An update of shrimp and prawn supply chain initiatives in Bangladesh

Recommendations for inclusive shrimp supply chain development for the STDF project

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WorldFish

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1 Introduction

1.1 Rationale

The Standards and Trade Development Facility (STDF) project implemented by FAO in cooperation with the Department of Fisheries and WorldFish is funded by WTO. It will target 1,000 shrimp and prawn farmers in Southwest Bangladesh and focuses on improving their livelihoods and securing their market access. This study focuses only on the supply chain component of the STDF project.

The situation in the shrimp and prawn sector is already changing, as a result of the supply chain innovation initiatives in Bangladesh. A premium supply chain that will provide premium quality traceable products and a fair distribution of profits among stakeholders is slowly being established (see Figure 1). The improved quality and traceability of the shrimp and prawn products from Bangladesh will contribute to an improved image of these products in the international market and to improved livelihoods of small-scale farmers and other stakeholders in the sector. The premium supply chain will initially only cover a small part of supply. However, it is expected that it will gradually expand when its business case is proven.

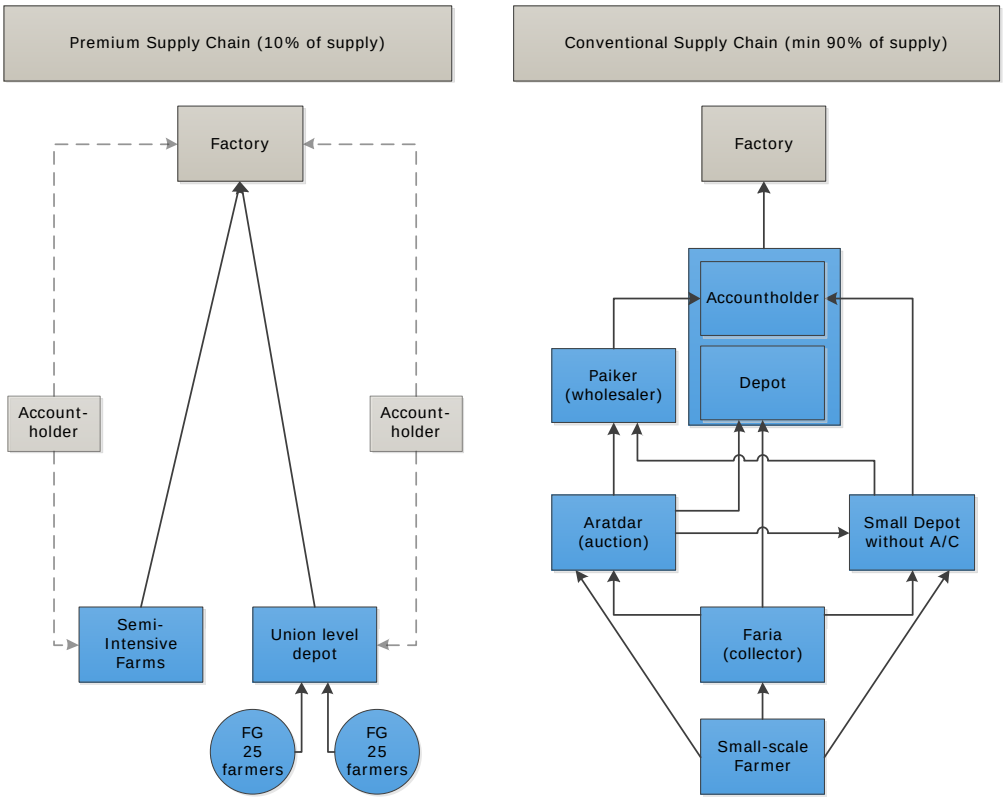

Figure 1 *Premium and conventional supply chain of shrimp and prawns*

The premium supply chain will link extensive small-scale farmers and semi-intensive larger farmers directly or through a limited number of intermediaries to the processing factories. Although the focus of NGO projects, and especially of the STDF project, is not on semi-intensive farms, these farms are included in the premium supply chain by the processors themselves. There is no blueprint for the supply chain model as its details will vary from location to location, but the supply chain model has some basic principles. This report will contribute to the understanding of these basic principles and will identify the constraints that need to be taken into account. This will help the STDF project to design a

supply chain model that can be implemented within the project period and will be sustainable after the project period as well.

1.2 Aim

The aim of this study is threefold, namely:

- To summarise the current situation in the shrimp and prawn supply chain in Southwest Bangladesh
- To summarise the approach of other projects working on supply chain innovation
- To provide recommendations for the supply chain design of the STDF project

1.3 Approach

This study was conducted on two levels

- Desk study to get an overview of available information
- An eight-day field visit in order to visit STDF stakeholders, validate available information and collect additional information

1.4 Structure

This report is divided into four chapters. The first chapter elaborates the market perspective, which should be leading in the focus of supply chain innovations. It will also explain the benefits of supply chain innovations related to market access and/or premium prices. Chapter 2 gives a concise overview of the most important stakeholders in the conventional supply chain and chapter 3 gives an overview of the most important issues. The report does not provide an all-encompassing analysis but focuses on the most relevant insights that need to be taken into consideration in the STDF project. Links to more elaborate supply chain studies are given in Appendix 1. The fourth chapter provides a summary of other supply chain initiatives implemented by other NGOs or by the private sector. Chapter 5 consists of recommendations for a premium supply chain model. The final chapter, the conclusion, summarises the most important considerations that need to be taken into account in the STDF project.

1.5 Acknowledgements

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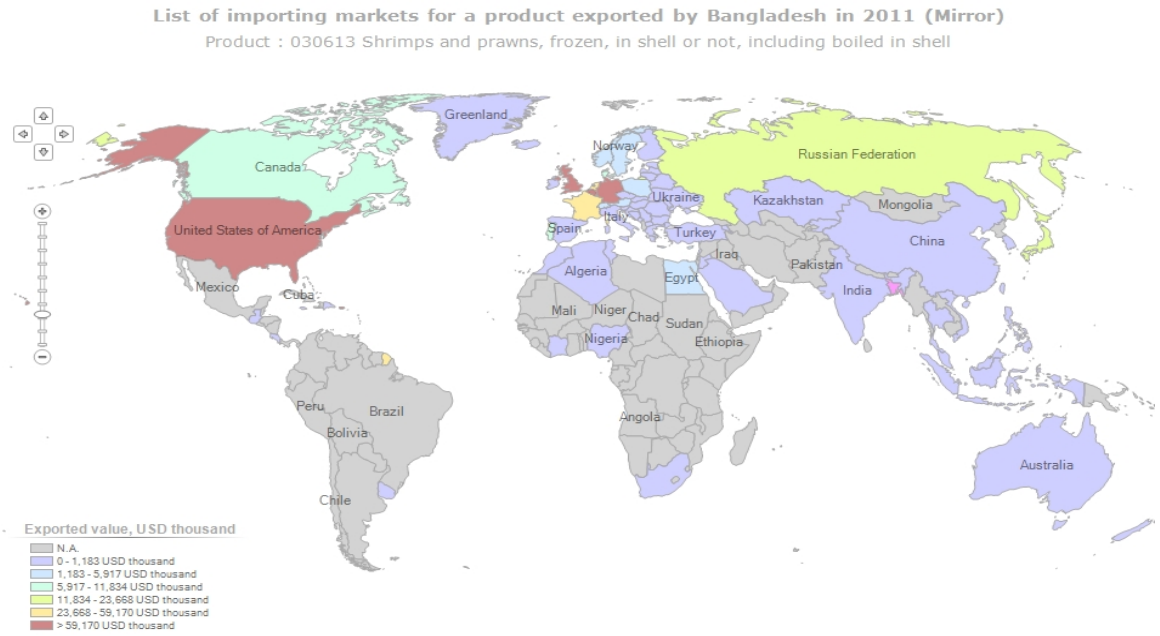
2 The market perspective

2.1 Export markets

Bangladesh is one of the world's leading producers of Black Tiger shrimp (*P. monodon*) and Fresh Water prawn (*M. rosenbergi*). Compared to the Pacific White shrimp (*P. vannamei*), which increasingly dominates the world market, Black Tiger shrimp and Fresh Water prawn are known for their supreme sizes, quality and taste. Both products are regarded as niche products and are sold at higher prices than the Pacific White shrimp, even if the sizes and quality are of equal level.

