5. Case Study: Vietnamese Frozen Pangasius and Shrimp Exports

5.1 Introduction

With market liberalisation in 1990, Viet Nam expanded its export volumes and was ranked as the fourth largest exporter of seafood in the world in 2010 (FAO, 2012). Viet Nam exports to as many as 153 countries, including very high-end markets in developed countries. Among Viet Nam's seafood exports, *pangasius* and shrimp play important roles. Yet, in recent years, some seafood exports from Viet Nam have faced difficulties meeting the regulations of importing countries.

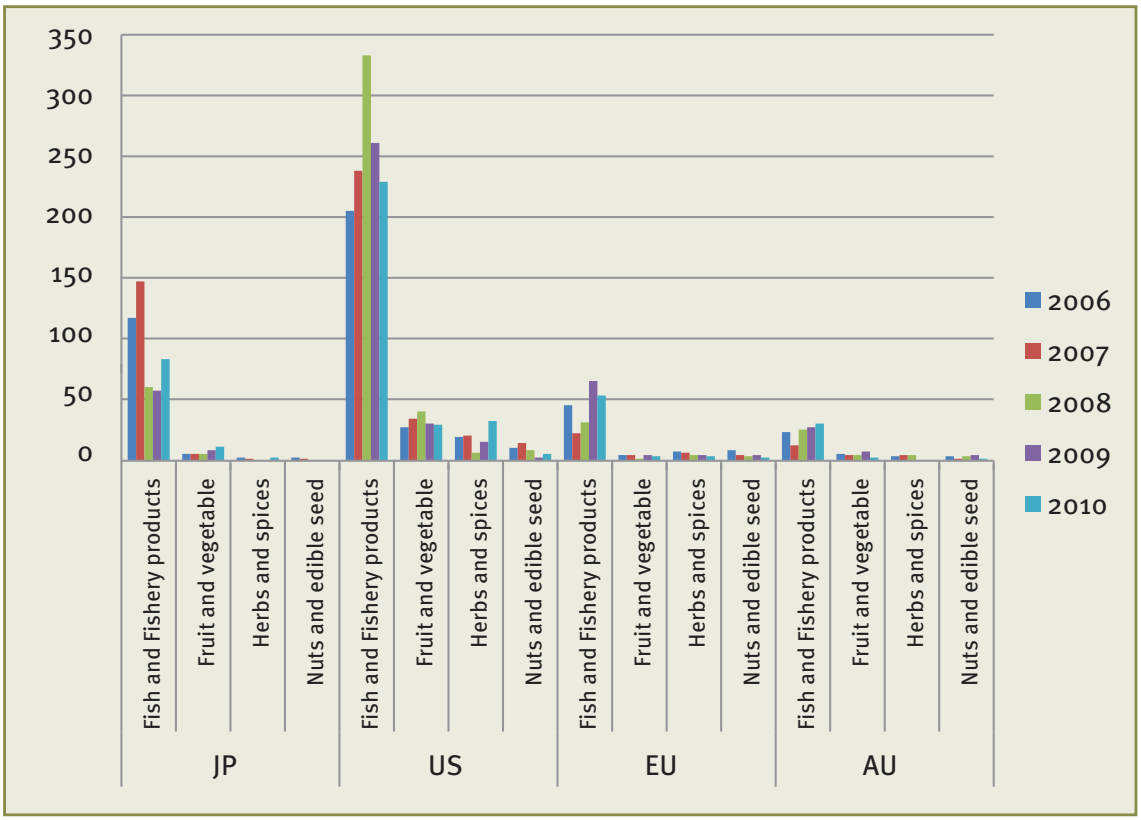
At Japanese ports, Viet Nam seafood imports have been the major target of intensive inspection in recent years. In May 2012, one shipment of Vietnamese shrimp to a Japanese port was found to contain ethoxyquin and this triggered more scrutiny of shrimp imports from Viet Nam by Japanese authorities. This incident was preceded by detections of trifluralin in 2010 and enrofloxacin in 2011. Both are banned substances in shrimp according to Japanese regulations. Shrimp exporters interviewed

Table 5.1: Rejections of Vietnamese agri-food exports at major markets

Market	Viet Nam's Rank	Cases	Period
Japan	1	563	2006–2010
United States	6	3,443	2002–2010
EU	9	613	2002–2010
Australia	10	418	2003–2010

Source: UNIDO dataset and analysis, based on EU RASFF, US OASIS, AQIS, and Japanese MHLW data

Figure 5.1: Number of rejections by major agriculture commodity group for Vietnamese products exported to four markets, 2006–2010



Source: UNIDO dataset and analysis, based on EU RASFF, US OASIS, AQIS, and Japanese MHLW data

for this case study are expressing great concern over this issue and mentioned that many exporters are now refraining from exporting to Japan for fear of being rejected once again. This could jeopardise future export growth in shrimp.

The detection of ethoxyquin in shrimp was a result of improper use of feeds. That is, the shrimp feed contained this substance for which Japanese authorities have rather strict limits. The detection of ethoxyquin points to a potential problem in the supply chain management of shrimp, especially at the early stage of shrimp culture. For the grown shrimp to pass inspection, the entire growth process needs to be well managed to avoid introduction of any banned or problematic substances. At the very least, these detections at the Japanese border suggest that Vietnamese shrimp growers may have some problems at the early stage of shrimp culture. This type of problem may not be limited to Vietnamese exports to Japan but may also apply to other important markets such as the EU and the United States. Improper management of feeds in the shrimp industry is also indicative of similar kinds of problems for other aquaculture products.

The data provided by the EU, United States, Australian and Japanese authorities all point to relatively high incidents of rejections of Vietnamese agri-food products (see Table 5.1). In these four markets, Viet Nam figures prominently among countries with large numbers of rejections during the periods concerned.

Among various agriculture commodities, fish and fishery products from Viet Nam seem to face rather high rejection rates when looking at the overall number of rejections (see Figure 5.1) and even when scaled by US$ million imports on average (see Table 5.2). In the Japanese market, Viet Nam ranks top in average rejection rates in fish and fishery products. In the EU, Viet Nam ranks 9th.

***Table 5.2:** Average rejections of fish and fishery product imports from Viet Nam (per US$ million imports)*

Market	Average Rejections (per US$ million imports)	Period
Japan	0.13	2006–2010
United States	0.37	2002–2010
EU	0.15	2002–2010
Australia	0.20	2003–2010

Source: UNIDO dataset and analysis, based on EU RASFF, US OASIS, AQIS, and Japanese MHLW data

A closer look at the reasons for rejections across these four markets reveals that fish and fishery imports from Viet Nam are rejected for various reasons. In the Japanese market, veterinary drugs residues and bacterial contamination seem to be major problems (see Table 5.3). In the EU market, veterinary drug residues, bacterial contamination, and heavy metals seem to be the problem. In the United States market, hygienic conditions, bacterial contamination, and labelling seem to pose difficulties for imports from Viet Nam. In the Australian market, the problem arises from bacterial contamination, labelling and veterinary drug residues.

Depending on the market, the problems faced by Vietnamese exports differ slightly. This may reflect several different factors such as different border enforcement regimes for specific issues, differences in the composition of Viet Nam's export basket to different markets, and the inability of exporters to meet the regulations in all markets, and so on. However, the numbers in Table 5.3 tell us that various weak links exist in the supply chain of agriculture products from Viet Nam. In the upstream supply chain, contaminations of various kinds (veterinary drugs and pesticide residues and bacterial and other contaminants) are not well controlled. In some cases, detections of heavy metals (possibly because of water pollution) also suggest that production is not well controlled or tested. Problems with hygienic conditions may be present throughout the supply chain. In the United States and Australian markets, issues surrounding labelling, which would occur close to the end of the supply chain, seem to cause many problems. Thus, various problems may exist throughout the Vietnamese supply chain for fish and fishery products.

Considering that these import rejection data are only a small fraction of the total rejections that happen along the value chain, the total amount of seafood products that do not meet international standards seem to be quite high.

What is unclear is why this is the case. With 37 years of export experience, Viet Nam is no longer an amateur in this field. Import rejections are costly, not only because of the actual costs of unsold products and shipment back to the exporting country, but also because it hurts the reputation of the country as an exporter. With increasing global competition and high standards, maintaining a good reputation is critical to attract consumer demand. Why have Vietnamese exporters not been able to reduce the rate of rejections? What are the bottlenecks? Along the fish and fishery products value chain, various stakeholders are operating, from raising fish seed to processing fish at the factory for export. What are the measures taken at each stage to comply with the required standards? What should be done to improve the situation and who should be responsible?

Another unclear aspect is that with increasingly stringent international standards and a growing number of certifications, who is hurt the most along the value chain? Complying with standards requires improvement in quality management systems. Who is to bear those costs? What are the effects on various stakeholders along the value chain? Are there differences in the effects of these impacts depending on the product or characteristics of the value chain?

This chapter examines these questions in detail for the frozen seafood export sector in Viet Nam. Viet Nam was chosen as a case study because of its fast-growing and changing economy and the fact that it has a high rate of import rejections. In particular we pick up two sectors, the shrimp and *pangasius* (catfish) export industries, since these are the major exported products, dominating 39.8 per cent and 30.1 per cent of Viet Nam's seafood export value in 2011 respectively (VASEP, 2011). In addition, since these industries largely rely on aquaculture, quality management is more important than with wild fishing. Although it is a specific case, the process of analysing this sector is generally applicable to same sectors in other countries.

Table 5.3: Reasons for import rejections of Vietnamese fish and fishery products in selected markets

	Japan	EU	United States	Australia
Bacterial contamination	145	127	961	121
Other contaminants	1	24	209	13
Additives	32	33	120	0
Pesticide residues	50	4	0	-
Adulteration/missing document	0	7	103	2
Hygienic condition/controls	23	20	981	1
Mycotoxins	7	0	-	0
Packaging	2	2	0	-
Veterinary drug residues	297	172	170	44
Labelling	0	2	349	77
Heavy metals	0	61	0	7
Others	6	6	21	1
Other microbiological contaminants	0	26	-	-
Total	563	484	2,914	266

Source: UNIDO dataset and analysis, based on EU RASFF, US OASIS, AQIS, and Japanese MHLW data

The next section describes the brief history of and current trends in these industries. The third and fourth sections explain the value chain structures and production processes for the *pangasius* and shrimp sectors. Section five discusses what quality and safety requirements are set by importing countries and section six discusses the major compliance challenges for exports from Viet Nam. Conclusions and policy recommendations follow.

5.2 History and current trends

5.2.1 Overview of the seafood sector in Viet Nam

Viet Nam has 3,260 km of coastline and more than 3,000 islands with an area of inland and territorial waters of 226,000km^2 and an area of 1 million km^2 of Exclusive Economic Zone, providing favourable natural conditions for the development of the aquaculture sector. There is a long history and tradition in Asia in general and Viet Nam in particular of growing rice and fish together on the same plot of land or on adjacent plots. In Viet Nam, there is a traditional saying that "rice and fish are like mother and children".

In fact, the aquaculture sector has been considered one of the priority sectors for agricultural diversification, economic development, and poverty reduction in Viet Nam. The seafood production value in 2010 accounted for more than 35 per cent of the total production value of the entire agriculture, forestry and fisheries sector – a large increase from around 16 per cent in 2002. This sector contributed more than 7 per cent of the GDP in 2010[29], generates incomes through exports, and creates jobs for about three million people, which is about one twenty-fifth of the total population of Viet Nam (Tung, Thanh and Phillips, 2004).

