



CBI
Ministry of Foreign Affairs of the Netherlands

The Bangladeshi seafood sector

A value chain analysis

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CBI Report: The Bangladeshi seafood sector A value chain analysis

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Management summary

The Asian region is a major supplier of fish products to the EU market. Over the period 2005-2010 in particular, the aquaculture sector in some Asian countries became an important producer as well as exporter of whitefish and shrimps. Within the Asian region CBI is currently studying the possibilities of developing integrated programmes for the seafood sector for specific countries. For the development of these programmes, a good understanding of the current situation in the supply and demand side of the industry is essential.

Currently, the fisheries sector in Bangladesh already contributes 60% of the total national demand for animal protein. The policy aims of the Government of Bangladesh are to enhance fishery resources and production, to alleviate poverty through self-employment, to improve the socio-economic position of fishermen, to meet the country's huge demand for animal protein, and to contribute to foreign exchange. At present the Ministry of Fisheries and Livestock focuses on increasing the availability of animal protein from fish and other seafood products. The policy lays emphasis on meeting local demand while also complying with international standards. The priority of the Ministry of Fisheries and Livestock is to enhance food safety conditions in the fisheries sector. Important to note is that currently all seafood exports are receiving a 10% export subsidy from the government of Bangladesh. This subsidy has a positive impact on the competitiveness of Bangladesh seafood products in the international market.

Based on the results of the desk study that has been conducted in the first phase of this study and CBI experience, the following subsectors in Bangladesh were selected for value chain analysis:

- Shrimp
- Frozen fish

Shrimp subsector

About 40% of wild shrimp and 95% of cultured shrimp produced in Bangladesh are exported. The two main exported cultured species are Black Tiger shrimp or Giant Tiger Prawn (*Penaeus monodon*) and Giant River Prawn (*Macrobrachium rosenbergii*). The two main exported wild species are Speckled shrimp (*Metapenaeus monoceros*) and Indian White shrimp (*Penaeus indicus*). The total value of Bangladeshi shrimp exports in 2011 was almost USD430m. The EU was the most important market, accounting for 75% of the total export value. For cultured shrimp, which represents the largest part of shrimp exports, Black Tiger shrimp contributes the largest share of production. Five main bottlenecks for the export potential of the Bangladeshi shrimp subsector have been identified. These are presented in Table 1.

Table 1 Summary of bottlenecks in the Bangladeshi shrimp subsector

Bottleneck	Level in the supply chain
Lack of raw materials	Primary production
Lack of skilled labour force and value-addition capacity	Processing
Bad quality image	All levels
Dominant position of commission agents	Supply chain
Lack of testing facilities	Processing/exports

The highest potential for shrimp exports relate to the cultured species (Black Tiger shrimp and Giant River Prawn) and not to the wild captured species (Speckled and Indian White shrimp). In contrast to other shrimp exporting countries in the region, Bangladesh is traditionally oriented towards the EU market and less towards other markets in the US and Japan. This would suggest that Bangladesh has a good position in the EU market and that additional assistance by CBI is not needed. However, it seems that the main reason that Bangladesh is so popular among EU buyers is the comparatively low price of cultured shrimp - which is mainly caused by the 10% export subsidy from the Government of Bangladesh - and the limited supply from other countries.

The stagnation of the growth in the volume and value of shrimp exports in the Bangladeshi shrimp subsector can be improved by increasing the production volume and/or area and/or by increasing the value of shrimp products.

To increase the production volume two strategies have been suggested: (1) reducing post-harvest losses and (2) increasing the productivity of shrimp farms. Post-harvest losses can be reduced by increasing the efficiency in the supply chain. This includes strengthening the bargaining position of farmers with middlemen and exporters, improving the infrastructure in the supply chain (including cold storage facilities), proper ice factories and transport, and by training middlemen and traders. The productivity of shrimp farms can be increased by improving the quality of inputs and training farmers in applying Best Aquaculture Practices (BAP). International support for these issues is already present but it is unknown if the support is successful. Both strategies will result in an increased production as well as an improved quality of the shrimp that reach the processing establishments.

Three strategies that can contribute to an increased value of shrimp products have been highlighted: (1) increasing the share of value-added products in the export basket, (2) improving the image of Bangladeshi shrimp abroad and (3) investing in food safety and sustainable certification initiatives. To increase the share of value-added products there is a need for more skilled workers in processing establishments. Workers can be hired from India or Thailand or trained domestically. To improve the quality image of Bangladeshi shrimp in the international market it is required to increase the willingness of buyers to pay more for Bangladeshi shrimp products. Suggestions to improve the quality image of Bangladeshi shrimp are to professionalise management staff in processing establishments, to introduce a Bangladeshi quality label that is recognised internationally and/or to improve the presentation of Bangladeshi shrimp exporters at international seafood trade shows. Investment in certification schemes such as the Aquaculture Certification Council or Naturland are noted as a strategy to increase the value of shrimp products. The characteristics of shrimp farms in Bangladesh are suitable for certification and a

number of NGOs are already working on certification initiatives with Bangladeshi producers and exporters.

One of the most important challenges for Bangladesh is to become known for the shrimp quality instead of low prices that result from the export subsidies. International support for the shrimp sector has been focused on productivity, EU food safety compliance and improving the productivity of small-scale farmers, while support in export promotion and branding has been limited.

Frozen fish subsector

Less than 3% of total fish production in Bangladesh is exported. Exported species are a variety of captured fish of which the most well known is the hilsha shad (*Hilsha ilisha*). The cultured species with the highest export potential are pangasius (*Pangasius Hypophthalmus*) and tilapia (*Oreochromis spp.*). In 2010 the total value of fish exports was USD80m, of which frozen fish contributed almost USD35m. The most important markets for frozen fish are the UK, Saudi Arabia, the US and to some extent Italy and China. Most products are exported as block frozen and an almost negligible part as fillets. Five main bottlenecks for the export potential of the Bangladeshi frozen fish subsector have been identified. These are presented in Table 2.

Table 2 Summary of bottlenecks in the Bangladeshi frozen fish subsector

Bottleneck	Level in the supply chain
Lack of skilled labour force	Processing
Dominant position of traders and commission agents	Supply chain
Lack of cold storage facilities	Supply chain
Lack of supply	Primary production
Low quality of the fish	Primary production

Although exports of whole frozen captured fishes still have a good potential in the countries that have Bangladeshi expat communities, this study focused on the export potential of cultured fish because aquaculture species have the highest development potential. The cultured species with the highest export potential are pangasius and tilapia. However, pangasius and tilapia are also consumed locally and therefore yield high prices in the domestic market. As a result most pangasius and tilapia are consumed locally and exports are limited. At this moment it is not expected that export promotion activities would immediately increase the export volume or value of Bangladeshi frozen fish because the problems the subsector is confronted with at the level of primary production and other levels of the supply chain are too large.

The lack of supply is mainly caused by low productivity of fish farms, post-harvest losses and a strong local demand for fish. There are three strategies suggested to deal with the lack of supply: (1) increase the productivity of fish farms, (2) reduce post-harvest losses and (3) encourage exporters to invest in integrated fish farms. Strategy one should include training programmes for farmers that support them to reduce mortality rates and increase the productivity of the ponds. Strategy two should include investments in the infrastructure including cold storage facilities and proper transport. Strategy three should enable exporters to generate a constant supply of fish that does not reduce the availability of fish on the local market and of which the quality is ensured because the exporter can control all the inputs and invest in more intensive and better managed production systems. This would also

make the exporters less dependent on the middlemen who dominate the supply chain and often are not quality minded.

Low quality of the fish partly is due to a lack of proper inputs and poor farm management but also due to a lack of cold storage facilities along the supply chain. Low-quality inputs and poor farm management result in fish that have no white but a yellowish or reddish colour of the fillet. These fillets are not suitable for many export markets. A lack of cold storage facilities threatens the freshness of the products that reach the processing establishments. To deal with the low quality of the fish that reaches the exporters, strategies should focus on (1) improving the quality of inputs (feed and seed) and (2) improving the infrastructure along the supply chain. The second strategy includes increasing the availability of cold storage facilities (the fourth bottleneck).

The final bottleneck, the lack of skilled labour force, limits the processing capacity of exporters. Currently, most frozen fish is exported as block frozen items while the highest market value and demand are for fillets. One explanation is that fish exports are often regarded as a sideline and an option to use the processing capacity more efficiently when there is a low supply of shrimp, which is mostly the main export item. Consequently, fish processing techniques receive insufficient attention from managers and factory owners. A strategy that focuses on creating a force of skilled factory workers who have the skills to properly handle fish fillets would contribute to the potential of Bangladeshi fish fillets in the international market.

It is expected that improved productivity, quality, and increased processing skills have a positive impact on the price and competitiveness of Bangladeshi frozen fish in the international market. However, the important question remains to what extent the promotion of export of frozen fish conflicts with the provision of local Bangladeshi food security because for Bangladeshi consumers fish is the most important source of animal protein.

1 Introduction

1.1 Rationale and background

The Asian region is a major supplier of fish products to the EU market. Over the period 2005-2010 in particular, the aquaculture sector in some Asian countries has become an important producer as well as exporter of whitefish and shrimps. Within the Asian region CBI is currently studying the possibilities of developing integrated programmes for the seafood sector for specific countries. For the development of these programmes, a good understanding of the current situation in the supply and demand side of the industry is essential.

1.2 Objectives

The main objective of this research is to identify the bottlenecks in two distinct but interconnected seafood export value chains in Bangladesh and to give considerations for action. Within the value chain analysis (VCA) sustainability is a leading principle.

1.3 Approach

This VCA consisted of three phases. The first phase consisted of a desk study. During this desk study a demand and supply analysis was carried out for the Bangladeshi seafood sectors and then two subsectors were selected for further investigation. The second phase consisted of fieldwork. During this phase in-depth field research was undertaken by local experts in Bangladesh. These local experts were hired for the specific purpose of assessing the specific situation and engaging with stakeholders for the selected subsectors. The result of phase two was a report delivered by the local consultants. The third phase consisted of the reporting. During this final phase the analysed value chains were described and depicted based on the results of the previous phases.

1.4 Structure

This final report consists of five chapters. Chapter 2 includes the general features and trends of the seafood sector in Bangladesh and gives an overview of the seafood sector. Information about the EU market for seafood products is provided in Chapter 3, which assesses the market potential for Bangladeshi products. Chapter 4 includes a description of the value chains and main bottlenecks for exports in each of the selected subsectors. This chapter identifies intervention opportunities for CBI. Chapter 5 presents the general conclusions of the study. Finally, Appendix 1 provides a stakeholder assessment grid for the selected subsectors.

2 General features and trends of the seafood sector in Bangladesh

2.1 Introduction

This chapter serves as background for the two value chain analyses presented in Chapter 4 and helps to understand the size and potential of the sector. It describes the general features and trends of the Bangladeshi seafood sector. Information is provided about the significance of the seafood sector for the national economy. Furthermore, trends in production and export to the main destinations are described for each of the selected subsectors.

This report discusses two subsectors that are selected on the basis of CBI experience in the seafood sector in Bangladesh:

- Shrimp
- Fish and frozen fish

2.2 Significance of the seafood sector for the national economy

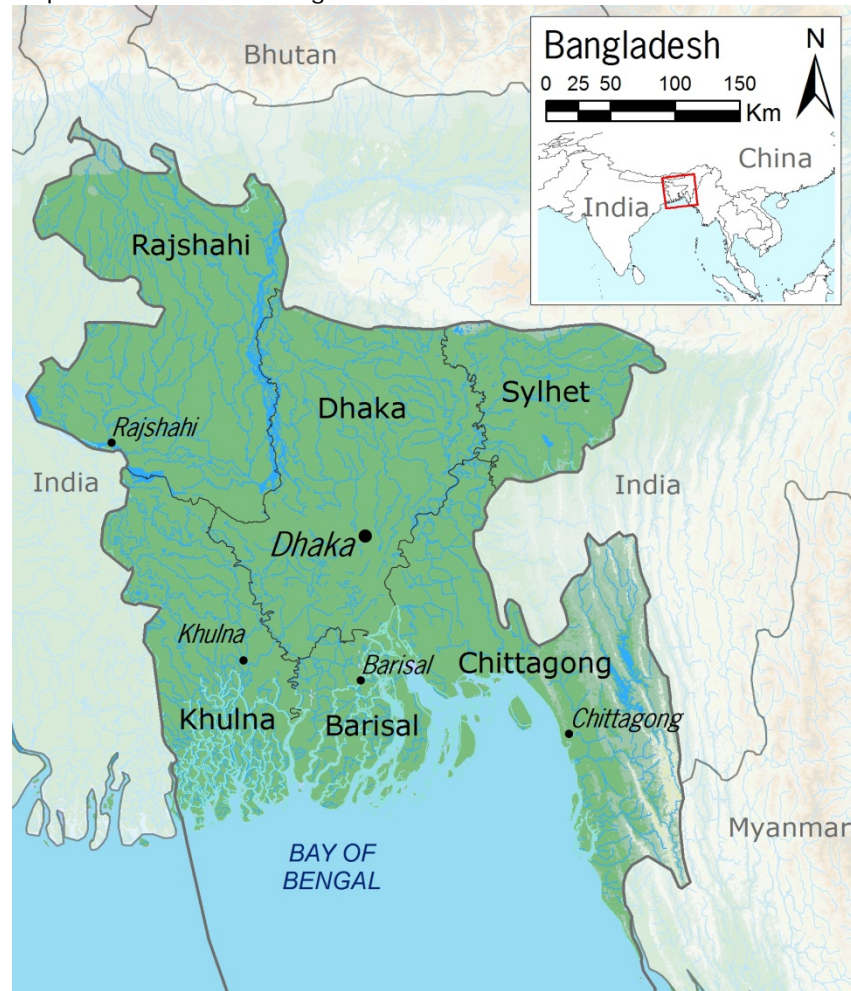
Bangladesh is located between India and Myanmar. The country has a large coastal line and a rich delta which is home to a large capture fisheries and aquaculture sector (Map 2.1). Bangladesh is divided into 7 administrative regions called divisions. Each division is further split into districts. The fisheries sector represents a significant portion of the national economy; the total production in 2009-10 was almost 3m tonnes, valued at around USD2.5bn and supplying 58% of the total national animal protein demand.¹ Its share in the Gross Domestic Product (GDP) and value of the agricultural sector amounted to 3.74% and 22.23% respectively. Fish and shrimp is the third largest export item in Bangladesh and contributed 2.70% to the country's total export. The fisheries sector is a major source of employment; about 10% of the total population (14.50m) is directly or indirectly engaged in the fisheries sector for their livelihood. Among this group, around 1m people are employed in the shrimp sector.² By implementing new fishery and aquaculture activities the Department of Fisheries of the Ministry of Livestock and Fisheries expects that this sector will facilitate the creation of full-time employment opportunities for an additional 462,000 mainly unemployed people and part-time employment opportunities for 991,000 during the financial year 2012-13.³

¹ MOFL, 2011, Fish Week Sankalon 2011, Yearly publication by Department of Fisheries, Ministry of Fisheries and Livestock, Dhaka

² BFFEA, 2012, Shrimp and Fish News January to April 2012, Bangladesh Frozen Foods Exporters Association

³ MOFL, 2010, Annual Report, Department of Fisheries, Ministry of Fisheries and Livestock, Dhaka

Map 2.1 Divisions of Bangladesh



According to the EU, there are 75 EU-approved seafood export establishments in Bangladesh. The Bangladesh Frozen Foods Exporters Association (BFFEA) states that there are an additional 20-40 seafood-processing establishments that are currently not yet EU approved. Most seafood companies in Bangladesh are family owned and small or medium sized. EU-approved processing establishments are concentrated in Chittagong and Khulna. Furthermore, as can be seen in Table 2.1, there are a number of companies with processing and production facilities approved by Aquaculture Certification Council (ACC) or Naturland. Interestingly, in 2011 only 37 exporters did business with the US.¹ There are no data about the number of Bangladeshi companies that actually traded seafood products with EU buyers.