Shrimp and prawn from Bangladesh are mainly exported to the EU (see Map 1). In 2011 (most recent data), the EU import volume from Bangladesh, mainly by Belgium, Germany and the UK, accounted for 80%, equivalent to 40,000 tonnes of total exports. In addition, 5,000 tonnes were exported to the US and 2,000 tonnes to Japan.



In Europe and the US, shrimp and prawn from Bangladesh are mainly distributed through the wholesale market for the out of home and Asian niche markets. Unfortunately, Bangladeshi exporters often cannot comply with EU buyer requirements for the retail sector. These requirements relate mainly to traceability and certification, but to a lesser extent also to the quality of the product and the consistency of supply.

2.2 Certification

In the retail segment in the EU but also in the US, sustainability certification is increasingly used as a market access requirement. In the US, large retailers such as Walmart only sell products that are certified by the Global Aquaculture Alliance (BAP). In the EU, especially in Western Europe, leading retailers demand either Global G.A.P. or also Aquaculture Stewardship Council (ASC) certification. Sustainability certification has not yet succeeded in Bangladesh as a result of the small-scale and extensive character of shrimp production, as well as the fragmented supply chain. The challenge is not only technical but also financial. Whereas organic certification may be rewarded with a price premium,

retailers in general do not pay a premium price for BAP, Global G.A.P. or ASC certification. The benefit of sustainability certification is market access to the retail segment, which is more stable in demand and often offers better and longer-term contracts.

2.3 Internal Control System

To move towards certification, one of the crucial bottlenecks is to set up an Internal Control System that reduces the costs and increases the feasibility of smallholder certification. Without an Internal Control System, certification will not be possible. Details about the requirements for an Internal Control System can be found at: http://www.ifoam.org/en/internal-control-systems-ics-group-certification.

2.4 Traceability

A major buyer requirement in the EU is traceability. Buyers require that each product can be traced back to the farm. Although Bangladesh has a traceability system that is accepted by the EU commission, this system is not yet operating optimally. The large number of small-scale farmers makes it very difficult for Bangladesh to guarantee full traceability. It is expected that traceability requirements will become increasingly stringent in the EU. Bangladesh will have to improve its system in order to maintain market access.

2.5 Quality

At this moment Bangladeshi shrimp and prawn compete mainly in the market based on price, not on the premium quality of the product. This is a missed opportunity. The products, when harvested from the shrimp and prawn ponds, have a unique quality that results from the almost natural extensive production practice. The lack of vertical integration and the lack of a cold chain result in the deterioration of the quality of the products when they reach the factory. The product quality can be improved with the establishment of a premium supply chain. With increased marketing efforts, international buyers can be informed about the uniqueness of the products. In addition, if the cold chain is improved, resulting in an improved quality of the shrimp, processors may be able to produce more head-on raw and peeled cooked products which provide them with higher margins.

The design of an inclusive shorter supply chain is necessary to work towards better traceable, certified and higher quality shrimp and prawn products from Bangladesh.

3 The shrimp and prawn supply chain in SW Bangladesh

The traditional shrimp and prawn supply chain in Southwest Bangladesh is characterised by a large number of middlemen (faria, aratdar, depots, paiker, and accountholders) (see Figure 1, page 5). These middlemen provide financial or other services (e.g. collecting, auctioning or transportation) and consolidate raw material along the supply chain. The marketing channel that a farmer uses depends mainly on the harvest volume, the location of the farm, the financial ties of the farmer, and the offered terms of payment. The exact configuration of the supply chain varies widely from location to location and from farmer to farmer. This chapter briefly describes the various stakeholders. In Appendix 1 a reference list is provided for other supply chain studies which have more detailed descriptions.

3.1 Stakeholders

3.1.1 Faria

Faria are small-scale traders who visit small farms at the time of harvest. They purchase, transport and sell small volumes of shrimp and prawn directly or indirectly (through an aratdar) to depots or paiker. Faria often do business in their own communities but sometimes also work in more distant areas. Traditionally, faria tended to offer credit payments to the farmers. More recently, in order to secure supply, faria also offer cash payments to farmers.

For small-scale farmers located far away from aratdar or depots, faria are regarded as the most convenient buyer of their product. Even if aratdar or depots can offer a slightly higher price, the costs and hassle of packing and transporting are too high for the small-scale farmer. Although sometimes faria operate independently, in many cases they work as representatives of aratdar or depots.

Although for the farmer it may be convenient to sell to a faria, for the factories faria are a crucial bottleneck in the supply chain. They are accused of malpractices and adulteration by manipulating the weight of the raw materials before they sell it to paiker or depots.

3.1.2 Aratdar

Arat are privately owned auction places where the owner rents out space to arotdar who facilitate the auctioning process. Paiker and depots purchase raw materials through aratdar. Arat mostly consist of a cluster of small shops in concrete sheds in the open air or a cluster of small shops in an indoor auction hall. The aratdar are equipped with iron tables, plastic crates, and traditional (cata) weighing equipment. Arat can vary in size. The smallest ones observed have only 4 or 5 aratdar inside their premises, while the largest can have more than 50. While smaller arat seem to be well organised, larger arat can be rather chaotic with less control on product inflow and outflow.

Farmers and faria increasingly use the arat to sell their products. They expect to get a better price for their products compared to when they sell to a faria or depot for a fixed price (confirmed by Nazmul 2013). In addition, aratdar always offer a cash payment instead of a credit payment. Recently, many shops that previously functioned as depots have now started to operate as auctions. This confirms the trend that farmers increasingly prefer to sell through auction. However, just like faria, aratdar are also accused of malpractices that results in farmers not getting maximum prices for their products. Besides a 3% commission, aratdar take margin by selling 1 kg of product to the customer while they only pay the value of 900 grams per kilogram to the seller. Also at arat, farmers therefore seem not to get the full price for their products.

3.1.3 Depots

Depots are collection centres where supply is consolidated. The volumes traded by depots vary considerably. In general depots close to the production areas are smaller, while depots close to the district capitals and the factories in Khulna are larger. Contrary to an aratdar, a depot owner actually purchases the product from farmers and faria. Depots add value by grading the shrimp and prawn and packing it for transport to the factories. Depots also regularly pre-process shrimp and prawn for the factories. Pre-processing mostly consists of de-heading and peeling of prawn. Contrary to aratdar, depots mostly offer farmers and faria credit payments. Farmers and faria seem to be less interested to sell through depots because they argue that the selling process at depots is not transparent and farmers and faria are afraid that they will not get a fair price for their products. Only farmers who are

bound to depots because of their isolated location or because they receive informal loans (*dadon*) from depots are still selling to depots.

3.1.4 Paiker

Paiker are wholesalers who operate with a license but without a shop. They purchase shrimp from aratdar and depots and transport and sell it to factories through accountholders. The accountholder will take a commission from the paiker for using his account. Paiker mostly purchase shrimp and prawn at the arat but also purchase from smaller depots that do not have their own means of transport. Paiker also regularly do pre-processing activities for the factories. Pre-processing mostly consists of de-heading and peeling of prawn.