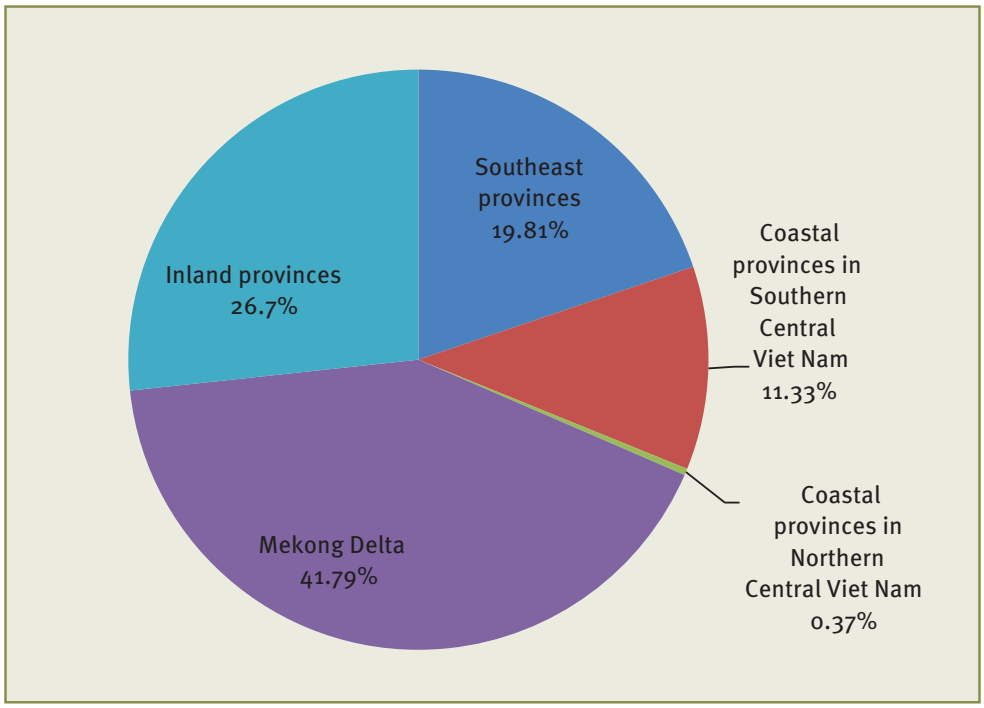
The Mekong River delta, which is a flat wide plain located in southern Viet Nam, is the main aquaculture production area. The delta lies along the last part of the lower section of the Mekong River, which is the world's second richest river basin in terms of biodiversity. Before pouring into the East Sea, the Mekong River reaches the delta through nine estuaries and a dense canal network. The river's unique interaction with Tonle Sap Lake in Cambodia provides young fish to the delta downstream. According to Baran, Starr and Kura (2007), the Tonle Sap Lake has 23 fish species whose annual migrations are triggered by changes in water levels. Every year, this region is flooded, bringing new organic matter from upstream. This area contributed more than 41 per cent to the total export value of seafood products in the whole country in 2011 (see Figure 5.2).

Three stages of development

There were three major periods in the development of the aquaculture sector in Viet Nam. During the first period from 1957 to 1980, there were few state-owned processing companies in the industry. The first one was Halong Canned Seafood, which was established in 1957 in northern Viet Nam. Later on during this period, ten more processing companies were set up in southern Viet Nam. In 1978, the Sea Product Import-Export Corporation (SEAPRODEX) was established and became the largest state-owned seafood processing and exporting company in Viet Nam. The second period from 1980 to 1990 saw the establishment of more than 100 state-owned sea food processing companies belonging to SEAPRODEX all over the country. The third period is

29 This was calculated by the author using data from the General Statistics Office of Viet Nam, www.gso.gov.vn/default_en.aspx (accessed July 2012).

Figure 5.2: Seafood exports from different regions of Viet Nam in 2011



Source: VASEP (2011)

Table 5.4: World seafood producers (in million tons)

Countries	2000	2002	2004	2006	2008	2010
China	21.52	24.14	26.57	29.86	32.73	36.73
India	1.94	2.19	2.80	3.18	3.85	4.65
Viet Nam	0.50	0.70	1.20	1.66	2.46	2.67
Indonesia	0.79	0.91	1.05	1.29	1.69	2.30
Thailand	0.74	0.95	1.26	1.35	1.33	1.29
Bangladesh	0.66	0.79	0.91	0.89	1.00	1.31
World Total	32.42	36.78	41.90	47.28	52.93	59.87

Source: FAO (2011) and FAO (2012)

Table 5.5: Water surface area for seafood production in Viet Nam (in thousand hectares)

	2000	2002	2004	2006	2008	2010
TOTAL	641.9	797.7	920.1	976.5	1052.6	1066.0
Area of sea and brackish water	397.1	556.1	642.3	683.0	713.8	728.5
Area for fish	50.0	14.3	11.2	17.2	21.6	26.5
Area for shrimp	324.1	509.6	598.0	612.1	629.2	645.0
Area for mixed and other aquatic products	22.5	31.9	32.7	53.4	62.7	57.0
Area for breeding	0.5	0.3	0.4	0.3	0.3	0.0
Area of fresh water	244.8	241.6	277.8	293.5	338.8	337.5
Area for fish	225.4	232.3	267.4	283.8	326.0	324.5
Area for shrimp	16.4	6.6	6.4	4.6	6.9	7.0
Area for mixed and other aquatic products	2.2	0.4	1.1	1.7	2.2	2.3
Area for breeding	0.8	2.3	2.9	3.4	3.7	3.7

Source: General Statistics Office, www.gso.gov.vn/default_en.aspx (accessed July 2012)

Figure 5.3: Total capacity of Vietnamese offshore fishing vessels (thousand CV)

Note: CV is cheval vapeur, i.e., horsepower.

Source: General Statistics Office, www.gso.gov.vn/default_en.aspx (accessed July 2012)

Figure 5.4: Export value of Vietnamese fishery products (US$ million)

Source: General Statistics Office, www.gso.gov.vn/default_en.aspx (accessed July 2012)

Table 5.6: Major export products of Viet Nam

	Unit	2006	2007	2008	2009	2010
Crude oil	Thous. tons	16,442.0	15,062.0	13,752.3	13,373.0	7,977.0
Electronic parts, computers and their parts	US$ million	1,807.8	2,165.2	2,640.3	2,763.0	3,590.2
Articles of plastic	US$ million	452.3	709.5	933.7	867.4	1,049.3
Electrical wire and cable	US$ million	705.7	882.3	1,009.0	891.8	1,311.1
Footwear	US$ million	3,595.9	3,999.5	4,769.9	4,071.3	5,122.3
Textiles, sewing products	US$ million	5,854.8	7,732.0	9,120.5	9,065.6	11,209.7
Fine art products	US$ million	119.5	217.8	385.5	1,296.2	...
Coffee	Thous. tons	980.9	1,232.1	1,060.9	1,183.0	1,218.0
Rice	Thous. tons	4,642.0	4,580.0	4,744.9	5,969.0	6,886.0
Wood and wooden products	US$ million	1,943.1	2,384.6	2,767.2	2,989.3	3,435.6
Fishery products	US$ million	3,358.0	3,763.4	4,510.1	4,255.3	5,016.3
Of which:						
Frozen shrimps	US$ million	1,262.8	1,387.6	1,315.6	1,293.3	...
Frozen fish	US$ million	1,083.4	1,379.1	1,968.7	1,766.9	...
Frozen cuttlefish	US$ million	92.5	60.8	64.8	82.7	...

Source: General Statistics Office,* www.gso.gov.vn/default_en.aspx (accessed July 2012*)

from 1990 up to now. Economic reform policies (*Doi Moi)* started in 1986 and became effective in the 1990s, creating favourable conditions for the production and export of aquaculture products.[30] Reforms included trade liberalisation, provision of transferable land use rights, and encouragement of the private sector including household enterprises. In this period, the number of seafood processing and exporting enterprises has increased considerably. These private enterprises have been competing with and replacing the state-owned enterprises in processing and exporting aquaculture products.

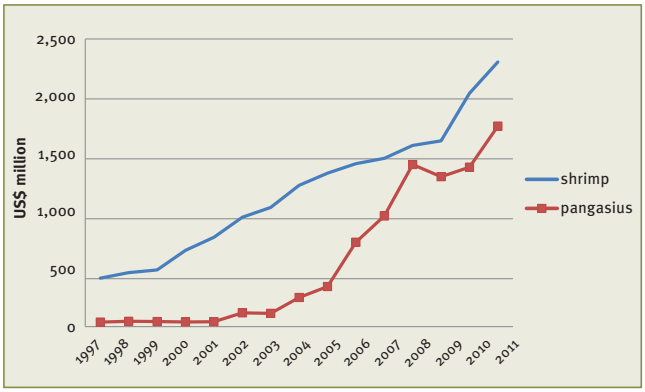
30 *Doi Moi* (reform policy) was officially enacted by the Sixth Party Congress in December 1986 when Viet Nam faced an economic crisis and needed policy reforms aimed at reducing macroeconomic instability and accelerating economic growth. The Sixth Party Congress started replacing the centrally planned economy with a system of bureaucratic centralised management based on state subsidies, and moving towards a market-oriented economy with the encouragement of the private sector. More details can be found in Kien and Heo (2008).

Growth in production and exports

Since then the aquaculture sector has had remarkable success in both production and export. In the world of seafood production, Viet Nam ranks third, after China and India (see Table 5.4). There has been a substantial growth in aquaculture production in Viet Nam. In 1997, the seafood production was only 40,000 tons, which is less than one tenth of that in 2000. In 2010, the production was more than five times that of 2000.

Such increases in production were possible because Viet Nam has a growing domestic resource base and only imports a limited amount of inputs for its aquatic production. In 2010, Viet Nam had to import only around 150 tons of seafood, which accounted for 5.6 per cent of its total production output (VASEP, 2011). Between 2000 and 2010, the area for seafood production increased constantly (see Table 5.5).

Figure 5.5: Export value of shrimp and pangasius (1997–2011)



Source: VASEP (2009, 2011)

Also contributing to the expansion of the production base has been a significant increase in the capacity of offshore fishing vessels in Viet Nam during the last ten years (see Figure 5.3).

The increase in production led to a remarkable increase in export value of Vietnamese aquatic products (see Figure 5.4). Despite a slight decrease in the value of aquatic exports in 2009 due to the global financial crisis, the export value reached a new record in 2010 at more than US$5 billion.

In recent years, fishery products have become one of the major export items of Viet Nam (see Table 5.6), accounting for more than 7 per cent of the total export value of Viet Nam in 2009.[31]

31 This was calculated by the author using data from the General Statistics Office of Viet Nam, www.gso.gov.vn/default_en.aspx (accessed July 2012).

Table 5.7: Top ten exporters of seafood products

Countries	2000		2010	
	Export value (US$ million)	World export market share	Export value (US$ million)	World export market share
China	3,603	6.5%	13,268	4.3%
Norway	3,533	6.3%	8,817	2.9%
Thailand	4,367	7.8%	7,128	2.3%
Viet Nam	1,481	2.7%	5,109	1.7%
United States	3,055	5.5%	4,661	1.5%
Denmark	2,756	4.9%	4,147	1.3%
Canada	2,818	5.1%	3,843	1.2%
Netherlands	1,344	2.4%	3,558	1.2%
Spain	1,597	2.9%	3,396	1.1%
Chile	1,794	3.2%	3,394	1.1%
World Total	55,750		308,562	

Source: FAO (2012)

Table 5.8: Ten leading importers of Vietnamese aquatic products (US$ million)

Rank	Importers	Jan–Mar 2012	Compared to the same period of 2011 (%)
1	EU	260.4	-7.9
2	United States	253.9	+18.7
3	Japan	228.6	+34.1
4	Republic of Korea	109.2	+24.1
5	China and Hong Kong	82.8	+24.7
6	ASEAN	69.9	+17.4
7	Mexico	35.9	+19.2
8	Canada	31.4	+6.6
9	Australia	36.9	+42.3
10	Russian Federation	22.6	-9.0
	Others	192.3	+22.3

Source: VASEP (2012a)

Table 5.9: Three Vietnamese aquatic products with the largest export values in 2008

Destination markets	Largest	Second largest	Third largest
EU	*Pangasius*	Frozen shrimps	Cephalopods
United States	Frozen shrimps	*Pangasius*	Tuna
Japan	Frozen shrimps	Cephalopods	Other saltwater fish
Republic of Korea	Frozen shrimps	Cephalopods	Other saltwater fish
China and Hong Kong	Frozen shrimps	*Pangasius*	Dried saltwater fish
ASEAN	*Pangasius*	Frozen shrimps	Dried saltwater fish

Source: VASEP (2009)

Out of the total export value of fishery products, frozen shrimp and frozen fish accounted for nearly 72 per cent in 2009, indicating that shrimp and fish, of which *pangasius* is the most important product, are two important export products in the aquaculture sector of Viet Nam. In fact, there has been a remarkable increase in the export value and export volume of *pangasius* and export value of shrimp in recent years (see Figure 5.5).