¹ www.foreigntradedata.com

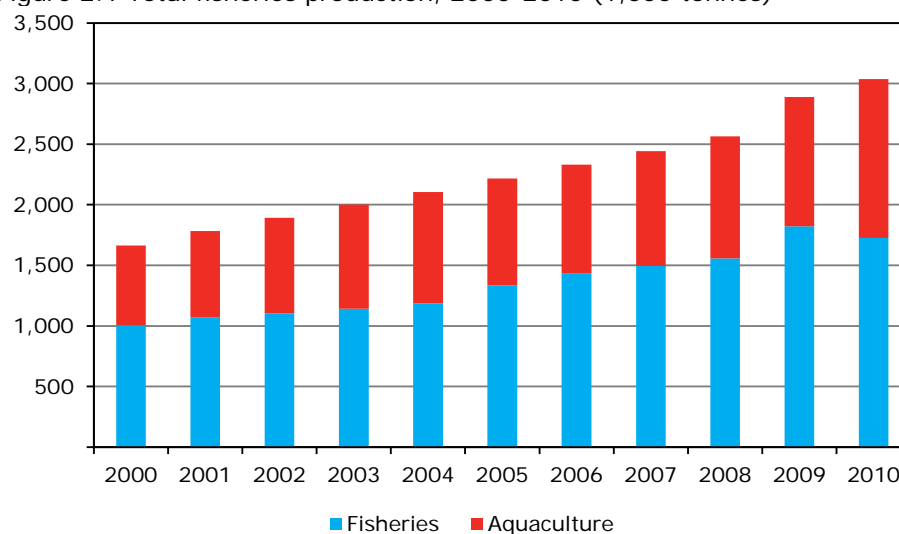
Table 2.1 Number of EU-approved seafood processing establishments and certified seafood companies

Divisions	Districts	Total no.	ACC	Naturland
Chittagong	Chandpur	1		
	Chitaggong	19	1	
	Cox's Bazar	3		2
	Subtotal	23	1	2
Dhaka	Dhaka	1		
	Narayanganj	1		
	Gazipur	1		
	Subtotal	3		
Khulna	Bagherhat	3	2	
	Jessore	2		
	Khulna	36	1	1
	Char Rupsa	2		
	Satkhira	4		
	Subtotal	44	3	1
Sylhet	Sunamganj	1		
	Sylhet	1		
	Subtotal	2		
	Total	75	4	3

Source: EU (2011)¹, processed by LEI

Figure 2.1 shows the total production volume from aquaculture and fisheries in Bangladesh. Both aquaculture and fishery production grew rapidly and total production increased from 1,6m tonnes in 2000 to more than 3m tonnes in 2010. Between 2000 and 2010 aquaculture production increased by 100% while capture fisheries increased by 60%. Although there is no single explanation for the increase in production, it may be partly explained by the government emphasis on the importance of developing the fisheries sector to increase the supply of animal protein to its population.

Figure 2.1 Total fisheries production, 2000-2010 (1,000 tonnes)

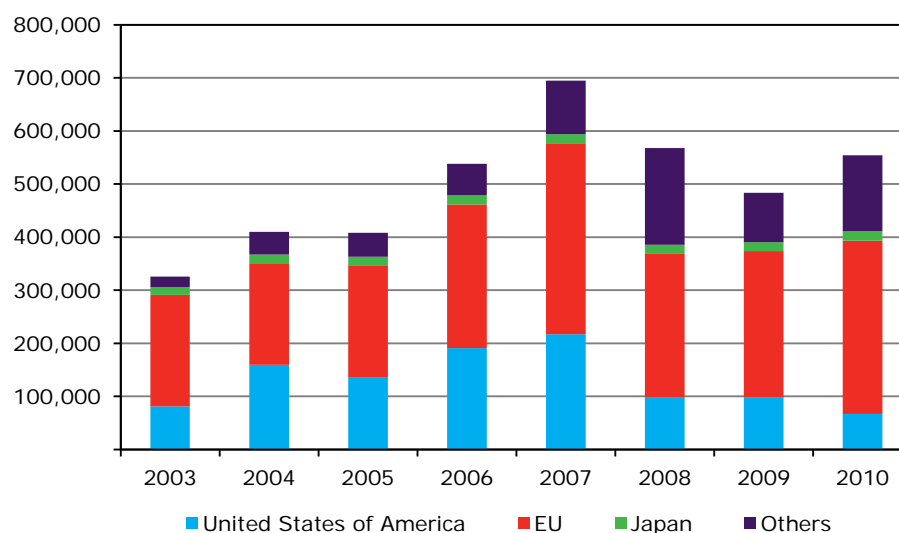


Source: FAO FIGIS (2012), processed by LEI

¹ Bangladesh fishery products approval list (30/09/2011), www.acc.org, and www.naturland.org

Figure 2.2 shows the total export value of fishery products from Bangladesh. It increased from USD300m in 2003 to more than USD540m in 2010. The most important market for fishery products is the EU. While the share of the EU has increased, the share of the US has decreased drastically since 2004. This is mainly due to a reduction in shrimp exports to the US market (see Figure 2.4). Shrimp accounts for 80% of the total export value. Frozen and fresh fish account for 10%, while the remainder is accounted for by other products such as bivalves, squid and cuttlefish. Important to note is that currently all seafood exports receive a 10% export subsidy from the Bangladesh government. This has a large positive impact on the competitiveness of Bangladeshi seafood products.

Figure 2.2 Export value of fishery products from Bangladesh by destination, 2003-2010 (USD1,000)



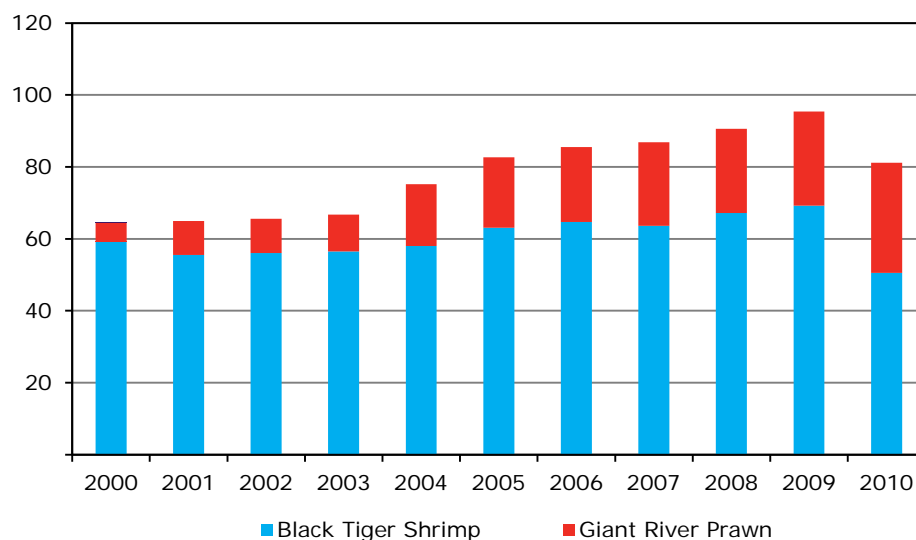
Source: ITC (2012), processed by LEI

2.3 Shrimp subsector

Production

Production and export data for Bangladesh are scarcely available, and if available their quality is dubious. Nevertheless, although the figures differ slightly, data from the department of fisheries and the FAO give some insight into total shrimp production. The combined cultured and captured shrimp production in 2010 was between 168,000 and 184,000 tonnes. According to the FAO, the total production of cultured shrimp increased from 60,000 to 80,000 tonnes between 2000 and 2010 (Figure 2.3) while according to the Department of Fisheries the total production of cultured shrimp even reached 96,000 tonnes in 2010. The two most important cultured species are Black Tiger shrimp (*Penaeus monodon*) and Giant River Prawn (*Macrobrachium rosenbergii*). Although the production volume of Giant River Prawn has increased and that of Black Tiger shrimp decreased, the latter still represents the largest share of production. Historical data for captured shrimp production are lacking but recent data show that the total production was 88,000 tonnes in 2010. Over 40 different species of shrimp are captured, of which only two are regularly exported: Indian White shrimp (*Penaeus indicus*) and Speckled shrimp (*Metapenaeus monoceros*). The others are mostly consumed domestically.

Figure 2.3 Total cultured shrimp production, 2000-2010 (1,000 tonnes)



Source: FAO FIGIS (2012), processed by LEI

The most important regions for shrimp production, both captured and cultured, are Chittagong and Khulna, which together account for 96% of total production (Table 2.2). While Black Tiger shrimp and wild shrimp are produced in both regions, the production of Giant River Prawn is concentrated in Khulna. It is expected that the production volume of cultured shrimp will continue to increase as a result of efforts to increase the productivity of shrimp farms, which currently averages less than one tonne per hectare. As a comparison, production in India - where culture systems are more intensive - is on average three tonnes per hectare. The production volume of captured shrimp is expected to decline further as a result of decreasing catches in the rivers and the Bay of Bengal.

Table 2.2 Shrimp production per region in 2010 (tonnes)

Division	Cultured		Captured	Share of total production (%)	Total (tonnes)
	Black Tiger	Giant River Prawn			
Barisal	858	3,283	1,511	3	5,653
Chittagong	17,259	122	15,607	18	32,989
Dhaka	0	1,270	341	0	1,611
Khulna	38,451	35,165	71,020	78	144,636
Rajshahi	0	10	5	0	15
Rangpur	0	12	12	0	24
Sylhet	0	4	2	0	6
Total	56,569	39,867	88,501	100	184,938

Source: Department of Fisheries (2012)¹

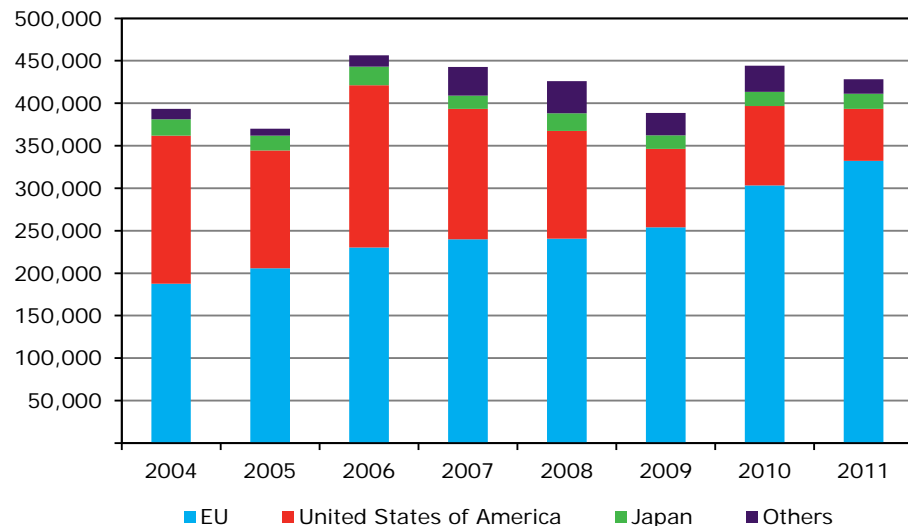
Exports

The total value of shrimp exports from Bangladesh increased from USD370m in 2004 to USD423m in 2011 (Figure 2.4). The EU share increased from less than 50% in 2004 to more than 75% in 2011. The US share decreased from almost 50% in 2004 to less than 20% in 2011. The main reason for this shift in export markets

¹ DoF, 2012, Fisheries Statistical Year Book (unpublished), a yearly statistical report by the Bangladesh Statistical Bureau and Department of Fisheries, Dhaka

from the US to the EU is that since 2004 Bangladesh has been confronted with anti-dumping duties in the US which made Bangladeshi shrimp less competitive in that market.

Figure 2.4 Value of shrimp exports by destination (USD1,000)



Source: ITC (2012) processed by LEI

While only 40% of captured shrimp is exported, 98% of Black Tiger and 90% of Giant River Prawn is exported. For Giant River Prawn the most common sizes are between 13 and 33 count per kg, for Black Tiger shrimp the most common sizes are between 34 and 54 count per kg. The relatively large size of Giant River Prawn offers good market opportunities in high-end markets in the US and EU. The sizes of Black Tiger shrimp are comparable with those in India and have a good market potential in high-end markets. Exported captured shrimp are much smaller on average, with the largest share between 155 and 264 count per kg. Captured shrimp are often used in the EU and US as an ingredient for salads and other precooked meals. Approximately 50% of Black Tiger and Giant River Prawn are exported as Individually Quality Frozen (IQF) or semi-IQF and 50% as block frozen. Only approximately 25% of captured shrimp is exported as IQF or semi-IQF and 75% as block frozen. An increasing number of exporters, approximately 20-30%, are investing in value-adding machines, for cooking for example. It is estimated that the total export value is currently divided as follows: Black Tiger shrimp 70%, Giant River Prawn 25% and wild shrimp 5%.¹ Within the EU, the largest markets for Bangladeshi shrimp are Belgium, Germany and Great Britain.

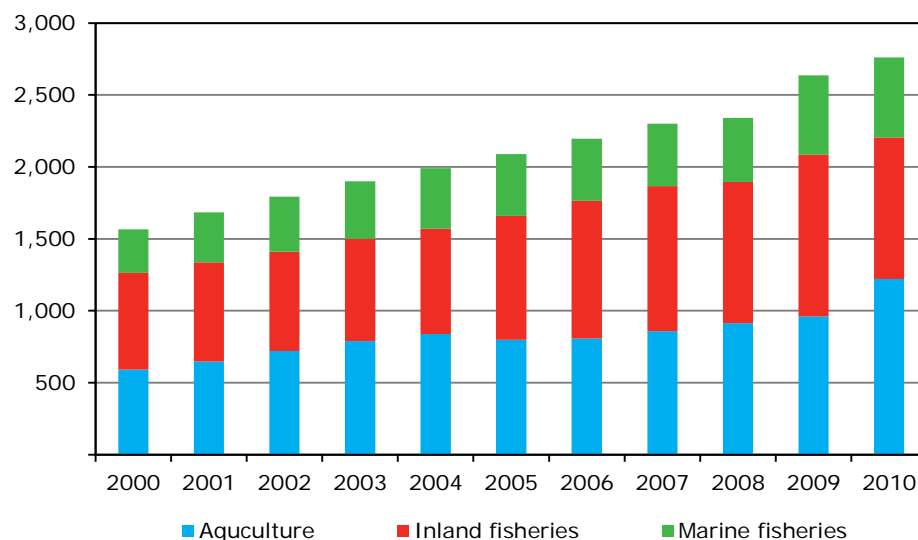
2.4 Frozen fish subsector

Production

Total fish production from inland and marine fisheries and aquaculture in 2010 was approximately 2.7m tonnes. Between 2000 and 2010 the total production from these sources increased from 1.5m to 2.7m tonnes (Figure 2.5). Both the production from capture fisheries and from aquaculture increased, but relatively the largest share of the increase originated from aquaculture.

