



CBI  
Ministry of Foreign Affairs of the Netherlands

# The Vietnamese seafood sector

## A value chain analysis

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**The Vietnamese seafood sector  
A value chain analysis**

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# Contents

	<b>Management summary</b>	<b>4</b>
<b>1</b>	<b>Introduction</b>	<b>8</b>
	1.1 Rationale and background	8
	1.2 Objectives	8
	1.3 Approach	8
	1.4 Structure	8
<b>2</b>	<b>General features and trends of the seafood sector in Vietnam</b>	<b>10</b>
	2.1 Introduction	10
	2.2 Significance of the seafood sector for the national economy	10
	2.3 Shrimp subsector	14
	2.4 Pangasius subsector	16
	2.5 Tuna subsector	18
	2.6 Clams, oysters and mussels subsector	20
<b>3</b>	<b>EU demand for seafood products from Vietnam</b>	<b>22</b>
	3.1 Introduction	22
	3.2 General trends and future prospects in EU seafood market	22
	3.3 General EU demand for seafood products	23
	3.4 EU demand for seafood from Vietnam	23
	3.5 Barriers to export to the EU market	24
	3.6 Market trends and growth potential for selected seafood products	25
<b>4</b>	<b>Subsector value chains and bottlenecks for exports</b>	<b>27</b>
	4.1 Introduction	27
	4.2 The influencers and supporters of the Vietnamese Seafood Industry	27
	4.3 Shrimp subsector	30
	4.4 Pangasius subsector	43
	4.5 Tuna subsector	55
	4.6 Clams, oysters and mussels subsector	62
<b>5</b>	<b>Conclusions</b>	<b>72</b>
	<b>Appendix 1 Stakeholder assessment grids</b>	<b>74</b>
	Shrimp Stakeholder Assessment Grid	74
	Pangasius Stakeholder Assessment Grid	74
	Tuna Stakeholder Assessment Grid	76
	Clams Stakeholder Assessment Grid	77

<b>Appendix 2 Baseline data</b>	<b>78</b>
Shrimp subsector	78
Pangasius subsector	82
Tuna subsector	84
Clams, oysters and mussels subsector	87

# Management summary

The Asian region is a major supplier of fish products to the EU market. Over the period 2005-2010 in particular, the aquaculture sector in some Asian countries became an important producer as well as exporter of whitefish and shrimps. Within the Asian region CBI is currently studying the possibilities of developing integrated programmes for the seafood sector for specific countries. This follows up on CBI's current seafood activities in Indonesia with the Ministry of Marine Affairs and Fisheries (MMAF) and the Surabaya Seafood Centre.

The policy of the Government of Vietnam aims to guide the seafood sector towards a leading world position as seafood exporter and is set out in the fisheries development strategy plan to 2020. An analysis of the plan shows that the focus of the Government of Vietnam is on increasing aquaculture production through diversification while the focus for capture fisheries is on protecting the fisheries resources.

Based on the results of the desk study, which was carried out in phase one of this seafood export VCA, the following subsectors in Vietnam were selected for value chain analysis:

- Shrimp
- Pangasius
- Tuna
- Clams, oysters and mussels

## Shrimp subsector

About 90% of shrimp production in Vietnam is exported. In 2010 the total value of Vietnamese exports was almost USD2bn. In 2010 the EU and Japan were the most important export markets in terms of value. Black Tiger shrimp still accounts for the largest share of shrimp production. However, the share of Pacific White shrimp is increasing rapidly. It is likely that in the coming years more farmers will shift to this non-native species. Five main bottlenecks for the export potential of the Vietnamese shrimp subsector have been identified as a result of the desk study, field work and validation workshop. These are presented in Table 1.

<b>Bottlenecks</b>	<b>Level in the value chain</b>
Shrimp disease	Primary production
Lack of sustainability in shrimp production	Primary production
Lack of vertical cooperation in the value chain	All levels
Lack of capital investment in infrastructure	All levels
Lack of cooperation between value chain operators and BSOs	All levels

There is considerable overlap between bottlenecks. As a result certain actions can tackle several issues. Most of the solutions to the bottlenecks relate to increased integration and cooperation between public and private actors across the shrimp sector. The most important bottlenecks for exports - traceability, food safety and sustainability - can be solved by increasing control and influence of lead firms over the value chain. Contrary to the problems at the primary production level such as disease and high input costs, these problems are directly related to exports, as non-compliance with traceability and food safety regulations will result in denial of market access, especially by the EU health authorities. This is especially so when exporting to the EU retail market segment where food safety, traceability and sustainability requirements are even stricter and more complex. The only way to achieve increased control in the supply chain is to create a competent base of suppliers who are not too risky to work with for lead firms or by

creating cooperatives of small-scale farmers that are not completely dependent on credit systems anymore. This enables them to buy farm inputs while maintaining a bargaining position that enables them to engage in direct relations with shrimp exporters. If Vietnam succeeds in organising its farmers in competent cooperatives that are able to engage directly with exporters, and in convincing exporters to invest in sustainable relationships with shrimp farmers, then the prospects for the sector are very good. However, this process will take time and in the short term attention needs to be given to solutions that can help to improve the current situation by, for example, raising awareness and competencies of middlemen and helping exporters to find partners to invest in sustainable shrimp production.

The export companies in the shrimp subsector are relatively mature. The fact that the exporters that were interviewed and present during the conference have not indicated that market access or market visibility is an issue for them suggests that these exporters are able to position themselves in the international market without additional support. Unless production from shrimp farms increases substantially it is unlikely that the exporters will be stimulated to further increase their export volumes by providing them with market intelligence or sponsoring them for visits to international trade fairs. However, exporters as well as other stakeholders in these subsectors have indicated that they struggle to meet the increasing demand for sustainably produced products. Furthermore, they also find it difficult to find their way through the wide range of diverse standards that apply to different markets within the EU, the US and Japan. Assisting and coaching exporters to identify, prepare and apply for certification schemes such as ASC, ACC, GlobalGAP or Naturland that fit best their product, business model and existing and prospective customers and markets may, if successful, substantially increase the export volume and value of sustainably certified shrimp products.

### **Pangasius subsector**

About 90% of pangasius production in Vietnam is exported. In 2010 the total value of Vietnamese exports was USD1.4bn. The EU and US are considered to be the most important market destinations for pangasius. Nearly all pangasius are exported as frozen fillets. Five main bottlenecks for the export potential of the Vietnamese pangasius subsector have been identified as a result of the desk study, field work and validation workshop. These are presented in Table 2.

<b>Table 2 Main bottlenecks of the pangasius subsector</b>	
<b>Bottlenecks</b>	<b>Level in the value chain</b>
Lack of quality fingerlings	Primary production
Lack of capital investments in infrastructure	Primary production
Lack of cooperation between value chain operators and BSOs	All levels
Lack of vertical cooperation and integration in the value chain	All levels
Complexity and diversity of international buyer requirements	Processors and exporters

Much work needs to be done to link the different actors and supporters in the pangasius sector together. More integration and long-term sustainable relationships between farmers and exporters, but also between value chain actors and BSOs, will benefit everyone. It seems that from the conclusions of the conference and in line with the conclusions in the shrimp sector the future of pangasius will be prosperous if the sector succeeds in making the move towards sustainable production. This must be achieved through improving the capacity and capability of pangasius farmers either through organising farmers horizontally or by increasing the formal relationships between farmers and processors, which will encourage processors to make investments in pangasius farms.

Similar to the shrimp subsector, the export companies in the pangasius subsector are relatively mature. The fact that the exporters that were interviewed and present during the conference have not indicated that market access or market visibility is an issue for them, suggests that these exporters are able to po-

sition themselves in the international market without additional support. Unless production from shrimp farms increases substantially, it is unlikely that the exporters will be further stimulated to increase their export volumes by providing them with market intelligence or sponsoring them for visits to international trade fairs. However, exporters as well as other stakeholders in these subsectors have indicated that they struggle to meet the increasing demand for sustainably produced products. Furthermore, they also find it difficult to find their way through the wide range of diverse standards that apply to different markets within the EU, the US and Japan. Assisting and coaching exporters to identify, prepare and apply for certification schemes such as ASC, ACC, GlobalGAP or Naturland that fit best their product, business model and existing and prospective customers and markets may, if successful, substantially increase the export volume and value of sustainably certified pangasius products.

### Tuna subsector

Vietnamese exports of tuna can generally be divided into canned tuna and frozen tuna products. In 2010 the total export value of canned tuna was expected to be over USD175m. The export value of frozen tuna in 2010 was USD103m. The US, EU and Japan are the most important markets for Vietnamese tuna. Six main bottlenecks for the export potential of the Vietnamese tuna subsector have been identified as a result of the desk study, field work and validation workshop. These are presented in Table 3.

<b>Table 3 Main bottlenecks of the tuna subsector</b>	
<b>Bottlenecks</b>	<b>Level in the value chain</b>
Outdated preservation techniques	Primary production
Lack of scientific data	Primary production
Lack of cooperation within the value chain	All levels
Lack of traceability	Primary production and traders
Lack of sustainability	Primary production
Food safety standards in export markets	Processors and exporters

The majority of the bottlenecks occur at the stage of the fishing fleet and the fish landing sites. Most of the small fishing vessels depend on the middlemen. In 2010 Vietnamese exporters exported about 80,000 tonnes of frozen and canned tuna, while only 37,000 tonnes of tuna were caught by the domestic fishing fleet. Data from VASEP show that Vietnam imported more than 52,000 tonnes of tuna in 2010, while in 2009 42,000 tonnes of tuna was imported from several countries. Vietnamese processors/exporters seem to be more dependent on imported tuna than on the raw material supplied by the domestic fleet. An important aspect for importing tuna from Vietnam is that tuna caught by Vietnamese vessels has lower import tariffs than tuna that has been caught by foreign vessels. It has been estimated that up to 50% of the catches cannot be sold to processors/exporters because the quality of the tuna has deteriorated due to insufficient cold storage facilities. Keeping in mind the lower tariffs for Vietnamese-caught tuna, processors should have an interest in improving the quality of the catches. Therefore the position of the fishing fleet within the value chain needs to be strengthened. The recently formed Vietnam Association of Tuna (VINATUNA) can contribute to the strengthening of the position of the fishing fleet. To maintain the quality of the tuna after it is caught, significant investments must be made and it is not certain whether the government will be able to provide the requested support. Also, the steps Vietnam is currently taking to obtain full membership in the WCPFC is an important improvement for the tuna sector.

Besides increasing imports of tuna from foreign vessels, production from the municipal fisheries may be increased substantially by reducing post-harvest losses. Besides increasing production there is also a large potential to stimulate exporters to source from sustainable sources, to support hand-line fishermen and to get involved in initiatives to promote sustainable tuna fisheries. However, for tuna this is a delicate issue because it is a migratory species with uncertain stocks. In order to increase the exports of sustainable certified products, an approach similar to that used for pangasius and shrimp is logical. There are ex-

amples of sustainable initiatives in the tuna sector to source tuna from small-scale fishermen that use sustainable catch methods. These kinds of initiatives can easily increase the export volumes and values of sustainable tuna products. However, exporters must be made aware of the market potential for sustainable certified tuna.

