the previous sections show, intermediaries and retailers are more likely to directly benefit from these improvements, as better-graded hilsa gets significantly higher prices in the markets. With better access to cold storage, some intermediaries are able to freeze hilsa during the peak season and sell it during the low and ban seasons, using supply and demand to their advantage to maximise profits. They are also able to switch to trade in other fish that are not affected by the ban.

Therefore the cost of this fishing prohibition falls almost completely on the fishers. Already poor, uneducated and in debt, fishers are not bearing this easily. The rice compensation they receive during the ban season is welcome but lacks protein, and is not enough to provide nutrition to their large families (only 40 kilograms per family, of which 5–10kg is lost as informal transaction fees). Moreover, only hilsa fishers are entitled to compensation, even though non-hilsa fishers cannot operate during the ban (Islam *et al.*, 2016). The lack of suitable compensation to other affected people across the chain puts further pressure on fishers to attempt illegal fishing. Fishers' low levels of education stop them from finding alternative incomes. Although there is a training programme for alternative income generating activities, uptake is very low: 7,785 fishers in 2013 and 1,743 in 2014, out of 186,000 households receiving rice compensation. This urgently points at the need to review the type of training on offer in a way that responds to the needs and skills of the fishing families.

Table II. Challenges and opportunities for key hilsa players



4.3 Opportunities to invest in improved infrastructure

Artisanal fisheries operate with relatively low technical costs (about US\$3,000 per year variable costs). This means that relatively small amounts of investment at the beginning of the chain can have a significant impact on the fishers' ability to operate. For example, respondents to the survey mentioned the need to invest in better technologies, such as access to storage facilities.

In terms of trading, the need is clear for investment in good landing centre facilities. Investing in these markets or bazaars makes a lot of economic sense, as they are already important trading locations near Dhaka with guaranteed year-round demand. Fish retailers, hawkers/ vendors from Dhaka and surrounding districts collect their fish from these markets, which are easily accessed by road, train or waterway.

Specific strategies for investment include improving services along the chain (transport, storage) that affect fish quality, reducing costs and increasing profits. For example:

- Modern facilities: larger landing centres to accommodate more intermediaries and facilitate the provision of other services on site (eg electricity, roof, water), as well as safe access to consumers
- Cold storage systems: these could be rented to supply fish during the ban season and festivals
- Affordable technologies for fish preservation: like steel or wooden boxes
- Less congestion: traffic jams around markets increase transport time and affect fish freshness. This was highlighted several times during the survey and focus groups
- Increased stall fees: to pay for better facilities. The current fees or taxes are low (in line with the basic services provided). Hilsa is a very profitable trade; traders would be open to higher fees if they were earmarked to pay for better landing facilities.

4.4 Inclusive financing

According to most respondents in the survey, there is little government investment to improve artisanal fisheries, or the marketing facilities along the value chain. Fishers have no access to finance for outfitting their boats. Intermediaries are affected by a lack of suitable trading facilities with services, some basic – like a roof or water – others more technical, like cold storage and better and quicker transport to ensure freshness of this valuable yet perishable commodity.

This represents a good opportunity for the Government of Bangladesh to develop an impact investment strategy to promote the sustainable provision of hilsa. These investments would complement the existing fishing ban that helps prevent overfishing of juvenile hilsa.

This could include combining funds from a variety of sources – such as the central government budget, philanthropic sources and private sector investments – in a collective fund to invest in the hilsa trade. See for example Bladon *et al.* (2014) for a discussion of trust funds for marine resource conservation. This could make small-enterprise loans available for fishers and processors, such as loans and equity investments in relatively inexpensive processing improvements (nets, boat fitting, ice and packaging for boats), as well as cold storage and distribution investments, such as trucks and local storage depots for intermediaries. There is also potential for larger amounts for public-private investment in fishery infrastructure, such as modern, well-connected landing centres and better road systems.

There are clear possibilities for repayment along the chain. For example, the government could repay investors under long-term investment contracts, such as long-term purchasing contracts with wholesalers and retailers, especially high-value retailers like exporters. This could also mean lifting the ban on hilsa exports, while ensuring that high profits can be shared along the rest of the value chain. For exporters, lifting the ban could be accompanied by a system allowing them to differentiate their product in international markets: according to the survey, Bangladeshi hilsa is renowned and highly valued for its taste, yet there is no official label to differentiate and capitalise on this niche product. A form of eco/fair trade labelling, for example, could improve traceability across the value chain as well as help to target high-end hilsa buyers.

4.5 Risk reduction and insurance

Risk is a major problem in artisanal fisheries. At the moment there is a major gap in insurance against losses. Most investment comes from *aratdars*, or wholesalers. They can lose the money invested as loans if their local facilitator (*bepari*) fails to collect it, or if the fishers are not able to deliver (due to illness, illegal fishing, loss of nets, boats, and so on). There is a palpable sense of use and abuse among survey respondents: fishers feel oppressed by the lack of alternative buyers and the loan conditions, while *aratdars* feel that they pay a high price in sharing the risk of failed fishing when things go wrong.

Fishing insurance can provide many benefits and support connectivity across the value chain, according to FAO (2017):

- For fishers:
 - Protects against accidents and natural hazards beyond fishers' control
 - Compensates (fully or partially) for the loss of or damage to fishing vessels, gear and catch (or harvest), thus helping to stabilise incomes in the fisheries sector
 - Reduces the individual's risk when adopting new technologies and buying improved equipment.
- Throughout the chain:
 - Reduces the risk to investors or financial institutions (such as a fund targeting artisanal fisheries) that provide credit to fishers and fish farmers
 - Fosters mutual assistance and co-operation among fishers, fish farmers and their organisations, and reduces friction between existing loans/ repayments.
- At the macro level:
 - Reduces the government's role and burden in terms of emergency relief in natural disasters
 - Promotes stability in fishery enterprises and the wellbeing of fishing communities, contributing to government's commitments to poverty alleviation, food security, 'zero hunger' objectives, and sustainable development
 - Helps to stabilise the fisheries sector's contribution to the national economy, supporting multiple jobs and livelihoods across the rest of the value chain.