¹ SEAT (2011) Sustaining the Shrimp and Prawn Value-Chain in Bangladesh (accessible through www.seatglobal.eu)

Figure 2.5 Total fish production by type of activity, 2000-2010 (1,000 tonnes)



Source: FAO FIGIS (2011), processed by LEI

The production of cultured fish is concentrated around Dhaka, Chittagong, Rajshahi and Khulna. These four divisions represent 83% of total fish production (Table 2.3).

Table 2.3 Cultured fish production in Bangladeshi divisions in 2010 (tonnes)

Province	Total production	Share of total production (%)	Area under cultivation (ha)
Barishal	67,629	6	33,318
Chittagong	222,747	18	67,658
Dhaka	419,978	34	97,075
Khulna	144,914	12	48,458
Rajshahi	232,053	19	64,435
Rangpur	78,788	7	29,980
Sylhet	53,627	4	30,385
Total	1,219,736	100	371,309

Source: Department of Fisheries (2011)¹

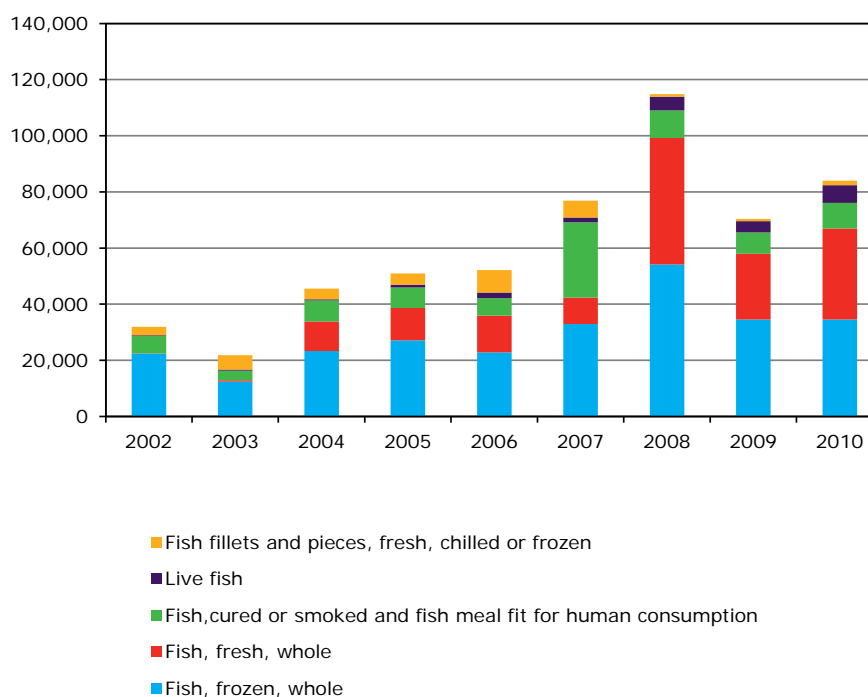
The fish species that were exported in 2011 are listed in Table 2.4. Currently, the largest international demand is for captured fishes that are consumed by the Bangladeshi diaspora around the world and particularly by Bangladeshi consumers in India. Cultured species that do have a high demand in high-end markets in the EU and US such as tilapia and pangasius are currently not able to compete with supply from countries such as China and Vietnam as a result of the poor quality and high price of the product. The high price is a result of the low productivity of fish ponds and the strong local demand for fish. As a result, farmers and traders often prefer to sell fish at local markets.

¹ MOFL, 2011, Fish Week Sankalon 2011, Yearly publication by Department of Fisheries, Ministry of Fisheries and Livestock, Dhaka

Exports of frozen and fresh fish

Figure 2.6 gives an impression of the most important export products and export value between 2002 and 2010. Frozen fish has traditionally been the most important export product, but exports of fresh fish have increased rapidly and now represent a share equal to that of frozen fish. As already mentioned, value-added products such as fillets only represent a minor part of the total export value. The total export value of frozen fish in 2011 was more than USD80m.

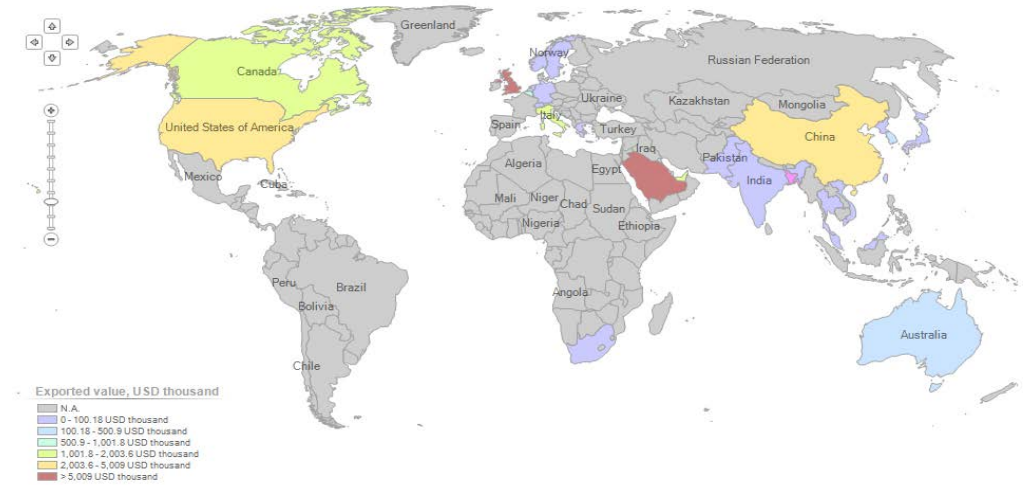
Figure 2.6 Value of fish exports by product, 2002-2010 (USD1,000)



Source: ITC (2012), processed by LEI

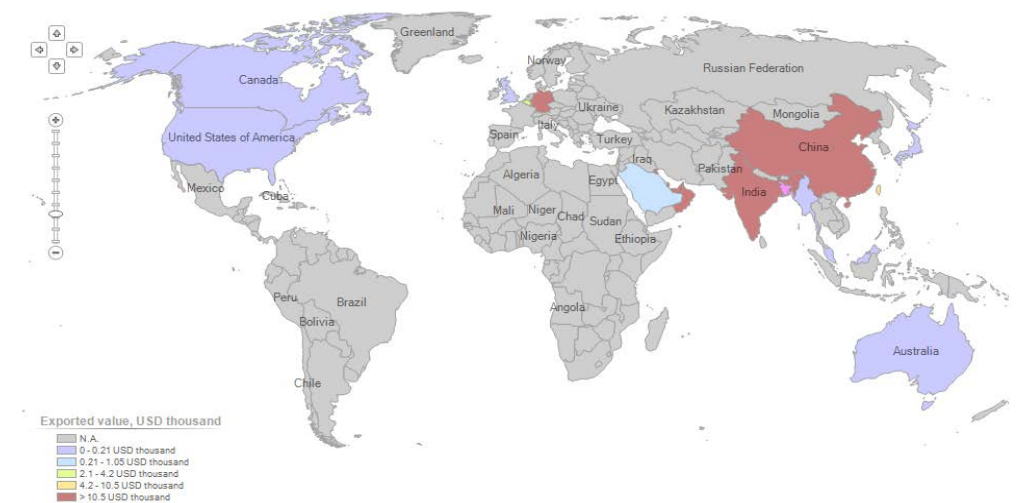
For frozen fish the most important markets are the UK, Saudi Arabia, the US and to some extent Italy and China (Figure 2.7). For fresh fish the most important markets are India, China, Germany and Oman (Figure 2.8). According to exporters and sector representatives, the processing categories exported are whole fish (40%), fillets (5%), slices (20%) and deveined headless and tailless (35%). This indicates that Bangladeshi frozen and fresh fish is currently mostly destined for low-value market segments.

Figure 2.7 Export market for Bangladeshi frozen fish in 2011



Source: ITC (2012), processed by LEI

Figure 2.8 Export market for Bangladeshi fresh fish in 2011



Source: ITC (2012), processed by LEI

Although it is not clear how many companies exported frozen fish to the EU, in 2011 there were only 12 companies that exported fish to the US. It is uncertain if these are the same companies that exported frozen fish to the EU. The companies that exported frozen fish to the US in 2011 are listed below:

- Anraj Fish Products Industries
- Blue Water Seafood
- Fresh & Green Frozen Foods
- Fresh Foods Limited
- Frozen Foods Limited
- Kuliarchar Cold Storage
- Masala Traders
- Rosemco Foods Limited
- Rupsha Fish and Allied Industries
- Sat & Co Limited
- Seamark Limited
- Ser & Co Limited

3 EU demand for seafood products from Bangladesh

3.1 Introduction

This chapter provides an overview of the EU demand for seafood products from Bangladesh, and shows whether there is a demand for Bangladeshi seafood products in the EU seafood market.

3.2 General trends and future prospects in the EU seafood market

In 2007, the per capita consumption of fish and shellfish in EU Member States amounted to about 7 kg. The recommended consumption level of fish and seafood per capita per year is estimated at 14.5 kg by the FAO. Countries such as Portugal and France consume the highest volumes of seafood. Only the Portuguese meet the level of consumption recommended by the FAO. With a consumption of about 6 kg, the Dutch level of consumption is slightly below the EU average.¹ The EU seafood market has grown over the past few years and this growth is expected to continue. The main EU trends and developments are:

- European fish landings are stable or decreasing. In terms of absolute volumes, the EU fish processing industry has become increasingly dependent on imports. During the period 2000-2009 the import from third countries increased by more than 30%.
- European consumption of fish products is increasing. On the one hand European consumers have become increasingly interested in value-added products from third countries. On the other hand, EU consumers tend to buy more frozen seafood instead of fresh products because of the current financial situation.
- Reform of the Common Fisheries Policy (CFP) and Common Market Organisation (CMO) will be finalised in 2013. Reforms may create new opportunities (higher tariff quotas) for or pose new threats (additional import restrictions) to developing countries.
- New EU regulations regarding fishing activities. Measures to combat Illegal, Unregulated and Unreported (IUU) fishing went into effect in 2010 and might pose restrictions on fish caught in developing countries.
- Increased labelling of fish products. As of 2011, refreshed fish products may no longer be labelled as fresh fish products. In Southern European countries in particular, consumers prefer fresh products. In North-Western Europe most consumers seem to be indifferent.
- Sustainable seafood is becoming the standard. Sustainably produced seafood is increasingly becoming the standard to get access to important market channels such as supermarkets. The environmental aspects of production in particular are receiving more and more attention. However, in other market channels sustainability is still not the standard. Nevertheless, supermarkets are emerging as the most important market channel. This development is visible in both Northern and Southern Europe, where supermarkets are increasing their market share.
- Increased certification and eco-labelling initiatives related to the sustainability agenda. Certification programmes and eco-labelling schemes for fish products have become indispensable for Northern European companies that sell fish

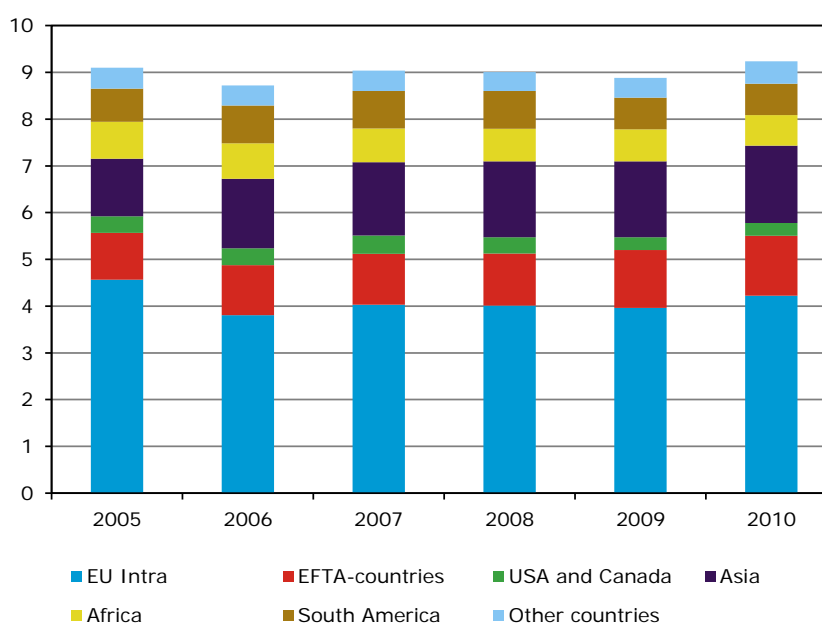
¹ PBL, *The protein puzzle; the consumption and production of meat, dairy and fish in the European Union*. PBL Netherlands Environmental Assessment Agency, The Hague, 2011.

products to maintain their market position. In Southern European countries, certification and eco-labelling also are receiving increased attention.

3.3 General EU demand for seafood products

In the period 2005-2010, the EU imported about 9m tonnes of fish products per year. In 2010, 46% of the fish products in terms of volume were imported from other EU. EU imports from EU Free Trade Agreement (EFTA) countries accounted for 14% of the import volume while the USA and Canada together supplied 3%. Asian countries supplied 18% of the import volume. Other products are imported from Africa (7%), South America (7%) and other countries (5%). In terms of value, 53% of total EU imports are intra-EU trade while Asian countries have a share of 16% of the total EU import value. Compared with intra-EU trade, Asian countries supply more volume of high-volume, low-value products.