### Clams, oysters and mussels subsector

Oysters and mussels are not yet exported, and about 80% of total exports of bivalves consist of hard clams. Other exported species are scallops and blood cockles. In 2010 the total export value of clams was USD45m. The EU is the most important export market for Vietnamese clams. Eight main bottlenecks for the export potential of the Vietnamese clams subsector have been identified as a result of the desk study, field work and validation workshop. These are presented in Table 4.

<b>Bottlenecks</b>	<b>Level in the value chain</b>
Diseases and an unstable natural environment	Primary production
Fluctuation of wild sea resources	Primary production
Limited and inefficient contract farming	Primary production
Heavy dependence on wild seed	Primary production
Lack of institutional arrangements	All levels
Slow expansion of co-management	Primary production
Lack of stable relationships with EU importers	Processors and exporters
Lack of knowledge on food safety and sustainability	All levels

Most of the bottlenecks are related to the management of collection and farming of hard clams, and the provision of seeds for clam production. The removal of these bottlenecks will most likely be the responsibility of the government authorities although the further development of co-management also is mentioned as a possibility. The position of the middlemen can prevent processors from cooperating more directly with clam producers. Nowhere are middlemen mentioned as an operator that can contribute to removing bottlenecks. Emphasising the role of middlemen and stimulating them to participate in value chain discussions may promote increased value chain cooperation. When exporting companies have more control of their sourcing they may be able to establish relationships with importing companies in the EU and the US, because these companies often require a stable supply of products.

The production of clams, oysters and mussels is facing severe constraints, but there are many opportunities to stabilise and increase production. Contrary to the other subsectors, clams, oysters and mussels from Vietnam are not yet major export products to the EU market. Although the fact that a Vietnamese clam supplier has now obtained MSC certification represents a major achievement, Vietnamese clams are relatively new in the EU market. Contrary to the other subsectors, exporters also indicate that they lack sustainable relationships with EU buyers and are not fully aware of the marketing potential in the EU. In order to increase their export volumes and value to the EU market they need additional support to visit trade fairs and meet more potential buyers in the international market. This is only the case for the SMEs and not for the larger exporters that export multiple products and are more consolidated in the international market.



# 1 Introduction

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## 1.1 Rationale and background

The Asian region is a major supplier of fish products to the EU market. Over the period 2005-2010 in particular, the aquaculture sector in some Asian countries became an important producer as well as exporter of whitefish and shrimps. Within the Asian region, CBI is currently studying the possibilities of developing integrated programmes for the seafood sector for specific countries. This follows up on CBI's current seafood activities in Indonesia with the Ministry of Marine Affairs and Fisheries (MMAF) and the Surabaya Seafood Centre. For the development of these programmes, a good understanding of the supply and demand side of the industry is essential. For CBI to support further export growth of the seafood sectors of the Socialist Republic of Vietnam, additional research on the value chains of the most relevant seafood products in Vietnam is required.

## 1.2 Objectives

The main objective of this research is to identify the bottlenecks in four distinct but interconnected seafood export value chains in Vietnam and to advise CBI as to whether an intervention is possible, feasible and expected to contribute significantly to export growth within the seafood sector programme period. Within the value chain analysis (VCA) sustainability is a leading principle.

## 1.3 Approach

This VCA consisted of four phases. The first phase consisted of a desk study. During this desk study a demand and supply analysis was carried out for the Vietnamese seafood sectors and four subsectors were selected for further investigation. The second phase consisted of field work. During this phase in-depth field research was undertaken by local experts in Vietnam. These local experts were hired for the specific purpose of collecting missing data, assessing the specific situation and engaging with stakeholders. The third phase consisted of a country visit and validation workshop. During this phase the results of the field research undertaken by the local experts were discussed in a workshop with key stakeholders. Following validation of the collected information, the main bottlenecks in the entire value chain that can hinder exports were discussed and possible intervention strategies to overcome the main bottlenecks were identified. The fourth phase consisted of the reporting. During this final phase the analysed value chains were described and depicted based on the results of the previous phases.

## 1.4 Structure

This final report consists of five chapters. Chapter 2 includes the general features and trends of the seafood sector in Vietnam. In this chapter the significance of the different subsectors for the national economy and the general features and trends in the different subsectors are described. Information about the EU market for seafood products with the main trends and barriers to Vietnam is provided in chapter 3. Chapter 4 includes the value chains and bottlenecks for exports. For each of the selected subsectors the value chains will be presented visually and the bottlenecks preventing exports will be listed and prioritised. Following each subsector analysis the bottlenecks that can be eliminated will be identified. Chapter 5 presents the general conclusions. Appendix 1 provides a stakeholder assessment grid for each subsector with information about the interest and influence of the different stakeholders. Appendix 2 contains the rel-

evant baseline data for each of the subsectors as a point of reference for monitoring and evaluating the results of the seafood programme.

## 2 General features and trends of the seafood sector in Vietnam

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### 2.1 Introduction

This chapter serves as background for the value chain analyses that are presented in the next chapter. It describes the general features and trends of the Vietnamese seafood sector. General information is provided about the significance of the seafood sector for the national economy. Furthermore, trends in production or catch and export to the main destinations are described for each of the selected subsectors.

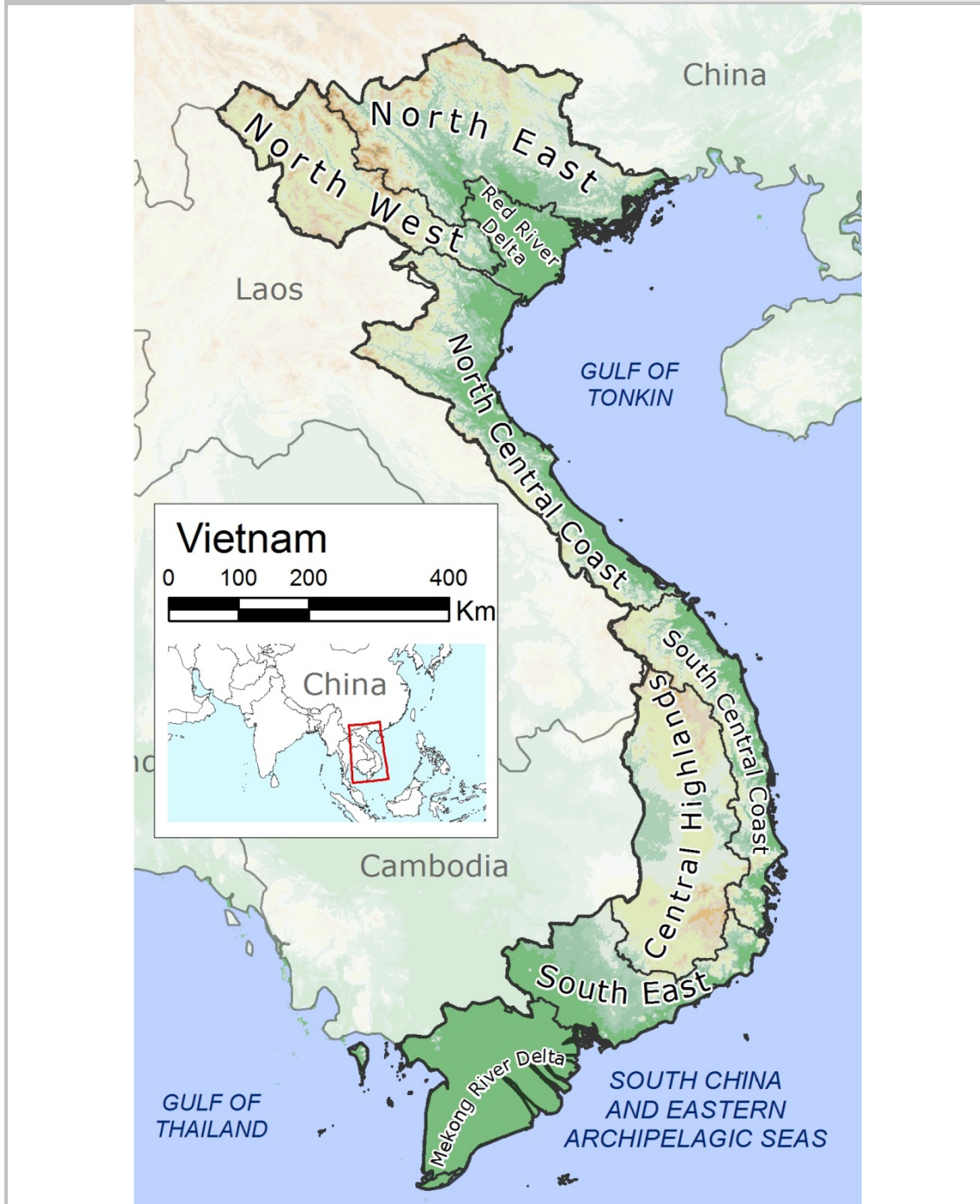
Based on the results of the desk study, which was carried out during phase one of this seafood export VCA, the following subsectors in Vietnam were selected for value chain analysis:

- Shrimp
- Pangasius
- Tuna
- Clams, oysters and mussels

### 2.2 Significance of the seafood sector for the national economy

Figure 2.2.1 presents a map of Vietnam with the different regions. North Vietnam refers to the North East province, North West province and the Red River Delta. When production data for the different provinces are presented in this report, production data from the South East region are included in the South Central Coast.

Figure 2.2.1 Map of Vietnam with the different regions



The policy of the Government of Vietnam aims to guide the seafood sector towards a global-leading position as seafood exporter and is set out in the fisheries development strategy plan to 2020. The following aspects of this plan are relevant:

- By 2020 the seafood industry contributes 30 to 35% of the agro-forestry-fisheries sectors' GDP, with a growth rate of 8-10% annually.
- Total fisheries output amounts to 6.5-7m tonnes, of which aquaculture production accounts for 65-70%.

- The strategy sets the targets to develop the fisheries sector according to four major sections: (1) fishing and fisheries resources protection, (2) aquaculture, (3) seafood processing and trading, (4) shipbuilding and fisheries logistic services.

An analysis of the plan shows that the focus of the Government of Vietnam is on increasing aquaculture production through diversification while the focus for capture fisheries is on protecting the fisheries' resources. The strategy includes the development of tilapia and marine fish production. However, there are parts of the document that emphasise the importance of diversification in aquaculture production in order to become less dependent on the production of shrimp and pangasius. In the short term, however, government programmes support these two species as they are considered the key export products. It is noteworthy that clams, oysters and mussels are seen by the government as an important growth sector and therefore the government provides incentives to entrepreneurs in this subsector. There is no information on actual support programmes.

In Vietnam, overall capture fisheries and aquaculture production amounted to 4.6m tonnes in 2008. Only 15% of this production volume was exported. Nevertheless, the contribution of the fisheries sector to the country's export earnings has increased rapidly over the previous decade. In 2010 seafood exports contributed approximately USD5bn out of a total export value of USD71.6bn. Currently, the fisheries sector ranks third in terms of foreign export earnings after the garment and crude oil industries, but ahead of other agricultural products such as rice and rubber.<sup>1</sup> More than 5m people are directly employed by the fisheries sector. Overall, around 8m people, or about 10% of the country's population, derive their main income from fisheries. The most important seafood products in Vietnam are pangasius, shrimp, tuna, and molluscs (including clams, oysters, mussels, squid and cuttlefish).