Conclusion

International and national commitments to promote sustainable growth are good to have on paper but not easy to carry out in practice. The Government of Bangladesh and its fisheries department are showing huge initiative in establishing measures to improve the stock of hilsa fish in the country, thus ensuring the supply of a valuable and charismatic fish species. Initial reports on the outcome of the measures are optimistic, demonstrating larger sizes of fish caught across the seasons. Bigger hilsa fetch better prices – as high as US\$25 per kilo. It is a profitable business.

Yet the cost of these regulations are falling squarely on the shoulders of small fishers who are poor, uneducated and already in constant debt. The government offers a small payment for ecosystem services during the seasonal fishing ban in the form of rice, which is good, but does not compensate for the loss of revenue, or of household food from by-catch. These small fishers have no bargaining power and no voice in the design of the policies that affect them.

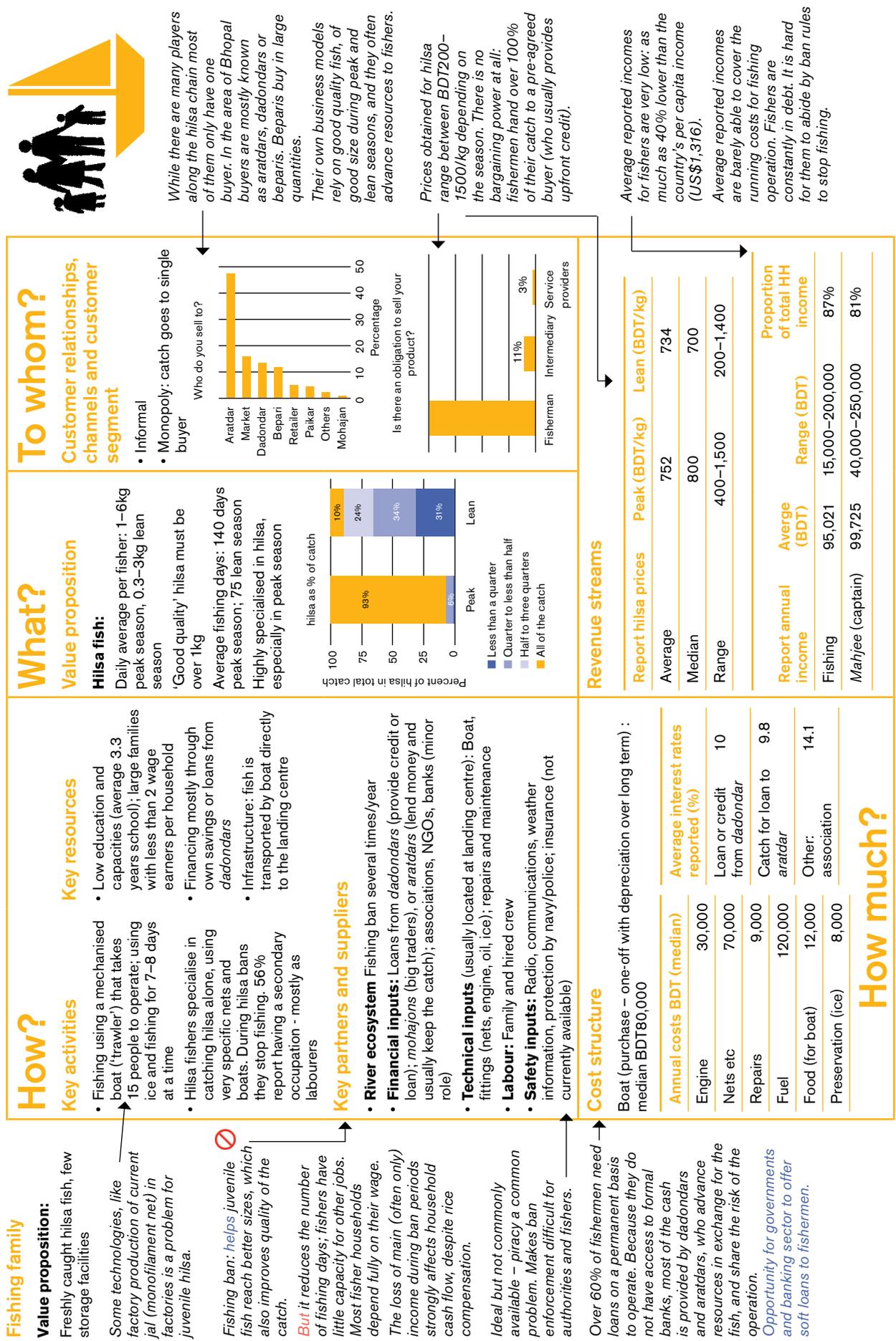
In this study we aim to provide hard data to help policymakers design sustainable development policies that are more inclusive, and do not leave behind those with less power. We used the LINK methodology and business model canvas to unpick the business propositions of key players across the value chain. We used a combination of focus groups, field surveys and interviews with key informants to untangle the value chains. In this way, our study provides concrete data and evidence on processes, power, and profits to help policymakers understand who is affected and how, and the best strategies to re-govern markets in more inclusive ways.

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Appendix 1. Fisher business canvas

Figure A.1 Fisher business canvas: opportunities and challenges



Appendix 2. The wholesaler business model: opportunities and challenges

A.2.1 Report on the aratdar focus group discussion: Kawran Bazar

This is the report on a focus group discussion with hilsa *aratdars* for the hilsa value chain study at Kawran Bazar.