As a result, Viet Nam is now among the top ten exporters of fish and fishery products and has moved up quickly in the ranking from the ninth rank in 2000 to the fourth in 2010 (see Table 5.7). In 2010, Viet Nam was only outranked by China, Norway, and Thailand in exporting fish and fishery products.

Major destinations

The increase in production was also in parallel with great diversification of export markets. Export markets have been expanded to more than 150 countries worldwide including major markets such as the EU (in particular Germany, Spain, Italy and The Netherlands), the United States, China, ASEAN countries, Russian Federation, and Australia in 2011 (see Table 5.8). Before 2000, Japan had been the largest market. The United States has become a more important market, especially since the Viet Nam–United States Bilateral Agreement came into force in 2001. In 2002, Viet Nam ranked second after Thailand in exporting shrimps to the United States.

In the major markets for Vietnamese aquatic products including the EU, the United States, Japan, Republic of Korea, and China and Hong Kong (China), Viet Nam exports mainly shrimps and *pangasius* (see Table 5.9)

Regarding the two most important aquatic export products, major countries that were importing shrimps from Viet Nam in the first quarter of 2012 were Japan, the United States, the EU, China and Hong Kong (China), Republic of Korea, Australia, and Canada (VASEP, 2012a). Major countries that were importing Vietnamese *pangasius* in the first nine months of 2011 were the EU, the United States, Mexico, Brazil, Russian Federation, Australia and Saudi Arabia (see Table 5.10).

The United States used to be the largest importer of Vietnamese *pangasius*. However, since the application of anti-dumping tariffs by the United States, the share of *pangasius* exported to this market in terms of the total exported *pangasius* products has declined substantially, leading to the increasing importance of other markets such as the EU and Russian Federation (see Figure 5.6 and Box 5.1).

Current challenges

Despite fast expansion in the past and effective and encouraging government policies, the seafood sector is facing three major bottlenecks: dwindling resources; quality and safety issues; and difficulty in expanding export markets (VASEP, 2011). These bottlenecks have various causes:

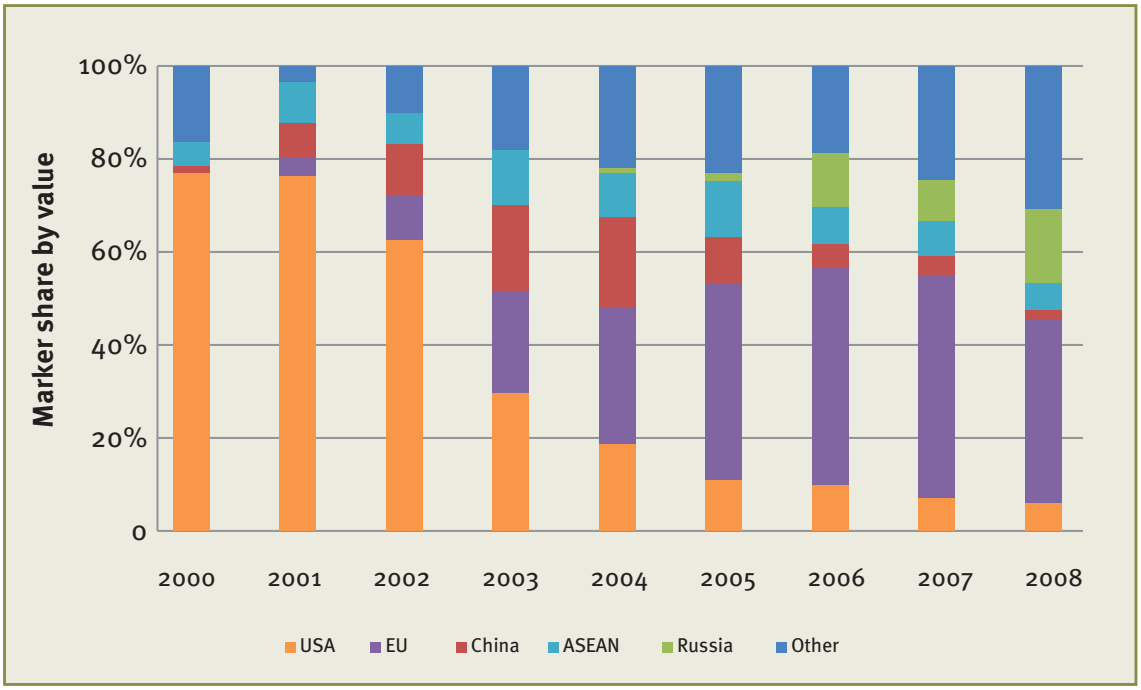
- Marine fish stock has been reduced because the coastal area has been overfished with unsustainable fishing methods for many years;
- Fishing has become more difficult because of instability in weather conditions and rising fuel prices, labour, capital and other costs;

Table 5.10: Share of import markets for Vietnamese pangasius (%)

Destination Markets	Share
EU	30%
United States	16%
Mexico	5%
Australia	3%
Saudi Arabia	3%
Russian Federation	3%
Brazil	3%
Ukraine	2%
UAE	2%
Singapore	2%
Hong Kong, China	2%
Colombia	2%
Canada	2%
Egypt	2%
The Philippines	1%
Others	20%

Source: VASEP (2011)

Figure 5.6: Destinations for Vietnamese pangasius exports



Source: Khiem et al. (2010: 15)

- The quality of broodstock has been downgraded because selection has not been managed appropriately;
- Prices of imported feed and other inputs keep increasing over time;
- Disease outbreaks have been more frequent and serious;
- Inappropriate usage of chemicals, antibiotics, and pesticides;
- Planning of aquaculture production has not been appropriate;
- Farmers and processors lack management knowledge, information, capital and technology, deterring them from expanding their business and improving the quality of their products;
- Fish prices in the international market have been fluctuating wildly;
- Various trade barriers, especially non-tariff barriers such as anti-dumping measures (see later sections for details), have been set up in many countries that import Vietnamese aquaculture products; and
- More complicated quality and safety standards have been increasingly applied in developed countries.

5.2.2 History of and trends in the *pangasius* industry

Production of *pangasius* dates back more than 50 years and takes place only in the Mekong River delta, which is the main area of freshwater fish production in Viet Nam. The *pangasius* in Viet Nam belong to genus *Pangasius*, which includes *Pangasius hypothalmus*, *Pangasius bocourti*, and several other species that are called "catfish" in English (Phillips, 2002). *Pangasius* is mainly grown in freshwater provinces of the Mekong River delta including An Giang, Dong Thap, Can Tho and Vinh Long. Before 1975, *pangasius* used to be domestically consumed and exported to markets such as Hong Kong (China), Singapore and Taiwan Province of China. It started to be exported to Australia in the mid-1980s and to the United States and Europe in the mid-1990s.

Viet Nam is the world largest producer of pangasius, which is low-priced freshwater fish. There are two *pangasius* species in commercial aquaculture in the Mekong River delta: *Pangasius bocourti* (*Basa* in Vietnamese), and *Pangasius hypophthalmus* (*Tra* in Vietnamese) (hereinafter called *pangasius*). These two *pangasius* species originated from the former, farmed in cages in this region a few decades ago. Compared with *Pangasius hypophthalmus*, *Pangasius bocourti* has a longer production cycle, which is eight months compared to six months for *Pangasius hypophthalmus*, requires better water quality, and has a lower dress-out weight, which is the amount of fish required to produce one kilo of fillet. Despite the fact that *Pangasius hypophthalmus* is of lower quality, it has gradually replaced *Pangasius bocourti* and accounts for 95 per cent of *pangasius* production. While *Pangasius hypophthalmus* has increasingly been exported, *Pangasius bocourti* is mainly for the local market. In 2002, only 72 per cent of *Pangasius hypophthalmus* was exported (Young and Son, 2002). In 2007, that percentage had increased to 90 per cent (VASEP, 2009).

In 2011, there were more than 230 *pangasius* exporters in Viet Nam. Vietnamese *pangasius* was exported to more than 130 countries with an export volume of 600,000 tons and an export value of US$1.8 billion. The major exported product was frozen *pangasius* fillets (VASEP, 2011).

5.2.3 History of and trends in the shrimp industry

Shrimp growing has a longer history than *pangasius* and dates back about 100 years. In fact, brackish water aquaculture in both southern and northern Viet Nam is dominated by shrimp farming. The Mekong River delta is the most important region for cultivating aquaculture products in general and shrimp in particular. According to Le (2012), Black Tiger prawn is the major aquaculture product in Viet Nam with a cultivation area of 570,000 hectares covering 94 per cent of the total brackish and marine culture area. In Viet Nam, the Mekong River delta is the most important area, accounting for around 80 per cent of the farming area and the same percentage of production of Black Tiger prawn. The Whiteleg shrimp, *Penaeus vannamei*, was only introduced in 2000.

The expansion of shrimp production really took off only after the 1990s due to advancements in technology allowing the production of artificial shrimp seed, and the opening of the Vietnamese economy to international trade following the *Doi Moi* policy implemented in 1986. The government policy that allows the conversion of rice fields and salt pans into shrimp ponds was considered one of the important factors contributing to the development of this industry.

Shrimp products for exports include block frozen shrimps, canned shrimps and processed shrimps. Of these, block frozen shrimps account for the largest proportion of total export value. Processed shrimps are, however, gradually expected to overtake traditional frozen shrimps in the future. Apart from being exported, shrimps are sold in the domestic markets. Big cities in Viet Nam are destinations for fresh and boiled shrimps.

In 2011, the export value of Vietnamese shrimps reached a new record of US$2.4 billion. Of these, which Black Tiger shrimps accounted for 59.7 per cent and Whiteleg shrimps accounted for 29.3 per cent of the total export value of aquaculture products. Vietnamese shrimps were exported to more than 91 countries (VASEP, 2011).

Box 5.1: Cases of international dispute over Vietnamese *pangasius* and shrimps

As a milestone in the course of its development, the *pangasius* industry in Viet Nam was the subject of an anti-dumping case in the United States market in 2003. Viet Nam started exporting *pangasius* to the United States in 1996 and its market share in 2002 was 12 per cent. Vietnamese *pangasius* was famous in the United States market for its quality, taste and especially low price, which was only 50 per cent of United States catfish. Because of competition from the Vietnamese *pangasius*, the price of the United States catfish dropped remarkably: the price of whole Ictalurus fish fell from US$1.65 to US$1.25/kg, and for Ictalurus fillet from US$4.5 to US$3.8/kg (Tung, Thanh and Phillips, 2004).

The continuous drop in price initiated aggressive actions from United States domestic producers. They first attacked Vietnamese *pangasius* on environmental and sanitary grounds. In 2001, the Catfish Farmers of America (CFA), comprising producers and agribusinesses in six southern states, lobbied for a ban on imports of catfish from Viet Nam, alleging that Vietnamese catfish was grown in unhygienic conditions in the Mekong River. After investigating the situation in the Mekong River delta, the United States Embassy in Viet Nam, however, rejected this claim.