According to the Vietnamese Association of Seafood Exporters and Processors (VASEP) there are 534 seafood processing establishments in the country that are licensed by the National Agro-Forestry-Fisheries Quality Assurance Department (NAFIQAD) and which therefore have permission to export. For exports to the EU and US additional NAFIQAD licenses are required. By the end of 2011, 393 companies were licensed to export to the EU. The total volume of processed fish products in 2010 was more than 1,500,000 tonnes. Vietnam has more than 400 freezing factories with a daily capacity of 7,500 tonnes.<sup>2</sup> In Vietnam many companies are traditionally owned by the state or joined stock companies. Only recently has the number of private companies risen. Table 2.2.1 provides an overview of the types of companies that were licensed for seafood exports in 2009.

Type of company	Red River Delta	North Central and Central Coastal	Southern Delta	Mekong River Delta	Total
State-owned	6	33	30	22	91
Joint stock	9	30	47	73	159
Private	3	71	114	104	292
Joint venture	4	0	4	1	9
100% foreign capital	4	0	4	1	9
Total	26	134	199	201	560

Source: Corsin (2010).<sup>3</sup>

<sup>1</sup> Corsin, F., 2011, personal communication.

<sup>2</sup> VASEP, 2012, personal communication.

<sup>3</sup> Corsin, F., 2011, personal communication.

It is obvious that the North Central and Central Coastal area, the Southern Delta and the Mekong River Delta are the three most important regions for seafood processing plants. The companies in the Red River Delta and the North Central and Central Coastal Area mainly source captured products and Pacific White shrimp which is a rapidly developing subsector in these regions. The Southern Delta region, of which Ho Chi Minh City is the capital, follows the Mekong Delta as the most important region, and a strategic one, as it is easy to source from both the central and southern regions. Furthermore, high quality workers and highly educated staff are easy to find here. Moreover, Ho Chi Minh City has an increasingly important export harbour from which products can be directly shipped to most export markets. In the Mekong River Delta, the number of processing establishments has increased rapidly since the cultured production of Black Tiger shrimp and Pangasius increased rapidly. At present it is the most important source of raw material for the Vietnamese seafood sector.

**Figure 2.2.2 Total fisheries production in Vietnam in 2000-2010 (1,000 tonnes)**

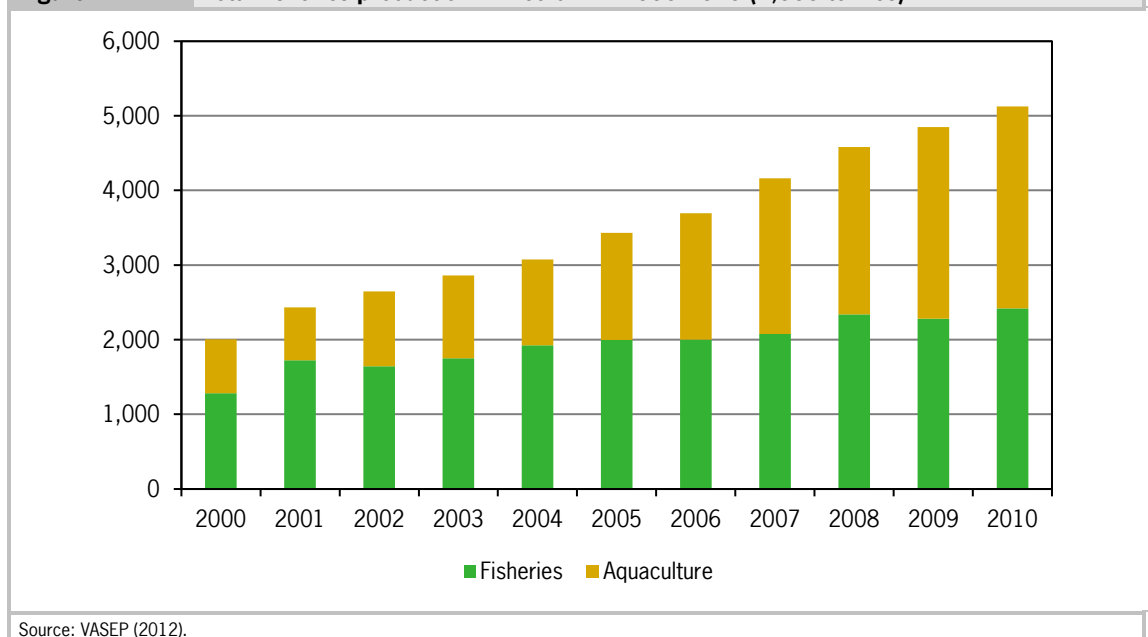


Figure 2.2.2 shows the total production of fish and aquaculture products in Vietnam in 2000-2010. In this period the total production has grown by 155%. The growth of the aquaculture production has been enormous, having increased by almost 2m tonnes in ten years. Production from fisheries has also grown, but more gradually. Cultured freshwater fish is the largest product group within aquaculture, while capture marine fish is the largest product group within fisheries. Freshwater fish is by far the fastest growing sector within the Vietnamese fisheries sector.

In Vietnam, donor-funded programmes focus mainly on aquaculture production. The most important target species are pangasius and shrimp. In the context of the Aquaculture Stewardship Council (ASC), there is a lot of interest from NGOs such as WWF, IUCN, Oxfam and IDH, particularly for pangasius. Although these organisations also focus on the shrimp subsector, pangasius appears to have priority. The Vietnamese seafood sector also receives a considerable amount of bilateral assistance from European countries, such as Denmark and the Netherlands, for example. This assistance focuses on the aquaculture subsectors and exports, but not so much on capture fisheries. For pangasius, IDH focuses mostly on providing financial and organisational support to exporters and large-scale producers to help them certify pangasius production in order to obtain the ASC label.

## 2.3 Shrimp subsector

### *Shrimp production*

In Vietnam, shrimp production has increased during the previous five years by approximately 56% from 300,000 tonnes in 2006 to almost 500,000 tonnes in 2010. Pacific White shrimp (*Vannamei*) account for the largest share of the increase in production. Pacific White shrimp has been introduced as a more productive shrimp species that is also more competitive in the international market compared to the domestic Black Tiger (*Monodon*) species. As can be seen in Figure 2.3.1, the contribution of wild shrimp to the total Vietnamese shrimp production is insignificant. Although Black Tiger shrimp still account for the largest share of production, the share of Pacific White shrimp is increasing rapidly. It is likely that in the coming years more farmers will shift to this non-native species.

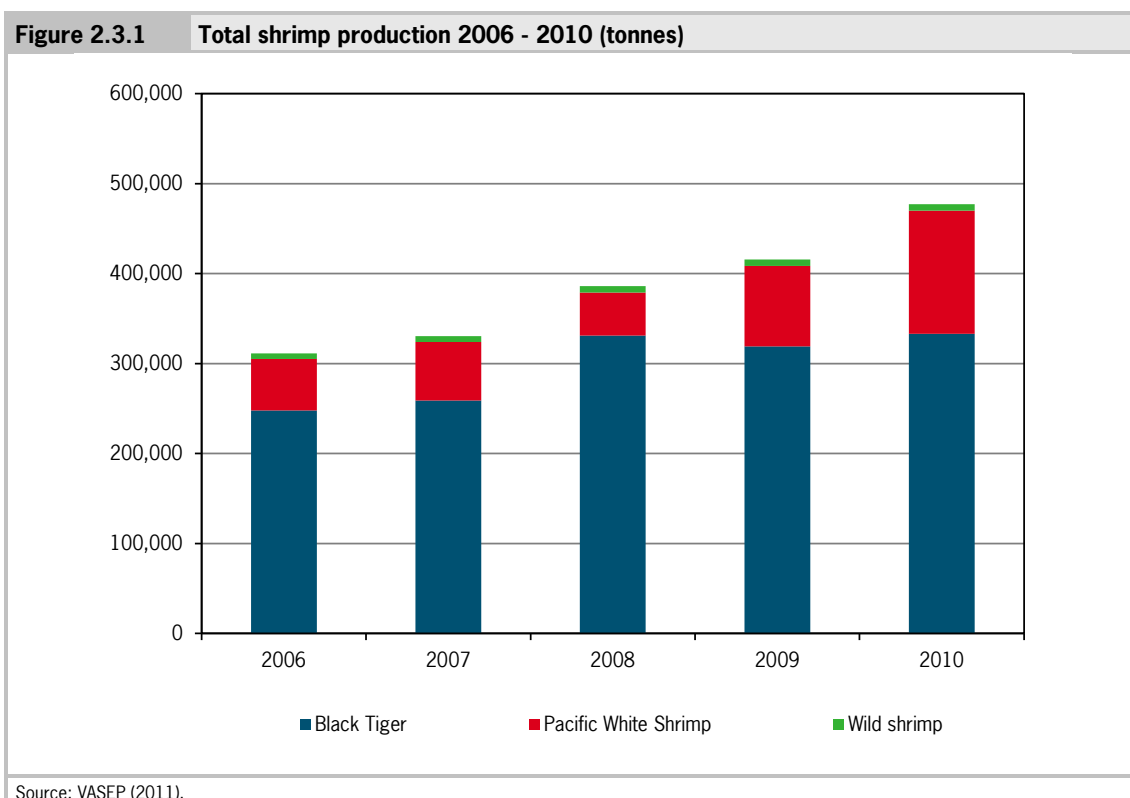


Table 2.3.1 shows the production of the different shrimp production regions in Vietnam in 2010 and their share of total production. Overall, the Mekong Delta accounts for about 73%, or 340,000 tonnes, of the total shrimp production. For Black Tiger shrimp, the Mekong Delta region accounts for more than 90% of total production, while Pacific White shrimp is produced mainly in the South Central region, accounting for over 50% of total production. During the coming years the production of Black Tiger shrimp is expected to stabilise, while the production of Pacific White shrimp is expected to continue to rise. This production increase of Pacific White shrimp will be the result of an increasing number of farmers that are expected to shift their production to Pacific White shrimp. The production of Black Tiger shrimp is expected to stabilise as a result of expected improvements in seed quality and farm management, which will benefit the productivity of the remaining farms. According to VASEP, the total production from shrimp farming increased to 495,000 tonnes in 2011.<sup>4</sup>

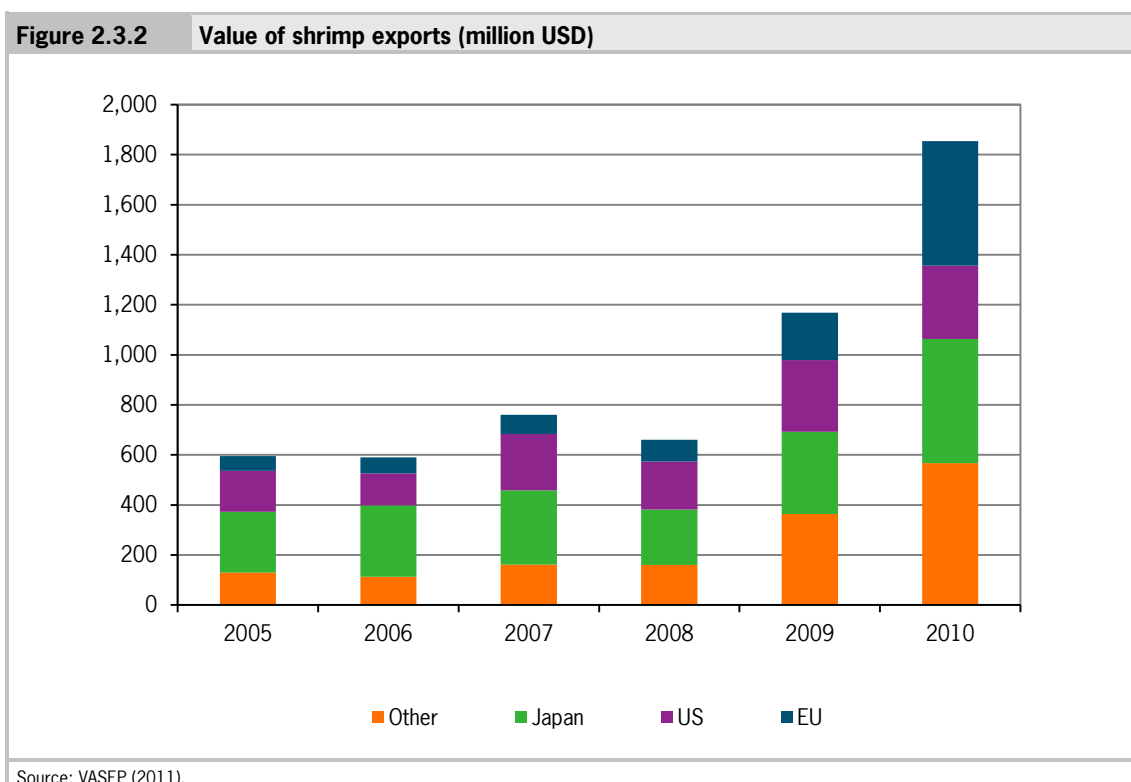
<sup>4</sup> VASEP, 2012, personal communication.