Facilitator: Md. Shahajat Ali, PhD, Research Fellow, BCAS

Venue: Office of the Secretary, *PanchTara Samannay Matshya Aratdar Bohumukhi Samabaya Samity* (PanchTara Co-ordinated Fish *Aratdar* Multipurpose Co-operative Society), Room 6, Kawran Bazar, Dhaka North City Corporation, Dhaka.

Date & time: 27 August 2016, 11:30–13:30

Kawran Bazar is one of the biggest wholesale fish markets in the country. The fish *aratdars* (wholesalers) facilitate fish sales to *beparis* and retailers at open auction and charge 5–8 per cent commission from the suppliers. There are more than 300 fish *aratdars* engaged in fish trading in the *arat* (wholesale market). Fish *aratdars* were invited to attend the focus group discussion (FGD) for this hilsa value chain study, and five participated (see the list of participants at the end of this transcript). First we introduced ourselves, and explained the importance to participants of conducting this study. Before discussing any topic, it was thoroughly explained in simple language to ensure that everyone understood. Participants were encouraged to take part in the discussion and express opinions and ideas freely. We followed a checklist and questionnaire for the value chain study to gather the necessary information. The following issues were thoroughly discussed with the participants, and we recorded their opinions and ideas:

1) Respondent profile

The *aratdars* were aged between 29 and 45. They are professional fish traders, and fisheries represent all of their household income. Their fish trading experience varies between 5 and 20 years. Apart from the fish trading business, one of the participants had a transport business and a grocery shop. They reported an increase in household income over the past five to ten years, and their annual incomes range from BDT0.60 to 1.5 million. All of them own land, either as homestead or agricultural land. Every participant pays tax in the form of trade license fees.

2) Hilsa trading in the arat

Focus group participants reported a clear difference between the amounts of hilsa fish traded in peak and lean hilsa seasons. As a popular fish, demand for hilsa is always high, so trading continues throughout the year – 132 days during the peak season and 233 days during the lean season every year. The fish market does not close. The average amount of fish sold per day by a single *aratdar* is 700 kilograms in peak season and 200kg in lean season. During the ban period hilsa is sold irregularly, and the supply comes from cold storage.

3) Diversifying from hilsa

The participants reported that they mainly trade in hilsa because its demand and price is comparatively high and they earn a good profit from it. When the supply of hilsa decreases during lean and ban periods, they trade in other fish such as carp, big catfish, shrimps and so on.

4) Hilsa supply and wholesale prices

The hilsa marketing channel from river to plate is complex. There are many actors who play a vital role in collecting, trading and transporting the fish before it reaches the consumers. As it is a favorite food item and has good market demand, every actor earns a good profit from it – except the artisanal fishers who catch it. The amount of fish supplied to the *arat* depends on how much is caught in the fishing grounds and also on demand in Dhaka and other district (local) markets. *Beparis* and *paikars* purchase the hilsa from the local landing centre (*arat*) and pack the fish with ice in suitable containers such as baskets, drums, wooden, plastic or Styrofoam boxes and send them to Dhaka or other district *arats* by road or waterways.

The amount of fish received by each *arat* depends on the marketing channels and how much money is invested as loans (*dadon*) among the fishing communities.

Each focus group participant invested on average BDT200,000–1 million in the fishing communities through *beparis* and *paikars*, with the mutual understanding that they will supply fish to the *arat*. Responsibility for recovering the loan (*dadon*) money lies with the *beparis* and *paikars*.

The *aratdars* do not have any direct contact with the fishers. The same *aratdar* informed us that a few *beparis* and *paikars* failed to procure any fish from the fishers they had given loans to, since these fishers were unable to fish for various reasons such as illness, illegal fishing, loss of nets, boats and so on, and ultimately their loan money was forfeited.

Participants said that the price of fish in the *arat* depends on supply and demand in the market and on fish size. Bigger sizes (from about 1 kilogram) are considered large-grade fish and are given a higher value. When supply increases the price decreases and vice versa. When fish is sent to the Dhaka *arat* its price remains hidden. The price of fish sharply increases on the eve of some religious and cultural festivals. The *aratdars* sell the fish at open auction and try to achieve the highest price possible, because they receive a commission of 6 to 8 per cent of the total price of the auctioned fish. The table-size fish on sale ranges in weight from 450 to 850 grams per piece, though sometime smaller fish are also sold. The wholesale price of hilsa as reported by the focus group is shown in Table A.1.

There are three stages of selling and purchasing the fish before it reaches to the consumer. In the **first stage**, the fishers catch the hilsa in the fishing grounds and bring it to the *arat* (landing centre-cum-wholesale market) for sale by auction. The fish is then purchased by *beparis*, *paikars* and *farias* from the *arat* and packed in boxes to send to bigger secondary markets like Dhaka, Barisal, Chandpur and Patuakhali. Local retailers also purchase fish from the *arat* to sell to local consumers.

In the **second stage**, the fish is again auctioned by *aratdars* for wholesale to *beparis*, *paikars*, retailers, hawkers and so on. Some of the fish is transported to other districts by *beparis* and inter-district fish traders. Consumers obtain their fish from local retailers and hawkers.

In the **third stage**, local retailers purchase the fish from the local wholesale market (*arat*) and sell it to local consumers.

5) Increasing profits

The *aratdars* said that if hilsa catches increase, they could get better profits from their trading. They could also make a good profit from quality fish. The quality (and price) of the fish can deteriorate due to being in transit for too long, or bad packaging, rough handling; and so on. They sometimes preserve the fish in cold storage to meet the higher demand during or before festivals. They have also developed facilities like steel or wooden boxes (with a capacity of 50–300 kilograms) to preserve unsold fish for a short time in order to get a higher price. Now they can preserve the fish in private commercial cold storage on a rental basis to profit from the maximum price during lean or ban seasons. But they felt that the government should build big cold storage facilities to preserve hilsa and other fish in order to maintain a steady price and supply of fish in the market. The *aratdar* association does not have cold storage.