The second attack on Vietnamese *pangasius* was on the name "catfish". A group of lawmakers in the United States claimed that Vietnamese *pangasius* cannot be scientifically called "catfish" and should not be sold under the label of "catfish" in the United States market. Vietnamese enterprises had to label their *pangasius* as "Basa fish" and "Tra fish" to sell to the United States market. In spite of this change, exports of Vietnamese *pangasius* to the United States market continued to increase because it was already very popular among United States consumers.

The United States producers did not stop. In 2002, when the market share of Vietnamese *pangasius* was up to 12 per cent in the United States, the CFA and eight catfish processors alleged that the Vietnamese frozen fish fillets were sold in the United States at below the cost of production. The petition was submitted to the United States International Trade Commission (USITC) and the Viet Nam Association of Seafood Exporters and Producers (VASEP), which represented 56 Vietnamese seafood processors, was called to be the defendant and submit their arguments for consideration. A USITC delegation travelled to Viet Nam to investigate the situation and finally concluded that Vietnamese *pangasius* was sold at less than a fair price in the United States market. The case led to the imposition of import tariffs of 37–64 per cent in the United States, which at that time absorbed 75 per cent of all *pangasius* exports from Viet Nam (Brambilla, Porto and Tarozzi, 2007). Shortly afterwards, Viet Nam *pangasius* exports to the United States declined by 50 per cent with an estimated loss of about US$24 million. The farmgate price of *pangasius* was reduced by half, leading to farmer bankruptcies and great loss of employment (Tung, Thanh and Phillips 2004).

As a result, processing companies and exporters in Viet Nam had to diversify their export markets to Europe, Canada, Australia and, later, to more than 50 other countries, leading to a substantial growth in the *pangasius* industry. By late 2003 and in 2004, the price of *pangasius* had recovered to its level before the case. Farmers reinvested in new cages and ponds and new processors emerged. The *pangasius* industry in Viet Nam has emerged as a remarkably fast-growing aquaculture sector due to the diversification of its export markets following the 2003 United States anti-dumping case.

Right after this anti-dumping case against *pangasius*, Viet Nam was faced with a new anti-dumping threat in 2003 against shrimp products. In December 2003, the Ad Hoc Shrimp Trade Action Committee (ASTAC), which is an association of shrimp farmers in eight southern states of the United States, filed an anti-dumping petition against six countries – Brazil, China, Ec-

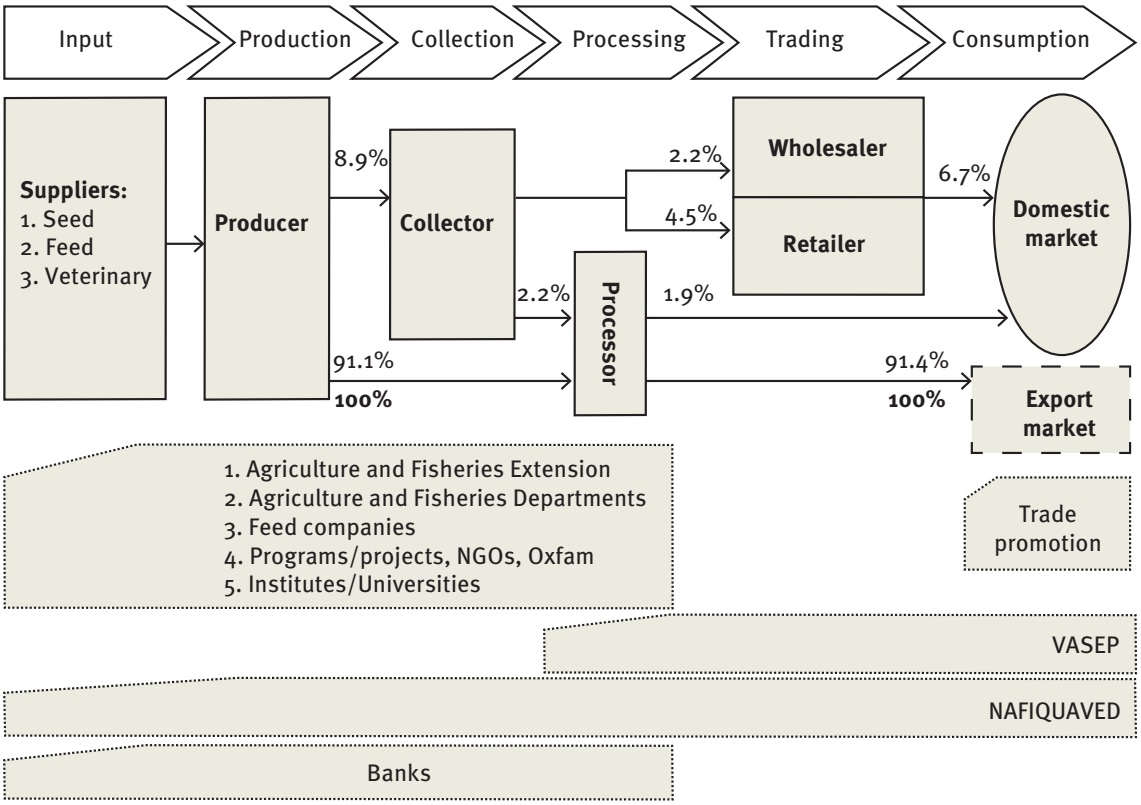
uador, India, Thailand and Viet Nam. The petition alleged that these six countries had dumped their shrimps in the United States market. In January 2004, the United States Department of Commerce (DOC) announced anti-dumping investigations against the six countries. Unlike the anti-dumping *pangasius* case, this time VASEP and Vietnamese producers had anticipated the case and had time to prepare by having monitored the preparations of the American shrimp producers, analyzed the United States shrimp market and trends in shrimp imports to the United States, and connected with international trade law firms. Nevertheless, Viet Nam could not succeed. In July 2004, the USITC decided that there was a reasonable indication that the United States industry was materially injured or threatened with injury due to the import of certain shrimp products from the countries concerned. The proposed tariffs were 12–93 per cent on Vietnamese shrimp products. As a result, the Vietnamese producers diversified their export markets to other countries. According to Viet Nam's General Statistics Office (GSO) (2012),[32] Japan became the largest market for Vietnamese exported shrimps. In 2009, Japan imported around 40,000 tons of frozen shrimps, valued at more than US$360 million and accounting for about 20 per cent of the Japanese frozen shrimp market. In 2010, the United States was the second largest importer of Vietnamese frozen shrimps. The United States and Japan imported 28 per cent and 27 per cent of Vietnamese exported frozen shrimps, respectively. The third and fourth largest markets are the EU and China.

Having not given up on the United States anti-dumping measures against Vietnamese frozen shrimps, in 2010 Viet Nam filed a complaint with the WTO pertaining to the anti-dumping duties that the United States had levied on frozen shrimps from Viet Nam. In 2011, a WTO panel concluded that the method used by the United States to calculate dumping margins were inconsistent with WTO rules and requested the United States to remove this calculation in the next period of review.[33]

32 GSO website: www.gso.gov.vn/default_en.aspx (accessed July 2012).

33 For more information on this issue, please see the dispute settlement page of the WTO, www.wto.org/english/tratop_e/dispu_e/cases_e/ds404_e.htm

Figure 5.7: Pangasius value chain in Viet Nam



Note: NAFIQAVED refers to the National Fisheries Quality Assurance and Veterinary Directorate of Viet Nam, while VASEP is the Viet Nam Association of Seafood Exporters and Producers

Source: Khiem et al. (2010: 29)

Table 5.11: Characteristics of pangasius farming sites

	Field pond	Island pond	Net-pen enclosure	Floating cage
Stocking density (pieces)	‹20m²	20–40/ m²	30–50m²	100–250m³
Yield	50–80ton/ha	100–300 ton/ha	1000 ton/ha	100–300kg/m³
Crop cycle (months)	6–8	5–6	5–6	5–6
Meat quality (colour of meat)*	Large % of yellow/pink	75–80% white	›95%white	›95%white
Production costs in 2006 (VND per kg)	9,000	10,000	11,000	11,000
Benefit-cost ratio (2006)	1.3	1.3	1.2	1.2

Source: Nguyen (2007)

* Color of meat is an important indicator of the quality and grade of pangasius. The best quality pangasius of grade 1 has white and light pink meat. Pangasius of grade 1 is often sold to the United States or Western European markets, which require high-quality fish. The lower-quality pangasius of grade 2 has light cream yellow meat. The lowest-quality pangasius of grade 3 has yellow meat (Khoi et al., 2008). Pangasius of grade 2 and 3 are often sold to markets that require lower-quality fish such as ASEAN countries or Eastern Europe.

5.3 *Pangasius* value chain and production process

5.3.1 *Pangasius* value chain

Figure 5.7 describes the *pangasius* value chain, showing the percentage value of fish sold to corresponding stakeholders. In the chain, there are suppliers of seed, feed, and veterinary drugs. Producers of seed, including larvae and fry (hatcheries), are mainly domestic, both state-owned and private, while suppliers of feed and veterinary drugs are both domestic and foreign producers and traders. The state-owned hatcheries also conduct research on the quality of broodstock and aquaculture techniques. Farmers buy these inputs at the market price directly from the suppliers or through traders.

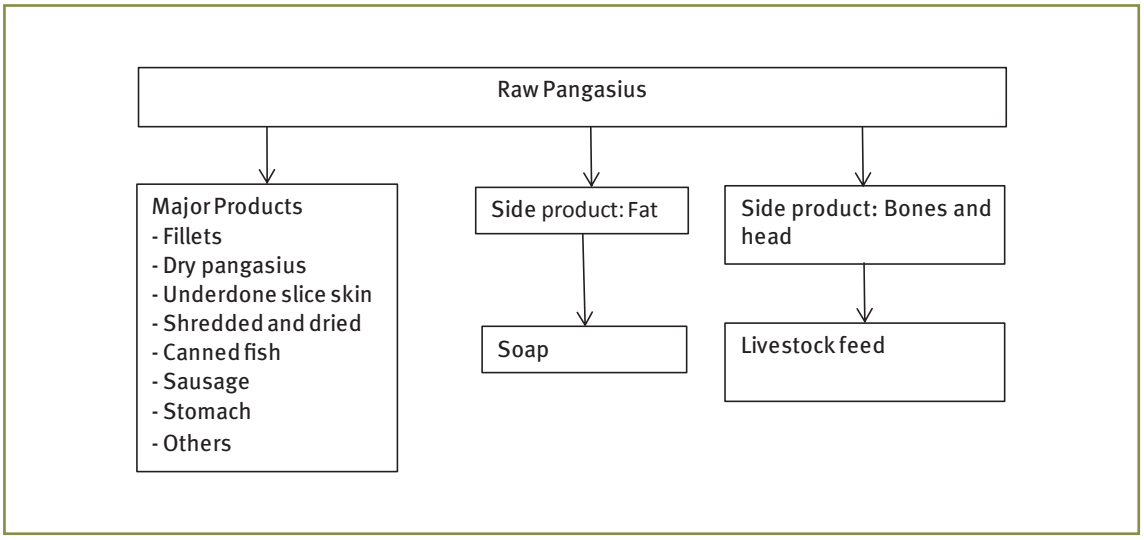
At the production stage of the chain, various farmers exist to produce fingerlings and fish. While fingerling producers are mainly independent, producers of fish (called "grow-out farmers") can be independent farmers, fishery association members, contracted farmers, or farms owned by processors (i.e., vertical integration). In the past, there were only independent grow-out farmers. However, as quality and safety standards required became more stringent, processors found it difficult to control the quality of inputs (fingerlings, feeds) and the use of antibiotics and chemicals by independent farmers, so other types of outgrowers emerged. The relationship between the processors and independent farmers is based on informal agreements rather than enforceable contracts. Instead of being independent, farmers can belong to a producer organization (fishery association), from which they receive market information, training on quality management, and technical support.