Region	Pacific White shrimp	Share (%)	Black Tiger shrimp	Share (%)	Total (tonnes)	Share (%)
North	8,800	6	6,300	2	15,100	3
North Central	22,600	17	4,800	1	27,400	6
South Central	73,800	54	12,700	4	86,500	18
Mekong Delta	31,500	23	309,300	93	340,800	73
<b>Total</b>	<b>136,700</b>	<b>100</b>	<b>333,100</b>	<b>100</b>	<b>469,800</b>	<b>100</b>

Source: VASEP (2011).

### *Shrimp exports*

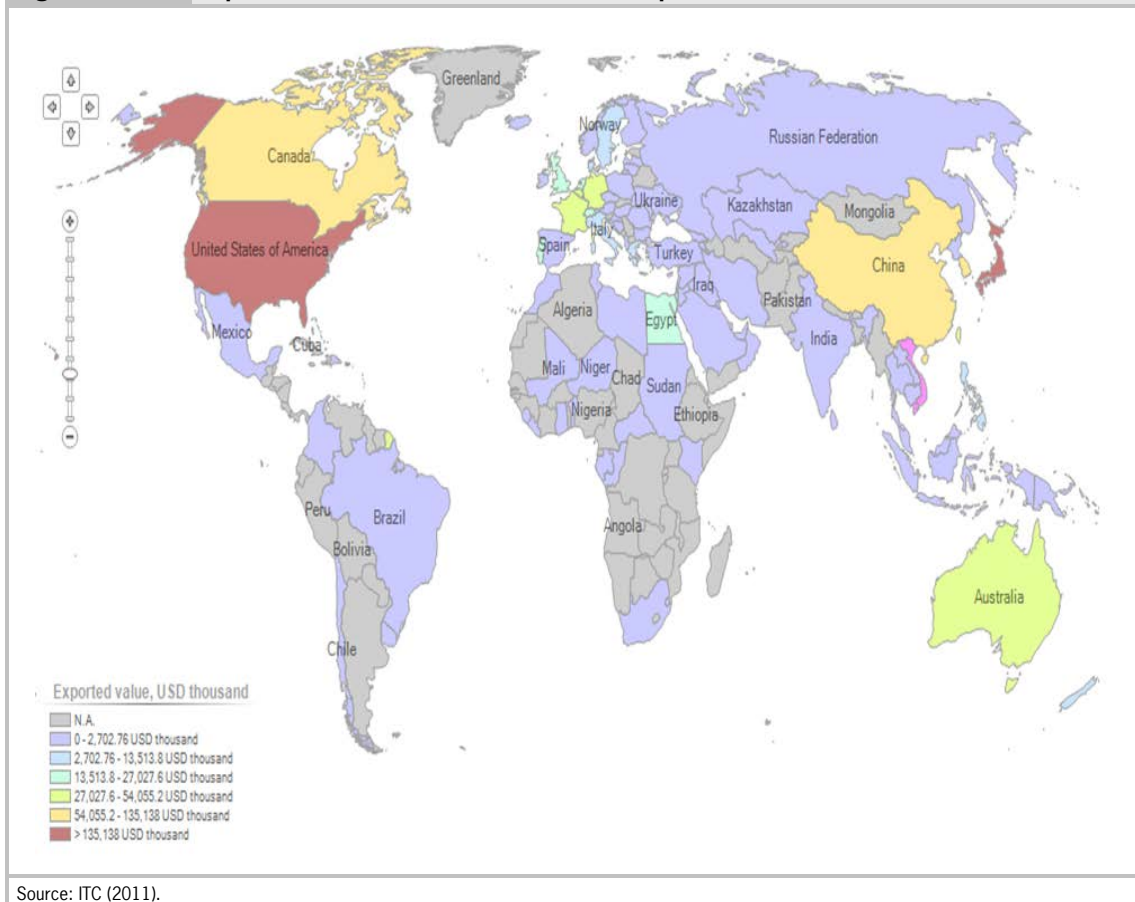
In general about 90% of shrimp production in Vietnam is exported. In 2010 the total value of Vietnamese exports was almost USD2bn. As can be seen in Figure 2.3.2, in the period 2005-2009 the US and Japan were the most important export markets in terms of value. In 2010 the export value of shrimp to the EU increased significantly compared to 2009 and was nearly equal to the export value to Japan. The difference between production volume and export volume can be explained by the conversion from live weight to product weight, as most shrimp is exported after peeling, without the head and tail. For frozen peeled shrimp the average live weight to product weight ratio is 0.6.



According to VASEP data, in 2010 77% of the export value comes from Black Tiger shrimp and 23% from Pacific White shrimp. The largest share of the value of Vietnamese shrimp imported to the EU in 2010 also consisted of Black Tiger shrimp (79%). Only 21% was Pacific White shrimp (VASEP, 2011). Figure 2.3.3 provides a detailed overview of the most important markets for Vietnamese frozen shrimp. The US and Japan are the largest importers. Within the EU, France, Germany and Belgium account for the largest share of frozen shrimp imports from Vietnam. More baseline data about production and export data are included in Appendix 2.



**Figure 2.3.3** Export market for Vietnamese frozen shrimp in 2010



Source: ITC (2011).

## 2.4 Pangasius subsector

### *Pangasius production*

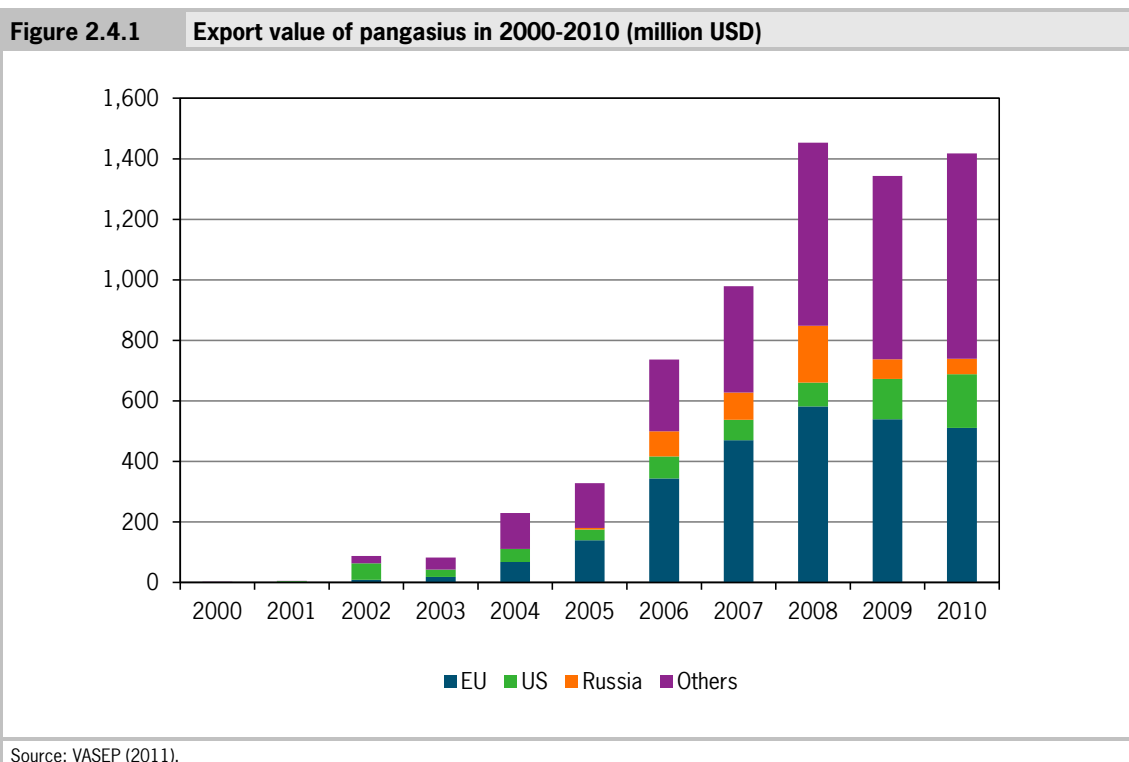
The farming of pangasius in Vietnam has developed rapidly over the past ten years. While in 2000 the production amounted to 100,000 tonnes, in 2010 production reached almost 1m tonnes. Over the past few years production has been fluctuating, with a peak of 1.2m tonnes having been reached in 2007. Table 2.4.1 presents the production of Pangasius in the different provinces of Vietnam in 2010. Nearly all pangasius production is concentrated in southern Vietnam. In the Mekong Delta approximately 5,400 hectares are used for the farming of pangasius. Dong Thap, An Giang, Can Tho, Vinh Long and Ben Tre are the provinces with the largest areas under cultivation and highest production volumes.

Province	Total production	Share of total production (%)	Area under cultivation (ha)
Tien Giang	39,000	4	207
Ben Tre	110,000	11	657
Tra Vinh	15,000	1	99
Soc Trang	25,000	3	125
Kien Giang	6,000	1	30
An Giang	173,000	18	999
Dong Thap	291,000	30	1,872
Vinh Long	115,000	12	406
Hau Giang	48,000	5	214
Can Tho	150,000	15	782
<b>Total</b>	<b>972,000</b>	<b>100</b>	<b>5,391</b>

Source: Vu NTTs - D-Fish (2011).

### *Pangasius exports*

Like pangasius production, the export of pangasius also increased significantly during the period 2000-2010. In 2000 the volume of the export was 700 tonnes, while ten years later this volume has increased to 660,000 tonnes with a value of USD1.4bn. In 2010 there were 291 pangasius exporters. About two-thirds of these exporters can be considered small exporters with an export volume of less than 1,000 tonnes in 2010. In 2010, 36 exporting companies are large exporters with a turnover of more than 5,000 tonnes. In 2010 these large exporters had a share of almost 75% of the total export volume. Nearly all pangasius is exported as frozen fillets; less than 1% of the export volume consists of other product types of pangasius (added value pangasius products).