6) Inputs and production cost

Most of the group participants said that they have invested their savings/own money in fish trading in the *arat*. Lack of capital in the business is an acute problem. A petty amount has been invested by commercial banks, *aratdar* associations and relatives as short-term loans. Bank loans have an interest rate of 12–17 per cent.

The *aratdars* employ laborers to handle the fish in the *arat* on a daily basis, paying them BDT250–300 per day. Auctioneers, account keepers and managers are paid BDT14,000–15,000 on a monthly basis to run the *arat*. Suppliers use launches, steamers or covered vans to transport the fish. But delays in transport, eg due to road congestion, cause deterioration in the quality and also the price of the fish. There is no loss of fish due to any reason whatsoever after the fish reach the *arat*. *Paikars*, *beparis* and retailers purchase the hilsa from the *aratdars* through open auction and there is no interference in selling the fish.

Table A.1 Wholesale price of hilsa at Kawran Bazar *arat*, 27 August 2016

WEIGHT RANGE OF HILSA	WHOLESALE PRICE OF HILSA		
	HIGHEST (BDT/KG)	AVERAGE (BDT/KG)	LOWEST (BDT/KG)
500–850g	1,000	900	800
900–1200g	1,400	1,200	1,000

7) Fees and taxes

The *aratdars* have to pay BDT5,000–6,000 per year as trading license fees to Dhaka North City Corporation to run their business in the market. They also pay a small amount for market stall fees, BDT200–300 a day, including electricity, water supply and cleaning.

8) Constraints and opportunities

The participants mentioned the following **constraints**:

- Insufficient capital for the fish trade is hampering business. There are least opportunities to manage the capital for fish trading from other sources.
- The current wholesale market is running on rented land owned by Bangladesh Railway and the site is inadequate for the wholesale fish trade.
- The connecting road to the market is often congested, delaying transportation and increasing transport costs.
- Infrastructure in the *arat*, such as the roof, water supply, lighting and fish stalls are in bad condition, creating problems such as making access harder for traders and consumers.

The **opportunities** mentioned by the participants are:

- Hilsa has high year-round demand in the market. There is sometimes even a shortage of hilsa, so it is not a problem at all.
- The market is situated in the middle of Dhaka city. Traders have easy access by road, train and waterways to this market from around the city and find it easy to collect the fish and take it to their own market. Traders from adjacent districts also collect their fish from this market.
- Fish retailers, hawkers/vendors from Dhaka city collect their fish from this market.
- Cold storage is available in and around the market for storing the fish. Ice factories are available to meet the demand for ice to preserve the fish.

9) Main constraints and opportunities to increasing hilsa's profitability

The **constraints** mentioned by the respondents are:

- Siltation is causing the river depth to decrease in places, creating submerged sand islands that obstruct the hilsa migrating upstream to breed.¹

- There is no government investment in fishing and trading hilsa. All capital has been invested by the fishers and traders themselves.
- Most of the fishers are in a 'debt trap'. Their living standard is far below the country's poverty line. Most of them are illiterate. It's very hard for them to abide by the rules and regulations for conserving hilsa and jatka when it means their family members go hungry.
- Production of *current jal* (monofilament net) in the factories is a challenge to the hilsa population, especially to jatka.
- The number of hilsa fishers in the country increases every year. Thus hilsa overfishing is destroying the fishing grounds. There is no restriction on the number of hilsa fishers in these natural fishing grounds.

10) Suggestions to address the problems and constraints

- Trading in fish is part and parcel of fishery development in the country. Government should therefore build several modern fish markets suitable for big cities to facilitate fish sales so that fish farmers and fishers could get a better price for their product.
- Fisheries have been recognised as a promising development sector in the country. Fishers and fish traders should be provided with soft loans from government financial institution like banks. A fisheries bank could be established to finance the fish farmer and fisher communities in the country, and release fishers from the debt-trap of *mohajon* money lenders.

11) *Aratdars* who participated in the focus group discussion

- Md. Younus Hossain (34)
- Md. Sukur Ali Khan (42)
- Md. Kamal Sarder (29)
- Biplob Kumar Biswas (29)
- Md. Zilkod Gazi (45).

All are fish *aratdars* at Kawran Bazar, Dhaka.

¹ Hilsa migrates between sea and fresh water, breeding in freshwater rivers. The young hilsa (jatka) remain in the fresh water until juvenile, then migrate to the sea for feeding and development. The matured female and male migrate back to the freshwater river basin for breeding. Hilsa is a deepwater fish, yet it travels along the migratory route at a depth of only 7–10 meters.

A.2.2 Report on the *aratdar* focus group discussion: Suwarighat fish market

This is a report on a focus group discussion with hilsa *aratdars* at Suwarighat, Chawkbazar, Dhaka for the hilsa value chain study.

Facilitators: Md. Shahajati Ali, PhD, Research Fellow, and Md. Shafiqul Islam, Research officer

Venue: Office of the President, Suwarighat *Matshya Aratdar Samabaya Samity* (Suwarighat Fish *Aratdar* Co-operative Society), Chawkbazar, Dhaka South City Corporation, Dhaka.