3.1.5 Accountholders

The accountholders are the bankers in the shrimp supply chain and key stakeholders in the financial system in the supply chain. Each factory provides a number of large depots with an account through which payments are transacted. Large depots, mostly in Khulna, have multiple accounts and can choose to which factories they supply. Most large depots have a network of smaller depots throughout the country. Small depots and paiker who do not have accounts themselves use the accounts of large depots to sell their products to the factories. In this case, the accountholder is never the owner of the products but will take a commission from the sales value and is responsible for the financial transaction.

Accountholders generally sell to exporters on credit. When they supply the product to the factory, the factory will pay a maximum of 40% of the value. The remainder is paid only after the exporter receives payment from their overseas buyer. This system creates a situation in which exporters do not need huge amounts of capital to operate their business. However, accountholders and depots need to purchase products from their suppliers mostly in cash. Therefore, they need large amounts of capital to keep their business running. When exporters are not able to pay the remainder of the payment,

accountholders and other stakeholders (especially depots and paiker) will suffer as they will lose the money that they have already spent on purchasing the shrimp.

The system of the accountholder creates a situation in which factory owners need a limited amount of capital to run their factories. They need to pre-finance 40% of the value of their purchases, but 60% is only paid when they receive the payment from their customers. However, factories can already collect bank loans based on the letter of credits that are provided by their customers. Factory owners are often accused of using the part of this money that they pay later to their suppliers for investments in other companies that operate under a holding company.

The accountholder system is a way for factory owners to limit their risks. It partly explains the unwillingness of factory owners to invest in the supply chain and an important constraint for supply chain simplification.

4 Issues to be solved in the supply chain

The fragmented supply chain in Southwest Bangladesh and the strong competition among buyers for available raw material causes a number of issues that result in the deterioration of the quality and the value of shrimp. This chapter will highlight the main issues that can be solved by simplifying the supply chain.

4.1 Pushing and soaking

The first method to increase weight is pushing. To increase the weight of shrimp and prawn a liquid is injected. This may result in a 10-20% weight gain per kilogram. Maximum weight is gained by injecting in the head, but also by injecting in the body, significant weight can be gained. Although this method is especially used with prawn, which have larger heads, it is also used with shrimp, especially the larger sizes.

Soaking is the second method used to increase the weight of the shrimp and prawn. By putting the shrimp in a basket with water and keeping it there overnight before supplying it to the processing establishment, up to 10% weight can be gained. Many buyers therefore request their suppliers (especially farmers, faria and small depots), not to put their products on ice or chilled water but to supply the products 'dry' or alive. This prevents the malpractice but deteriorates the quality of the product.

Pushing and soaking result in increased profits for the seller in two ways. First, the seller can sell 1.1 kg instead of 1 kg. Second, instead of 30 count shrimp (head-on pcs/kg), he can sell the shrimp now as 28 count shrimp as not only the volume but also the size has increased after pushing and/or soaking. These methods do not only result in higher net profits per kg, but also enables faria and depots to offer higher prices to their suppliers and thus to secure supply.

Although both the government and the private sector have taken many efforts to prevent pushing and soaking, such as closing suspected depots, destroying adulterated products and giving fines, the problem is not yet completely solved. Especially during the shrimp peak season, it remains to be seen whether the problem is really under control. All stakeholders emphasise that most of the people do not use malpractices anymore but that a small group of people are not yet under control. See also Alam (2011: 177) for a detailed explanation of the motivation for pushing and soaking and the marketing system behind it.

4.2 Price manipulation

Besides pushing and soaking there are other methods through which faria, depots, arat and commission agents take margin in the supply chain and enable themselves to compete for raw materials. The main method that is used by intermediaries in the supply chain is to purchase shrimp from farmers on a per maund basis (local measurement) but considered a maund to be equivalent to 40 kg rather than the actual 37.32 kg at which they sold the shrimp at the next step of supply chain. Thus they enjoyed an extra margin of about 2.68 kg per maund from the farmers (NACA, 2006; Alam, 2011). Various aratdar admitted that it is common to use this method to increase their income.

4.3 Quality and food safety

Although depots and arat are monitored by the FIQC and the sanitary situation differs from location to location, in general food safety standards are lacking. Shrimp is handled on concrete floors, not stored in proper boxes, ice is not checked for quality and crushing machines and locations are not monitored. In addition, shrimp is not put on ice right after harvest and often too little ice is added in later stages of the supply chain, which all contributes to a lack of food safety and a deterioration of the quality.

4.4 Traceability

As a result of the larger number of small-scale farmers (in total more than 200,000) and the large number of intermediaries, it is very hard to maintain traceability in the current supply chain. Although all actors seem to be able to trace the shrimp and prawn back one step and forward one step, shrimp is mixed at various levels in the supply chain. Although a traceability system for the EU has been improved with the help of UNIDO and the DoF, this system is not functioning properly.

Without improved traceability it is hard to comply with high-end market buyer requirements for the EU and US retail sector. These requirements include full traceability and often also chain of custody certification. If Bangladesh has the ambition to obtain and maintain market access to these high-end market segments, it is crucial to design a supply chain in which traceability can be guaranteed from pond to plate. This involves the design of an internal control system, which is unlikely to be feasible to implement in the entire supply chain, but may be feasible to implement with smaller premium supply chains where all stakeholders are fully committed.

5 Donor projects and supply chain initiatives

This chapter highlights the most important donor projects and their supply chain innovation initiatives. It discusses both supply chain innovations in the conventional supply chain as well as in the premium supply chain (see Figure 1, page 5). The aim is to provide an overview of the different strategies and approaches. This will enable the STDF team and others to take the various options into account in the design of a premium supply chain.

5.1 Donor programmes

BEST-BFQ

Implementer: UNIDO
The project: BEST-BFQ (http://bfqbangladesh.wordpress.com)
Period: 2010 - December 2014
Budget: *Unknown*

Focus

The Better Fisheries Quality (BFQ) or BEST programme is implemented by the United Nations Industrial Development Organization (UNIDO) with financial support from the European Union (EU), the Norwegian Agency For Development Cooperation (NORAD) and the Government of Bangladesh. It is a follow-up programme of the Bangladesh Quality Support Programme (BQSP) implemented during 2006-2010. To extent this work, the BEST-BFQ programme was granted.

The BEST-BFQ programme aimed to:

- Harmonise the regulatory framework for controls in the supply chain
- Strengthen the control reach of the competent authorities throughout the supply chain
- Improve the reliability and validity of sampling and laboratory analysis for official controls
- Set up a Training Centre in the BFFEA for vocational training and skill development
- Support initiatives to simplify the supply chain
- Support the sector to strengthen internal control systems for GAP, traceability and hygiene
- Implement and enforcement of the labour law to improve labour conditions in factories

Sustainable Agriculture, Food Security and Linkages (SaFaL)

Implementer: Solidaridad Asia Network Limited
The project: SAFAL (http://solidaridadnetwork.org/safal)
Period: November 2012 – December 2016
Budget: €12m

Focus

Solidaridad with support from the Embassy of the Kingdom of Netherlands in Bangladesh implements the Sustainable Agriculture, Food Security and Linkages (SaFaL) programme for improving food and nutrition security for 50,000 farm households, disadvantaged landless workers and women in Southwest Bangladesh. SaFaL interventions focus on producer support for sustainable local ecosystem based commercial agri- and aquaculture, value addition and market efficiency. It promotes the accessibility and availability of certified and safe food for consumers in local and international markets. Key aspects of the SaFaL programme are:

- Capacity development for good aquaculture and agriculture practices for 50,000 households
- Organising 50,000 farmers into 1,000 producer groups
- Introducing a business model for entrepreneurial lead farmers
- Demonstrating profitability of sustainable production practices to farmers

- Designing and implement a short premium supply chain for SaFaL producer groups
- Designing the Village Super Market Concept as local trading hub for outputs and inputs
- Developing market linkages to give farmers financial incentives to adopt sustainable practices
- Developing the Seafood Trade Intelligence Portal as a hub for sourcing, marketing & investment.