The EU and US are considered the most important market destinations for pangasius. In 2010, 36% was exported to the EU, while 13% was exported to the US. Figure 2.4.1 indicates that almost 50% of export-

ed pangasius goes to several other countries in Asia, the Middle East and Eastern Europe. The pangasius export value to the EU has decreased since 2008; the export volume however has been stable. This might be the result of the strong competitiveness in the European whitefish market during the past few years that has put downward pressure on the export prices of pangasius. More baseline data about production and export data are included in Appendix 2.

## 2.5 Tuna subsector

### *Tuna production*

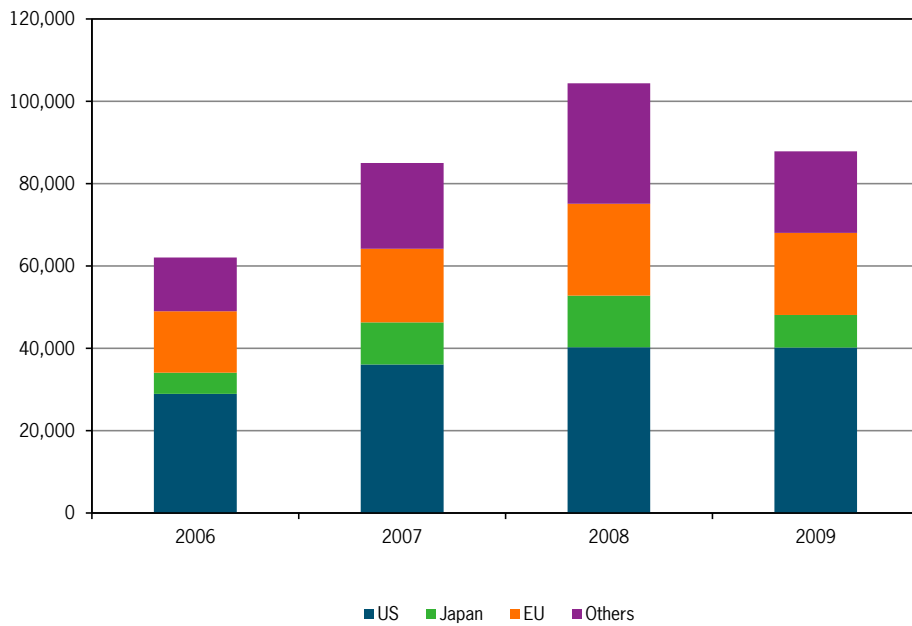
In Vietnam, tuna fisheries are considered to be the most important type of fishery. However, availability of data regarding tuna catch and species is limited. In 2010, catch of Yellow Fin tuna and Big Eye tuna were estimated at 17,000 tonnes, while an estimated 20,000 tonnes of Skipjack was caught. Participants of the strategic conference estimated the catch of Skipjack at less than 20,000 tonnes. More specific data could not be provided. Tuna is caught using long line, purse seines and gillnets. Long lines are used only in the three central provinces of Vietnam (i.e. Binh Dinh, Phu Yen and Khanh Hoa), while gillnets and purse seiners are used in almost all coastal provinces. Gillnet and purse seiners are catching mainly Skipjack tuna, but shark, rays, and mackerel are an important bycatch.

In Vietnam, tuna catch volumes are not sufficient to provide the processing industry with enough raw material. Therefore tuna is imported from other countries. These low catch volumes are partially the result of the small size of most Vietnamese fishing vessels and the fact that they do not fish in international waters. In 2010 more than 52,000 tonnes of tuna was imported with a value of USD95m. In the period 2006-2009 an annual volume of 35,000-45,000 tonnes was imported. Vietnam imported about 52,000 tonnes of tuna in 2010. Although it is likely that most imported tuna are Skipjack and Yellow Fin tuna, no detailed information about the imported species is available. Information about the countries of origin is also lacking. However, during an interview with an exporter it was mentioned that in 2010 Vietnam imported significant volumes of tuna from Taiwan.

### *Tuna exports*

Vietnamese exports of tuna generally can be divided into canned tuna and frozen tuna products. Figure 2.5.1 presents the export value of Vietnamese tuna. An increase from an export value of USD60m in 2006 to over USD100m in 2008 was followed by a drop to 2007 levels in 2009. For 2010 the total export value of canned tuna is expected to be over USD175m. The US, EU and Japan are the most important markets for Vietnamese tuna. Within the EU, Germany is by far the largest importer, with about 55% of the EU imports. The division of main export markets for 2010, however, is not available.

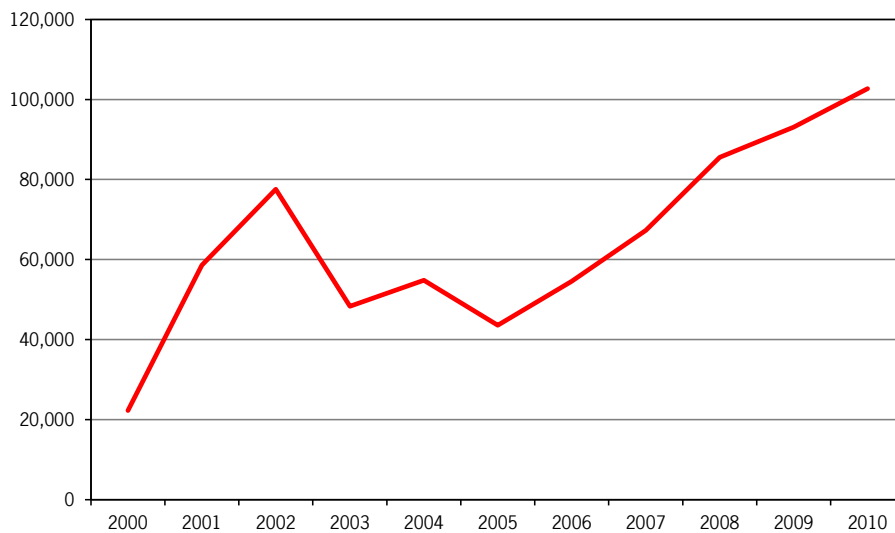
**Figure 2.5.1** Export value of canned tuna in 2006-2009 (1,000 USD)



Source: ITC (2011).

In Figure 2.5.2 it can be seen that since 2005 exports of frozen tuna are rising. In 2010 exports amounted to USD103m. From available statistical data it is not clear which species are exported as frozen tuna, but most likely this is mainly Yellow Fin tuna. More baseline data about production and export data are included in Appendix 2.

**Figure 2.5.2** Export value of frozen tuna in 2000-2010 (1,000 USD)



Source: VASEP (2011).

In 2011 Vietnamese exports of tuna (canned and frozen) continued to grow. In the first eleven months of 2011 exports increased by almost 30% compared to the first ten months of 2010. In particular, exports to Japan showed a sharp increase.<sup>5</sup>

## 2.6 Clams, oysters and mussels subsector

### *Production of clams, oysters and mussels*

In Vietnam oysters and mussels are only cultured, while clams are both cultured and captured. In 2010 more than 28,000 tonnes were captured while almost 152,000 tonnes of clams were cultured. Most of the captured clams are caught in the Mekong Delta (i.e. Ben Tre, Tien Giang, Soc Trang, Bac Lieu and Ca Mau provinces). The farming of clams is concentrated in the Mekong Delta (i.e. Tra Vinh province) and the Red River Delta (i.e. Nam Dinh, Thai Binh and Thanh Hoa provinces). Production of clams has increased steadily. In 2009 clam production more than doubled compared to 2006.

Three species of oysters occur in the lagoons and along the shores of Vietnam: *crassostrea. rivularis* in the North, and *C. lugubris* and *C. belcheri* in the south and lagoons in Central Vietnam. Recently Vietnam started to import seed of *C. gigas* for farming purposes. In 2009 more than 13,000 tonnes of farmed oysters were produced, with the largest share of production in the North of Vietnam. Currently, more than 90% of the commercial oyster production comes from farming. The remaining 10% is captured. As it is unclear in which part of Vietnam, this information is not included in Table 2.6.1. It is estimated that at present the majority of oysters are traded in local markets. Only a small amount of oysters are unofficially exported to China as fresh oysters. Like the production of clams, the production of oysters has increased rapidly in Vietnam. In 2009 total oyster production amounted to ten times what was produced in 2004 (1,300 tonnes).

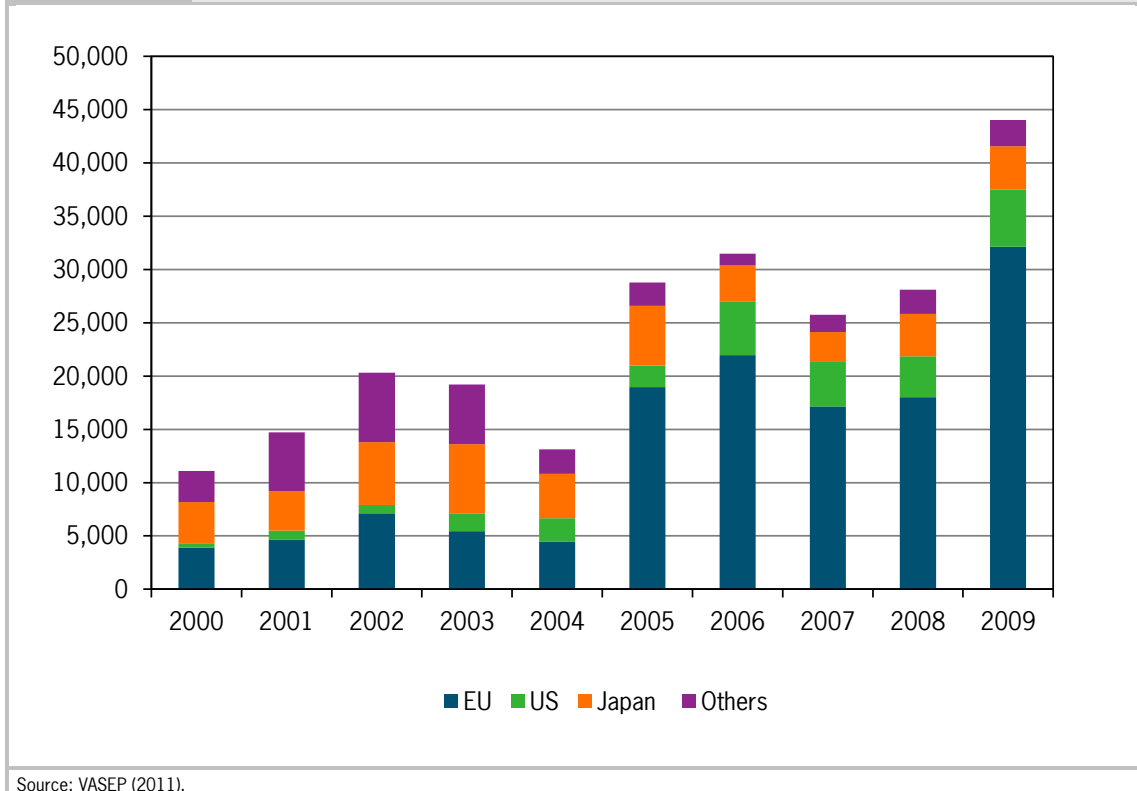
Mussels are farmed in small numbers in the North Central and the South Central regions of Vietnam. In 2009 a total of 3,400 tonnes were produced. It is estimated that more than 90% of the production of mussels originates from farms. At present there is no export (yet) and all mussel production is sold at local markets. Over the period 2005-2010, production of mussels in Vietnam fluctuated between 500 and 3,000 tonnes.