Figure 3.1 EU imports by origin, 2005-2010 (million tonnes)



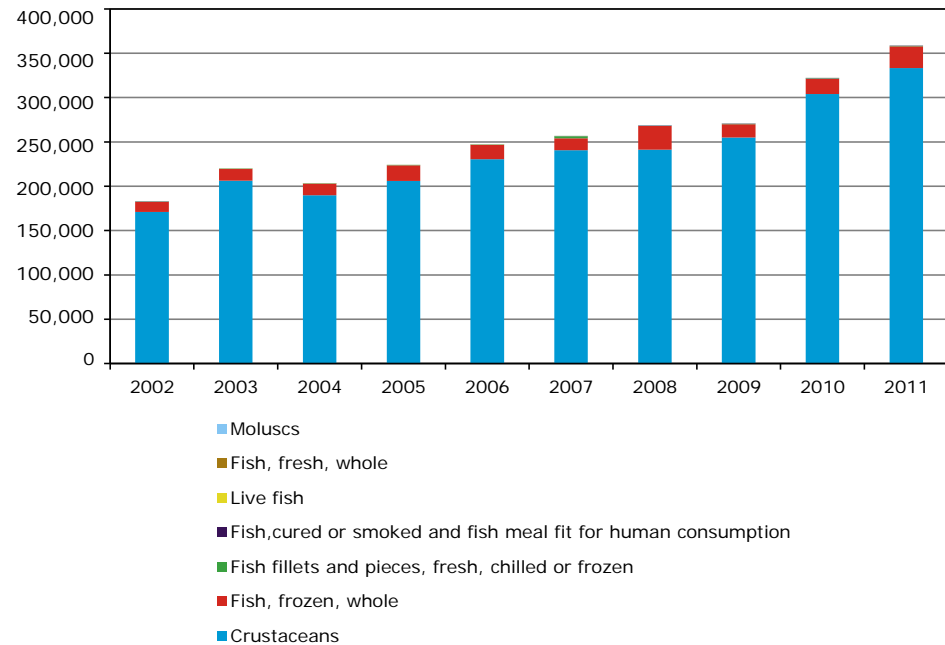
Source: Eurostat (2011), processed by LEI

Most of the imports from countries other than the EU consist of raw material or primary processed products that are further processed and traded in the EU. In 2010 the main imported product categories in terms of volume were frozen fish fillets (21%), frozen fish (20%) and fresh/chilled fish (16%).

3.4 EU demand for seafood from Bangladesh

In the period 2002-2011, the EU import of seafood from Bangladesh increased from USD150m to USD360m. The increased export of shrimp was the main contributor to the export growth. Bangladeshi Fresh Water and Black Tiger shrimp have an excellent market in the EU. Other seafood products did not experience significant export growth in the past decade.

Figure 3.2 EU imports from Bangladesh by category, 2005-2010 (USD1,000)



Source: ITC (2012), processed by LEI

3.5 Barriers to export to the EU market

There are two main barriers to export to the EU market, namely import tariffs and food safety and sustainability standards. Both aspects are discussed briefly in this section.

EU import tariffs

Tariff issues currently focus on the US, where anti-dumping duties act as a barrier for shrimp exporters that are faced with high duties compared with exporters from other countries. Several countries have successfully objected to the US policies and duties have been reduced. Nevertheless, unequal duties in the EU still influence the competitive position of one country compared with another. Bangladesh falls under the General System of Preferences (GSP) in the EU and is therefore more competitive than countries that do not fall under the GSP system. However, as the status of all the countries is being reviewed, Bangladesh may be confronted with higher tariffs in the future. A major problem with import tariffs is that the procedures to fight cases objecting to them are often long and drawn out.

Standards with respect to sustainability and food safety

The increased focus on sustainability and food safety results in higher quality standards with respect to production and hygiene. The high level of EU food safety standards compared with the level of standards in markets such as the US, Japan and especially alternative markets such as South Korea or the Middle East, may constitute a barrier for exporters for whom the costs of compliance are too high. For instance, for cultured shrimp the EU demands that an EU-authorized authority (referred to as the Competent Authority) in each country tests and labels products from every shrimp farm in order to guarantee full traceability and guarantee that no forbidden medicines are used during the production cycle. If, for whatever reason, the local supply chain in shrimp producing countries cannot meet these requirements or is not able to pass the required tests, this may constitute a reason to export to other countries instead. In recent years there have been instances in which, as a result of rejection by the EU health authorities (as well as those of the US and Japan) based on the presence of antibiotics, exporters shifted their focus to other markets where health standards are less stringent than in the EU. This ultimately results in different supply chains that are geared towards specific end markets, each with its own level of quality. Contrary to other barriers, such as import tariffs, this barrier may be eliminated in countries in which shrimp are produced, as institutions can be strengthened and producers can be trained for compliance with EU standards.

3.6 Market trends and growth potential for selected seafood products

This section elaborates on the market demand and growth potential as well as the value-added potential for each of the selected subsectors.

Shrimp

Market demand for shrimps in the EU is strong. Demand for shrimp products has increased during the past few years, and despite the financial crisis the EU demand remained strong. In the near future it is expected that competition between different shrimp species (especially between Pacific White and Black Tiger shrimp) will increase. The main result is likely to be that in Western Europe Black Tiger shrimp becomes more of a niche product because it is more expensive than Pacific White shrimp. However, in Southern Europe Black Tiger shrimp will remain a mainstream product because Black Tiger is preferred to Pacific White shrimp for reasons of taste and size. It is also expected that the market for value-added products such as marinated and battered shrimp will increase. This offers opportunities for Bangladeshi exporters that are able to invest in processing machines. The market for captured shrimp is expected to remain stable.

Frozen fish

Market demand for frozen fish in the EU is high, but competition is strong. Cheap bulk products such as pangasius and tilapia compete with more expensive captured species such as cod and plaice. In the main market segments new products can compete best if the quality, characteristics and price are equal to those of the currently available products. However, there are also market segments in which there is demand for less well-known products, presenting a niche opportunity for innovative frozen fish products. The market for native Bangladesh species, such as Hilsha, in the EU Bangladeshi diaspora is expected to remain stable.

4 Subsector value chains and bottlenecks for exports

4.1 Introduction

This chapter describes the influencers and supporters of the seafood industry, presents the VCAs of the shrimp, fish and frozen fish subsectors, and identifies the main bottlenecks for exports. The chapter gives an overview of the structure and dynamic of the seafood sector and shrimp and frozen fish subsectors and identifies opportunities for intervention and support.

4.2 Influencers and supporters of the Bangladeshi seafood industry

The first part of this section describes the main government authorities that shape the institutional framework in which the Bangladeshi seafood industry operates. The second elaborates on all the other supporters of the Bangladeshi shrimp and frozen fish subsectors. The significance of the stakeholders mentioned in this section is assessed in Appendix 1.

4.2.1 Institutional framework

*Department of Fisheries (DoF)*¹

The DoF falls under the Ministry of Livestock and Fisheries and is located in Dhaka. The latest official government policy document for the fisheries sector was published in 1998. However, the Ministry of Fisheries and Livestock published an annual report that gives some insights into the government policy. In the 2010-2011 annual report, the ministry writes that the main objectives for the fisheries sector are:

- to enhance fishery resources and production,
- to alleviate poverty through self-employment,
- to improve the socio-economic position of fishermen,
- to meet the country's huge demand for animal protein,
- and to contribute to foreign exchange.

At present, the ministry focuses on increasing the availability of animal protein from fish and other seafood products. The policy lays emphasis on meeting local demand while also complying with international standards. The priority of the ministry is to enhance food safety conditions in the fisheries sector. It is not clear whether the government puts more emphasis on the development of capture fisheries or aquaculture production.

The DoF is the Competent Authority (CA) for the EU and is responsible for approving processing establishments for exports to the EU and for implementing EU regulations with regard to traceability and food safety control. The DoF implements EU regulations with the help of the laboratory wing and the Fish Inspection Quality Control (FIQC) unit. Other important organisations that operate under the Ministry of Fisheries and Livestock are the Marine Fisheries Academy (MFA), the Bangladesh Fisheries Research Institute (BFRI) and the Bangladesh Fisheries Development Cooperation (BFDC). The mandate of these organisations is explained in the section on Research Institutes.

¹ www.fisheries.gov.bd

Export Promotion Bureau (EPB)¹, Ministry of Commerce

The EPB falls under the ministry of commerce and is entrusted with the responsibility of promoting export from Bangladesh. It is responsible for marketing Bangladeshi products abroad but also for providing the different sectors in Bangladesh with market information. Furthermore, the EPB is responsible for conducting research that aims to identify new market opportunities for Bangladeshi products. Recently the EPB facilitated the participation of seafood exporters in the European Seafood Exhibition by financing a country pavilion.

Fishery Products Business Promotion Councils (FPBPC)², Ministry of Commerce

The FPBPC falls under the ministry of commerce. It was formed in 2003, and consists of representatives of different parts of the seafood sector. It is not clear to what extent the FPBPC works together with the EPB. It seems, however, that the activities of the FPBPC are limited to Bangladesh while the activities of the EPB also extend beyond the borders. The prime objective of the FPBPC is to support the sector in achieving competency in the local and global context as well as to help the industry develop capacity in the areas of human resources, product diversification, quality and standards, and acquiring suitable technology. The FPBPC aims to develop fishery products, improve quality through addressing problems associated with compliance by creating a traceability system throughout the value chain, develop human resources and expand the export market.

4.2.2 Research institutes

There are many universities and research institutes involved in research pertaining to fisheries and aquaculture. The major players are listed below.

Bangladesh Fisheries Research Institute (BFRI)³

The BFRI is the most important institute for research on fisheries and aquaculture. BFRI is a national research institute that is a part of the Ministry of Fisheries and Livestock. It was founded in 1984 and has its headquarters in Mymensing. Regional offices are located across all the main fishery and aquaculture provinces in the country. BFRI conducts research and provides training programmes to improve productivity within the fisheries sector. The research and training mainly focuses on primary production.

Marine Fisheries Academy

The Ministry of Fisheries and Livestock also founded the Marine Fisheries Academy (MFA). The MFA was established under the Ministry of Fisheries and Livestock for training fishing vessel personnel. The centre is located in Chittagong. The MFA mainly trains crews of marine fishing vessels.

Bangladesh Fisheries Development Cooperation (BFDC)⁴

The BFDC is also part of the Ministry of Fisheries and Livestock and was established back in 1964. The role of the BFDC is to develop and support the marine fisheries sector. The BFDC builds and maintains various harbours and landing sites and also supports the industry in developing and modernising the fishing fleet. The BFDC is located in Dhaka.

¹ www.epb.gov.bd

² http://technobd.info/demo/bpc/fpbpc_home.php

³ www.fri@gov.bd

⁴ www.bfdc-gov.org

Other research institutes

Besides BFRI, MFA and the BFDC, there are several universities that have fishery and aquaculture departments. The most important are the Department of Fisheries Technology and the Department of Aquaculture at the Bangladesh Agricultural University, the Department of Fisheries at the University of Rajshahi, and the fisheries and aquaculture departments at the universities of Dhaka and Khulna.

4.2.3 Producer and exporter associations

Bangladesh Shrimp and Fish Foundation (BSFF)¹

The BSFF's mission is to work in support of the growth of the shrimp and fish industry on an economically, socially and environmentally sustainable basis. A few of the most important objectives of the foundation are to provide critically needed support in the form of: (1) policy formulation, (2) aquaculture production technologies for shrimp and fish, (3) awareness training on EU and US FDA food safety rules, and other non-tariff trade conditions, including labour issues and environmental sustainability for various segments of the shrimp and fish-based industry in Bangladesh. A prime role of the BSFF is to function as a liaison between the stakeholders in the private sector (industry organisations, universities and research organisations) and the relevant public sector organisations to fully utilise the scarce national resources, both intellectual and physical, and donor funding.

Bangladesh Frozen Food Exporters association (BFFEA)²

The BFFEA works to promote and protect the interests of frozen food processors, packers and exporters in Bangladesh. It also functions as a bridge between the trade bodies and the government and private agencies. The BFFEA is devoted to the establishment and promotion of contracts with foreign buyers, business associations, the chamber of commerce and industries to further develop the export marketing of frozen foods. The majority of the BFFEA members are frozen shrimp exporters. BFFEA works closely with the Export Promotion Bureau and was also represented at the Seafood Exhibition in Brussels.

Bangladesh Aquaculture Alliance (BAA)

The BAA is a platform for all stakeholders of the fish and shrimp sector, in which the BFFEA plays a crucial role. The BAA aims to achieve better quality, improved traceability and increased production. The objective of the alliance is to produce marketable fish or shrimp exclusively through the adaptation of an environmentally-friendly, ecologically sustainable and socially responsible industry. The BAA was initially engaged in work pertaining to traceability issues, but it is currently unclear what activities the platform is pursuing.

4.2.4 Financial institutions

There are various national banks that provide short-term loans to fishermen and farmers as well as to processors in the seafood sector. These include Sonali Bank, Rupali Bank, Agrani Bank, Krishi Bank and Janata Bank, among others. Middlemen and traders often also provide working capital to primary producers in the sector.

¹ www.shrimpfoundation.org

² www.bffea.net

4.2.5 International donors and UN agencies

United Nations Industrial Development Organization (UNIDO), EU and NORAD
Better Work and Standards - Better Fisheries Quality (BEST-BFQ) is a programme funded by the European Union, NORAD and the Government of Bangladesh and implemented by United Nations Industrial Development Organization (UNIDO). This is a follow-up to the Bangladesh Quality Support Program, which was implemented during 2006-2010. BEST-BFQ is a unique programme with a farm-to-fork approach focusing on strengthening the quality of the national fisheries infrastructure of Bangladesh.

To further improve the sustainability of this system, BEST-BFQ intends to strengthen the fish inspection and control operations at all stages of the shrimp supply chain, establishing credible laboratory services and assisting private entrepreneurs in improving their productivity and compliance with market requirements.

IFAD (International Fund for Agricultural Development)

To focus its efforts to stimulate rural growth IFAD has selected two groups as targets for its programmes and projects: extremely poor people who have some productive potential, and poor small-scale farmers and entrepreneurs. IFAD supports reforms in key policy areas, including:

- improvements in agricultural extension and research
- regulations required for improved access to inland fisheries
- regulation of rural markets
- reforms in the regulatory framework for rural finance
- the Aquaculture Development Project (around Jessore)

DANIDA (Danish International Development Agency)

One of the components of the DANIDA-funded Agricultural Sector Program Support Phase II is the Regional Fisheries and Livestock Development Component (RFLDC). The RFLDC is implemented jointly by the Department of Fisheries (DOF) and the Department of Livestock Services (DLS), with two Technical Support Units (TSUs) based in Barisal and Noakhali. The immediate objective of the RFLDC is to improve and sustain production of and returns from fisheries and livestock systems for resource-poor households.

DFID (Department for International Development)

DFID supports various fishery and aquaculture activities in Bangladesh. Support for Fisheries Education and Research (SUFER-DFID) is one the successful programmes in the area of fishery and aquaculture-related activities and enhanced overall fishery productivity and indirectly contributed to increased exports. DFID is presently supporting a number of programmes, such as the Chars Livelihood Program (CLP) and Economic Empowerment of the Poorest (EEP)/SHREE (Stimulating Household Improvements Resulting in Economic Empowerment). The focus is on poor farmers and fishermen.

European Union (EU)

The EU-funded Food Security for Ultra Poor (FSUP) programme is being implemented by four international development agencies - Islamic Relief Worldwide, CARE, WFP and ICCO - in association with 15 national NGOs over the period from January 2009 to 31 December 2013. The NGO BRAC is also implementing the 100% EU-financed post-SIDR livelihoods rehabilitation programme in 30 severely affected subdistricts. The objective is to support the rehabilitation of agriculture-based livelihoods (agriculture, fisheries, livestock rearing and forestry) and non-agriculture-based livelihoods (small businesses, rickshaw vans and cash for work).