Date & time: 19 September 2016, 12.00–13:45

Suwarighat fish market is one of the oldest wholesale fish markets in Bangladesh, located next to the dam on the River Buriganga near Chawkbazar (Dhaka South City Corporation). The land the market is on was purchased by the Suwarighat Fish *Aratdar* Co-operative Society. At present the market has no permanent structure, not even a shed. Traders have had trouble trading fish in bad weather conditions. The fish *aratdars* facilitate open auctions to sell fish to the *beparis* and retailers, charging 5–8 per cent commission from the supplier. There are more than 40 fish *aratdars* engaged in fish trading in the market. After an invitation to *aratdars* to attend the FGD on the hilsa value chain study, six participated (the list of participants is at the end of this report). First we introduced ourselves, and explained the importance to participants of conducting this study. Before discussing any topic, it was thoroughly explained in simple language to ensure that everyone understood. Participants were encouraged to take part in the discussion and express their opinions and ideas freely. We followed a checklist and questionnaire for the value chain study to gather the necessary information. The following issues were thoroughly discussed with the participants, and we recorded their opinion and ideas:

1) Respondent profile

The *aratdars* were a mixed age group, aged 28 to 75. One was a senior fish trader who has been in the fish trading business for the past 50 years. They are professional fish traders, and fisheries represent all of their household income except one. Their fish trading experience varies between 5 to 50 years. Apart from the fish trading business, one of the participants had another business too. Their household income has increased during past five to ten years and their annual income ranges from BDT550,000–1,200,000. All of them own land, either as homestead or agricultural land. Every participant pays Union/Pourashova tax and trade license fees.

2) Hilsa trading in the *arat*

Focus group participants reported that consumers have always had a preference for the taste of hilsa fish. Demand for this popular species is so high that trading in hilsa continues throughout the year, and there is no closure of the fish market; however, there is a clear difference in the amount of hilsa traded between its peak and lean seasons. Hilsa trading lasts for 150 days in peak season, and 180 days in the lean season every year. A single *aratdar* sells on average 300 kilograms of fish per day in the peak and 90kg in the lean season.

3) Diversifying from hilsa

The participants reported that they mainly trade in hilsa because its demand and price is comparatively high and they earn a good profit from it. When the supply of hilsa decreases during lean and ban periods, they trade in other fish such as carp, big catfish, shrimps and so on.

4) Hilsa supply and wholesale prices

Participants reported that the amount of fish supplied to the *arat* depends on the fish caught by the hilsa fishers and also on demand in Dhaka (local) markets. As Dhaka is a big market, hilsa from the fishing grounds in the southern parts and any marine catch are sent to Dhaka markets to get higher profits. Hilsa are purchased by *paikars* at the local *arat* and sent to Dhaka *arat* by road or waterways. The amount of fish received in each *arat* depends on marketing channels and the amount of money invested as loans (*dadon*) in fishing communities. The participants informed us that they give loans to fishers for purchasing fishing equipment through *beparis/paikars* with the mutual understanding that the fishers will in turn supply fish to the *arat*. The amount of loans distributed by each *aratdar* annually ranged from BDT100,000 to 1.20 million. They had at times forfeited these loans when fishers were not able to fish due to illness, loss of equipment and so on.

As for Kawran Bazar *arat*, participants said that the price of fish in the *arat* depends on supply and demand, and on fish size. Bigger sizes (about 1 kilogram and above) are considered large-grade fish and given a higher value. When supply increases the price decreases and vice versa. When the fish is sent to Dhaka *arat* its price remains hidden. The price of hilsa also sharply increase on the eve of some religious and cultural festivals. The *aratdars* sell the fish at open auction and try to achieve the highest price possible, since they receive a commission of 6–8 per cent of the total price of the auctioned fish. The range of weight of marketed table-size hilsa fish is 450 to 850 gm/piece though sometime smaller fishes are also marketed. The wholesale price of hilsa as reported by the focus group is shown in Table A.2.

Table A.2 Wholesale price of hilsa in Suwarighat arat, 19 September 2016

WEIGHT RANGE OF HILSA	WHOLESALE PRICE OF HILSA		
	HIGHEST (BDT/KG)	AVERAGE (BDT/KG)	LOWEST (BDT/KG)
500–850g	750	650	550
900–1200g	1,000	900	800

Hilsa is sold and purchased in three stages before reaching the consumer, as described in the report from the Kawran Bazar focus group discussion above.

5) Increasing profits

As for the Kawran Bazar FGD, the *aratdars* said that if hilsa catches increase, they could get better profits from their trading. They could also make a good profit from quality fish. The quality (and price) of the fish can deteriorate due to being in transit for too long, or bad packaging, rough handling; and so on. They sometimes preserve the fish in cold storage to meet the higher demand during or before festivals. They have also developed facilities like steel or wooden boxes (with a capacity of 50–300 kilograms) to preserve unsold fish for a short time in order to get a higher price. Now they can preserve the fish in private commercial cold storage on a rental basis to profit from the maximum price during lean or ban seasons. But they felt that the government should build big cold storage facilities to preserve hilsa and other fish in order to maintain a steady price and supply of fish in the market.

6) Inputs and production cost

Like the Kawran Bazar *aratdars*, the participants described lack of capital in the business as an acute problem. Most of the participants said that they have invested their savings/own money in fish trading in the *arat*. A petty amount has been invested by commercial banks, *aratdar* associations and relatives as short-term loans. Bank loans have an interest rate of 12–17 per cent. All the participants felt that government should offer loans to the fish trading business through commercial banks.

The *aratdars* employ labourers to handle the fish in the *arat* on a daily basis, paying them BDT250–300 per day. Auctioneers, account keepers and managers

are paid BDT14,000–15,000 on a monthly basis to run the *arat*. *Beparis* and *paikars* pack the fish in suitable containers including baskets, drums, wooden or Styrofoam boxes using ice as a preservative, and transport the fish by launch or steamer, truck or covered van to Dhaka and other districts. In these conditions the fish remains in good quality for about 10–15 hours. There are private ice factories around the market and there is no problem in procuring ice to preserve the fish. But delays in transport due to road traffic congestion cause deterioration in the quality and also the price of the fish. The *aratdars* pay BDT50 per 80 pieces of fish for unloading fish from the truck or covered van. Each *aratdar* has spent at least BDT5,000 a year on ice for the short-term preservation of fish in steel boxes. There is no loss of fish due to any reason whatsoever after the fish reaches the *arat*.