Generally, farmers belonging to producer organizations control fish quality better than independent farmers. Contracted farmers are often under close monitoring by the processors, in a kind of vertical coordination between the processors and farmers. The processors provide the farmers with support and services including guidance on how to use drugs and chemicals, and accessibility to laboratory services for fish disease diagnosis. Thus, the quality of fish supplied by contracted farmers is often better than that of fish supplied by independent farmers. Moreover, an increasing number of processors have been establishing their own farms to ensure the quality and traceability of the fish. The processors apply stringent quality and safety standards to these farms to meet the requirements of the Japanese, United States and EU markets. Recently, due to higher quality and safety standards imposed by importers, the number of contracted farmers and farms owned by processors has been increasing because the processors find it easier to control the production process of contracted farmers and their own plants to ensure fish quality and safety.

For the domestic market, there are local collectors who buy fish from various farmers to sell to wholesalers and retailers in big cities in Viet Nam. To the extent that the processors sometimes sell *pangasius* products that do not meet export quality standards to the domestic market, the domestic market is a secondary market to the export market. Fish for export are sent to processors for further treatment before being sent to the overseas markets. In the past, there were collectors between producers and processors. Due to the increase in the typical size of producers, processors have been increasingly buying fish directly from farmers. As a result, collectors of exported fish have gradually closed their businesses and switched to providing transport, hired by processors or farmers to simply transport the fish.

There are various governmental and non-governmental organizations (NGOs) that regulate and support the main stakeholders in the *pangasius* chain. The Ministry of Agriculture and Rural Development (MARD) is the main governmental body responsible for development of the fisheries sector in general and the *pangasius* industry in particular. Under MARD, there are regional departments that provide stakeholders in the *pangasius* chain with technical and financial support and extension services. The National Agro-Forestry-Fisheries Quality Assurance Department (NAFIQAD) under MARD is responsible for matters related to the quality of agricultural products, including national programmes on quality assurance and the issue of quality certificates for agricultural products. The Viet Nam Association of Seafood Exporters and Producers (VASEP) and the Viet Nam Fisheries Society (VINAFIS) are associations of processors and exporters of *pangasius* that are active in promoting the development of the

Figure 5.8: Pangasius products



Source: Authors

pangasius industry. These bodies provide producers, collectors, and processors with extension services, credit, technical advice, audit services for certification and market information, organise collective actions, and provide guidelines for their production activities.

5.3.2 *Pangasius* production process

According to various statistics, the total production area for *pangasius* in 2007 was around 5,000–9,000ha (Mantingh and Nguyen, 2008). There are three types of farming sites. In descending order of importance in *pangasius* production, they are: ponds (field ponds or island ponds); net-pen enclosures; and floating cages in the river. Field ponds are often less than 5,000m^2 and about two to three metres deep. Island ponds are on islands in large rivers or on river banks and are often 5,000–10,000m^2 and up to five metres deep. Each pond requires about two to three workers to take care of feeding the fish and changing 30–50 per cent of the water in the pond daily by pumping water from/to canals/rivers. Ponds are often located near canals/rivers. There is no water discharge treatment so it increases canal/river pollution and disease transmission and outbreaks. After harvest, accumulated waste at the bottom of the pond is removed and released into rivers or used for agriculture fertilisation. Nonetheless, the pond aquaculture system is the most productive and environment-friendly (Khoi, 2011). As a result, *pangasius* production using ponds has become popular. Various characteristics of these farming sites are presented in Table 5.11.

In the past, most *pangasius* fry were caught from the Mekong River around the border between Cambodia and Viet Nam. In the late 1990s, researchers were able to control the whole life-cycle of *pangasius* through breeding. Today, the majority of the fry are produced in hatcheries by the private sector in the Mekong River delta. First, larvae are nursed to fry until they reach 1g per piece. The nursing stage from larvae to fry takes 40 days and is the most risky stage because the fry are very sensitive to changes in water quality and temperature and have a survival rate of only 8–30 per cent (Belton and Little, 2008; Sinh and Hien, 2010).

From the hatcheries the fry are nursed for around nine weeks to grow to 10–15cm (15g); they are then called fingerlings and are ready to be sold to farmers (Khoi, 2007). The nursing stage from fry to fingerlings takes 80 days with a higher survival rate of 60 per cent. When grow-out farmers purchase fingerlings, their quality is checked by observing their mobility and agility. Healthy fingerlings are a bright colour and have no body deformations, injuries, or damaged fins. At this stage, the quality is not checked by government bodies.

The most important determinant of fingerling quality is quality of broodstock, followed by water quality because it is directly connected with diseases. Nowadays, breeders are selected from grow-out farms with no previous knowledge or experience of proper breeding methods. This has led to significant inbreeding. Quality degradation from uncontrolled breeding and shortage of seeds and fingerlings has become one of the major problems currently facing the sector. Before 2003, there was only one spawning season per year, which was from April to July. Since 2003, due to the increase in demand for *pangasius*, spawning has been done throughout the year. As a result, the hatcheries have to use more chemicals and veterinary drugs and give more feed to the female *pangasius* to make more frequent artificial fertilisation possible. Grow-out farmers may suffer because they have no way to test fingerling quality. They buy fingerlings mainly based on trust in the hatcheries.

Types of feed also affect the quality of *pangasius*. There are two types of feed for *pangasius*: home-made feed and pallet feed or manufactured feed. Home-made feed is made of rice bran/broken rice, soybeans, and trash fish, and sometimes additives such as vitamin C and lysine are also used (Khoi, 2011). It is cheaper than pallet feed and its quality is not consistent. Home-made feed, therefore, can reduce fish growth and cause high fat

Figure 5.9: Pangasius farm sizes in An Giang province

Source: Khiem et al. (2010: 2)

deposition in visceral areas of the fish. As a result, farmers have shifted from home-made to pallet feed. Until 2002, 99 per cent of farmers still used home-made feed. However, in recent years, the use of pallet feed has increased, particularly on large farms (Khiem *et al.,* 2010). It takes approximately 4kg of home-made feed or 2.5–2.8kg of pallet feed to produce 1kg of *pangasius*. The fish are fed five to six times a day. In terms of operating costs for fish producers, feed is the largest cost, which is about 74 per cent if home-made feed is used and 90 per cent if manufactured feed is used (Khiem *et al.,* 2010), followed by the costs of fingerlings and labour. Therefore, the survival of fish producers depends heavily on the price of feed. In fact, many farmers decide whether to cultivate *pangasius* or other types of fish on a crop-by-crop basis (Khiem *et al.,* 2008).

In the past, *Pangasius bocourti* was known for its disease resistance. However, because the rapid expansion of its production has resulted in high stocking densities and water pollution, disease occurrence has been increasing. To deal with the problem, farmers are using antibiotics for prophylactic therapeutic treatments. Because it would be too costly for farmers if their fish failed to meet buyers' standards and couldn't be sold, farmers follow the quality management rules and regulations strictly. They are, however, rarely aware of what medicines are permitted and not permitted. The small-scale farmers simply follow the advice of friends and drug sellers on how to treat disease and use veterinary drugs (Khoi, 2011). Fish quality is first assessed by visual checking of colour and size and later by testing in the laboratory. Consumers in the United States and the EU prefer fish with white and pink meat and of identical size and are willing to pay higher prices for it. Fish that have yellow meat and/or not identical sizes can only be sold to Eastern European markets such as Russian Federation and the ASEAN countries. Some farmers rotate *pangasius* culture and shrimp culture to avoid diseases.[34] The culture of fish is all-year around. It takes about 6–8 months to raise fingerlings to a weight of around 1–1.5 kg before harvest and being sold to processors or collectors.

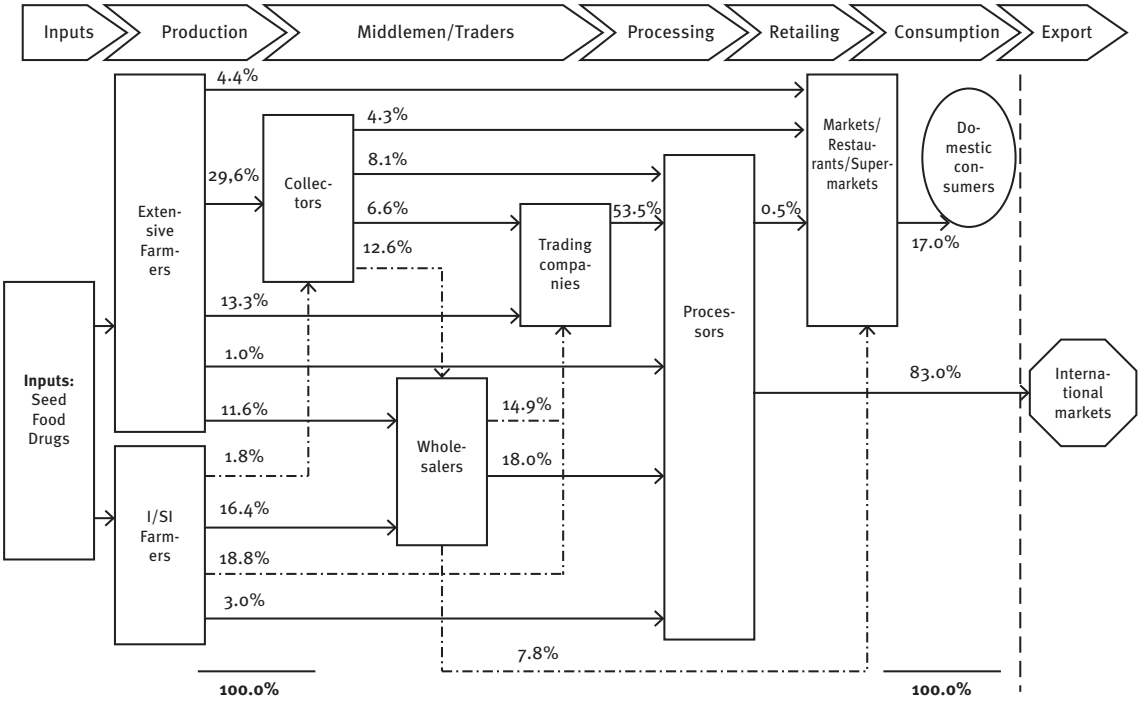
Three weeks before harvest processors or traders often come to farmers to check fish quality and take a sample of fish they might want to buy to test for antibiotics and chemical residues. If antibiotic and chemical residues exceed the required standards, the harvest will be postponed for some time so that the residues will be reduced down to the appropriate level. Before harvest, the fish are starved for two days. The fish are then harvested and transported alive to the processors by boats.

The final price for fish depends largely on its quality. To assess fish quality, the collectors/processors will check the colour of the fish and take a sample for further testing in their own labs or independent labs. The final price is not set until the day of harvest. In fact, independent farmers and even the contracted farmers have little power in negotiating prices with the collectors and/or processors, partly because they have no labs for testing fish quality. Also, there is often delayed payment from collectors/processors to farmers.

In processing factories, different fish from different farmers are separated into different batches by the processors. The fish are then checked for quality by sampling, cleaned, filleted, and frozen for exports. To obtain certification of compliance with HACCP standards, the products are randomly checked and

34 While it is easy to convert shrimp ponds to rice fields, it is difficult to convert pangasius ponds to rice fields. As a result, pangasius production maintains a high latent capacity, where farmers produce pangasius when the demand is high and stop production temporarily when there is reduction in demand.

Figure 5.10: Shrimp production value chain (Black Tiger) in Viet Nam



Source: Le (2012: 71)

analyzed by NAFIQAD. Major products from *pangasius* include fillets, dry *pangasius*, underdone sliced skin, shredded and dried fish, canned fish, sausages, stomach, and others. In addition, there are side products; for example, *pangasius* fat is sold to producers of soap, and *pangasius* bones and heads are sold to producers of livestock feed (see Figure 5.8). Most of the processors apply quality management systems such as HACCP, ISO 9001:2000, and SQF 2000. Large processors are equipped with advanced equipment and machines and frequently provide their workers with training (Khoi, 2007).