International Union for the Conservation of Nature (IUCN)

IUCN Bangladesh, on behalf of the Ministry of Environment and Forests and in association with local communities, is working to establish a co-management model to conserve and develop the natural resources of Tanguar Hoar for the benefit of its dependents. The wetland supports freshwater mother fisheries and is a known residence for migratory birds. It also sustains the livelihoods of 88 surrounding villages and contributes to the national food security.

Oxfam Novib/IUCN Consortium

Oxfam Novib and IUCN are setting up a programme around Khula which aims to prepare farmers and exporters for Aquaculture Stewardship Certification (ASC). The programme is still in the start-up phase and no information is currently available.

Solidaridad/CARE

A consortium led by Solidaridad and CARE is planning to set up a programme to support the development of the domestic supply chain of cultured fish. The programme is still under development and no information is currently available.

USAID

Bangladesh has been selected as one of the priority countries under the US Government's recently launched Feed the Future Initiative. Under this initiative, the goal of USAID is to increase production of more affordable and nutritious staple foods in Bangladesh through: Increased on-farm productivity, increased investment in market systems, enhanced food security policy and planning capacity, and enhanced agriculture innovation capacity. USAID will work closely with the Government of Bangladesh, other donors and private sector investors to achieve these objectives. In addition, USAID will consolidate and expand the impact and influence of USAID's ongoing agricultural programme and launch new projects. USAID-PRICE is working on food safety, traceability and food security issues.

World Bank

The objective of the World Bank funded Employment Generation Program for the Poorest project for Bangladesh is to provide short-term employment in community sub-projects to enable households to better cope with vulnerability, while strengthening programme implementation in cooperation with the Ministry of Food and Disaster Management. The objective of the Second Social Investment Program Empowerment and Livelihood Project for Bangladesh will be to improve the livelihood, quality of life and resilience to climate variability, natural hazards and other shocks of the rural poor, especially the left-out poor and vulnerable households, which include fish farmers and fishermen.

The WorldFish Center

The WorldFish Center has been set up to help eradicate hunger and poverty by harnessing the benefits of fisheries and aquaculture. The centre carries out research-for-development with its partners to make small-scale fisheries more resilient and productive, and to support the adoption of sustainable aquaculture that specifically benefits the poor. Key competencies are in Policy Economics and Social Sciences, Natural Resource Management, and Aquaculture and Genetic Improvement. The WorldFish Center has 300 employees in Bangladesh.

Food and Agricultural Organization (FAO)

The FAO is involved in various projects relating to marine resource management and improved testing facilities for seafood exports.

4.3 Shrimp subsector

Figure 4.1 presents the shrimp value chain in Bangladesh and includes the priority bottlenecks which are crucial for the export potential of the shrimp industry in Bangladesh. For all the operators, influencers and supporters and bottlenecks, it is indicated at which level of the supply chain they are relevant or operating.

Four main categories of operators can be distinguished in the Bangladeshi shrimp value chain:

1. Input suppliers
2. Shrimp farmers and fishermen
3. Middlemen
4. Processors/exporters

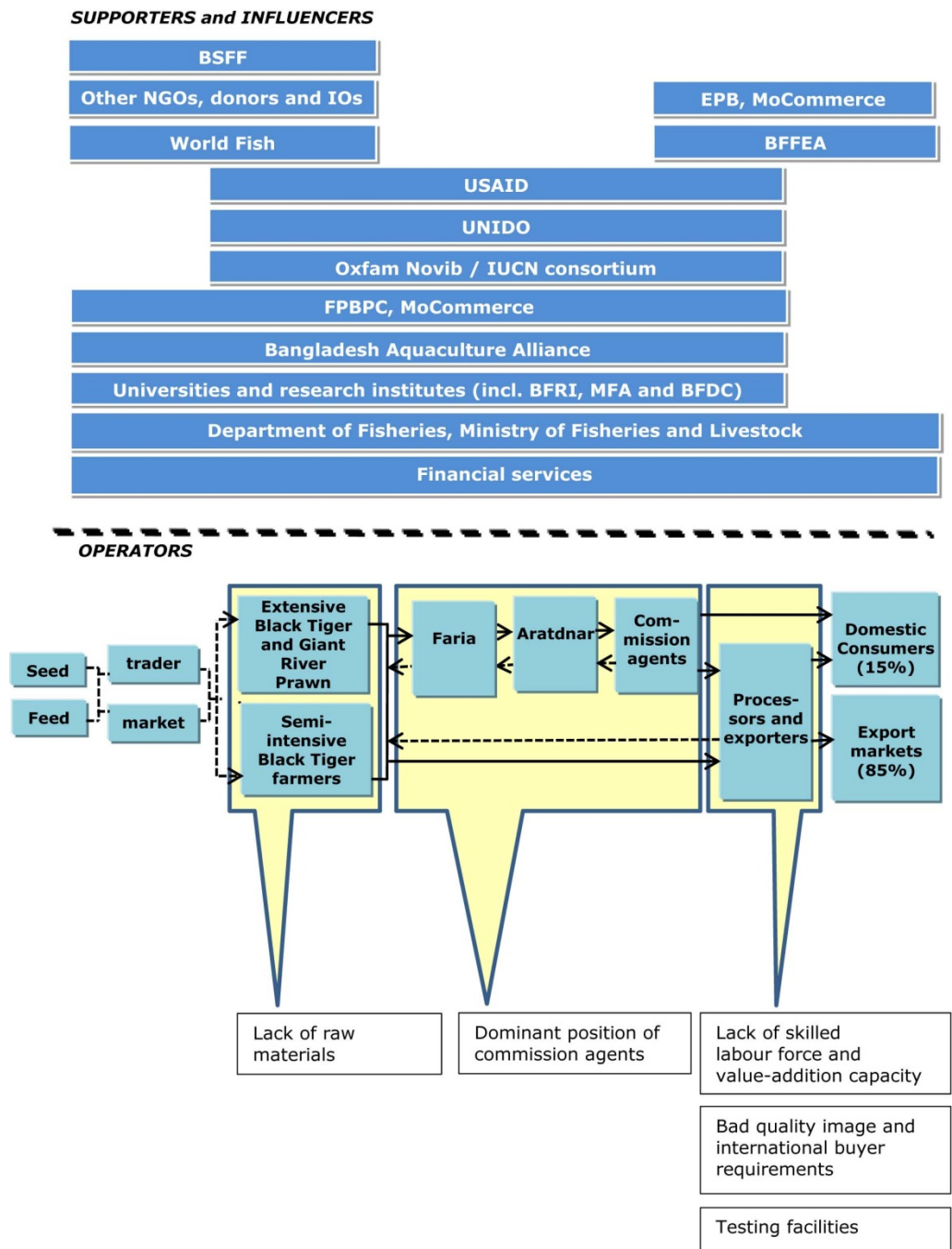
Furthermore, five different categories of influencers and supporters can be distinguished:

1. Government authorities
2. Donors and international organisations
3. Research institutes
4. Producer and exporter associations
5. Certification bodies
6. Financial institutions

Finally, five bottlenecks have been identified as a result of the desk study and the fieldwork:

1. Lack of raw materials
2. Lack of skilled labour force and value-addition capacity
3. Bad quality image and international buyer requirements
4. Dominant position of commission agents
5. Lack of testing facilities

Figure 4.1 The shrimp value chain and its main bottlenecks



4.3.1 Operators in the value chain

Much of the information in this section, especially that concerning input suppliers, farmers and middlemen, is cited from USAID (2006).¹ Although this study is already seven years old, the basic structure and dynamics in the supply chain have not changed much in the interim.

4.3.1.1 *Input suppliers*

1. Seed

Shrimp seed in Bangladesh comes from three sources: 1) hatcheries, 2) fry catchers, and 3) trawlers and fishing boats. Compared with other countries such as India, the domestication of shrimp broodstock is limited in Bangladesh. The dependency on wild shrimp seed raises serious questions about the sustainability of the sector. About 50% of all seed used as input for the shrimp farms is still collected from the wild. The majority of the wild Black Tiger seed comes from the Cox's Bazar region. From the Cox's Bazar and Chittagong regions Black Tiger shrimp seed is distributed to the districts around Khulna. The majority of Giant River Prawn seed is collected in the canals and rivers in the districts around Khulna. The remainder is collected by trawlers and fishing boats that catch pregnant mother shrimp at sea and supply these directly to shrimp farmers.

In regions where seeds are produced or captured locally, farmers buy shrimp seed directly from seed suppliers. However, in the regions where fry is not captured or produced locally, farmers depend on commission agents and traders who buy shrimp seed from other regions. In these cases the distribution of shrimp seed takes place through various levels of traders and commission agents that aggregate the supply of shrimp seed that comes from a wide range of regions before they distribute it to the regions where farms are located. In some cases these traders are also the ones who buy the shrimp yields from the farms and who provide financial support to farmers. However, in many cases these traders are only involved in the trade of shrimp seed.

2. Feed

There are about 100 different fish feed companies active in Bangladesh, each of which has its own brand. Companies produce a range of products, and fish and prawn feed is only a small part of their portfolio. Sometimes these feed companies tend to provide knowledge on better farming techniques through their distribution channels. This provides them with access to farmers and enables them to sell their products directly to the farmers. Feed mill technologies have been quite traditional in Bangladesh. However, in recent years fish feed companies increasingly use newer technologies that result in higher quality feeds with better nutritional values. Feeds are mostly distributed directly to farmers or through traders that have their shops in bazaars.

4.3.1.2 *Shrimp producers*

1. Shrimp farmers

It is estimated that there are a total of about 40,000 to 60,000 Black Tiger shrimp farmers and another 100,000 farmers that culture Giant River Prawn located mostly in Chittagong and in Khulna. The total area of Black Tiger shrimp farms was

¹ USAID, 2005, A Pro-Poor Analysis of the Shrimp Sector in Bangladesh, United States Agency for International Development, Washington

estimated in 2009 to be 218,000 ha, while the area under Giant River Prawn production was estimated to be 30,000 ha. Most farms still use traditional extensive farming systems that have already been in use since the mid-1950s.

In Khulna traditional shrimp farming is mostly carried out in paddy fields and fish ponds. Shrimp production in paddy fields is combined with the production of rice, while in fish ponds shrimp production is combined with production of other fish, such as carp. The fish ponds are referred to locally as Ghers. In Khulna farmers grow both Black Tiger and Giant River Prawn. Farmers in Cox's Bazar and Chittagong intercrop shrimp with salt. Salt production mostly takes place between December and May, and shrimp is stocked between June and September. In Cox's Bazar and Chittagong the main species cultured is Black Tiger shrimp, which is not affected by the high salinity in the ponds in this region.

USDAID (2006) stated that with the support of international donors some shrimp farmers have been assisted to adopt modified extensive methods that include improved water management, pond preparation, combined culture of Black Tiger and *Rosenbergii*, combined shrimp and fish production, and higher stocking densities. An advantage of the modified extensive production systems is that these are very suitable for eco-certification as they generally only use natural products to grow the shrimp. USDAID reported in 2006 that only 125 ha of land was under semi-intensive production of the type that is also used in India and Indonesia. The majority of these farms are located in Khulna, while a few may be found in Chittagong and Cox's Bazar. According to local insiders, the number and area of semi-intensive shrimp culture has increased slightly since then, but the average productivity of shrimp farms is still around 0.5 tonnes per hectare per farming cycle. The low productivity is regarded as one of the main bottlenecks for the further development of the shrimp farm sector.

2. Trawlers and fishing boats

In 2005 there were 97 trawlers and 44,000 other fishing boats engaged in marine fishing. A large part of these focus on shrimp capture. The regulatory framework and law enforcement in fisheries in Bangladesh is argued to be very weak and Bangladesh is accused of overfishing its marine resources. Resource management is also weak in inland fisheries. As a result of the risk of overfishing, the sustainability of captured shrimp from Bangladesh can be disputed. However, a wide variety of wild shrimp species are caught, of which especially the species *P. Indicus* and *M. Monoceros* are exported while most other species are locally consumed.

4.3.1.3 Middlemen

The low productivity of shrimp farms results in a situation in which exporters depend on multiple levels of traders that market the shrimp from the different districts through local depots and auctions to their factories. The three main levels of shrimp traders are: 1) local collectors (*faria*), 2) local traders (*aratdnar*) and 3) commission agents. These collectors, traders and commission agents are in some cases the same persons who provide the inputs, such as seed and feed, to the farmers.

1. Faria

Faria directly collect the shrimp from the farmers in their region and sell all the shrimp to *aratdnar* on the same day. *Faria* generally do not have depots or cold storage facilities. *Faria* often offer farmers loans for their operational costs and in return buy back the shrimp at a price they have set. This price is often depressed in

order to optimise the margin for the faria when selling the shrimp to the aratdnar. It is estimated that there are approximately 7,500 shrimp faria in the country (USAID 2006). The influence of faria, who traditionally set prices in remote areas, is decreasing day by day with the development of communication systems throughout the country.

2. Aratdnar

Aratdnar buy the shrimp directly from farmers in their region or from faria. The aratdnar often provide loans to faria and farmers in order to ensure supply. However, if farmers or faria are not financially tied to aratdnar, they sell the shrimp through the auction. This happens in Khulna in particular, where the auction is referred to as 'Chatal'. Most aratdnar own depots and cold storage facilities. They are able to cool the products before trading them to commission agents. Since the EU has increased pressure on the sector to improve food safety, the depot owners face severe challenges as their facilities have to comply with EU and HACCP protocols. It is estimated that there are approximately 1,600 aratdnar in the country (USAID, 2006).

3. Commission agents

Commission agents generally buy shrimp from the aratdnar and mediate between them and the processors. They are mostly small and medium-sized enterprises that have a strong financial position. The commission agents try to depress the buying price and optimise the selling price; they take substantial commissions that depress the price that farmers receive for their product. It is estimated that there are about 120 commission agents (USAID 2006). Commission agents mostly have direct ties with one or more processors who offer them premium prices for their material. In turn, commission agents attempt to bind aratdnar and farmers to themselves by providing financial and material loans.

Although there are also farmers who sell their shrimp directly to commission agents and processors, the majority sell through faria and aratdnar. A main reason this system is in place is that the farmers live in remote areas and mobile phone technology has not yet spread to the poorest people. As a result, farmers were (and still are) not always aware of market prices and often had no other option than to accept the price offered by local traders. Although in recent years, partially as a result of EU food safety demands, the control over the supply chain has increased, the complex network of collectors, traders and commission agents is still active.