Aquaculture for Income and Nutrition
Implementer: WorldFish
The project: AIN
Period: October 2011 – September 2016
Budget: USD25m

Focus
This is a five-year USAID-funded project that will reach communities across 20 districts in the southern stretches of Barisal, Khulna and Dhaka divisions of Bangladesh. WorldFish will directly implement the multi-faceted project in close cooperation with the Department of Fisheries, Bangladesh (DoF), the Bangladesh Fisheries Research Institute (BFRI), and the Bangladesh Agricultural Research Council (BARC). The project involves a four-pronged approach, with initiatives addressing the key Feed the Future goals of sustainably reducing poverty and hunger. Over five years, the project aims to improve the livelihoods of close to 1m households, and add over USD200m in fish and shrimp production to the Bangladeshi aquaculture industry. The programme aims to reach as many as 100,000 shrimp and prawn farmers. The main focus is on increasing inputs (especially PL), farmer group organisation, and increasing productivity. The programme also aims to work towards sustainability certification to achieve market access to high end retail in the US and the EU and to strengthen vertical integration in the supply chain.

5.2 Supply chain innovation initiatives

5.2.1 Planned initiatives

BFFEA Premium Collection Centres
World Fish, BFFEA (and Solidaridad)

Around 5,000 farmers from 16 unions will be directly linked to 16 processing plants through 16 premium collection centres. One processor plant will be linked to one collection centre, which will be linked to approximately 4 farmer groups (100 farmers) from a respective union. The ultimate objective of this project is to achieve certification by establishing direct linkages in the supply chain, making first steps towards certification (now ISO is considered) and by the introduction of an Internal Control System. Although WFC supports with initial investments, the project will need to be private sector driven.

The staff appointed to the collection centres will be selected and employed by BFFEA. The staff will stay with BFFEA after the project is expired. The factories will provide the construction cost, rent, staff, operational cost and transportation costs for the collection centres. WF will provide equipment like iron tables and insulated boxes. Ice will be provided by the factories to collect shrimp to the collection centres. The respective processing plant will be responsible to pay the farmers for the frozen products within 24 hours after they have received the shrimp. In case the factory owner does not comply, the BFFEA will be responsible to pay the agreed amount within 48 hours after receiving the shrimp by the processor plant. For this purpose, BFFEA will set up a special fund which the 16 processors pay for by donating e.g. 1 TK per kg of their purchase through these collection centres to this fund.

Responsibilities of BFFEA
- Selection of processors
- Rent and/or construction of collection centres
- Supervision of collection centre staff

- Providing staff salaries
- Covering operational costs
- Supplying ice needed in farm collection boxes
- Logistic costs
- Payment to the farmer within 48 hours in case the Processor plant does not pay for frozen products within 24 hours after delivery of shrimp by the farmers.

Responsibilities of WorldFish
- Providing technical support where requested
- Providing training costs for staff on Good Aquaculture Practice (GAP), Food safety, and Certification
- Providing assistance in acquiring certification and perhaps bearing certification costs on a trial basis
- Supporting processors with a maximum of USD1,200 per processing plant to purchase tables and boxes.

Solidaridad has indicated to be interested in joining with this initiative and also in linking their farm groups to this initiative.

A main risk of this project is that its concept is designed by BFFEA headquarters in Khulna. Although there has been a meeting with its members, it is not completely clear to what extent all the factory owners that have expressed their interest to participate are at the same page about the set up and design.

Common receiving centres and the Village Super Market (VSM)
Solidaridad and BFFEA

To fight malpractices in the conventional supply chain, BFFEA is in the process of designing common receiving centres. The concept is mainly that all shrimp and prawn that is supplied to factories is first supplied to these centres where the quality will be checked by staff of FIQC and factory quality managers. Only if products are approved, factories will purchase the product and supply it to their factories. The idea of common receiving centres has been developed and implemented previously in the Fish Landing and Service Centre project. However, this initiative failed due to disagreements between the Department of Fisheries and the BFFEA about the business model (see page 21).

BFFEA is still convinced that if the business model is right, common receiving centres can be a key solution to malpractices in the supply chain. BFFEA suggests that it may be a good opportunity to use the Village Super Markets that Solidaridad is considering to use in their project as common receiving centres. The VSM is a unique market place concept linking agri-food chains in Southwest Bangladesh, at once serving as a market place, market information and knowledge exchange, service centre and business hub. As a market it serves local consumers, traders and exporters as well as farming professionals looking for inputs and technical support. It will provide crucial cooling, icing and storage infrastructure to supply-chain stakeholders. It will also be used as a venue for special events, like agro-fairs, and as a reach-out point for government services and as a safe haven for people and domestic animals at times of floods and risky weather.

At this moment, Solidaridad is implementing a feasibility study for the Village Super Markets. It is at this moment not yet clear whether the concept will be implemented.

E-traceability
UNIDO, Solidaridad and WFC

All NGOs working on the shrimp and prawn sector are looking for ways to improve the traceability in the supply chain. E-traceability is regarded as one of the options to do this. UNIDO started to work on e-traceability in 2013. So far there have only been consultative discussions but nothing has been implemented or piloted yet. The key concept so far is to provide all farmers and intermediaries with a sim card through which they need to upload all shrimp transactions to a centralised system managed by FIQC. It would result in a complete e-traceability system for the entire supply chain which would

become a legal requirement enforced by the Government of Bangladesh. However, it is expected by many experts that this system will be highly sensitive to fraud and hard to implement.

Since the UNIDO project finished in December 2013, it is unlikely that major steps can be made within this project period. In addition to UNIDO, Solidaridad has the ambition to introduce a E-traceability system for its shrimp and prawn farmers. It is scoping for opportunities with proven systems such as farmforce and traceregister. WorldFish has indicated its interest to join efforts to work on E-traceability. The ambition of Solidaridad and WorldFish is not to introduce E-traceability as a legal requirement but to use it as a system on top of the legal framework which can be implemented by the farm groups of their projects and the intermediaries and factories in short supply chains that they will be linked to.

Traceregister (www.traceregister.com) is the mandated traceability system by BAP. Although BAP has mainly certified larger farms, according to Traceregister it is also feasible for small farms. Farmforce (www.farmforce.com) is especially focused on small-scale farmers. Farmforce does not only offer a system to maintain traceability of large numbers of small-scale farmers, it also offers a system to monitor the performance of farms, a mobile information platform, and a way to reduce auditing costs for sustainability standards.

E-Traceability can be regarded as a stepping stone towards certification as it is a way to maintain an Internal Control System. However, the system requires commitment throughout the supply chain. Also, there are costs involved, and if the customers are not willing to pay a premium price, it remains to be seen who is willing to pay for it. An example of this is the company Gemini, which was BAP certified and which implemented the traderegister system, but stopped maintaining this after they decided not to prolong their BAP certification.

5.2.2 Ongoing initiatives

Organic Shrimp Project
WAB Trading International

WAB trading, a German Importer, took over the organic Shrimp Project that was implemented by SIPPO from 2005 to 2007. WAB succeeded in certifying almost 3,500 farmers (more than 7,000 ha of farmland) with Naturland organic certification. It operates a network of more than 25 collection centres where farmers supply their products in personal insulated boxes and chilled in good quality ice. From these collection centres, WAB uses its own insulated truck to transport the products within six hours after harvesting to a factory in which they supervise processing and logistics. In 2013 WAB exported 21 containers of organic Black Tiger shrimp to a leading German retailer.