Over time, the *pangasius* industry has seen an increase in the number of large farms and a decline in the number of relatively small farms as depicted in Figure 5.9. *Pangasius* production is more capital-intensive than other aquaculture products so smaller farmers cannot compete with larger ones. Processors are shifting from smaller farmers to larger ones because the latter can provide them with fish of higher quality and that better meet standard requirements. However, farmers with less than 0.5ha still accounted for more than 80 per cent of all farmers in 2008. Because of limited land it is more difficult for small *pangasius* farmers to grow but relatively easier for them to cultivate other fish species or even downgrade from grow-out farming to nursing or hatching. Farmers without the capital to invest in nursing or hatching were forced to leave the industry.

5.4 Shrimp value chain and production process

5.4.1 Shrimp value chain

Figure 5.10 describes the value chain of shrimp production in Viet Nam. In this chain, input suppliers include three groups of stakeholders: sellers of inputs such as feed and antibiotics; fishermen who catch wild shrimp broodstocks; and shrimp hatchery and nursery farmers. The fishermen sell their broodstocks to the hatchery and nursery farmers directly or through traders. Some broodstocks are brought from central Viet Nam to the Mekong River delta. According to Le (2012), in 2009 there were 1,100 Black Tiger and five Whiteleg hatcheries in the Mekong River delta that produced more than 9 billion post-larvae Black Tiger prawns and 250 million post-larvae Whiteleg prawns, altogether accounting for 50 per cent of the total demand in the region. More than 70 per cent of the Black Tiger post-larvae are sold directly to the grow-out farmers in the same province, while about 26 per cent are sold through seed traders and the rest are kept for self-nursing. The hatcheries can have five to six cycles a year. The nursery sites can have about 50 cycles a year, each cycle being about three to five days.

Grow-out farmers, including improved extensive and intensive/semi-intensive farmers, can be independent farmers or contracted farmers, invested in by the processing companies.[35] According to Le (2012), compared with the intensive farmers the improved extensive farmers often have a larger average culture area per farm, lower average stocking density, shorter stocking

35 Extensive shrimp production is the traditional method that is often used in the coastal areas and requires minimal investment in labour and management, while intensive shrimp production requires heavy investment in capital and labour.

time, a lower percentage of post-larvae being tested for diseases, prawns mainly fed with natural feeds, lower survival rates, and importantly lower yields, which is only one-seventh of that of intensive farmers. Intensive and semi-intensive production is mainly used for growing *Penaeus vannamei*, while extensive production is used for growing Black Tiger and Whiteleg shrimps. In the Mekong River delta, about 78 per cent of the area is cultivated by the improved extensive farmers and the remainder by intensive and semi-intensive farmers. Most of these farmers are independent and small-scale (Tung, Thanh and Phillips, 2004).

Prawn trading activities often take place during the peak harvest period from April to September. The independent farmers sell their products to collectors who sell the shrimps to wholesale buyers. The collectors and wholesale buyers are sometimes owned by the same people who supply inputs. The wholesale buyers then sell the shrimps to the processing companies. The relationship between the wholesale buyers and the processing companies is often characterised by on-the-spot marketing. The contracted farmers often sell the shrimps directly to the processing companies. They may, however, sell to the collectors and/or wholesale buyers as it is not always possible to enforce the contract between the processing companies and the contracted farmers. According to Loc (2006), about 60 per cent of the shrimps are sold to the processing companies through the collectors and/or wholesale buyers.

For export, the shrimps will be processed, packed, and delivered to distributors, which are foreign import companies, some of which are located in Viet Nam, mostly in Ho Chi Minh City. These foreign import companies re-label the final products and sell them to foreign retailers, who then sell the shrimps to end users. For the domestic market, the shrimps can be sold directly by farmers or collectors and processors to local markets, supermarkets, and restaurants. In the shrimp value chain, 83 per cent of production is for export, while only 17 per cent are sold to the domestic market.

Apart from the main stakeholders already mentioned, there are minor stakeholders including service providers such as feed, medicine, and ice suppliers, people who process shrimp heads, and local transporters.

Similar to the *pangasius* value chain, various government organizations and NGOs support the major stakeholders in the shrimp value chain. The MARD and its agencies, of which NAFIQAD is important, VASEP, and national and provincial trade promotion centres manage the shrimp industry and provide the suppliers, farmers, and processors with technical advice, extension services, management training courses, quality control, financial support, and opportunities to take part in domestic and overseas trade fairs. Particularly, VASEP, as an effective processors' association, represented them in legal matters including the European anti-dumping legislation and provides its processor members with market information and various trainings.

Comparing the market structures of the two sectors, while large proportions of both *pangasius* and shrimp go to processors (93 per cent for *pangasius* and 83.6 per cent for shrimp, based on previous figures) and are exported, the value chain structure before processing is more complicated for shrimps than for *pangasius*. Because of rising standards, *pangasius* production is becoming more consolidated (as will be explained later), and the role of collectors between grow-out farmers and processors is becoming less important. On the other hand, a large proportion of shrimps are still being produced by small-scale fish farmers. We will examine the differences in these sectors by carefully analysing the production processes of these two types of aquatic products.

5.4.2 Shrimp production processes

Shrimps can be either caught from the wild or raised in farms. In Viet Nam, when exports of shrimp began in 1975, shrimps were mostly caught from the sea. As exports increased over time, cultured shrimps have become dominant. Black Tiger and *Penaeus vannamei* are the two main types of shrimp cultured in Viet Nam.

As mentioned above, for cultured shrimps there are two ways of organising shrimp production – extensive and intensive/semi-intensive. Extensive shrimp production is the traditional method that is often used in the coastal areas and requires minimal investment in labour and management, while intensive shrimp production requires heavy investment in capital and labour. Intensive shrimp production is higher-yielding than extensive production, but it is also prone to the outbreak of diseases due to its high shrimp density. Disease induces the farmers to use antibiotics and that could affect shrimp quality. Intensive shrimp production methods are known to have negative effects on the environment because of the frequent use of chemicals. Disease outbreaks have also been experienced by other shrimp-producing countries, such as Taiwan Province of China, Indonesia and Thailand.

Post-larvae are produced in hatcheries until they reach about 2–2.5cm and are sold to farmers. Post-larvae quality is often checked by sight. Shrimp diseases including fungal disease, white spot disease, and *Monodon baculovirus* (MBV) disease are common. To prevent these diseases farmers have to use a great number of antibiotics and chemical substances.

It takes about four months for the grow-out farmers to grow the shrimps. The main shrimp crop starts in January and ends in May. Shrimps are often harvested several times in one crop so that harvesting can continue for some months beyond May. Because collectors and/or wholesale buyers collect shrimps from different grow-out farmers and mix them together, it is more difficult for the processing companies to trace the shrimps and ensure their quality than if they buy shrimps directly from contracted farmers.

Wild shrimps, by contrast, are seldom infected with micro-organisms and bacteria. After being caught, the shrimps are stored on boats offshore for an average of 5–7 days (minimum three days and maximum 15 days). The shrimps will be sold to the collectors and/or wholesale buyers who will then sell them to the processing companies within a day. For various reasons such as inappropriate temperature, transportation hygiene, and time spent in offshore storage and transportation, shrimps can, however, be infected with micro-organisms and bacteria.

Table 5.12: List of relevant certifications

Certification	Main contents	Level applied	Coverage
SQF2000	Food safety assessment programme covering processors, distributors and warehousing	Factory	Global
SQF1000	Food safety assessment programme for primary producers	Farm, Hatchery	Global
HACCP	Management system for the prevention of contamination by physical, chemical, and biological hazards	Factory	Global
GlobalGAP	Initiated by the members of the Euro-Retailer Produce Association, main focus is on food safety and traceability, and concerns with social and environmental issues	Factory, Farm	Global
BRC	Food safety and quality criteria required for supplying to UK retailers and designed to standardise food criteria and monitoring procedures	Factory	United Kingdom
GMP	Developed by the US FDA for verifying the safety and purity of drug and food products	Drug and chemical suppliers	United States
ISO22000	International food safety management system involving interactive communication between chain actors, and a system management approach based on HACCP principles	Factory	Global
ISO 9001-2000	Quality management system for providing consistent products and services to meet customer expectations, focusing on quantitative measurement of performance	Feed suppliers	Global
BAP	Address environmental and social responsibility, animal welfare, food safety and traceability in a voluntary certification programme for aquaculture facilities	Farms	Global
OHSAS	British standard for occupational health and safety management system	Factory	United Kingdom
PAD	*Pangasius* Aquaculture Dialogue, initiated by WWF, is a set of standards based on multi-stakeholder consultation	Farms	Global
BMP	Targeted to improve farmers' management practices, delivering increased profitability and environmental performance by making more efficient use of resources	Farms	Global

Source: Khiem et al. (2010); Mantingh and Nguyen (2008)

5.5 Compliance with what standards is required by importing countries?

A great number of different food quality standards and certifications are relevant to this sector and importers' requirements also vary across countries. Table 5.12 provides some of the relevant certifications. These are typically requested and required by the importers. Having these certificates by no means guarantees that products procured by these processors will pass inspection at the port. However, many importers are requiring these to screen the capabilities of firms.

Although the focus of these certificates varies, the main concerns for these certifications can be categorised as (a) hygiene, (b) social, and (c) environmental. While early certifications were concerned with what is physically included in the food products (i.e. (a)), more recent certifications tend to include other factors surrounding the production process of the food products, reflecting consumers awareness of environmental issues and sustainable livelihoods. There are both mandatory and voluntary, public and private standards (for a thorough review on the types of standards, refer to ITC, 2011).

Apart from these certifications, each country has a set of regulations to check the quality of imported goods at its borders. The requirements and testing procedures vary greatly across countries, though most include tests of maximum chemical residue levels. For the EU, while each member country has its own authority conducting border inspections, the European Food Safety Authority and the European Commission's Directorate-General for Health and Consumers (DG SANCO) are in charge of assuring food safety at Union level. The EU records and shares all the rejection data through its Rapid Alert System for Food and Feed (RASFF). For the United States, the FDA is in charge of regulating imports based on the Federal Food, Drug and Cosmetic (FD&C) Act (UNIDO, 2010). For Japan, the Imported Foods Inspection Services under the Ministry of Health, Labour and Welfare (MHLW) is in charge of imported food quality regulation based on the Food Safety Basic Act (for details, refer to Chapter 2). These border inspections relate to other sets of regulations that the exporting countries need to satisfy, as we have seen in Table 5.3.

Requirements of importers vary greatly across the importing countries, raising compliance costs for the exporters. According to interviews with Vietnamese exporters, we can observe different patterns of requirements across importing countries. For the EU, the main export products are unprocessed fish fillets and shrimps, and the buyers are more concerned about whether the exporters have the relevant certifications, such as SQF, BRC, and GlobalGAP. Thus, from the exporters' point of view, it is most

important to obtain the required certifications. This is similar for the United States, except that certificates such as Best Aquaculture Practices (BAP) are more popular there. As of 2012, there is no requirement by these countries for seafood consignment sampling and testing before clearance for export (VASEP, 2012a). On the other hand, the Japanese market presents a different case. Japanese buyers' are not much concerned with whether the exporter is certified, but about the actual levels of antibiotic residues in the products. Although Japanese importers do not value certifications, they care about how production is carried out in practice and often visit processing factories with technical experts and offer technical advice for improvement. Importers conduct sampling tests voluntarily, apart from the mandatory inspection by the Vietnamese authority (NAFIQAD), because the sampling rate and testing accuracy are not enough to meet Japanese quarantine standards. Importers fear port rejections because their names will be revealed on the MHLW's website, damaging their reputation. According to exporters, port inspections in Japan are very strict relative to the EU and United States.