7) Fees and taxes

The *aratdars* have to pay BDT2,500–3,500 in trading license fees to Dhaka North City Corporation to run their business in the market. The fish stalls are allotted to the *aratdars* for a fixed amount of BDT20,000 per year. One participant paid income tax annually. There is no informal fee or access right fee for the market and they can run their business without any outside interference.

8) Constraints and opportunities

The respondents mentioned the following **constraints**:

- Insufficient capital for fish trading is hampering the business. However, there are opportunities to find capital from other sources.
- The present wholesale market is running in a temporary shed owned by the *aratdar* association. The fish deteriorates in rainy or sunny weather.

- c) The connecting road to the market is often congested, delaying the transportation of the fish and also increasing the cost of transport.
- d) The *arat*'s infrastructure is in poor condition, including its roof, water supply, lighting, and stalls. This creates problems for handling the fish and giving easy access to traders and consumers.
- e) No bank or financial institutes are interested in investing in the fish market sector due to the presence of high risk factors.
- d) In the river basin the fishing ban is helping to conserve spawning hilsa and juvenile jatka (define as less than 25 centimetres long) from illegal fishing, but there is little or no action to protect them at sea. Destructive fishing activities are continuing without any intervention.
- e) The production of *current jal* (monofilament net) in net factories is a threat to the hilsa population, especially to young hilsa (jatka).

10) Suggestions to address/remove the problems/constraints

The **opportunities** mentioned by the participants are:

- a) Demand for hilsa remains steady all year round. There is even sometimes a shortage of hilsa fish on the eve of religious and cultural festivals.
- b) Traders have easy access by road and waterways to this market from around the city and can easily collect the fish and move on to their own local market. Traders from adjacent districts also collect their fish from this market.
- c) Fish retailers, hawkers/vendors from Dhaka city collect their fish from this market.
- d) Cold storage is available in and around the market for storing the fish. Ice factories are available to meet the demand for ice to preserve the fish.
- a) Government should build modern fish markets to facilitate fish marketing, since the markets are such an important and integral part of fishery development in the country.
- b) All efforts should be made to conserve spawning hilsa and jatka from illegal fishing and trade to increase hilsa production in the country. The jatka conservation programme should be strengthened further.
- c) As hilsa production has increased, the ban on hilsa exports should be withdrawn.

11) *Aratdars* who participated in the focus group discussion

9) Main constraints and opportunities to increasing hilsa's profitability

Constraints as mentioned by the respondents are as follows:

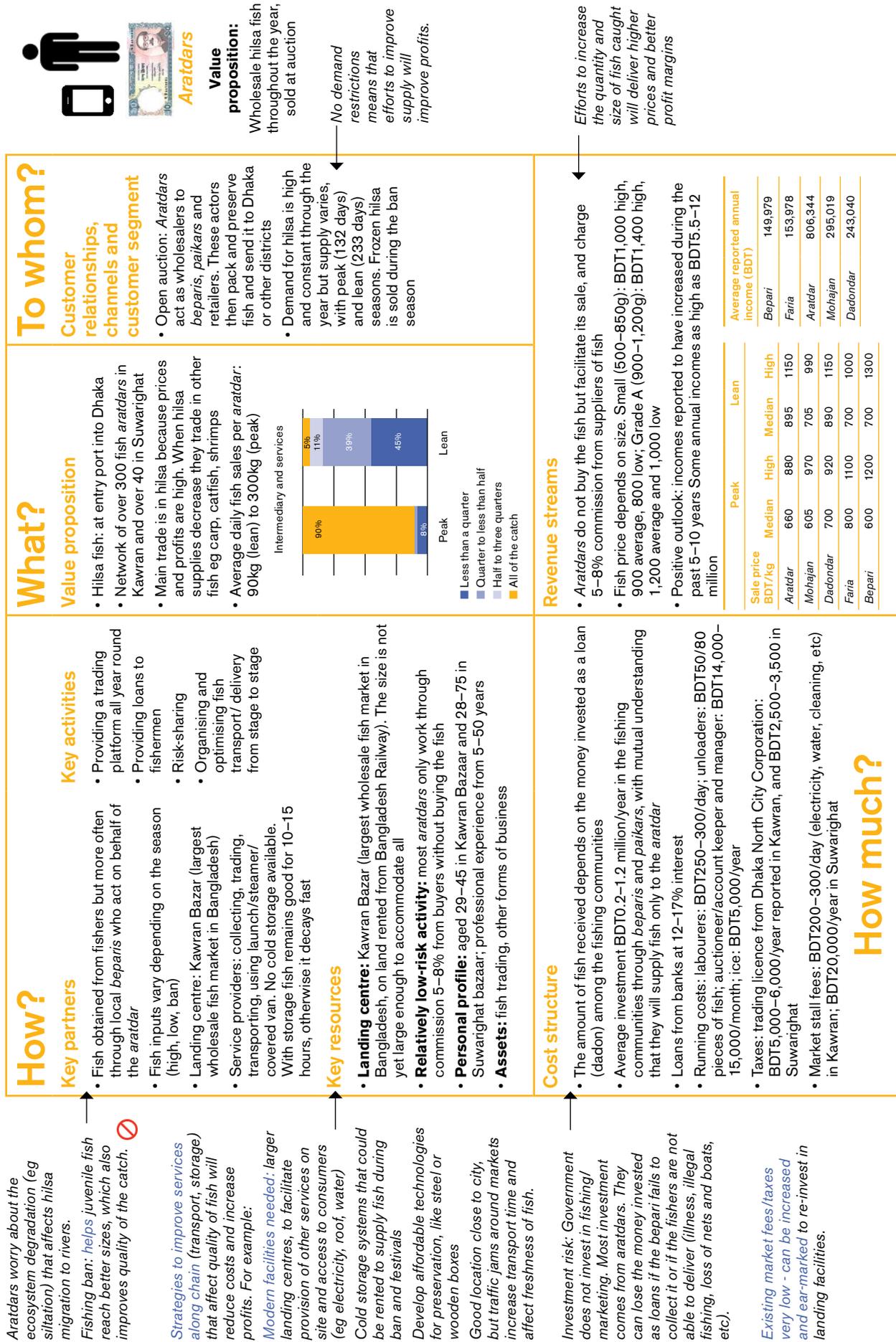
- a) Siltation is causing the river depth to decrease in places, creating submerged sand islands that obstruct the hilsa migrating upstream to breed.
- b) There is no government investment in fishing and trading hilsa. All capital has been invested by the fishers and traders themselves.
- c) Most of the fishers are in a 'debt trap'. Their living standard is far below the country's poverty line. Most of them are illiterate. It's very hard for them to abide by the rules and regulations for conserving hilsa and jatka when it means their family members go hungry.