Region	Captured			Cultured		
	Clams	Oysters	Mussels	Clams	Oysters	Mussels
North	5,900			52,800	11,900	-
North Central	400			4,200	100	500
South Central	-			7,600	1,400	2,900
Mekong Delta	21,800			87,300	-	-
Total	28,100	-	-	151,900	13,400	3,400

Source: VASEP (2011).

<sup>5</sup> The Fish Site 2012. Tuna Export keeps strong growth. January 11, 2012.

**Figure 2.6.1** Export value of clams in 2000-2009 (1,000 USD)



Source: VASEP (2011).

Since oysters and mussels are not yet exported there are no specific processing establishments that focus on the export of these species. There are many small-scale producers that process oysters and mussels (and other mollusc species) for domestic consumption. According to VASEP there are about twelve processing plants that are largely engaged in processing of clams. Ten companies are based in the Mekong Delta, one processor in Ho Chi Minh City, and one processor in Hai Phong city. Processing plants usually process clams together with other products, such as shrimp and pangasius.

#### *Exports of clams, oysters and mussels*

About 80% of the total export (in terms of volume and value) of bivalves from Vietnam consists of hard clams. Other exported species are scallops and blood cockles. Export of clams is increasing. In the period 2000-2009 the export value increased from more than USD10m to nearly USD45m. In 2009, 21,000 tonnes of clams were exported. From Figure 2.6.1 it appears that the EU is the most important (and growing) export market for Vietnamese clams. Export values to Japan are stable, while export values to the US seem to indicate a growth in clam exports from Vietnam. More baseline data about production and export data are included in Appendix 2.

## 3 EU demand for seafood products from Vietnam

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### 3.1 Introduction

This chapter provides an overview of the EU demand for seafood products from Vietnam. Relevant information about suppliers of seafood to the EU located in countries other than Vietnam will also be included in the analysis. Section 3.2 describes the general trends and future prospects in the EU seafood market. Sections 3.3 and 3.4 analyse the EU demand for seafood in general and the EU demand for seafood from Vietnam. Relevant barriers to export to the EU market are described in Section 3.5.

### 3.2 General trends and future prospects in EU seafood market

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

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

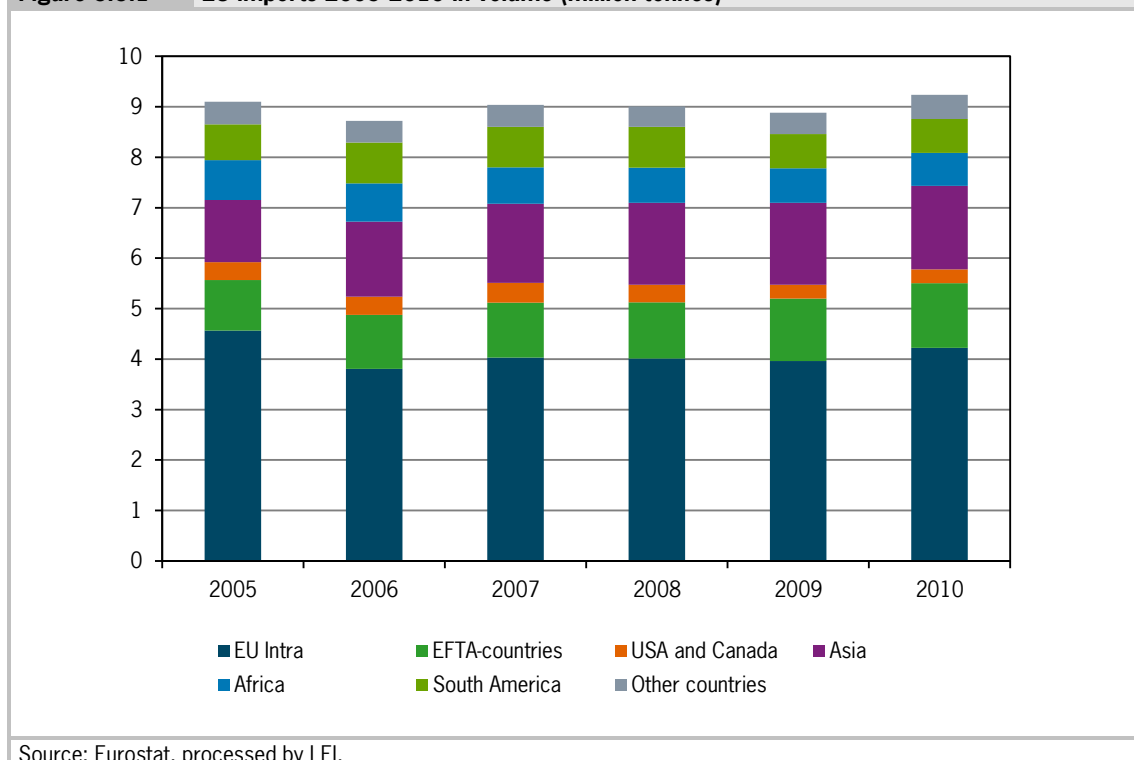
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<sup>6</sup> PBL, The protein puzzle; the consumption and production of meat, dairy and fish in the European Union. PBL Netherlands Environmental Assessment Agency, The Hague, 2011.

### 3.3 General EU demand for seafood products

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

**Figure 3.3.1 EU imports 2005-2010 in volume (million tonnes)**



Source: Eurostat, processed by LEI.

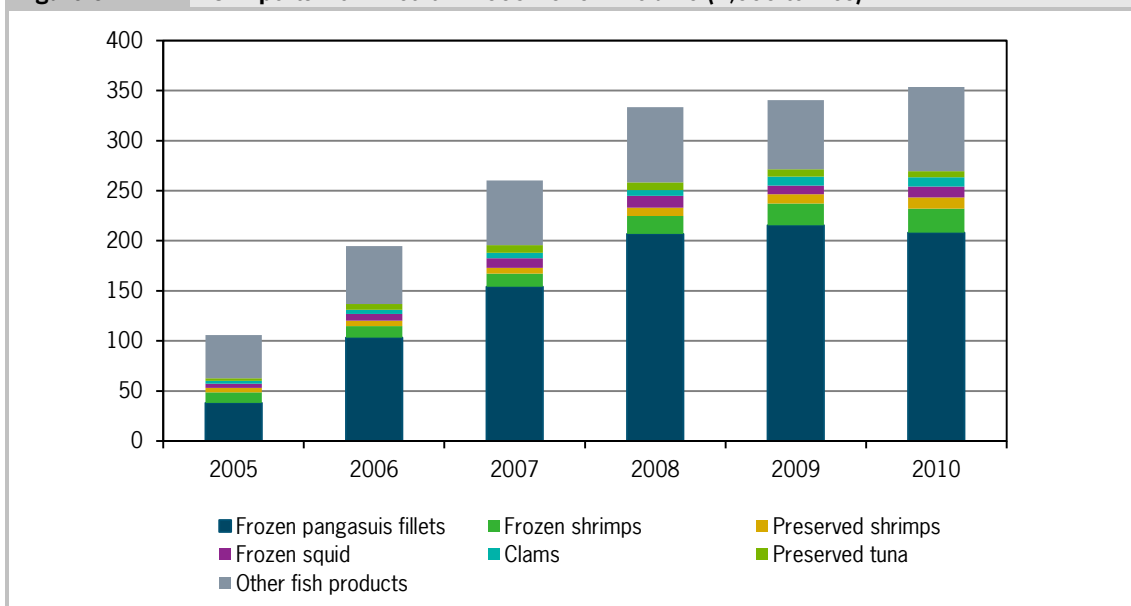
Most of the imports from countries other than EU Member States consist of raw material or primary processed products that are further processed and traded in the EU. In 2010 the main imported product categories in terms of volume are frozen fish fillets (21%), frozen fish (20%) and fresh/chilled fish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

### 3.4 EU demand for seafood from Vietnam

In the period 2005-2009 the import of pangasius fillets from Vietnam increased from 40,000 tonnes to more than 215,000 tonnes. The increased export of pangasius was the main contributor to the export growth of Vietnamese fish products to the EU. In 2010, however, exports of pangasius decreased slightly in terms of volume. In 2005 the total export volume was 105,000 tonnes, while by 2010 this volume had increased to 355,000 tonnes. With strong increased export of pangasius in the period 2005-2010, Vietnam has become a significant supplier of frozen fish fillets to the European market.



**Figure 3.4.1 EU imports from Vietnam 2005-2010 in volume (1,000 tonnes)**



Source: Eurostat, processed by LEI.

### 3.5 Barriers to export to the EU market

There are basically two main barriers to export to the EU market, namely food safety standards and import tariffs. Both aspects are discussed briefly in this section. Ultimately the competitiveness of the sub-sectors in Vietnam depends to a large extent on the degree to which these two barriers constitute a bottleneck for access to the EU market.

#### *Standards with respect to sustainability and food safety*

The increased focus on sustainability and food safety results in higher quality standards with respect to production and hygiene. The high level of EU food safety standards compared to the level of standards in markets such as the US, Japan and especially alternative markets such as South Korea or the Middle East, may constitute a barrier for exporters for whom the costs of compliance are too high.

For cultured shrimp, for instance, the EU demands that an EU authorised authority in each country tests and labels products from every shrimp farm in order to guarantee full traceability and that no forbidden medicines are used during the production cycle. If, for whatever reason, the local supply chain in shrimp producing countries cannot meet these requirements or is not able to pass the tests that need to be carried out, this may constitute a reason to export to other countries instead. In recent years it has happened that as a result of rejection by the EU (and also US and Japanese) health authorities, on the basis of the presence of antibiotics, for example, exporters shifted their focus to other markets where health standards are less stringent than in the EU. This ultimately results in different supply chains for specific end markets that each have own levels of quality. Contrary to other barriers, such as import tariffs, this barrier may be eliminated in the countries where shrimp are produced, as institutions can be strengthened and producers can be trained for compliance with EU standards.

Traceability is an issue in aquaculture production, as it is used as a means to be able to trace the origins of unsafe seafood. However, it is also an issue for capture fisheries since the EU has demanded the availability of catch certificates for each fish that is imported in the EU since 2009. These certificates are part of the EU regulations concerning Illegal, Unreported and Unregulated (IUU) fishing. As many fisheries in developing countries consist of small-scale vessels that are often not properly registered and area for a large part operated by uneducated fishermen, the introduction of catch certificates has proven to be a barrier for exports to

the EU. However, it is reported that by now most of the important fisheries have registered all vessels and implemented new policies that support fishermen and exporters in being able to provide the documents that are required for export to the EU market. The CBI modules may be useful tools to deal with this barrier, as many of the solutions may be found in export coaching and the strengthening of business support organisations.