4.3.1.4 Processors and exporters

Processors and exporters are mostly the same company, and are the final link between the domestic supply chain and export markets. The total number of shrimp processors listed by the department of fisheries in 2007 was 131. Of this total number, however, a number of companies are not operating, due to a lack of raw material supply. Those exporters that are active are only operating at 20% of their capacity. In September 2011, after a self-imposed EU ban, the DoF (the Competent Authority) approved 75 fishery processing establishments for access to the EU market.¹ Almost all indicate they are exporting shrimp. An overview of the location of these factories was provided previously, in Chapter 2. Many exporters have more than one factory. Therefore, the actual number of companies that export to the EU is lower than the number of processing establishments. A company may have both EU and non-EU approved processing establishments, enabling the company to

¹ https://webgate.ec.europa.eu/sanco/traces/output/FFP_BD_en.pdf

strategically choose different markets and market segments and to manage the costs of compliance with international standards. In general, processing establishments are strategically located close to the various shrimp farming areas in and around Khulna and Chittagong and landing sites in the same provinces.

There are only a few processors or exporters that have their own farms or formal contract farming arrangements and therefore most are dependent on commission agents for their supply of raw material. This has consequences for the control that exporters have over the quality of the product and forces the government to be involved in managing and regulating the bottom end of the supply chain. There are a few exceptions among the exporters. A good example is APEX,¹ which is one of the most well-known shrimp exporters in Bangladesh. APEX has set up fully integrated production facilities and only purchases shrimp from other sources if they have excess capacity. Exporters such as APEX have mostly installed semi-intensive production systems that provide them with higher yields and better quality products. However, in Bangladesh most of the export companies are relatively small, family-owned and run operations and therefore lack the capital to make large investments that go beyond their own factory boundaries. It seems that those exporters that have their own production facilities are also getting involved in certification initiatives such as ACC and Naturland.

Processing facilities are mostly limited to peeling, block freezing, IQF or semi-IQF, and cold storage facilities, yet an increasing number of processors are investing in machinery that enables exporters to produce more value-added products, such as cooked and battered shrimp. However, as explained in Chapter 2, the contribution of these value-added products to total exports is still limited.

Table 4.1 gives an indication of the average size of small, medium and large shrimp exporters in Bangladesh. As just mentioned, most of the shrimp exporters are small and medium-sized companies that are family owned and run. The subsector lacks large public companies that fuel technological development and innovation such as large shrimp exporters CP in Thailand or Vin Hoan in Vietnam.

Table 4.1 Categories of most important processing establishments according to export volume and value

	Average production volume (tonnes)	Average export value (million USD)	Number of companies (estimate)
Small	Less than 1,000	Less than 8.00	30%
Medium	1,000-1,500	8.00 to 10.00	60%
Large	More than 1,500	10.00 to 15.00	10%

Source: Expert Interviews at Department of Fisheries (2012)

4.3.2 Flow of products along the value chain

As explained in the previous section, shrimp are distributed through a complex network of collectors, traders and commission agents. The ownership of the product changes hands at various levels of the supply chain. Moreover, the inputs in the subsector are also distributed through a complex network. The structure and dynamics of the supply chain result in a lack of transparency and this raises many issues regarding food safety and sustainability.

¹ www.apexfoods.com

4.3.3 Bottlenecks and solutions

From the desk study and fieldwork, five bottlenecks have been identified that limit the development potential of the shrimp sector in Bangladesh. Important to note is that the bottlenecks presented might be not the only bottlenecks in the subsector but those that have been emphasised in this study. The five bottlenecks are:

1. Lack of raw materials
2. Lack of skilled labour force and value-addition capacity
3. Bad quality image and international buyer requirements
4. Dominant position of commission agents
5. Lack of testing facilities

The significance of the stakeholders mentioned in the boxes below is assessed Appendix 1.

1. Lack of raw material supply

Description	The shrimp sector in Bangladesh is facing a raw material crisis. The lack of raw material is caused by the low productivity of shrimp farms. As a result, processing factories only run at 20% of their capacity.
Solution and actions	Exporters look for solutions to these problems both on the factory and on the farming side. Some of the plants are considering investing in integrated production systems and are planning to work directly with the farmers from which they receive raw materials. Exporters intend to introduce improved technology to increase productivity. Exporters suggest the following initiatives to solve these problems: <ul style="list-style-type: none"> - Permission to farm Pacific White shrimp (<i>P. vannamei</i>) in Bangladesh because it has higher yields and is less risky to culture. - Financial incentives by the government need to be continued until 2020. Farmers should be provided all the financial incentives that the government provides to other agricultural sectors in Bangladesh. - More and continuing training, seminars, symposia, research and development, exposures and other learning programmes to educate farmers about better aquaculture practices. - The government should ensure the quality of seed, feed and other inputs as well as make them easily available throughout the country so that farmers have better access to quality inputs. - In order to encourage investment, banks should offer the same interest rates offered to other sectors. - The establishment of new processing establishments should be discouraged, as there is already a shortage of raw material in the market. - Demand for leasing government land to each processor that is suitable for shrimp/prawn farming, where the processor can invest in integrated shrimp farms that use more intensive production methods.
Stakeholders	Department of Fisheries , Bangladesh Frozen Foods Exporters Association, Bangladesh Fisheries Research Institute, Bangladesh Shrimp Fish Foundation, exporters

2. Lack of skilled labour force and value-addition capacity

Description	Bangladesh lacks a skilled labour force in the processing establishments. This not only includes factory workers but also management staff. This is a risk for the quality of the products and limits the potential of increasing the volume of value-added products.
Solution and actions	In order to deal with the lack of a skilled labour force and the lack of capacity for value-added products, exporters and industry insiders have made the following suggestions: <ul style="list-style-type: none"> - For the time being, a skilled labour force can be hired from Thailand or Vietnam. - Set up a new training institute focusing on frozen foods processing for factory workers and management staff. - Encourage exporters to hire university trained staff. - Facilitate exporters with access to capital to enable them to invest in processing machinery.
Stakeholders	Department of Fisheries, Bangladesh Frozen Foods Exporters Association, Bangladesh Shrimp and Fish Foundation, exporters

3. Dominant position of commission agents

Description	The most frequent and widespread problem in this segment of the value chain is the position of commission agents. Although many relationships between exporters and commission agents are based on trust and quick payment agreements, it is common for commission agents to break their commitment. When there is a crisis in the supply of raw material, commission agents claim double commission. During periods of raw material crisis, commission agents are also often reluctant to supply proper documents and have less incentive to supply good quality material. It is known from other countries, such as Vietnam, that middlemen (or commission agents) are the link in the value chain with the least incentive to meet international standards or to adopt better management practices. Regulating or managing their practices is crucial to the success of the subsector as a whole.
Solution and actions	The best solution to this issue is to reduce the dependency of exporters on commission agents. Research is needed into why exporters in Bangladesh are so reluctant to increase their involvement at the farm level and into the exact roles of faria, aratdnar and commission agents. Based on the outcomes of this analysis, a strategy can be developed that either enables exporters to more actively engage in the shrimp farming subsector or enables the subsector to regulate and improve the practices of the middlemen. A short-term strategy can be to help exporters to set up formal contracts with commission agents in order to deal with the opportunistic behaviour of commission agents.
Stakeholders	Department of Fisheries, relevant NGOs and international organisations, Bangladesh Frozen Foods Exporters Association, exporters and middleman

4. Bad quality image and international buyer requirements

Description	<p>Bangladeshi shrimp have a bad quality image in the international market. In addition, Bangladeshi shrimp exporters have difficulty complying with the most stringent international buyer requirements. Exporters claim that requirements are implemented by buyers in an inconsistent manner. In some cases, when prices are too high, buyers complain about the quality of the products, delay payments, or refuse to buy, while when prices are low complaints are rare and standards are applied consistently.</p> <p>In general, exporters claim that some of the tests increase the overhead costs of production and reduce the profit margin. Finally, the demands of international buyers with regard to labelling and traceability of the products are very difficult to meet for some of the processors.</p>
Solution and actions	<p>Several solutions are suggested. Proper negotiation, ethical business practices and long-term relationships between importers and exporters are the best solutions to solve these issues. At the same time, the image of Bangladeshi shrimp must be improved. This can be achieved, for instance, by creating a national quality label. A good example is the quality mark for Indian seafood products introduced by MPEDA, which is slowly gaining recognition in the international market. A good quality image results in easier market access and better prices.</p> <p>Regarding the test reports and other documentation, exporters suggest that Bangladesh obtain easy acceptance without major hassles, as the industry has made huge progress in seafood quality and some international compliance and certification authorities are satisfied with the overall efforts and achievements within the sector.</p>
Stakeholders	Department of Fisheries, Bangladesh Shrimp and Fish Foundation, Bangladesh Frozen Food Exporters Association, Exporters

5. Lack of testing facilities

Description	Testing facilities for export certificates are concentrated in and around Dhaka. The lack of local testing facilities in Khulna and Chittagong causes additional costs for exporters and also often delays shipments.
Solution and actions	An increased number of local testing facilities in the areas where processors are located would improve shipment procedures. It is important that the highest quality testing machines are used in order to minimise the risks of rejections in the EU and other markets.
Stakeholders	Department of Fisheries, UNIDO, FAO, Exporters, Bangladesh Frozen Foods Exporters Association

4.4 Frozen fish subsector

Figure 4.2 presents the frozen fish value chain in Bangladesh and includes the priority bottlenecks which are crucial for the export potential of the frozen fish industry in Bangladesh. The frozen fish value chain is to a large extent comparable with the shrimp value chain, yet the marketing channels differ slightly. The focus in this section will be on cultured fish, especially pangasius, because this is the species with the highest export potential in the future.

In the Bangladeshi frozen fish value chain four main categories of operators can be distinguished:

1. Input suppliers
2. Farmers
3. Middlemen
4. Processors/exporters

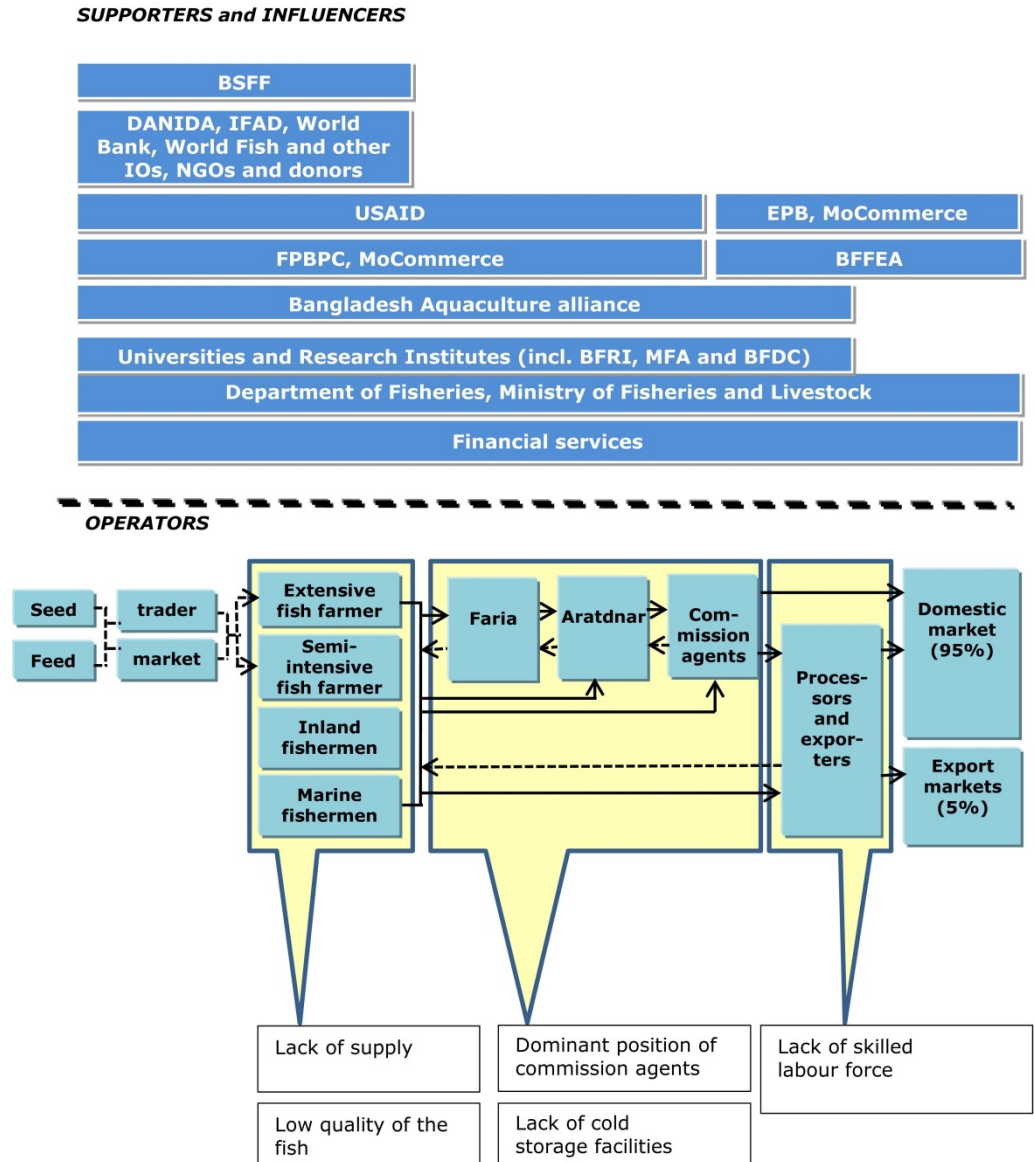
Furthermore, six different categories of influencers and supporters can be distinguished:

1. Government authorities
2. Research institutes
3. Producer and exporter associations
4. Certification bodies
5. Financial institutions
6. IOs, NGOs and donors

Finally, five bottlenecks have been identified as a result of the desk study and the additional fieldwork

1. Lack of skilled labour force
2. Dominant position of traders and commission agents
3. Lack of cold storage facilities
4. Lack of supply
5. Bad quality of the fish

Figure 4.2 The (frozen) fish value chain and its main bottlenecks



4.4.1 Operators within the value chain

4.4.1.1 *Input suppliers*

Two types of traders distribute inputs in the white fish channel. The first type of traders are those who have a shop where they sell fish feeds, medicines, lime and other inputs almost year-round. Most of these traders operate their business as individuals or small partnerships by hiring a shop in the local bazaar. The second type of traders carry the seeds from hatcheries to the local bazaar or directly to the farmers. This is a seasonal occupation. The dependency of farmers on traders places the farmers at a disadvantage as they have no way of ascertaining the quality of the seed they purchase. There is still a lack of quality management by the government at the level of hatcheries.

There are 931 private and 77 government hatcheries around the country that produced 465,000 kg of fish seed during 2009-2010.¹ Hatcheries are mainly located in Jessore, Mymensingh and Bogra, which are the districts with the most favourable climate. In addition, there are some natural spawning locations in the country, such as the Halda River in Chittagong, from which seed collectors collect seed that is then distributed to hatcheries and nurseries. From the districts where seed is produced, seed is distributed to other districts where seed is not locally available.

The presence and distribution channels of fish feed companies has already been discussed in Chapter 4.2.

4.4.1.2 *Fish farmers*

The total area under fish cultivation is estimated at around 370,000 ha and approximately 900,000 people are directly involved in fish culture (including shrimp farming). Although Mymensingh was traditionally the centre of freshwater aquaculture in Bangladesh, culture practices are now dispersed over all provinces where water bodies are available. The WorldFish Center (2008) published a report on freshwater aquaculture in Bangladesh that gives a detailed overview of the sector.² A summary is provided below.