- Hajee Abul Hasnat (75)
- Md. Shafiqul Islam (55)
- Md. Liaquat Hossain (45)
- Md. Abdur Razzak (28)
- Gopal Chandra (42)
- Santu Babu (50).

All are fish *aratdars* at Suwarighat, Chawkbazar, Dhaka.

A.2.3 Wholesaler business canvas

Figure A.2 W wholesaler business canvas: opportunities and challenges



Appendix 3. Exporting hilsa

A.3.1 Fish exporter: personal interview

This is a report on an interview with a fish exporter for the hilsa value chain study.

Facilitators: Md. Shahajat Ali, PhD, Research Fellow and Md. Shafiqul Isalm, Research Officer

Venue: Office of fish exporter Mr. Liton Devnath, Dar-us-salam Arcade, Purana Paltan, Dhaka South City Corporation, Dhaka

Date & time: 19 September 2016, 14:30–16:00

Hilsa is the national fish of Bangladesh. The fish is popular for its taste in Bengali communities at home and abroad, and is exported to those countries where there is market demand. But due to the decline in catch size and a shortage of supply in the domestic market, hilsa exports were banned in 2012. The interviewee said that there are bright prospects for exporting hilsa to countries with Bengali communities, which could earn a lot of foreign currency for the country. The present KII is based on information provided before the export ban was imposed.

At the start of the interview we introduced ourselves and informed the interviewee of the importance of conducting this hilsa value chain study. Each issue was thoroughly explained to him before it was discussed, and he was encouraged to express his opinions and ideas freely. We followed a checklist and questionnaire for the hilsa value chain study to gather the relevant information for this study, and recorded the interviewee's opinions on each issue throughout the discussion.

1) Profile of interviewee

Mr. Liton Devnath (49) is a fish exporter with 25 years' experience. His educational level is 12 classes. He has a small immediate family of four members including two children, but he comes from a big family in Gazipur District. More than 50 per cent of his income is from fish exports. He earns more than approximately BDT2 million from exporting fish and other food items such as vegetables, fruits and frozen foods. His annual income has been the same over the past five to ten years. He owns homestead as well as agricultural land. He pays tax in license fees and income tax annually.

2) Contact with buyers

Hilsa exports depend on demand from the buyer (importer) in an open market. Then the buyer (importer) and supplier (exporter) agree on product quality, amount, weight, packing materials, price and so on. As soon as the export contract is finalised, the exporter starts to collect and process fish for export. He informed us that he exports fish to buyers in Canada, Singapore, Dubai, Kuwait, India (Kolkata) and other countries with Bengali communities.

3) Collecting and processing hilsa

He employs special *beparis* and *paikars* who collect the good quality exportable larger size (1 kilogram and above) hilsa fish directly from the fishers as soon as they land it in the landing centre, and preserve the fish in ice to keep the fish fresh. To collect the good quality fish, he offers a higher price, about 10 per cent higher than the usual market price. Then the *beparis/paikars* clean the fish in clean water, pack it in cartons or boxes and sends it to the fish processing plant for processing before export. Before export, the quality of the fish is also tested in the DoF's Fish Quality Control laboratory to check that it fulfills the importing country's quality control criteria and regulations. If it fulfills the quality control criteria, the fish is ready for export.

4) Packing materials and transportation

The fish are packed in paper cartons, 5–10 kilograms of fish per carton depending on carton size. The interviewee uses imported cartons (priced at BDT30–40 each) from South Korea to pack the fish. Good quality packaging ensures that any contamination will be avoided during transportation to importing countries. The interviewee uses refrigerated or covered vans to transport the fish, preserved in ice, from landing centres to airports or shipping ports. He sends fish to the importing country by air or ship depending on the buyer's requirements. He told us that in general he sends consignments by ship.

5) Amounts and price of fish

The respondent informed us that he spends BDT1,000–1,500 per kilogram on purchasing exportable hilsa fish from the *beparis/paikars*. The export price of fish varies from country to country. The average export price was US\$25–30 per kilogram, depending on fish size. The export price of fish varies from country to country. He exported more than 180 million tonnes of fish in 2011 in 12–15 consignments to different countries. He said that Bangladeshi hilsa is preferred by consumers and priced higher than Myanmar and Indian hilsa for its flavour. But Myanmar and Indian hilsa is sold in stores as Bangladeshi, thus cheating customers. Steps must be taken to identify the pride of Bangladeshi hilsa as Bangladeshi. Branding Bangladeshi hilsa is essential to save its identity in the export market.