#### *EU import tariffs*

Discussions regarding EU import tariffs mainly concern tuna and shrimps. Import tariffs for tuna have been debated widely, as Vietnam faces higher import tariffs compared to other countries that supply tuna to the EU, especially for canned tuna products (20-25%). These tariffs are also applied to imports from other Asian countries, such as the Philippines and Indonesia. Countries such as Fiji and Papua New Guinea have signed (interim) Economic Partnership Agreements (EPAs) with the EU and thus enjoy comparatively favourable conditions to trade tuna and other fish products. For shrimp, tariff issues currently focus on the US, where anti-dumping duties act as a barrier for shrimp exporters that are faced with high duties compared to exporters from other countries. Several countries have successfully objected to the US policies and duties have been reduced. Nevertheless, unequal duties still influence the competitive position of one country compared to another. At this time Vietnam falls under the General System of Preferences (GSP) system in the EU. However, as the status of all the countries is being reviewed, it may be that in the future they are confronted with higher tariffs. An example of the consequences of higher import tariffs is the Thai shrimp industry, which lost its preferential status for the EU market in the year 2000. As a result, exports to the EU dropped dramatically while exports to the US increased rapidly. Only after the Tsunami in 2004, when Thailand regained its preferential status, did shrimp exports to the EU recover slightly. A major problem with import tariffs is that the procedures to fight cases objecting to them are often long and drawn out.

### **3.6 Market trends and growth potential for selected seafood products**

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

#### *Pangasius*

Current market demand for pangasius is strong. Pangasius is one of the most important imported fish products for the EU market. Spain, Germany, Poland and the Netherlands import the highest volumes. Not all pangasius is consumed in these countries. It is also processed and re-exported to other EU countries. In terms of volume, there seem to be few growth opportunities for export to the EU market and the highest export growth is expected to countries in Eastern Europe (Ukraine and Russia) and South America. In the US, a programme for the mandatory inspection of catfish products has been proposed. In the long term this regulation might cause a slowdown in imports of pangasius.<sup>7</sup> As demand will exceed the production level, import prices of pangasius are expected to increase. Nevertheless, the market position of pangasius remains strong. Potential to add value to pangasius fillet may occur in some niche markets where high-quality products could have potential. Furthermore, sustainable production of pangasius can provide added value.

#### *Shrimp*

Market demand for shrimps in the EU is strong. Demand for shrimp products has increased during the past few years, and despite the financial crisis the EU demand remained strong. In the near future competition in the main shrimp markets is expected to increase as EU trading and processing companies are

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<sup>7</sup> Globefish, *Market report pangasius - August 2011*. Globefish, Food and Agricultural Organization, 2011.

able to source different shrimp species from a wider variety of countries. Growth potential therefore seems high. As with tuna, there are different market segments for shrimp products. Therefore its value added potential is relatively high. Throughout the EU, shrimps are consumed as various products in several market segments. Since most shrimp products are value added products, these products are more sensitive to changes in demand as a result of economic situation and outlook.

#### *Tuna*

Market demand and growth potential for tuna products is strong. Product differentiation has resulted in demand for different tuna products in different market segments, such as traditional products (canned tuna) and products designed for convenience. Furthermore, demand for sustainably produced tuna is increasing in North-western Europe.<sup>8</sup> Other important suppliers of tuna to the EU, such as Ecuador, are favoured by a 0% tariff and therefore have a comparative advantage over most Asian countries. Canned tuna products from Vietnam compete with canned tuna from Spanish and French canning companies.

#### *Clams, oysters and mussels*

EU market demand for clams is increasing. Most high value molluscs are produced and traded within EU countries. There seems to be growth potential, as Vietnam already exports a significant amount of clams to the EU, other Asian countries and the Middle East. Globefish mentions growth possibilities for other molluscs such as oysters and mussels in terms of exports.<sup>9</sup> Since these products are not exported to the EU yet, however, it is difficult to determine the growth potential and value added potential of oysters and mussels.

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<sup>8</sup> CBI, Sustainable tuna in the United Kingdom, The Netherlands and France. Centre for the promotion of imports from developing countries, The Hague, 2011.

<sup>9</sup> Globefish, Market report bivalves - August 2011. Globefish, Food and Agricultural Organization, 2011.

## 4 Subsector value chains and bottlenecks for exports

### 4.1 Introduction

In this chapter the value chains of the selected subsectors in Vietnam are analysed and the main bottlenecks are identified and prioritised. The value chain analysis for each of the subsectors consists of two sections. In the first section the value chain is mapped. This section includes a visual representation of the value chain with its operators, supporters and influencers. It also provides information about the flow of products along, and the relationships within, the value chain. The second section includes the key bottlenecks of the value chain that were discussed during the strategic conference as well as a visual representation of these bottlenecks. For each of the key bottlenecks the main solutions and actions, stakeholders that need to be involved and donor agencies that are already working on specific bottlenecks are mentioned.

The main stakeholders for each subsector are described. In order to avoid repetition and/or conflicting descriptions of stakeholders in different subsector descriptions, a complete stakeholder description is only provided in the first subsector where the stakeholder is mentioned. Relevant additional details regarding these stakeholders are provided when relevant for each following subsector.

### 4.2 The influencers and supporters of the Vietnamese Seafood Industry

The first part of this section describes the main government authorities that shape the institutional framework in which the Vietnamese seafood industry operates. The descriptions of the institutions are general and limited to the overarching roles and responsibilities that they have in regulating, supporting and promoting the seafood sector. The second section elaborates on all the other supporters of the Vietnamese seafood sector, including producer associations, exporter associations, financial institutions and research institutes. The specific roles and responsibilities of all the influencers and supporters in the four subsectors will be explained in Sections 4.3-4.6.

#### *The institutional framework*

##### *Ministry of Agriculture and Rural Development (MARD)*

Since 2007, the ministry of fisheries has become a part of the Ministry of Agriculture and Rural Development (MARD). MARD has been appointed by the EU as the Competent Authority. The four most important offices and/or departments of MARD with regard to the seafood sector are the General Fisheries Office (usually called the Directorate of Fisheries (DoF), the National Agro-Forestry-Fisheries Quality Assurance Department (NAFIQAD), and to a lesser extent the Department of Animal Health (DoAH) and the National Centre for Agriculture and Fisheries Extension.

The DoF has seven sub-departments that mainly operate at the level of primary production:

1. Scientific & Technological and International Cooperation Department
2. Aquaculture Department
3. Inspection Department
4. Department of Capture Fisheries and Resource Protection
5. Analysis and Verification Center for Aquaculture
6. Fisheries Information Center (FIC)
7. Vietnam Institute of Fisheries Economics and Planning (VIFEP)

DoF is mainly responsible for the overall management of the fisheries sector and for making and implementing policy and regulations.

NAFIQAD is the most important department of MARĐ with regard to quality control and food safety, which are crucial for the exports of seafood to the EU. NAFIQAD has six branches throughout the country that perform operational tasks such as conducting biochemical tests. The department has responsibilities at both the producer and factory levels:

- At the producer level the department is responsible for the residue monitoring programmes for which it takes random samples on a monthly basis. If antibiotics or other forbidden residues are detected, NAFIQAD has the authority to sanction the producer. Only products that are tested by one of the NAFIQAD labs and have been given a certificate can be exported to the EU market.
- At the farm level NAFIQAD is currently planning to introduce a traceability system in which every aquaculture farm will receive a number that will help the sector to meet buyer requirements for traceability. This system will first be implemented for the pangasius sector.
- At the factory level NAFIQAD is responsible for certifying processing facilities. NAFIQAD is also responsible for certifying factories for access to the EU market.
- NAFIQAD provides training for farmers and processors to improve their awareness of food safety issues in the seafood sector.

The Department of Animal Health is responsible for monitoring and regulating the use of medicines and chemicals in the aquaculture sector. The centre of Agriculture and Fisheries Extension is supporting producers in their efforts to meet national regulation.

The provincial Departments of Agriculture and Rural Development (DARD) are responsible for monitoring the compliance with regulations and applying sanctions for regulation violations at the provincial level.

#### *The Ministry of Commerce and Industry (MOIT)*

MOIT also plays a significant role in the shrimp sector. MOIT is responsible for state management of the commerce and industry, including seafood enterprises (farming, fishing, processing and exporting enterprises). MOIT is focussed on state management of the exporting and importing seafood companies. Under MOIT there are four key sub-department functions, as listed below:

1. Department of Export and Import responsible for granting the C/O (certificate of origin) for export products including seafood. In addition, the Vietnam Chamber for Trade and Industry (VCCI), a semi-governmental organisation: also grants the C/O to the seafood processors/exporters.
2. Department of multi-border trade policies: responsible for the management of multi-border trade policies, e.g. WTO, antidumping, tax, tariff from.
3. National Committee Office of International Cooperation: responsible for international cooperation of trade and industry, e.g. WTO, ASEA-EU, ASEAN-US, ASEAN-China, etc.
4. Department of Trade Promotion: responsible for trade promotion for the export companies.

At the provincial level MOIT also operates under the authority of the Provincial People's Committee (PPC) and is mainly responsible for export promotion.

#### *The Vietnam Certification Centre (QUACERT)*

QUACERT is the National Certification Body of Vietnam established by the Ministry of Sciences and Technology as a subsidiary of the Bureau for Standards, Metrology and Quality. QUACERT is authorised to provide services including certification of management systems to international standards: ISO 9000, ISO 14000, OHSAS 18000, ISO 22000, HACCP, GMP, ISO 27001, ISO/TS 29001, GLOBAL GAP; product certification to Vietnamese standards (TCVN), foreign standards (JIS, ASTM, GOST, GB), regional standards (EN, CEN) and international standards (ISO, IEC); and product certification to technical regulations. Certifi-

cates issued by QUACERT, including VietGap, are approved internationally.

### ***Research institutes***

The research, education and training institutes involved in the seafood sector include universities, research institutes and vocational schools. The most important are noted here.

The universities include the Fisheries University in Nha Trang; Ha Noi University of Agriculture; the National University in Ha Noi; the University of Agriculture and Forestry in Ho Chi Minh City; Can Tho University; and the Fisheries University in Kien Giang.

For aquaculture the most important research Institutes are the Research Institute for Aquaculture nos. 1, 2, and 3 (RIA). RIA 1 is located in the north of Vietnam, RIA 2 in the centre of Vietnam and RIA 3 in the south of Vietnam. All three institutes have different specialisations, e.g. fresh or brackish water aquaculture.

For fisheries there are the Research Institute for Marine Products in Hai Phong City and the Institute of Oceanography in Nha Trang City.

Vocational schools where students are educated to work in the seafood sector include those in Hai Phong, Bac Ninh and Ho Chi Minh City.

### ***Producer and exporter associations***

#### *Vietnam Fisheries Society (VINAFFIS)*

VINAFFIS is responsible for protecting and supporting all the stakeholders, especially at the level of primary production in the fisheries and aquaculture sector. VINAFFIS represents and protects the legitimate interests of its members, promotes dialogue and brings producers opinions to policy-makers in order to formulate and adjust policies towards the sustainable development of fisheries. VINAFFIS cooperates with fisheries organisations across the world in order to exchange scientific technology, improve economic cooperation and improve the capability of members to develop sustainable fisheries.

VINAFFIS has 32 provincial VINAFFIS representations and sub-associations, over 800 branches and 34,000 individual members. Furthermore, there are over 60 collective members of the central VINAFFIS organisation. Those are fisheries faculties of universities, fisheries research institutes, training and education centres, businesses and sub-associations operating in the fisheries sector. Vietnam Fisheries Magazine is an organ of VINAFFIS, which provides information on policies and plans issued by the government, as well as major activities of the sector and the society to members.