Freshwater fish-culture systems practiced in Bangladesh can be categorised into three groups: carp polyculture, monoculture and integrated fish culture.

- In integrated systems, fish culture is integrated with other agricultural enterprises, for example rice-fish farming, rice-fish-duck farming, and fish-poultry farming.
- Polyculture of Indian and Chinese carps along with a few other exotic species is the most dominant system in Bangladesh.
- Other practices include pond monoculture of pangasius. Monoculture of genetically improved tilapia in ponds is also becoming popular, particularly among commercial producers. However, the quality of both pangasius and tilapia is not of the same level as in Vietnam and China.

Pond culture in Bangladesh is mostly practiced with semi-intensive techniques, with high fingerling stocking rates but low use of feed and fertiliser. Fish farmers

¹ DoF, 2012, Fisheries Statistical Year Book (unpublished), a yearly statistical report by the Bangladesh Statistical Bureau and Department of Fisheries, Dhaka

² Dey MM, Bose ML, Alam MF. 2008. Recommendation Domains for Pond Aquaculture. Country Case Study: Development and Status of Freshwater Aquaculture in Bangladesh. WorldFish Center Studies and Reviews No. 1872. The WorldFish Center, Penang, Malaysia.

generally use less supplementary feed and other inputs compared with fish farmers in countries who use more advanced aquaculture systems, such as in China and Thailand.

Pangasius culture gained popularity rapidly as a commercial enterprise since the late 1990s. Due to the local conditions, pangasius can be farmed year-round and offers good financial prospects to farmers due to the high productivity. Many farmers have shifted from carp culture to pangasius culture. However, farmers need to be able and willing to use more expensive pelleted feed in order to reach high productivity. In 2009 there was an estimated total area of 30,000 ha under pangasius monoculture.

While pangasius was previously mainly a fish for the upper class, it has now become a fish for poor people as well as a result of the low price compared with carp. Despite the good market potential, producers are frustrated by the low prices that result from the long supply chain in which traders and commission agents take margins and exploit the farmers and by the lack of quality feed which reduces the productivity and quality of the fish products. Currently, the most significant issue for exports of pangasius is that the colour of the fillet is often reddish, which is mainly due to the specific pangasius genetic strain that is available in Bangladesh but also due to the composition of the feed used. Production of pangasius and tilapia contributed close to 29% of the total aquaculture production in 2011.¹ It is expected that the production of pangasius and tilapia will continue to rise.

Under the guidance of WWF and with a task force from the DoF and BFRI, the government and research institutes are trying to solve the issues in the pangasius sector. The spearheads of the strategy are: improving the quality of seed by importing it from countries like Vietnam, improving the access of farmers to this quality seed, and improving the availability of quality feed through a new animal feed standard. It is suggested that farmers be trained in managing the water quality in order to reduce mortality rates and improve the quality of the fish.

4.4.1.3 Middlemen

This section focuses on how the fish is distributed from the fish farmers and landings to the exporters' processing establishments. The production of fish (especially cultured fish) is more dispersed than the production of shrimp. This results in a far more complicated supply chain, in which various levels of middlemen and traders facilitate and dominate the distribution of the products but also exploit farmers by taking commissions at each step and not informing farmers about actual market prices. The situation is changing as a result of improved communication techniques that enable farmers to gather information about up-to-date market prices and alternative buyers of their products. However, as they are located in remote areas, the options they have to fetch better prices for their products are limited.

While farmers and fishermen who are located close to urban markets can sell their products directly in the local marketplaces, farmers and inland fishermen who are located in remote areas depend on the services of local *faria* who purchase material and transport it to collection centres that are mostly run by *aratdnar*. As in the shrimp sector, *aratdnar* are often the final link before the fish is sold to commission

¹ Ali, H., M. M. Haque and B. Belton, 2012, Striped catfish (*Pangasianodon hypophthalmus*, Sauvage, 1878) aquaculture in Bangladesh: an overview. *Aquaculture Research*, pp. 1-16

agents who are in direct contact with exporters. However, as there is a large local demand for fish, aratdnar also supply fish to local urban markets and to retailers that distribute the fish across the country. In the fish supply chain paikar are mentioned as another step between faria and aratdnar, but their specific role and position is unclear.

The commission agent is essentially a procurement agent for the processing plants. Every processing plant has a few fixed agents who ensure their supply of fish. Processing plants pay the agents. Agents take a commission from each transaction and provide capital to the aratdnar. Commission agents have establishments in the regions of Khulna, Chittagong, Cox's Bazar and other cities where the processing plants are located. Their intermediary position gives them a lot of knowledge compared with other actors, which allows them to make significant profits.

Transportation systems are only moderately developed in Bangladesh. White fish is often produced in remote areas with only basic infrastructure. In these remote places, smooth transportation is unavailable and farmers or fishermen use boats or non-motorised vans to reach the faria, aratdnar or landing centres where they can sell their products. From there, aratdnar arrange the transport to the commission agents by trucks, buses or trains.

4.4.1.4 Processors and exporters

There are only a small number of processors and exporters that deal with fish as main activity. Although there are many exporters that offer fish through their websites, there are only few that actually have raw material available and are able to supply to international customers. For most of the exporters fish is a sideline in their complete product portfolio. As mentioned in Chapter 2, in 2011 only 12 exporters exported fish to the US, which is one of the largest markets for Bangladeshi frozen fish. Some of these exporters have their own farms, but most are fully dependent on the supplies from their commission agents.

Processing facilities for fish are limited to block freezing and some filleting. The limited processing skills for more value-added products such as filleting are a major obstacle to the potential for further development of frozen fish exports.

4.4.2 Flow of products along the value chain

The flow of fish from fishermen and fish farmers to the processing establishments goes along several stakeholders. As production is very scattered through remote areas in the country, local collectors and different levels of middlemen deliver the fish to commission agents, who finally sell the product to the processing companies and exporters. This long value chain in which the ownership of the product changes hands several times gives rise to many issues in relation to food safety and price. There are only a limited number of larger farms which are directly linked to processors or exporters. Although food safety issues are better managed in these shorter supply chains, the quality of the product - e.g. the colour of the fish - often does not meet buyer requirements from high-end markets abroad.

4.4.3 Bottlenecks and solutions

A list of bottlenecks has been identified from the desk study and the fieldwork. This is not a complete list, but it includes the most important ones. Other bottlenecks, such as traceability, testing, shipping delay, and buyer requirements on sustainability, are not included because until the bottlenecks listed below have been solved it is not advisable to work on those issues. The most important bottlenecks are:

1. Lack of skilled labour force
2. Lack of supply
3. Low quality of the fish
4. Dominant position of traders and commission agents
5. Lack of cold storage facilities

The stakeholder mentioned in the boxes below are assessed on their significance in Annex 1.

1. Lack of skilled labour force

Description	There is a lack of a skilled labour force that is able to produce quality fish fillets. While this is not a real problem for those species (e.g. carp and several capture species such as Hilsha) that are exported as whole fish to Bangladeshi or Indian communities abroad, this is an issue for access to higher-end markets. Currently only a small portion of exports are exported as fillets while almost all exports are exported as whole fish to Bangladeshi abroad.
Solution and actions	There are two solutions to this problem. In the short term, workers from India and Thailand could be hired to work in the factories and do the processing. In the long run this is not a solution. Meanwhile, a training programme should be set up for Bangladeshi workers in order to train them to perform the processing activities. This could be done on the job or at one of the universities or vocational schools.
Stakeholders	Bangladesh Shrimp and Fish Foundation , Bangladesh Frozen Foods Exporters Association, Department of Fisheries, exporters, universities, Bangladesh Fisheries Research Institute

2. Lack of supply

Description	The availability of raw material is crucial for exporters, yet the supply of cultured fish is low. There are various reasons for this. First, there is strong local demand and many fish do not reach the exporters but rather are distributed via local markets. Second, there is a lack of quality seed and feed for cultured fish. In addition, farmers are mostly uneducated and lack knowledge about good aquaculture practices.
Solution and actions	The variety of potential actions to solve these issues are broad. There are actions required both at the level of the fish farms and at the level of processors and exporters. At the level of farms, farmers should get better access to quality feed and seed that would enable them to achieve a higher productivity. Farmers should also be trained in better aquaculture practices in order to make them aware of how important it is to manage their ponds in a proper way. Research institutes should

	<p>be encouraged to introduce better quality seed and feed from domestic sources, but an attempt should also be made to import affordable products from neighbouring countries. Educating farmers and improving the quality of inputs should not only result in a higher productivity but, as a result of a higher efficiency, also in lower production costs per kg, resulting in better prices for producers.</p> <p>As fish is so important for domestic food security, it is a delicate question whether increased production should be used to provide exporters with a supply of raw material for processing or that it should be used to supply the domestic market with more fish. In order to avoid this discussion the government should take an approach that is also requested in the shrimp sector: providing exporters and processors with support to build their own integrated farms. This would reduce pressure from the availability of traditional sources and at the same time contribute to the improvement of the quality of the fish (which is addressed in the discussion of the final bottleneck). Another important measure is to avoid the development of new processing establishments while there is already a supply shortage. Although it may be strategically desirable to have some new processing establishments in provinces where there are currently none, additional processing capacity would generally result in unhealthy competition. The government should set rules for building additional processing establishments.</p>
Stakeholders	Department of Fisheries, Winrock International, other NGOs such as WWF and Solidaridad, international organisations such as FAO and WorldFish Center, Bangladesh Shrimp and Fish Foundation, exporters

3. Low quality of the fish

Description	<p>Increasing the availability of fish is not sufficient. An important bottleneck is that the colour (which is related to the quality and composition of inputs) of the most economically attractive cultured species, such as pangasius and tilapia, is reddish. This does not sell well in many of the high-end markets. While markets in Russia and the Middle East are not so discriminating, the demand in the EU and US is for very white fillets. If the colour is not satisfactory, the product will not sell, even if the price of the product is competitive.</p>
Solution and actions	<p>The solutions to this problem are partly the same as for the previous bottleneck. Farmers should be encouraged to use quality inputs and manage the water quality in the ponds. This is crucial for the health of the fish and the colour the fish will develop. However, it is also argued that the genetic strings of the fish used, especially for pangasius, is not the best. It is suggested that private hatcheries and the government be encouraged to import quality seed from Vietnam and China. At the same time, farmers should get better access to quality seed and feed, and the government should set up a programme that supports the sector in also distributing the quality inputs to remote areas. Encouraging exporters to set up their own integrated fish farms with more intensive production methods and good management</p>

	<p>practices would also contribute to the availability of fish that complies with international buyer requirements. At this moment it is not clear how many exporters have their own fish farms.</p> <p>The solutions should include the training of farmers and programmes to make quality inputs such as feed and seed available to more farmers.</p>
Stakeholders	Bangladesh Shrimp and Fish Foundation, Winrock International, Bangladesh Fisheries Research Institute, universities, other NGOs such as WWF, FAO, USAID, exporters, Department of Fisheries.

4. Dominant position of traders and commission agents

Description	The dominance of traders and commission agents in the supply chain poses several threats to the potential of frozen fish exports. The first issue is the fact that while the market prices for fish are strong as a result of a large local and international demand for fish, the prices farmers get are low as a result of the commission and price manipulation of traders and commission agents. An important reason for the dependency on middlemen is that processing facilities are concentrated in and around Khulna and Chittagong, while the production of cultured fish is dispersed over the country.
Solution and actions	A possible solution to this issue is to find ways to shorten the supply chain and to encourage exporters to bypass certain levels of traders in order to create a shorter supply chain in which prices are better and quality inputs for farmers are assured. Shorter supply chains would benefit both the farmers and the processors or exporters. However, as in the shrimp sector, it should be investigated why farmers and processors or exporters are not currently working together closely. If the reasons for this can be identified, a strategy should be developed that encourages farmers and processors or exporters to work together more closely.
Stakeholders	Department of Fisheries, Bangladesh Frozen Foods Exporters Association, exporters, commission agents

5. Lack of cold storage facilities

Description	While the fish supply chain is very long, cold storage facilities are only present at the top level. As a result, lots of raw material is wasted because the quality cannot be maintained. Reducing post-harvest losses by installing proper cold storage facilities could contribute to an increase of raw material supply to exporters.
Solution and actions	There are several solutions to this problem. The first is to provide support to processors, commission agents and aratdnar for the creation of cold storage facilities in the regions where the fish is produced. Another solution is to enable fish farmers to use cold storage facilities of other agri-food sectors.
Stakeholders	Ministry of Fisheries and Livestock, Bangladesh Frozen Foods Exporters Association, exporters, commission agents

5 Conclusions

Shrimp

An overview of the five bottlenecks in the shrimp supply chain in Bangladesh and the level of the supply chain on which they occur is presented in Table 5.1.

Table 5.1 Bottlenecks in the supply chain of shrimp in Bangladesh

Subsector	Bottleneck	Level of the supply chain
Shrimp	Lack of raw materials	Primary production
	Lack of skilled labour force and value-addition capacity	Processing
	Bad quality image and international buyer requirements	All levels
	Dominant position of commission agents	Supply chain
	Lack of testing facilities	Processing/exports

The highest potential for shrimp exports relate to the cultured species (Black Tiger shrimp and Giant River Prawn) and not to the wild captured species (Speckled and Indian White shrimp). In contrast with other shrimp exporting countries in the region, Bangladesh is traditionally oriented towards the EU market and less towards other markets in the US and Japan. This would suggest that Bangladesh has a good position in the EU market and that additional assistance by CBI is not needed. However, it seems that the main reason that Bangladesh is so popular among EU buyers is the comparatively low price of cultured shrimp - which is mainly caused by the 10% export subsidy from the Government of Bangladesh - and the limited supply from other countries.

The stagnation in the growth in the volume and value of shrimp exports in the Bangladeshi shrimp subsector can be improved by increasing the production volume and/or area and/or by increasing the value of shrimp products.

To increase the production volume two strategies have been suggested: (1) reducing post-harvest losses and (2) increasing the productivity of shrimp farms. Post-harvest losses can be reduced by increasing the efficiency in the supply chain. This includes strengthening the bargaining position of farmers with middlemen and exporters, improving the infrastructure in the supply chain (including cold storage facilities), proper ice factories and transport, and by training middlemen and traders. The productivity of shrimp farms can be increased by improving the quality of inputs and training farmers in applying Best Aquaculture Practices (BAP). International support for these issues is already present but it is unknown if the support is successful. Both strategies will result in an increased production as well as an improved quality of the shrimp that reach the processing establishments.