6) Constraints and suggestions

The following **constraints** were identified by the respondent:

- a) There is huge demand for hilsa in the export market, but the Government of Bangladesh is maintaining its ban on hilsa exports. However, the interviewee suspects that hilsa is exported by some exporters as other types of fish, which is unacceptable. Thus Bangladesh is losing its potential export market.

- b) Sometimes it is difficult to collect quality exportable fish. More money and effort needs to be spent collecting the fish.
- c) Fish spending too long in transit becomes an acute problem, as its quality deteriorates and ultimately may be rejected by the buyer. Thus the exporter has to bear a huge financial loss.

The following **suggestions** were put forward by the respondent:

- a) Bangladesh's hilsa production has increased in the country due to the steps taken to help production. The ban on hilsa exports could therefore be lifted and permits reissued to start exporting again.
- b) Government should take proper steps to brand Bangladeshi hilsa and make it a household name worldwide.

A3.2 Exporter business canvas

Figure A.3 Exporter business canvas: opportunities and challenges



Exporter/paikar

Value proposition:

Specialised retailer for high quality product abroad

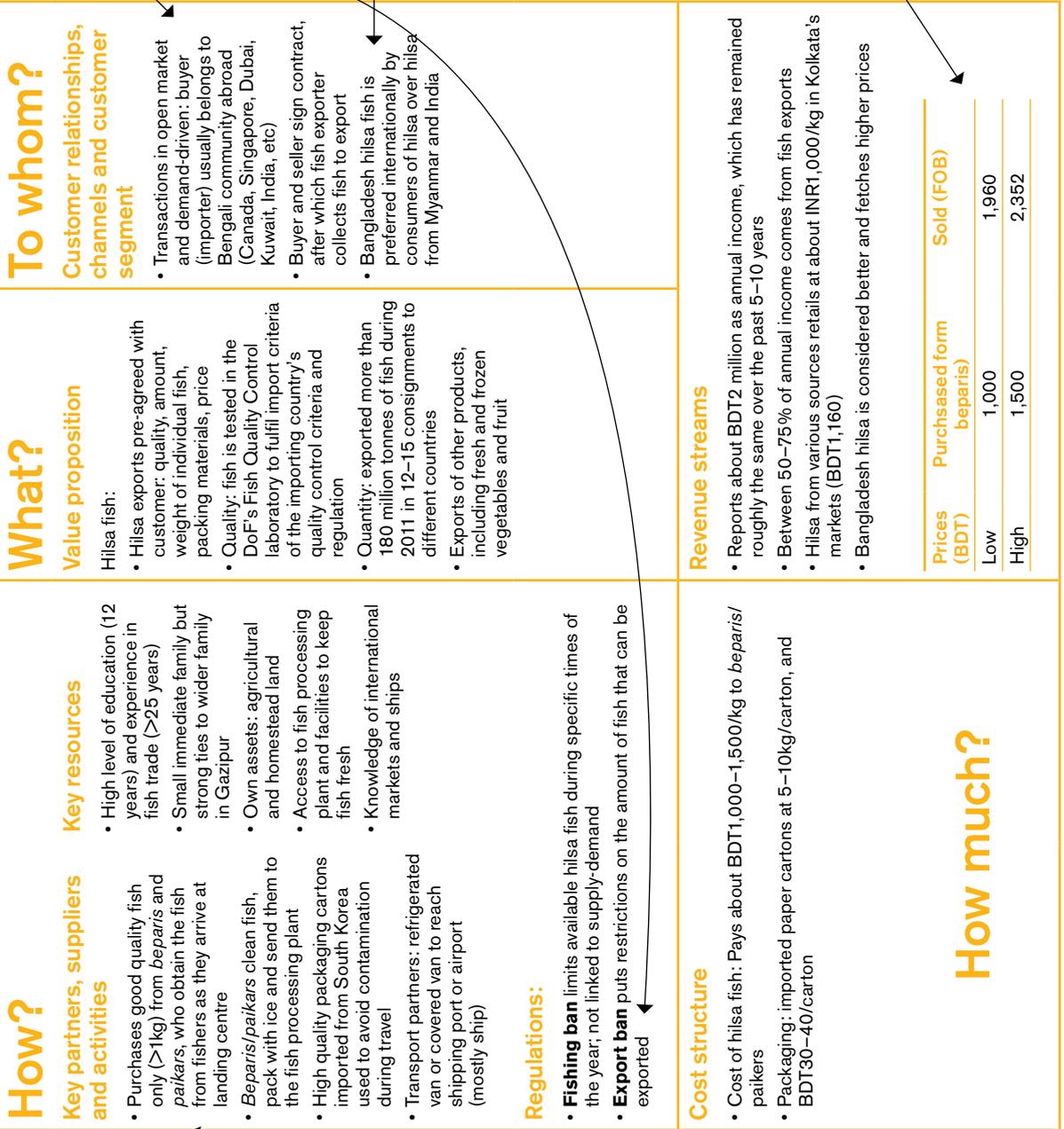
Good quality exportable fish is sometimes difficult to obtain – need investments in time and effort to collect from multiple sources.

Longer transport time affects quality of fish, which can be rejected by final buyer at the exporter's cost.

Fishing ban: helps juvenile fish reach better sizes, which also improves quality of the catch.

Export ban restricts high value market development.

Reported prices paid for fish are about 10% above market price to get best quality fish directly at the landing centre.



Bangladesh has seen a recovery in stocks of its national fish, the once-plentiful hilsa, since the government introduced measures to protect it in 2003. The most important of these is a seasonal fishing ban during key stages of fish development, with food compensation for affected fisher families.

While the conservation measures affect first and foremost the fishers who catch hilsa, there are implications on actors across the whole value chain – such as intermediaries, traders and service providers. What are the impacts on each link in the chain – who gains and who loses? This paper aims to unpack systemic constraints along the hilsa supply chain and to inform policymakers on how the ‘leave no one behind’ agenda may be achieved.

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