Furthermore, these quality standards required by importers are not stable but evolve over time, often with "very short notice" according to Vietnamese exporters interviewed for this study.[36] Exporters say, "Importers require the certificate A today and tomorrow they require the certificate B. As an exporter, there is no alternative but to obtain the B certification as well because otherwise we lose business. At the same time, we also need to pay for renewing the certificate A". According to exporters, lately Japanese ports are intensifying the inspection of Vietnamese products. These cases are detailed in Box 5.2.

36 Note that whether this refers to a sudden change in a policy or reflects the lack of policy surveillance capability by importers is not clear.

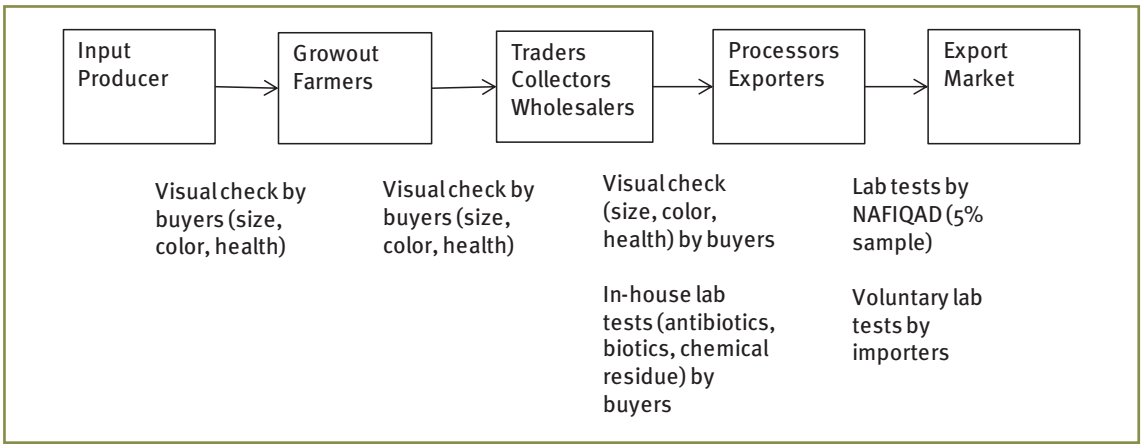
Box 5.2: Ethoxyquin in Vietnamese shrimp

On 18 May, 2012, a Vietnamese shipment to a Japanese port was found to contain ethoxyquin. Ethoxyquin for shrimp is among those chemicals for which MRLs (maximum residue levels) are not established, and because the Japanese government uses the positive list system (refer to Chapter 2), the uniform maximum residue level of 0.01ppm is applied. According to "the Imported Foods Monitoring Plan for FY 2012", if a violation is detected, the rate of monitoring inspections will be increased by 30 per cent and voluntary self-inspection is advised for the violators, whose names are revealed on the MHLW website. This rate of monitoring will in principle be normalised if no further violations are detected within one year and/or after more than 60 inspections. While this procedure is a routine process for the Japanese quarantine system, Viet Nam exporters raised concern because (a) the Japanese MRL for ethoxyquin is too low given that the MRL established by the EU and the United States is 150ppm and Japan also applies 150ppm for fishmeal (but not for shrimp), and (b) the source of ethoxyquin in Vietnamese shrimps was imported fishmeal from Latin America, which is also used by other exporting countries such as Thailand or Indonesia. Thus, the Vietnamese government and exporters' associations argue that it is not fair that only their shrimp will be the target of intensive monitoring.

NAFIQAD's director visited Japan to request adjustment of the MRLs for ethoxyquin based on the risks to human health. The Vietnamese government made a list of fishmeal containing ethoxyquin with its MRLs and instructed exporters not to use fishmeal containing this chemical (VASEP, 2012c). The exporters interviewed expressed great concern over this issue and mentioned that many of them are now refraining from exporting to Japan due to the fear of being rejected once again (another violation detection would increase the inspection rate to 50 per cent). They said that ethoxyquin is also included in the feed of pigs, chickens and fish in order to maintain quality. Shrimps can feed on soybeans but that would result in low quality as shrimps need a lot of nutrition until close to harvesting. In order to test for ethoxyquin, exporters need to import some testing kit, adding to their costs. One exporter estimated that the inspection fee increased costs as much as 20–30 cents per kg of shrimp after this incident.

In fact, there were similar incidents in the past, such as the case of enrofloxacin (2011) and trifluralin (2010) relating to shrimp exports to Japan. After the detection of violation at Japanese ports, the Vietnamese government decided to include both in a list of prohibited chemicals (Circular 03/2012/TT-BNNPTNT for enrofloxacin and Circular 20/2010/TT-BNNPTNT for trifluralin; VASEP, 2010; 2012b).

Figure 5.11: Quality inspections conducted at each level along the value chain



Source: Authors, based on interviews

Overall, because of the rise in standards, testing fees and certification fees are increasing for exporters. Exporters currently incur on average 1.5 to 2 times more expense on testing fees compared to some years back (VASEP, 2012a). Also, because inspection takes longer at Vietnamese ports before shipping abroad, it adds more storage expenses. The increasing number of different certifications and standards also adds costs for the exporters. The application costs for certifications (US$2,000 for the initial cost of GlobalGAP) need to be borne by those who will be certified – stakeholders in Viet Nam. Processors and exporters incur these costs while for smallholders, government subsidy is offered in some cases. There are also cases where the testing fees are borne by importers.

5.5.1 What measures are taken in Viet Nam?

Processors/exporters

Even with this increasing number of certificates, requirements seem mostly to be satisfied by exporters. When you visit these exporters, you quickly notice that they have many framed certificates hanging on their office walls. Although exporters express complaints, particularly because they need to bear all the costs of obtaining these certificates, they still decide to obtain them to continue trading. Most exporters also have in-house labs to check chemical residue levels (see Figure 5.11). They test the levels before purchasing from traders or smallholders and before shipping for export. Some exporters also mentioned the use of outside labs that can detect antibiotics more accurately for shipment to countries like Japan where testing is very stringent. These types of private labs are also available in the country. Processors who have a special relationship with importing firms (i.e. subsidiary firms, long-term suppliers, contractors) are in a better position to receive technical advice and information about the required standards relative to other independent firms. We observed that some processors have Japanese technical experts sent by their buyers who work in their factories, monitor the production processes, and offer advice for improvement on a daily basis.

Small-scale farmers

According to the interviews and field surveys conducted in June 2012, the greatest difficulty with compliance seems to lie at the level of small-scale producers as there are a large number of them. First of all, many farmers do not even know what the relevant standards are. According to Khiem *et al.* (2010), 36 per cent of farmers were not aware of these quality and safety standards in 2008. For popular standards, such as SQF and GlobalGAP, the MARD has put a lot of effort into increasing smallholder awareness by offering them training sessions and by offering to shoulder 50 per cent of application costs to obtain certificates. However, according to extension workers, the number of smallholders who have actually obtained these certificates is trivial because (a) the certification costs are high, (b) they have their own farming experience and do not see the necessity of being certified, and (c) they are "conservative". It is too costly for farmers to acquire such standards and they are not rewarded with higher prices for the products that satisfy these standards.

Government

Various government bodies and NGOs regulate and facilitate the development of the aquatic sector in Viet Nam. The Ministry of Agriculture and Rural Development (MARD) and provincial Departments of Agriculture and Rural Development are the central and local governmental agencies, respectively, that manage the development of the aquaculture industry. Under MARD, the National Agro-Forestry-Fisheries Quality Assurance Department (NAFIQAD) consisting of six regional centres in Viet Nam is in charge of food safety assurance and quality control in the aquaculture industry. NAFIQAD succeeded the former National Fisheries Quality Assurance and Veterinary Directorate (NAFIQAVED) in 2007 for the purpose of "assisting the Minister to carry out the state governing of quality and safety of agricultural, forestry, fishery products, and salt nation-wide".[37]

Among their activities and responsibilities, one that is important to the seafood export sector is regular monitoring inspection for harmful substances, which is conducted annually according to "the Residue Monitoring Programme for Certain Harmful Substances in Aquaculture Fish and Products". The monitoring programme is considered to follow EU requirements. According to NAFIQAD's report of activity in 2010, they inspected 154 aquatic areas in 36 provinces and cities for various species, including Black Tiger shrimp, white shrimp, giant prawn, and catfish. In total, 4,075 samples were inspected, of which 3,798 were from production farms, 143 samples were from hatcheries, and 134 samples were from middlemen. The results of inspections reveal the number of unsatisfactory samples (but not the names of the sites). Notably high violations were found in the use of prohibited antibiotics, particularly trifluralin, which was newly included on the list of prohibited substances for aquaculture in 2010. When violations are found, NAFIQAD takes measures such as (a) requesting suspension of production at these sites, (b) requesting processors not to purchase from these sites, (c) investigating the root cause for the violation, etc.

Apart from the monitoring inspection, NAFIQAD is also responsible for issuing export certification to companies based on their inspection. In addition, all the export products need to go through random sampling tests by NAFIQAD before export. According to exporters, the rate of testing at the port is about 5 per cent. NAFIQAD is also responsible for disseminating information about changing import requirements to the stakeholders in the sector.

During the last few years, complicated safety standards related to chemical and drug residues and importer certification systems have been increasingly applied to exported aquaculture products from various countries including Viet Nam. To cope with the new requirements, at the national level, MARD have requested local authorities to focus more on improving the quality of fish products even at the expense of quantity reduction. Various other new legal documents have been released to improve quality and manage hygiene and food safety in the industry. The Vietnamese government announced a Master Plan for the aquaculture and fisheries sector for the period 2005–2010 and directions for 2020. At the local levels, few provincial and mu-

37 From the NAFIQAD website, www.nafiqad.gov.vn/d-monitoring-programme (accessed August 2012).

nicipal governments have been active in training farmers and processors on how to conform to such complicated quality and safety standards or providing subsidies for application of these standards.

Industry associations/Non-government organizations

Besides these state administration agencies, the Viet Nam Association of Seafood Exporters and Producers (VASEP) and Viet Nam Fisheries Society (VINAFIS) play an effective role in promoting development of the industry. VASEP is an effective local association of leading seafood exporters and producers founded in 1998. They actively represent their members in local and international collective actions and provide their members with diverse services such as extension services, trade fairs, and information. VASEP also conveys opinions from the member exporters and producers to the government and to importing countries. Additionally, there are provincial fish associations that support suppliers, farmers, processors and exporters in the industry.

5.5.2 Observed effects of standards on stakeholders along the value chains

Processors/exporters

The direct effects of the increasing importance of standards/certificates on processors and exporters are the added costs of compliance, most of the time without any increase in the sales price. For EU and United States buyers, producers and exporters invest and obtain the required certificates. They need to incur not only the initial costs but also annual renewal fee. For detecting maximum residues, they conduct lab tests in-house and sometimes also use outside labs before exporting. At the ports, NAFIQAD conducts another random sampling test. Overall, the current trend has increased the expenditure burden on processors and exporters.

The second effect is changes to the business model of processors to rely more on fish supply from their own farms or their contract farmers rather than sourcing from traders or smallholders via on-the-spot marketing. With increasingly strict standards, the transaction costs of dealing with many smallholders are rising. In terms of assuring traceability, it is easy to centrally control all the processes from fish production to processing rather than having to trace all the smallholders' production histories. Thus, there is a trend for processors to vertically integrate production. One exporter who owns large shrimp ponds mentioned that, in their production system, each pond is labelled with an identification number. Thus, if some problems with these shrimps were detected, they could stop using all the shrimps from that pond and investigate the cause. The exporters also issue IDs for traders who bring fish/shrimps to their factories. However, because traders purchase from many small ponds and each pond is often too small to fill one container used for transportation, they tend to mix fish/shrimps from various ponds. This makes it more difficult to assure traceability for inputs from traders.