The activities of WAB in Bangladesh include production of high-quality PL, group formation and training of farmers on shrimp culture and marketing aspects, record keeping of all farm-related activities, monitoring and evaluation of farming practices, internal inspection, external inspection by IMO Switzerland, and certification by Naturland. The farms are certified through group certification and therefore WAB is implementing a strict Internal Control Systems which guarantees that all group members are controlled by WAB.

The supply chain model
WAB succeeds in operating a short simplified supply chain which secures them with high-quality organic shrimps. There are a number of critical success factors in the model of WAB.

- **Premium price**
  WAB receives a premium price (10-20%) for its products in the German organic market. However, WAB does not offer a premium price to its farmers. All the capital that is gained as a result of organic certification is used to cover the costs of certification and the costs of operating the vertically integrated supply chain. Without a premium price WAB would not be able to make profit.

- **Internal Control System**
  WAB has succeeded in designing an Internal Control System that is accredited by IMO, an international third party certifier, and by Naturland. This system makes WAB and Mostafa Organic responsible for implementing the Naturland standard instead of making each and every farmer responsible. The ICS will ensure that all farmers are controlled according to the Naturland standard. The ICS reduces the cost of certification. It includes a rule that farmers need to sign a contract in which they are obliged to fully cooperate with WAB regarding the inspections of their farms and use of inputs, but are not forced to sell through the WAB depots.

- **Supreme quality control**
  By taking control over the critical control points from the point of harvest to the point of processing, WAB is able to maintain the quality of the product from point of harvest to point of delivery to its customer. It enables WAB to export cooked products as well as HOSO products which in other cases is more difficult. Customers do not only pay for the certification but also for the supreme quality.

- **Competitive price fixing**
  WAB is not forcing their farmers to sell to their collection centres by contract. However, besides quality PL and technical support, they offer farmers a competitive transparent price fixing system in which farmers get a fair price based on actual weight and actual grade. Collection centres are equipped with electronic weighing machines and farmers and collection centre staff jointly grade the harvest. In addition, WAB pays the farmers within two days after harvesting through a cash transfer. If WAB is not able to offer a competitive price, or if the incentives offered by WAB are not good enough, each farmer is free to sell to another buyer. WAB scientific manager Jens Kahle explains that if 50% of their farmers actually sell to the WAB depot this is yet a high percentage.

- **Supply of quality PL**
  The incentive for WAB to invest in a hatchery is twofold. First, according to organic certification hatcheries need to operate according to organic principles. To guarantee this, WAB has to operate its own hatchery. Second, to prove the business case of certification to farmers as well as to increase supply to their factory without increasing the number of farmers in their programme, the productivity of farms needs to be increased.

- **Proven commitment to improved productivity**
  WAB not only purchases shrimp and manages the depots but also manages a large extension network of specialists who support farms to manage their ponds properly. A reason farmers are committed to WAB is that the technical support has indeed increased their productivity.

Although the supply chain model of WAB is a very good example for others, its financial feasibility depends largely on the premium price its products receive in the market. This premium price is paid for the organic certificate. For other exporters, it is unlikely that they are interested to invest as much as WAB which is necessary to comply with organic standards and group certification requirements. Therefore, the potential of the WAB model should not be overestimated. However, aspects like the price fixing system and the provision of inputs like quality PL and quality ice should be taken into consideration.

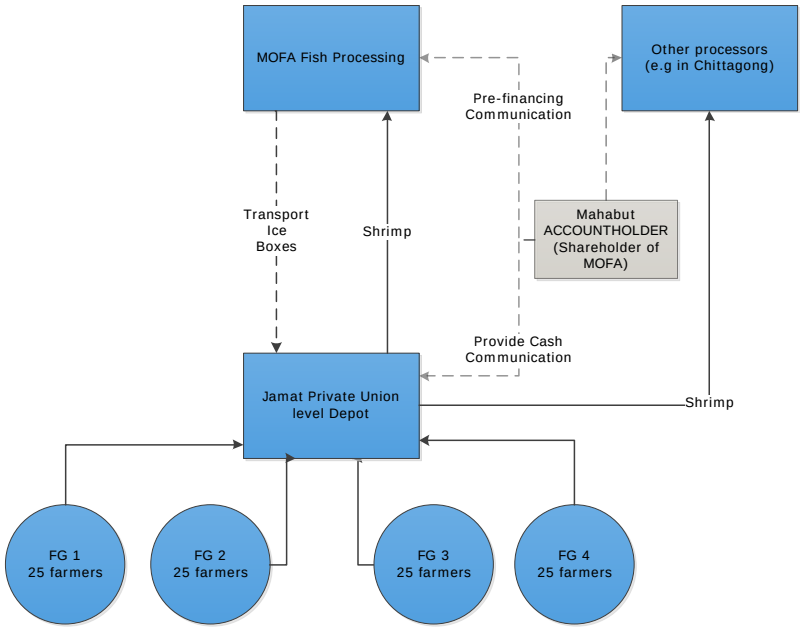


Figure 2 *Supply Chain Simplification pilot*
Source: UNIDO

In Shyamnagar, UNIDO is implementing a pilot project to link their farmer groups that have been trained in GAP to a shorter supply chain. The project is in an initial stage and the upcoming shrimp season will have to prove whether the model works properly.

The basic principle of the model piloted by UNIDO is similar to the model as proposed by BFFEA and WFC. However, contrary to the model proposed by BFFEA and WFC, the premium collection centre is not operated by a factory owner but by an independent entrepreneur. In addition, the depot is not directly linked to a factory owner, but actually to an accountholder who can supply to various factories.

The depot is managed by a local entrepreneur who has expressed interest in building and managing a new depot that would be linked to the UNIDO farm groups. This entrepreneur is a good friend of an accountholder who is also shareholder of a processing plant in Jessore. The accountholder has agreed to provide credit to the entrepreneur in Shyamnagar to enable the purchase of shrimp from the UNIDO farm groups. He in turn will supply the shrimp to the factory in which he has a share in Jessore or to other factories.

Although it is interesting to observe whether this model works, there are some risks and doubts. A major risk is whether the depot owner will only be dealing with the UNIDO farmer groups or will also purchase shrimp from faria and others. If the latter is the case, the question is whether the premium shrimp from the UNIDO farm groups will be separated from the rest or whether it will be merged in the bulk. Also, if on top of this the accountholder is not supplying to one specific factory but selling to many, what is then the difference with the conventional model? Is the involvement of the accountholder not just because this is an easy way for him to secure supply to his accountholder business? From this perspective the UNIDO pilot model could be a stepping stone towards a shorter supply chain but it is definitely not the ideal model.

5.2.3 Failed initiatives

Various persons in the sector have explained that many supply chain simplification efforts have been undertaken in the previous 20 years and most have failed, but that most of the failures have not been documented. One of the failures that have been documented to a certain extent is the construction of the shrimp landing and service centres.

Fish and Shrimp Landing Centres
EU, Department of Fisheries and BFFEA

In 1997, the EU imposed a ban on the shrimp imports from Bangladesh because of a lack of compliance with EU food safety regulations throughout the supply chain. The EU, the government of Bangladesh and the BFFEA jointly decided to take action. Between 1995 and 2000, 21 Shrimp Landing and Service Centres around the major shrimp landing districts, of which twelve in Khulna division, were constructed. Each centre cost around USD100,000 and was built on 0.14 hectares of land (Alam 2011). Each centre was provided with facilities including chilling water tanks, pre-processing facilities, grading equipment, an ice tank, a weighing platform, potable water, and sanitary toilets.