Three strategies that can contribute to an increased value of shrimp products have been highlighted: (1) increasing the share of value-added products in the export basket, (2) improving the image of Bangladeshi shrimp abroad and (3) investing in food safety and sustainable certification initiatives. To increase the share of value-added products there is a need for more skilled workers in processing establishments. Workers can be hired from India or Thailand or trained domestically. To improve the quality image of Bangladeshi shrimp in the international market it is required to increase the willingness of buyers to pay more for Bangladeshi shrimp

products. Suggestions to improve the quality image of Bangladeshi shrimp are to professionalise management staff in processing establishments, to introduce a Bangladeshi quality label that is recognised internationally and to improve the presentation of Bangladeshi shrimp exporters at international seafood trade shows. Investment in certification schemes such as the Aquaculture Certification Council or Naturland are noted as a strategy to increase the value of shrimp products. The characteristics of shrimp farms in Bangladesh are suitable for certification and a number of NGOs are already working on certification initiatives with Bangladeshi producers and exporters.

One of the most important challenges for Bangladesh is to become known for the shrimp quality instead of low prices that result from the export subsidies. International support for the shrimp sector has been focused on productivity, EU food safety compliance and improving productivity of small-scale farmers, while support in export promotion and branding has been limited.

Frozen fish

An overview of the five bottlenecks in the frozen fish supply chain in Bangladesh and the level of the supply chain that they occur on is presented in Table 5.2. Although exports of whole frozen captured fishes still have a good potential in the countries with Bangladeshi expat communities, this study focused on the export potential of cultured fish because aquaculture species have the highest development potential for the future. The cultured species with the highest export potential are pangasius and tilapia. However, pangasius and tilapia are also locally consumed and therefore yield high prices in the domestic market. As a result most pangasius and tilapia are consumed locally and exports are limited. At this moment it is not considered realistic that export promotion activities would immediately increase the export volume or value of Bangladeshi frozen fish because the problems that the subsector is confronted with at the level of primary production and other levels of the supply chain are too large.

Table 5.2 Bottlenecks in the supply chain of frozen fish (mainly pangasius) in Bangladesh

Subsector	Bottleneck	Level of the supply chain
Frozen fish	Lack of supply	Primary production
	Low quality of the fish	Primary production
	Dominant position of traders and commission agents	Supply chain
	Lack of cold storage facilities	Supply chain
	Lack of skilled labour force	Processing

The lack of supply is mainly caused by low productivity of fish farms, post-harvest losses and a strong local demand for fish. There are three strategies suggested to deal with the lack of supply: (1) increase the productivity of fish farms, (2) reduce post-harvest losses and (3) encourage exporters to invest in integrated fish farms. Strategy one should include training programmes for farmers that support them in reducing mortality rates and increasing the productivity of the ponds. Strategy two should include investments in the infrastructure including cold storage facilities and proper transport. Strategy three should enable exporters to generate a constant supply of fish that does not reduce the availability of fish on the local market and of which the quality is ensured because the exporter can control all the inputs and invest in more intensive and better managed production systems. This would also

make the exporters less dependent on the middlemen who dominate the supply chain and are often not quality minded.

The low quality of the fish partly is due to a lack of proper inputs and poor farm management but also due to a lack of cold storage facilities along the supply chain. Low quality inputs and poor farm management result in fish that have no white but a yellowish or reddish colour of the fillet. These fillets are not suitable for many export markets. A lack of cold storage facilities threatens the freshness of the products that reach the processing establishments. To deal with the low quality of the fish that reaches the exporters, strategies should focus at (1) improving the quality of inputs (feed and seed) and (2) improving the infrastructure along the supply chain. The second strategy includes increasing the availability of cold storage facilities (the fourth bottleneck).

The final bottleneck, the lack of a skilled labour force, limits the processing capacity of exporters. Currently, most frozen fish is exported as block frozen items while the highest market value and demand are for fillets. One explanation is that fish exports are often regarded as a sideline and as an option to use the processing capacity more efficiently when there is a low supply of shrimp, which is mostly the main export item. Fish processing techniques therefore receive insufficient attention from managers and factory owners. A strategy that focuses on creating a force of skilled factory workers who have the skills to properly handle fish fillets would contribute to the international market potential of Bangladeshi fish fillets.

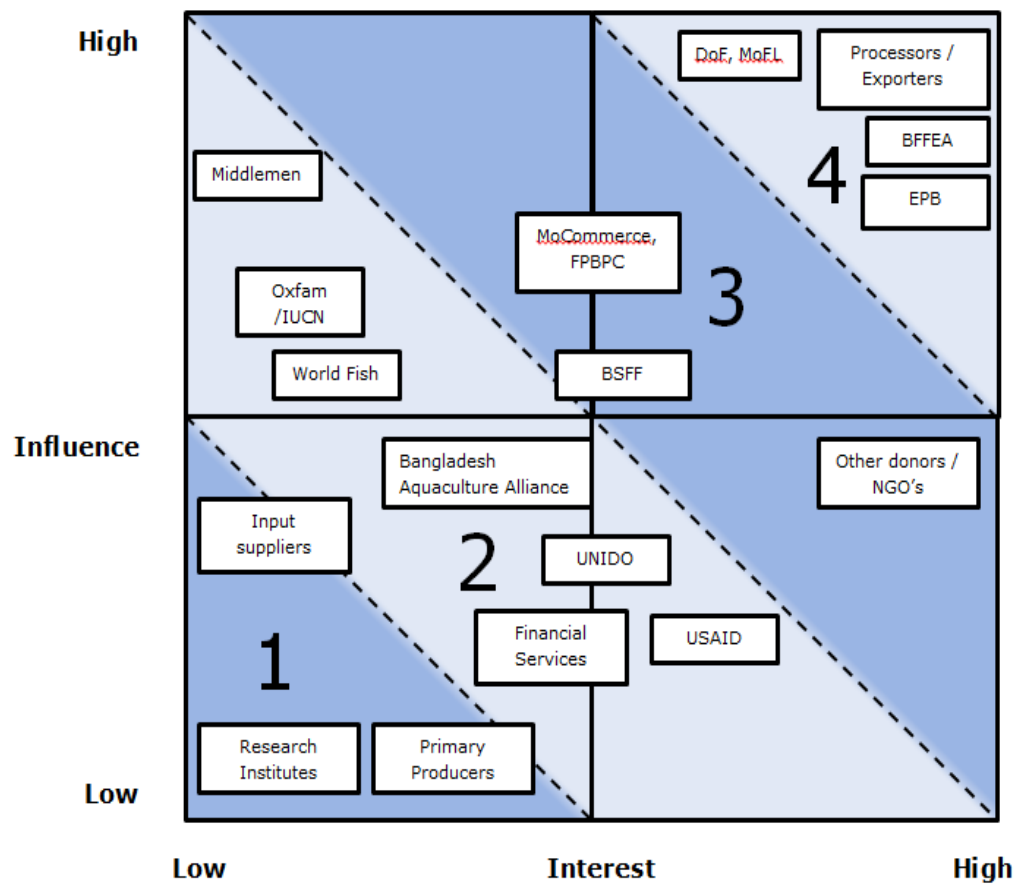
It is expected that improved productivity, quality, and increased processing skills have a positive impact on the price and competitiveness of Bangladeshi frozen fish in the international market. However, the important question remains to what extent the promotion of export of frozen fish conflicts with the provision of local Bangladeshi food security because for Bangladeshi consumers fish is the most important source of animal protein.

Appendix 1 Stakeholder assessment grids

Introduction

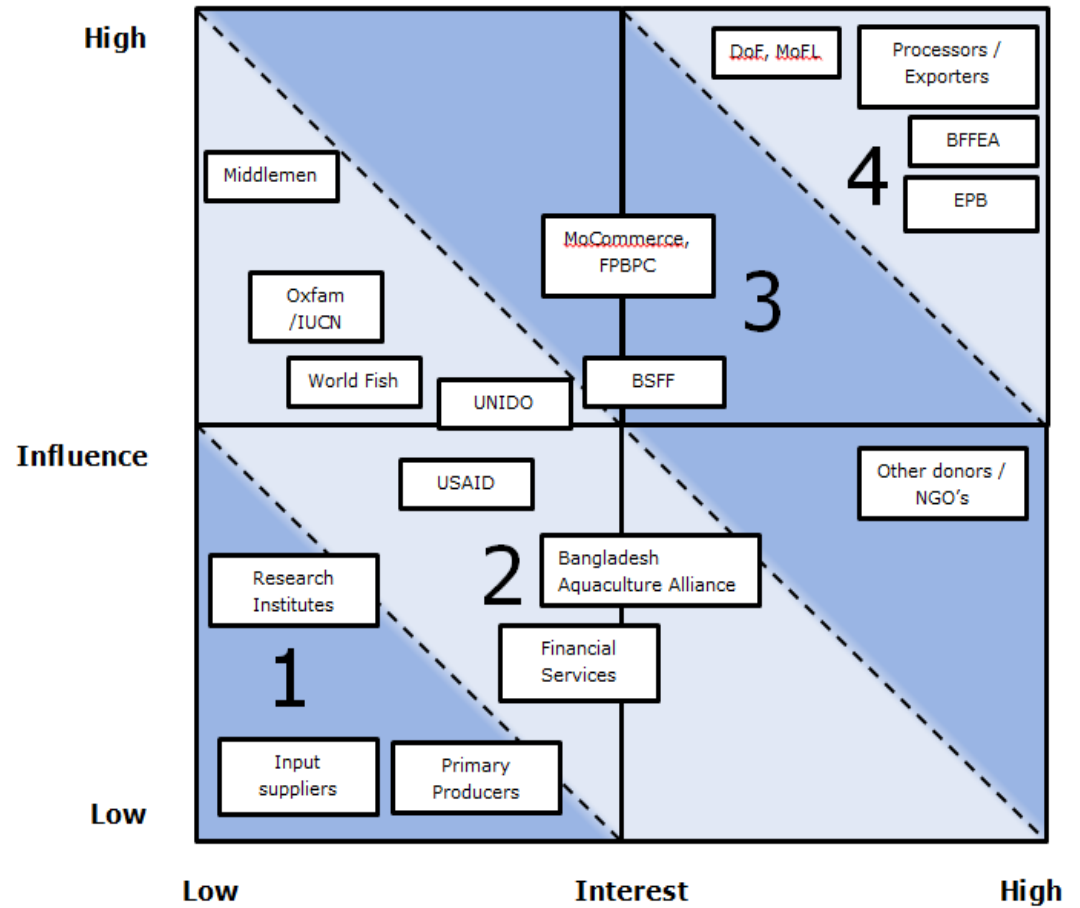
This appendix presents the stakeholder assessment grids for the two subsectors. Stakeholders are agencies, organisations, financial institutions, groups or individuals who have a direct or indirect interest in a possible CBI intervention in the value chain. The involvement of a particular stakeholder in a CBI programme can be determined based on the level of influence and the level of interest.

Shrimp Stakeholder Assessment Grid



- 1 = Keep informed
- 2 = Keep satisfied
- 3 = Active consultation
- 4 = Strong buy-in required

Frozen Fish Stakeholder Assessment Grid



Appendix 2 Baseline Data

Shrimp subsector

Export volume and value for shrimp in 2002-2011			
Year	Monodon		
	Export volume (tonnes)	Export value (USD 1,000)	Export of sustainable produced products (%)
2002	34,018	398,935	n.a.
2003	37,066	325,566	n.a.
2004	45,233	404,603	n.a.
2005	46,845	380,843	n.a.
2006	54,859	469,584	n.a.
2007	52,718	462,469	n.a.
2008	55,363	447,858	n.a.
2009	52,361	406,740	n.a.
2010	53,425	461,352	n.a.
2011	52,311	501,833	n.a.

Source: ITC (2012), processed by LEI

The main export markets for shrimp in 2002-2011						
Year	EU			US		
	Volume (tonnes)	Value (USD 1,000)	% (value)	Volume (tonnes)	Value (USD 1,000)	% (value)
2002	20,604	177,129	44%	8,535	70,098	18%
2003	24,694	214,990	66%	8,143	81,717	25%
2004	22,503	194,598	48%	17,364	76,005	19%
2005	26,269	213,185	56%	15,873	81,880	21%
2006	28,957	239,196	51%	19,442	59,692	13%
2007	28,959	251,293	54%	14,965	48,438	10%
2008	31,829	249,796	56%	13,757	39,105	9%
2009	36,094	265,239	65%	9,892	53,467	13%
2010	38,389	314,908	68%	8,161	56,857	12%
2011	40,706	376,847	75%	4,519	84,081	17%
Year	Japan			Others		
	Volume (tonnes)	Value (USD 1,000)	% (value)	Volume (tonnes)	Value (USD 1,000)	% (value)
2002	3,241	18,875	5%	1,638	132,833	33%
2003	3,004	17,096	5%	1,225	11,763	4%
2004	3,415	19,304	5%	1,951	114,696	28%
2005	3,194	17,355	5%	1,509	68,423	18%
2006	4,001	21,770	5%	2,459	148,926	32%
2007	2,568	15,342	3%	6,226	147,396	32%
2008	3,095	20,693	5%	6,682	138,264	31%
2009	2,433	16,140	4%	3,942	71,894	18%
2010	2,500	16,937	4%	4,375	72,650	16%
2011	1,986	17,883	4%	5,100	23,022	5%

Source: ITC (2012), processed by LEI

Frozen fish subsector

Export volume and value for frozen fish in 2002-2011			
Year	Export Volume (tonnes)	Export Value (USD)	Export of sustainable produced products (%)
2002	10,458	18,358	n.a.
2003	10,100	21,110	n.a.
2004	10,810	24,180	n.a.
2005	19,869	33,700	n.a.
2006	21,374	33,382	n.a.
2007	34,107	45,589	n.a.
2008	31,385	56,851	n.a.
2009	26,930	35,655	n.a.
2010	17,982	44,875	n.a.
2011	9,484	39,516	n.a.

Source: ITC (2012), processed by LEI

The main export markets for frozen fish in 2002-2011						
Year	EU			US		
	Volume (tonnes)	Value (USD 1,000)	% (value)	Volume (tonnes)	Value (USD 1,000)	% (value)
2002	3,142	11,308	62%	509	1,701	9%
2003	3,052	13,444	64%	690	2,233	11%
2004	2,831	13,475	56%	1,209	4,685	19%
2005	3,957	17,761	53%	872	3,071	9%
2006	3,915	16,383	49%	1,082	4,153	12%
2007	3,222	15,964	35%	912	3,423	8%
2008	5,379	26,831	47%	2,581	5,394	9%
2009	4,075	15,101	42%	1,434	5,221	15%
2010	3,909	17,525	39%	1,195	4,916	11%
2011	4,969	26,023	66%	1,367	6,086	15%
Year	China			Others		
	Volume (tonnes)	Value (USD 1,000)	% (value)	Volume (tonnes)	Value (USD 1,000)	% (value)
2001	38	17	0%	6,769	5,332	29%
2002	178	94	0%	6,180	5,339	25%
2003	668	426	2%	6,102	5,594	23%
2004	1,184	987	3%	13,856	11,881	35%
2005	3,896	2,797	8%	12,481	10,049	30%
2006	10,902	6,718	15%	19,071	19,484	43%
2007	6,994	5,316	9%	16,431	19,310	34%
2008	3,149	2,523	7%	18,272	12,810	36%
2009	2,227	2,098	5%	10,651	20,336	45%
2010	477	743	2%	2,671	6,664	17%

Source: ITC (2012), processed by LEI



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