This trend of vertical integration of ponds by processors is more clearly observed for the *pangasius* sector because *pangasius* are more cash-intensive and less labour-intensive than shrimps. For shrimps, although some processors have their own shrimp ponds (a few have very large ones in the order of 500ha), it is not as common as in the *pangasius* sector. The reasons for this difference are: (i) *pangasius* is a capital-intensive product that emerged only recently so that smallholders do not have much comparative advantage, (ii) shrimps are prone to diseases and thus risky if relying on one large pond, (iii) shrimps are more labour-intensive in production than *pangasius*, (iv) shrimps need coastal land for brackish water and are land-consuming. According to one exporter, in order to satisfy its factory's processing capacity, it needs 4,000ha of shrimp farm. However, if it were *pangasius*, the company would only need 400ha. Thus, there are few shrimp processing companies that have their own ponds and, even if they do, the shrimps harvested from their own ponds account for only 2–3 per cent of total production.

Small-scale farmers

Because of the change in the business model of processors and exporters, a large number of *pangasius* smallholders have exited the market. They either diversified into producing other fish targeted for domestic markets or downgraded their business to raising fingerlings or fish seed. On the other hand, shrimp smallholders seem to be more resistant to this change because they do have comparative advantages over the processors in producing shrimps, as mentioned in the previous paragraph (i.e. labour-intensive production, land-ownership, etc.). However, as the traceability requirement becomes even more important, it is likely that these shrimp smallholders are also to be consolidated in future. Among smallholders, those who have contracts with processors are in a better position to maintain their roles as fish or shrimp suppliers. However, these groups of smallholders are special as they own relatively larger ponds (thus reducing the transaction costs for the processors).

Collectors/traders

In the *pangasius* sector, the role of collectors and traders has declined because the processors tend to source directly from their contract smallholders and rely less on traders. Traders still operate because it requires special boats to transport the fish, but they currently function more as "transporters" than as "traders" in the traditional sense. These collectors transport *pangasius* from smallholders to processors. In the shrimp sector, the traders are still active in buying shrimps from farmers and selling to processors although they have become more tightly controlled by processors through such means as formal registration.

5.6 Major issues in import standards compliance

Given these market structures and impacts on stakeholders, what are the major bottlenecks for standards compliance in Viet Nam? Based on the fieldwork observations, we find three major issues.

5.6.1 Inadequate incentive mechanisms to comply with standards/certificates

The first and probably the most important issue is the country's weak enforcement of these certification/standards. While the stakeholders are aware of the need to comply with certification schemes/standards, under the current system there are not enough incentives for them to comply. In other words, there is neither reward for compliance nor punishment for non-compliance, particularly at the levels of small-scale grow-out and fingerling farmers. They do not have the incentive to apply for SQF1000 because in practice they can still sell their fish or shrimps without these certificates and because the costly certificates do not yield higher prices. From fingerling farmers to grow-out farmers and from grow-out farmers to collectors, few are certified and no lab tests of maximum residue levels are involved in sales decisions. Transactions occur based on visual quality checks. Although importers, especially from the EU and United States, require particular types of certifications for processors, they do not strictly investigate whether the farmers who supply the processers are also certified.

The main problem with chemical residues is that they are not readily detectable. They need to be tested for in a lab facility. It is essentially a problem of information asymmetry, where one actor in the transaction (a seller, in this case) has more information than his counterpart (a buyer). In this situation, because the buyer cannot discern the difference between a good product and a bad product, he is not willing to pay a higher price for the former. Thus, the suppliers of good products are discouraged and they decide not to supply. This is the classic "lemon's problem" in economics, which means that "lemons" (i.e. low-quality products) drive the high-quality products out of the market. If, somehow, quality becomes observable and fetches higher prices, it is expected that two separate markets would develop for each type of product. Thus, if the processors are aiming for markets with stringent standards, they have clear options available to them.

Lab tests are the only way to detect residues and thus quality. This is already done at the level of processors, but not upstream because the equipment is not widely available at the level of farmers. NAFIQAD's regular monitoring inspection is definitely one effort to enforce high quality in the market by chasing the low-quality away, but the sheer fact of high rejection rates in EU, United States and Japanese markets suggests that it is not enough. It may be that the sample size for testing is inadequate (i.e. low probability of detection), testing accuracy is not achieved, or that punishments for violations are not effective. Lab tests are not perfect because they rely on a sample. According to one of the exporters, samples of shrimps taken from the upper level of the container and the bottom level of the container may give different results.

As another example, one Japanese importer interviewed for this study mentioned that the way the test is conducted in Viet Nam is not adequate, at least not by Japanese standards. To test the residue level, it is necessary to crush many shrimp to obtain an extract from them, but he saw only a few crushed when lab tests were done at one of the Vietnamese processors. He said that if the tests are conducted in that way, even if the lab test results proved safety and the necessary documents were also well prepared by processors, the importers would still be suspicious. Thus, this importer does voluntary inspections at their own cost before entry into Japan because they know that the Japanese port inspections are very stringent. In their words, "It is ultimately up to how sincere and serious the manager is about quality standards. In Thailand, the government control is more strictly done, even from the level of fish feed". As a reference, the share of this company's average annual costs for the quality test exceeds 80 per cent of their average annual profit. They spend this much because they fear the effect on their reputation if prohibited residues are detected in their products.

A certificate is a signal of quality. In the world of asymmetric information, because the high-quality producers want to be recognised for their superiority, they invest to obtain objectively approved signals that show that quality. This works as long as the high quality receives higher reward. Between processors/exporters and importers, this is working. Because importers recognise these signals, the processors/exporters have incentives to invest in them. Thus, in fact, most processors have multiple certificates. Although the existence of various and similar certificates confuses processors/exporters and adds to their costs, as a mechanism, signalling is functioning at this level. On the other hand, at the level of farmers, because their buyers – that is, collectors or processors – do not strictly require or value this signalling, farmers have no incentive to invest in the costly certificates. This seems to be the root cause for farmers' disinterest in applying for certification even after attending training courses offered by MARD and being offered subsidies of 50 per cent of the application fee.

Currently, the Vietnamese government is trying to create VIETGAP, which is in accordance with the GlobalGAP and thus contains higher requirements than the SQF1000. Previously, they emphasised SQF1000 and extension workers have offered training to farmers. However, the result is that the farmers are now aware of these certificates, but not interested in getting certified. Observing this situation, it is not clear whether the farmers' responses to VIETGAP will be any different from their current responses. It is crucially important to consider building the incentive mechanism, that is, either reward or punishment, for the farmers to be interested in these certificates.

5.6.2 Weak control of upstream market

A second and related issue is the control of quality in the upstream market, particularly at the level of shrimp seed or fish seed. As lab tests are not perfect, even if the tests are conducted at the processor level before export, it is still important to control the production processes of the value chain as much as possible. At stages closer to export, the quality control becomes strict, but stages further back are less strictly controlled. Quality control physically becomes more difficult as it involves a large number of small-scale farmers who are also geographically spread apart, unlike the processors.

The most difficult control seems to be at the production input level, such as fish seed, feed and antibiotics. For example, shrimp seed is grown in many parts of the country and the Central province is known for producing seed. In 2011 and 2012, an epidemic of disease affecting shrimp, particularly Black Tiger shrimp, spread throughout the country, affecting 97,000ha of farms (VASEP, 2012a). This has been a serious concern for the sector and the share of Black Tiger is declining because it is prone to disease. Instead, the share of *vannamei* is increasing as it is more disease-resistant. The main reason for this disease is thought to be the low quality of shrimp seed. While government-owned hatcheries are SQF- and GlobalGAP-certified, these are few in number. Since these hatcheries do not have enough capacity to supply all the buyers, many grow-out farmers must purchase from private hatcheries, some of which operate without licence from competent authorities.

The Directorate of Fisheries in Viet Nam, Department of Animal Health, and other relevant agencies conducted seed inspections in March 2012 in Khanh Hoa province, which is one of the three largest seed-producing provinces. According to VASEP, only half of the inspected hatcheries were approved as passing the standards of veterinary hygiene and given a health certificate. Quoting the same source:

The Provincial Sub-Department of Animal Health highlighted difficulties in seed quarantine because a majority of seed was smuggled and out of control which caused an increase in diseased shrimp in localities. Until now, there have not been management measures on shrimp seed such as regulation on shrimp seed quality before releasing from the hatcheries, regulation on monitoring reproductive age of broodstock which can reproduce the best quality seed. Intensifying quarantine (building many quarantine stations, establishing inter-sectoral inspection team), strengthening inspection of seed producers and traders' operating conditions are not put into practice. Compared to shrimp production in Thailand, success rate in shrimp farming in Viet Nam reached 30 per cent, lower than that of Thailand (70 per cent) because Viet Nam's supply and quality of seed are poor. (VASEP, 2012a: 17–18)

If seeds are not controlled properly, it is easy for the shrimps to catch diseases. That would induce farmers to use antibiotics to treat the disease. However, according to interviews with extension workers, it often happens that these farmers are not very aware of what is contained in these antibiotics. Some input sellers try to approach farmers with bags of mixed antibiotics and sometimes offer free training programmes on usage as a sales campaign. Because farmers do not wish to kill their sick shrimps, they use these antibiotics. If these are not properly managed, then the chemicals remain in some shrimps. Thus, control of inputs is also critically important to ensure the quality of the final export products.

5.6.3 Still room for non-compliance

Lastly, an additional difficulty with standards compliance is the fact that there is no one common standard/certificate on the international market. The standard requirements vary greatly across various importing countries. Thus, even if a product does not satisfy the needs of one country, the processors can shift that product to another country with lower standards. In fact, in the interviews, most of the processors openly admitted that when they have had products rejected or products that do not meet the standards of the EU, United States or Japanese markets, they send those products to other markets, for instance in Asian and Middle Eastern countries. They added that because these products still satisfy the standards set by these markets, it does not mean that they are sending bad products.

These "loose ends" in the international market work both positively and negatively for the processors. The diversity of requirements is a plus for processors because they can always find somewhere to ship the "low-quality" product even when some problems occur. It also works negatively in terms of standards compliance because this leaves room for them to be less careful in quality control in the production process. If the end product is strictly inspected by a common standard, they would have no option but to follow the strict rule.

5.7 Conclusions and policy implications

In this chapter, we examined the situation of standards compliance in the particular case of the Vietnamese frozen seafood export sector. We have seen that the rapid expansion of this sector was not only due to market liberalisation policies but also due to efforts to diversify destination markets, particularly when their *pangasius* and shrimps were at risk through international trade disputes. This diversification may have made standards compliance more difficult for Viet Nam because different markets require different standards. In addition, because most of the Vietnamese processors and exporters are independent entrepreneurs and not controlled by large multinational companies, unlike in Indonesia and the Philippines, it is probably more difficult to apply one common standard to the production processes and management (Taya, 2003).

The increasingly stringent trade standards are adding costs for Vietnamese stakeholders but mostly without increasing prices. The required standards vary across importers and over time, often with short notice, and are creating confusion among stakeholders. We have heard a lot of cries from processers during the interviews conducted for this study. Still, the processors and exporters try to comply, as meeting these standards provides access to export markets. The great difficulty lies in standards compliance at the level of the small-scale farmer. In fact, because it is costly and difficult to deal with numerous smallholders and enforce standards, many processors are no longer relying on smallholders and are moving to vertically integrate production processes, particularly for the *pangasius* sector.

The chapter concludes with some policy recommendations to help improve trade standards compliance for Viet Nam. Firstly, a stricter enforcement mechanism is needed to ensure standards compliance. While a lot of famers are now aware of the existence of these standards and certifications, they are not willing to obtain certifications because there is no effective incentive mechanism. Secondly, because random sampling tests of maximum residues are never perfect, it is also important to regulate the upstream market as much as possible, particularly at the levels of fish/shrimp seeds. This strict control of seeds will reduce the risk of disease and thus the use of antibiotics. Thirdly, in addition to intensifying monitoring by local authorities, offering access to public labs for farmers may also bring positive results by educating farmers about the condition of their fish. If they can check the status of their fish themselves before sale, that will also give them more incentives to grow safer fish. Here, development agencies seem to have important roles to play.