The intention was that almost 80,000 farmers trained in the project would land their shrimp in those landing centres. In the centres the shrimp would be washed, iced, packed and transported to the processing plants by insulated truck. Initially the government leased out the centres to informal farm groups who would be responsible for managing it. The government charged a fee to the users and expected farmers to bring the products to the centre. However, farmers never sent their products to the centres and soon all centres were closed. In 2003, the BFFEA proposed to take over the lease and the government decided to lease out the centres to the BFFEA for a period of 10 years. Unfortunately, also BFFEA did not succeed to motivate farmers to sell their shrimp through the centres.

Alam (2011: 158) found that 'the main reason for the lack of use was that forias and farmers found them more expensive to use than private depots and did not wish to disrupt the network of trading arrangements they had built up with local private depot owners over the years.' Also Alam (idem) found that many of the centres had technical problems. The BFFEA adds to above reasons that the locations were not strategic and that these centres were only focussing on shrimp. Others argue that eventually factory owners are not interested at all to operate these centres because it does not fit their business model. Another reason could be the ambition with regard to the scale of these centres. Almost all farmers were expected to send their products to these centres; therefore the centres were mainly built on the Upazilla level. Maybe the centres were too far away from the farmers who could actually benefit from selling their shrimp through these centres.

Some of the planned supply chain innovations, such as the village super market and the BFFEA common receiving centres have partly the same design as these shrimp landing and service centres. Before investing in these innovations, it should be carefully analysed why the shrimp landing and service centres have failed to realise their potential.

6 A premium supply chain for the STDF farm groups

The supply chain model proposed in this chapter is designed based on lessons learned from initiatives of WAB and UNIDO and built further on planned initiatives of e.g. WorldFish and Solidaridad. The design and implementation of a premium supply chain model should solve problems such as traceability, food safety, quality. In addition, it should contribute to the feasibility of sustainability certification by creating a stepping stone towards an Internal Control System (ICS) that is accepted by third party certification initiatives for small holder farmers.

Figure 3 provides the basic layout of a premium model where farmer groups are linked to union level premium collection centres that are directly linked to a factory. While farmers and depots supply the product, factories provide good quality ice, collection boxes and transport. If necessary, account holders will play a role in the financial transactions between the factory and the union level collection centre. All stakeholders are responsible to maintain product quality, traceability and to prevent malpractices.

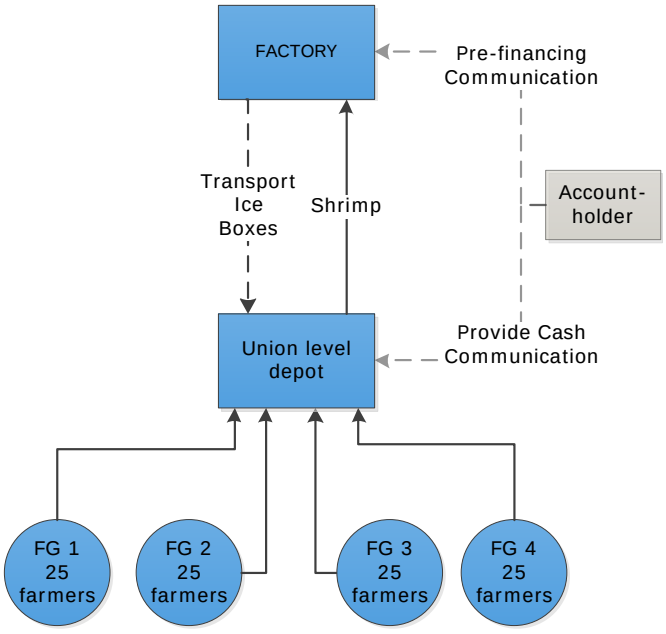


Figure 3 *Basic lay out of a premium model*

As a result of the wide diversity of supply chain dynamics across the region, it is not possible to design a one-size-fits-all blueprint of a premium supply chain model. However, basic principles that are crucial for success can be identified. The exact configuration should be fine-tuned for each individual case based on the situation of the farmer groups and the business models and mind-set of the factory owners. This chapter will discuss the crucial aspects of a premium supply chain at the various levels of the supply chain.

6.1 Basic Principles

6.1.1 Incentives for farmers

The first crucial aspect for the design of a premium supply chain is to provide the right incentives to farmers to sell their products through a premium supply chain channel.

Price fixing
For farmers, the main reason for their preference to sell through the auction is the price fixing system. A fair price based on a fair grading and weighing system is important, as well as a selling system which is transparent and observable.

To consider selling to another marketing channel, the price offered by an alternative seller should be at least equal to the prices offered at the auction. Farmers of the newly formed farm groups of the STDF project are currently not convinced that others are able to offer an equal or better price. Therefore, a crucial aspect for the STDF project needs to be to co-design the price fixing system with farmers and factories.

The price fixing system could be largely based on the system used by WAB. WAB sets the price the day prior to the first day of a new moon or full moon harvesting period (*Goan*). Farmers can decide whether they will come to the WAB depot or not. If on the first day it turns out that the offered price is too low and as a result farmers do not supply, WAB may decide to increase its price to attract more supply. If the price is too high, increasing supply, WAB may reduce its price or stop purchasing. Except when WAB suddenly needs to fill and ship a container to deliver on time to a customer, WAB will never pro-actively offer a significantly higher price (a premium) than the market price.

On top of the price setting, WAB offers the farmers a transparent procedure for electronic weighing and grading of the shrimp and provides farmers with a quick payment. Payment to farmers is normally made within two days after purchase.

For the premium depot these are the crucial aspects of a yet to be designed price fixing system: competitive price; transparent procedure; and cash payments. WAB warns that it takes a long time to really understand the local price dynamics and that it has cost them many years to be able to do it properly.

Logistics
In many cases, especially where farmers are located far away from auctions or depots, farmers sell to faria or representatives of depots who offer a good price and collect the product at the farm gate. The farmers have no hassle to send their products to auctions sites or collection centres by themselves. Hassles include the packing of the products and the transportation to the collection centre or auction.

If farmers are expected to sell to a premium supply chain channel, they should either be compensated for the additional hassle, or it should be ensured that there is no additional hassle at all. Various strategies can be used to achieve this. One option is to let representatives of the premium depot collect shrimp from the farms and bring it to the collection centres. The challenge in this strategy is to prevent these representatives from adulterating the shrimp in order to increase their income. One possible solution is to pay the representative of the depot not by kg of product but by day.

Another option is to identify a person within the farmer group who is willing to take account for the post- harvest logistics. This should be a farmer or a faria who lives among the farm group members and becomes a part time entrepreneur. This is a rather inclusive strategy as often faria are regarded as a constraint in the supply chain and most strategies aim to eliminate their role. Instead of eliminating them, these new faria could be directly linked to the collection centre as a service provider, providing them with an income and taking away the hassle from the farmers. It is crucial that these faria are selected from within the farm group community because their role should be based on reciprocal trust.

6.1.2 The conceptual design of the premium depot

Minimal supply volume

According to the BFFEA the minimal supply volume for a factory to send its truck to a depot would be around 1,000 kg. However, during peak days they expect volumes of up to 5,000 kg. According to calculations of local experts and farmers this volume could be provided by a minimal of 100 farmers (or four farm groups). Of course this depends on their production systems (polyculture vs monoculture) and pond sizes, but it is an indication. If the supply volume is less, the costs may be too high for factory owners to send their trucks.

Guaranteeing this minimal supply volume is tricky. Supply volumes depend on many factors. The German scientific manager of WAB, Jens Kahle, explains:

> 'The supply quantity to the collection centres varies, depending e.g. on the geographical situation and the day of the goan. Some collection centres supply only a few 100 kg, while others supply more than one 1,000 kg/day. This system is really very very dynamic. One day you end up with 15 t in the processing plant other days with 200 kg. There are a lot of factors influencing the supply starting with the price, moon, sun, rain ... It takes some time to understand how this is all connected.'

It is crucial to design a business model from the perspective of the depot and factory owner who that can deal with this very dynamic situation. Advantages of WAB are that they have a wide-spread network of collection centres and that they have extension workers in the field at all times which enables them to follow the local situation closely. In order to guarantee sufficient supply volume to the collection centre and to make it more feasible to use own insulated trucks for transport, it is recommended to the STDF project to link minimal four but preferably more farm groups to one collection centre and to work with only one processor for all 1,000 farmers in the STDF project.

The location of the depot: Union or village level

The location of the depot is crucial for its success. Whether the collection centre is constructed at the upazila, union or village level has large implications on the logistics required to get the products from the pond to the collection centre. While the BFFEA and WorldFish are planning to build the premium depots at the union level, WAB decided to construct their depots at the village level.

Most farmers are located a maximum of 1-2 km walking distance from the WAB premium depot. Compared to selling to faria or depot representatives there is still some hassle for the farmers (they need to collect ice and boxes at the depot before harvest and need to bring the harvest personally to the depot afterwards). However, they do not need to make additional costs for logistics. Farmers argue that if additional costs are involved, they are more likely to sell to others who purchase at their pond.

The relatively high costs of managing small depots at the village level compared to managing larger depots at the union level is compensated by the relatively lower costs for services that need to be provided to farmers for logistics. Small distances may also reduce the risk of malpractices as farmers supply their harvest directly to the depot and have no excuse to e.g. soak the product in water or ice overnight.

With the desire for vertical integration in mind, it is recommended that the premium depots for the STDF project are located within walking distance (1-2 km) for the members of at least four but preferably more farm groups. If this is not feasible the design of the supply chain model should include the recruitment of entrepreneurs (depot representatives of farm group based faria) who take account for logistics and are motivated not to use malpractices to increase their income.

Ownership

According to the BFFEA and WorldFish initiative, factory owners will construct and operate the premium depots. This is in line with the business model of WAB. If this is successful, it may be a perfect business model, resulting in a high level of vertical integration. However, its success may be

limited by two factors. First, not all exporters are interested to get involved in the depot business as it is a different type of business than the processing and export business. The purchasing process is very dynamic and requires a lot of expertise and also a lot of investment in time and money. Second, even if exporters are interested to get involved in the depot business it is doubtful whether they can be competitive in the price fixing system and at the same time maintain their own margins.

Therefore, it is crucial to find out which exporters have a long term interest to invest in the supply chain. Most likely these are exporters whose business is really focussed on shrimp and not on other sectors such as e.g. garments or hotels. It is often the relatively small business whose owners depend for their income on the profit of their processing establishment. These exporters are most likely to be willing to make long term investments in supply chain development.

Another option is to consider finding local entrepreneurs who are convinced of the business potential of a premium depot and are willing to invest and operate it. The entrepreneur has more reason to make this business work. However, the risk of malpractices is also higher. It is crucial that the depot owner and the factory owner trust each other in order to make this construction successful. A test case for this is the UNIDO pilot in Shyamnagar as discussed in the previous chapter (see page 20).

An important issue related to the ownership and management of the depot is the question of corruption. How to ensure that the depot refrains from malpractices and adulteration in order to be able to compete for the raw material and to increase personal benefits? Respondents indicate even if factories send their own staff, there is a risk for corruption as accountholders sometimes bribe quality managers to accept adulterated shrimp. Although the risk still exists in a shorter supply chain, it is expected that if the accountholder is not part anymore of the supply chain, he has no incentive to bribe the quality manager. In addition, depot staff should be paid properly to prevent them from being bribed by others to accept adulterated shrimp. This issue should be discussed closely with the involved stakeholders, especially the factory owner.

The depot as service provider

Although during the project period farmers will be motivated to sell to the premium depots by the extension workers of the STDF and other projects, after the project period they need to be motivated as well. One way to achieve this is to make the premium depot also a small service centre. This is in line with concepts such as the village super market and the WAB collection centres. Both concepts include aspects such as the provision of quality inputs (PL, lime, etc.) and the availability of extension workers. If these kind of services help farmers to improve their productivity and increase their income it is likely that they are motivated to sell their shrimp as well.

Traceability

The traceability system is a key aspect of the premium supply chain. Introducing a system like farm force can help to design an internal control system which eventually can be a first step towards certification. All stakeholders in the premium supply chain model should be invited to co-design the traceability system and to discuss how costs and benefits should be shared. Without anonymous commitment to a traceability system it is not feasible to manage it. Maintaining traceability and records could also be used as a prerequisite to be allowed to sell to a premium depot.

At the WAB depots, farmers are only allowed to supply their product by themselves, with their farmer ID. The depot staff will register the supply volumes and upload all information in an online database. This allows them to monitor which farmers supply to their depot and which volumes. In this way not only traceability is guaranteed but also WAB is enabled to adopt their supply chain management to the generated information.

6.1.3 The processor and the accountholder

BFFEA vs. individual factory owners

The main incentive for the exporters to work with premium depots is to secure a small part of supply to their factory directly. They expect that through a simplified supply chain they can prevent issues like soaking and pushing and can improve the quality of their products by reducing the time from

harvest to the factory. Although meetings have been organised about the supply chain initiative of BFFEA and WorldFish, it is not clear to what extent all the exporters are at the same page about the proposed supply chain model and it seems that various exporters have different opinions and ideas while they are now selected for the BFFEA WorldFish project. Therefore it is crucial to thoroughly understand the mind-set of the factory owner, his motivation to get involved and his willingness to invest in a premium depot.

The cash flow and the BFFEA guarantee fund

The role of the accountholder in the conventional supply chain is crucial. They are the bankers of the supply chain and without them the cash flow would dry up. Large accountholders and the large processing groups often have their own banks from which they provide themselves with credits to do their business. Accountholders also have a stake in malpractices because they can increase their profits by trading adulterated shrimps.

Ideally, in a shorter supply chain, there needs to worked with factory owners that do not depend on accountholders to make their financial transaction, but who are willing and able to purchase shrimp from the premium depot with their own financial resources. If the number of these exporters is limited another option is to identify accountholders who also own a factory and thereby actually have a double role and a big stake in doing their business without malpractices.

BFFEA has expressed the ambition in the agreement with WorldFish to set up a guarantee fund which should enable exporters to purchase raw material from their own resources without making use of the accountholder. The fund will guarantee that if the exporter cannot pay the farmer within 24 hours after purchase, the BFFEA will pay instead within 48 hours after purchase. In order to be able to manage this fund, all processors will have to pay 1 TK per kilogram of shrimp purchased from the premium depots.

For the STDF project team it is recommended to discuss with WorldFish and BFFEA to what extent STDF can link to this facility.

7 Conclusion and final recommendations

This report is an attempt to describe the very complicated situation in the shrimp and prawn supply chain in Bangladesh and to give an overview of all the ongoing, planned, and past initiatives to improve this situation. It is a result of a two week short field visit to Southwest Bangladesh. However, some loopholes and hidden facts will not have been discovered during the fieldwork or are not included in this report. Also, many of the descriptions of the supply chain and issues to be solved, and many of the provided suggestions and recommendations are not new inventions and are already in the minds of the STDF project team. Nevertheless, the report provides the STDF project team with recommendations to achieve its ambition in the short project timeframe.

The STDF project has a short implementation period and for the success and sustainability of its results it is crucial to take the following final recommendations in consideration when implementing the supply chain component. These recommendations also apply to the other supply chain initiatives of Solidaridad and WorldFish.

A premium price for organic certification
Although many argue that the WAB model should be used as a scalable model for the implementation of a wider premium supply chain, it must be taken into account that the success of the WAB model depends largely on the premium price that is received in the German market for organic shrimp. Without the premium price it is unlikely that the large network of depots, extension workers and investments in hatchery and logistics can be covered.

Without organic certification, even if farm groups become BAP or ASC certified, it is unlikely that shrimp and prawn from Bangladesh will receive a premium price. Therefore, for the STDF and other projects it is crucial to work on a premium supply chain model of which its financial feasibility does not depend on a premium price from the market but on a cost neutral redistribution of costs and margins among the actors in the premium supply chain. The model as suggested by WorldFish and BFFEA as well as the pilot implemented by UNIDO are test cases for this.

Another strategy could be to move towards organic certification. However, to make this possible to plans to support farm to increase their productivity should be adjusted to what is allowed according to the organic standard. It is unlikely that this is feasible within the STDF project period.

Not one size fits all
There is not a one size fits all premium supply chain model. The basic principles are discussed in the previous chapter, but the specifics need to be fine-tuned for each and every premium depot. From the very beginning, group discussions and multi-stakeholder meetings should be held with the potential partners per STDF region to design the most suitable configuration of the supply chain model. Without understanding the behavioural patterns of farmers, processors and other stakeholders, and without getting their commitment to consider selling through this new channel, it is unlikely that any of the supply chain initiatives will succeed.

Self-sustainability and co-creation
Have thorough discussions with the operators of the premium depots about how their business models can become sustainable, also after the project period. Here it is crucial to think about aspects such as extension services, input supplies and maybe even grocery supplies against discounted rates. During the project period the depots need to be operated commercially without financial support for its operational cost in order to force all stakeholders to make its business model sustainable.

Awareness raising among farmers around collective marketing
Most projects focus on supporting farmers to increase feasibility and do not include awareness raising about the benefits of selling through a premium supply chain. It is crucial that farmers are being made

aware of the benefits and the potential of setting up a premium supply chain. A marketing module should be included in the train-the-trainer or lead farmer programmes about collective marketing and supply chain issues.

Inclusive not exclusive

WAB was confronted with resistance from faria, depots and arots when they started to purchase directly from their own depots. Other persons were put out of business. To prevent this it is important to try to provide actors from the conventional supply chain with a role in the new supply chain. As mentioned earlier, e.g. faria could play an important role if farm groups are located farther than walking distance away from the premium depot. Including those who can add value by training and motivating them to use good practices can help to reduce resistance to innovation and change.

The selection of factory owners

For the sake of the sustainability of the project it is crucial to identify factory owners that have the financial means and willingness to get directly involved in operating a premium depot without being dependent on the financial services provided by an accountholder. Also, for the success of the project it is recommended to identify processors of which the factory is located close to the production area. If possible the STDF project should aim to work with one or maximum two factory owners who can manage the three areas of the STDF project instead of selecting one processor for each production area. This allows the project team to concentrate efforts.

Include farm groups of other projects

The supply volume to a premium depot will largely determine its success. Therefore, it is crucial to link as many farm groups as possible to a depot while at the same time locating the depot not too far away from the farm groups. As the Solidaridad, WorldFish, UNIDO and FAO projects are concentrated in the same areas it is recommended to link as many NGO farm groups in a union as possible to the same depot. This is in line with the BFFEA and WorldFish initiative where one collection centre per union will be established. It entails that if Solidaridad opens a premium depot with BFFEA in Durmuria, the STDF farm groups here should be linked to that depot, while the Solidaridad farm groups close to a potential STDF and BFFEA depot in Shyamnagar should be linked to this depot. Cooperation between the different project is crucial for the sustainability of the business model of the premium depots.

E-traceability

It is unlikely that the STDF team will manage to implement an e-traceability system within the short project period. However, if it is the ambition, it is crucial to join efforts with WorldFish and Solidaridad to introduce one e-traceability system for all the premium depots. Solidaridad, WorldFish and STDF may consider to implement one joint pilot to test the practical and financial feasibility. This will contribute to the goals of all projects and at the same time reduce the financial risks. Solidaridad is already in a scoping phase and could be the lead in such a pilot project.

Appendix 1 Overview of available literature

This overview is not all-inclusive but highlights the most recent and relevant value-chain studies of the shrimp and prawn sector in Bangladesh.

Ahsan, Md. N., 2013. *Development of a Framework for Simplification of Shrimp Supply Chain in Bangladesh.* UNIDO, Dhaka.

Alam, N.S.M., 2011. *EU regulatory governance and the management of quality in the Bangladesh shrimp supply chain.* Curtin University of Technology, Curtin.

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Haque, M.M., M.A. Wahab, D.C. Little and F.J. Murray, 2012. *Development trends and sustainability issues of four commercially important farmed seafood trade in Bangladesh*. Deliverable 2.1. Bangladesh Scoping Report SEAT.

Innovision, 2013. *Value chain analyses shrimp, prawn and tilapia from the Southern region of Bangladesh and feasibility analyses brackish water seabass in the southern region in Bangladesh*. Worldfish, Dhaka.

Kelling, I., K. Sau Jespersen, S. Ponte and F. Kruijssen, 2013. *Upgrading in selected value chains for aquaculture products.* Deliverable report 5.9 of the Sustaining Ethical Aquaculture Trade (SEAT) project.

Van der Pijl, W. and A.P. van Duijn, 2012. *The Bangladesh Seafood Sector: A Value Chain Analysis*. The Hague: CBI.

WorldFish, 2012. *Hub Scoping for Aquatic Agricultural Systems Programme (Activity 2.2).* Field Scoping Report of Khulna, Satkhira, and Bagerhat.

Appendix 2 Field activities

11-2-2014	Morning	• STDF group Durmuria (group discussion) • AIN group Durmuria (group discussion)
	Afternoon	• Bulus Market Durmuria (observations and informal meetings) • Mosotofa fish arot Khulna (observations and informal meetings)
12-2-2014	Morning	• Meeting with Dr. Nazmul Khulna University at WFC office • Meeting with Mr. Kobir at BFFEA office Khulna
	Afternoon	• Visit Faltita market • Interview with AIN partner depot at Faltita market • Interview with A/C holder/ depot in Khulna • Visit Asia Sea Food Limited
13-2-2014	Morning	• Meeting with Solidaridad, WFC and FAO • Visit STDF farmer group Durmuria (group discussion) • Short interview Faria Durmuria
	Afternoon	• Work on report
14-2-2014	Morning	• No programme
	Afternoon	• Work on report
15-2-2014	Morning	• BFFEA meeting on malpractices and adulteration
	Afternoon	• Meeting with Khulna district Fisheries officer • Visit Yassien Arot • Visit other arrot
16-2-2014	Morning	• Breakfast meeting with mr. KhalilUllah BFFEA • PL dealers meeting in Sathkira
	Afternoon	• Meeting with WAB Deputy Executive Director • Visit WAB/WFC collection centre and farmer group Sathkira • Meeting with COP FtF Erik Keus
17-2-2014	Morning	• Meeting with UNIDO BEST BQF Team Khulna
	Afternoon	• Visit STDF farmer group Durmuria
18-2-2014	Morning	• FIQC Khulna • New Factory owner interview
	Afternoon	• Prepare presentation debriefing
19-2-2014	Morning	• Travel to Dhaka
	Afternoon	• Prepare presentation debriefing • Debriefing at FAO, WFC, and DoF

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