#### *The Vietnam Association for Seafood Exporters and Processors (VASEP)*

VASEP is the association that unites 80% of Vietnam's seafood exporters and processors and is much stronger than many other seafood exporter associations in other Asian countries. The main functions of VASEP are to protect the rights of the seafood exporters and processors (e.g. the lawsuit against US concerning Catfish/Pangasius, anti-dumping of shrimp); to lobby for the members with regard to government policy (e.g. tax for importing seafood) and to improve the public private corporation in the sector. Finally, VASEP also is responsible for increasing the visibility of Vietnamese seafood in the international market.

The exact functions of VASEP are defined as follows:

- reinforcing international and interior relationships
- providing updated market information and organising events
- launching seafood trade promotion and export market expansion

- providing training courses: organising and implementing educational and training courses to improve the ability, professional knowledge, skills and awareness of technicians, managers and personnel who are in charge of import-export business in the seafood enterprises
- providing consulting services

*The National and Provincial Associations of Small and Medium Enterprises*

This association also provides support to small and medium enterprises in the seafood sector, but mainly on the dissemination of good business models; information on regulations of both the Vietnam government and importing countries, including EU; access to and collaboration with banks and influence on the policies of the Vietnamese government; and technical assistance, e.g. training, workshops.

***Financial institutions***

Several state banks offer financial services for the seafood sector, e.g. Bank for Foreign Trade (Vietcombank) and the Bank for Commerce and Industry (Vietinbank). Very often these banks require complicated procedures to attain loans, and they are more geared towards working with companies rather than small-scale farmers.

Other banks, such as the Vietnam Bank for Agriculture and Rural Development (VBARD), the Development Assistance Fund (DAF), the Bank for Investment and Development of Vietnam (BIDV) and the Vietnam Bank for the Poor (VBP) (currently known as the Vietnam Bank for Social Policy (VBSP), can offer loans to small- and large-scale farmers, middlemen and processors.

Recently, many private commercial banks have begun providing loans for the shrimp industry. The interest rate, however, can be higher than 10%. The advantage is that these loans are easier to access for all kinds of loan takers.

In addition to the Vietnamese banks, some donors (UNDP, DANIDA) and NGOs have granted projects and provided microcredit to farmers, including small shrimp farmers, in selected poor provinces of Vietnam.

Although banks play an important role in providing loans on the basis of collateral (properties or agricultural land), available bank loans are insufficient to cover producers' operational costs. Informal sources of credit, such as moneylenders and middlemen, are regularly used to finance the working capital and investments of fisheries and aquaculture operations.

***Certification bodies***

Besides the public certification bodies there are also many private parties active in Vietnam, e.g. VERITAS, Intertek and SGS Vietnam.

**4.3 Shrimp subsector**

Figure 4.3.1 presents the shrimp value chain in Vietnam and includes the priority bottlenecks which are crucial for the export potential of the shrimp industry in Vietnam. When relevant, the differences between the value chains of Pacific White and Black Tiger shrimp are specified.

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

1. Input suppliers: e.g. hatcheries, feed suppliers, substances (medicals and chemicals) and equipment
2. Farmers: e.g. traditional and semi-intensive
3. Middlemen: e.g. small and large middlemen
4. Processors/exporters

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

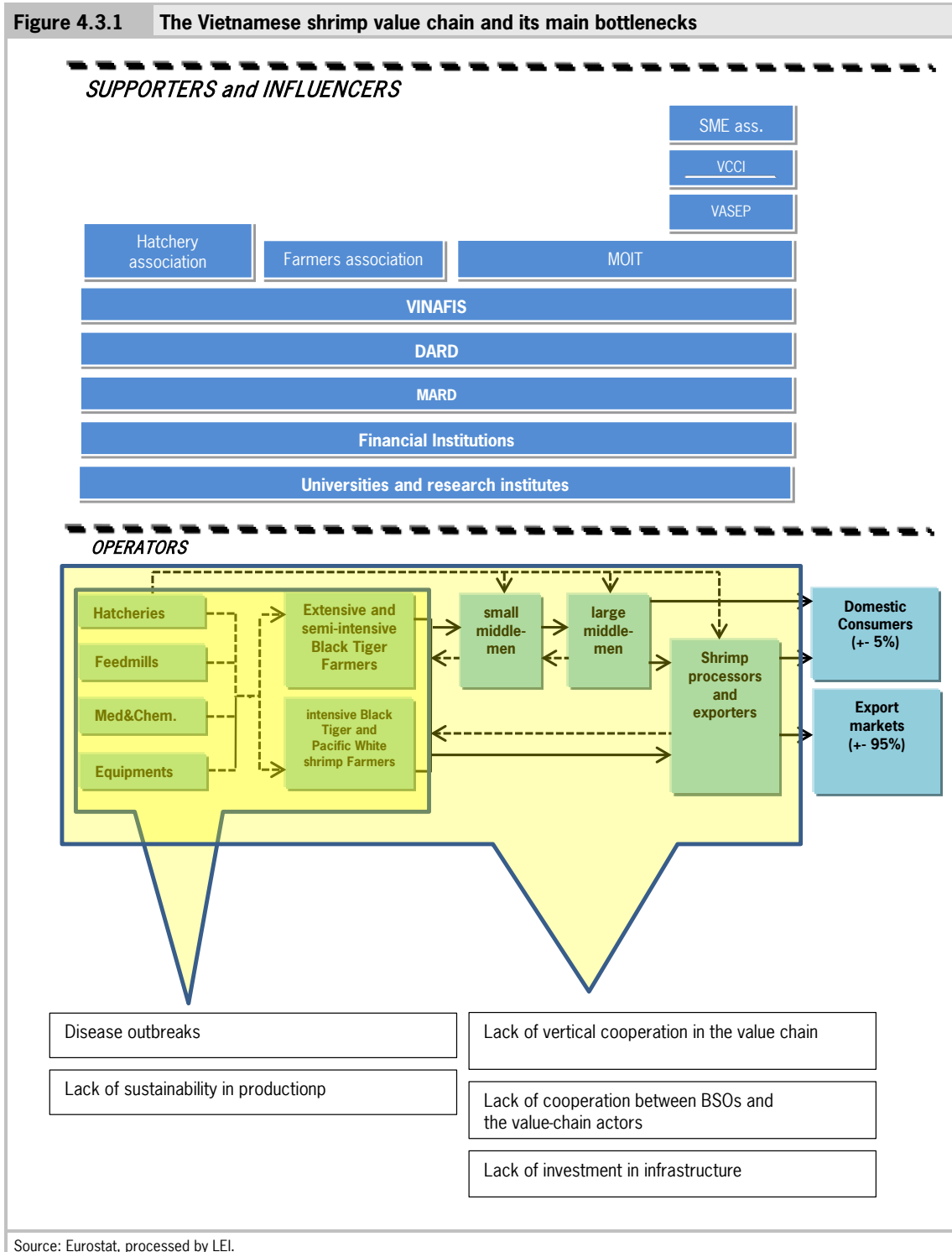
1. Government authorities (e.g. DARD, MARD, MOIT, VCCI)
2. Research institutes
3. Producer and exporter associations (e.g. VASEP, VINAFIS, SME associations)
4. Certification bodies
5. Financial institutions

Finally, five main bottlenecks have been identified as a result of the desk study, field work and validation workshop:

1. Shrimp disease
2. Lack of vertical cooperation in the supply chain
3. Lack of capital investment in infrastructure
4. Lack of cooperation between value chain actors and Business Support Organisations (BSOs)
5. Lack of sustainability, including production volume



**Figure 4.3.1 The Vietnamese shrimp value chain and its main bottlenecks**



**Operators in the value chain**

*Input suppliers*

There are four main inputs being supplied to the shrimp farms subsector: 1) seed, 2) feed, 3) chemicals and medicines and 4) equipment. In general these inputs are sold through two marketing channels: 1) directly from the producer to large-scale farmers or 2) through local distributors who are often middle-

men who also provide working capital and harvest (and post-harvest) services. The way in which farmers purchase their inputs depends on their financial situation. Farmers with sufficient financial resources will buy directly from the producers for a slightly better price, while those with a lack of financial resources will buy through traders and pay a slightly higher price. Each of the four inputs will be discussed briefly below.

#### 1. Seed

It is estimated that in 2010 local hatchery production supplied about 58.8% of the total demand for Black Tiger seed and 47.5% of the total demand of Pacific White shrimp seed. The remainder of the local demand is imported from neighbouring countries such as China and Thailand, and especially for Pacific White shrimp, also from the US. According to local experts, the imports of cheaper Chinese seeds are an important threat to Vietnamese shrimp production because the quality is often insufficient.

Hatcheries breed shrimp and produce naupili (young larvae) or even post larvae which are sold to shrimp farms. In Vietnam, shrimp hatcheries can be separated into small and large hatcheries. It is argued that especially the quality of seeds from small hatcheries - which are often privately owned while the large hatcheries are often state owned - are too low and are one of the reasons behind the high mortality rates in shrimp production. Large hatcheries take care of the entire breeding process and mainly supply seed to shrimp seed traders or supply directly to larger commercial farms. While some small hatcheries buy nauplii from large hatcheries to grow them to post-larvae, others are actually nurseries where post-larvae are acclimatised to local circumstances. Small-scale hatcheries mostly supply to middlemen and traders and sometimes supply directly to smaller farms. Although the regulatory framework in which hatcheries operate is weak and many seeds are sold illegally, there are also a number of hatcheries, especially the larger commercial hatcheries, which are certified by MARD and supply better quality seeds.

Before 2008, it was estimated that about 80% of the hatcheries were located in South Central Vietnam because the local conditions there are most favourable. In recent years many hatcheries re-located to the Mekong Delta Region to be closer to their buyers (i.e. shrimp farmers).

#### 2. Feed

In Vietnam the weakness of the shrimp subsector is that the feed price is 10-15% higher compared to other countries. The main reason is that 60% of shrimp feed production is controlled by foreign companies (e.g. CP, Grobest, Uni-president, Concopro, etc.). The high production cost is also caused by the lack of locally available feed ingredients. According to MARD, 2.4m tonnes of feed is consumed in the Vietnamese aquaculture sector. 50% of the necessary inputs to produce this amount of feed have to be imported.

#### 3. Medicines and chemicals

Medicines and chemicals are often distributed through local feed traders and retail shops. However, industry insiders say that farmers can also easily purchase medicines at local pharmacies which are not approved for use in food production. This may cause severe issues in the export markets.

#### 4. Equipment

Equipment for shrimp farming is mostly sold through local warehouses that sell inputs for the agricultural sector.

### *Shrimp producers*

The Mekong Delta Region is the most important production region for the Vietnamese shrimp subsector. In general we can distinguish four types of farms; three types produce Black Tiger shrimp and one type produces Pacific White shrimp. The average productivity of each farm type is given in Table 4.3.1.

<b>Table 4.3.1</b>		<b>Types of shrimp farms and their productivity</b>
<i>Black Tiger shrimp</i>		
- Extensive		0.3 - 0.6
- Semi-intensive		0.8 - 1.0
- Intensive		2.4 - 6.5
<i>Pacific White shrimp</i>		
- Intensive		11.7
Source: Adapted from Corsin (2011). <sup>10</sup>		

#### 1. Black Tiger shrimp

In 2010 (Corsin) the area covered by farms producing Black Tiger shrimp amounted to 670,000 hectares. Most of these farms (about 92% of the total Black Tiger shrimp production area) are concentrated in the South of Vietnam in the Provinces Ca Mau, Bac Lieu, Kien Giang, Soc Trang, Ben Tre and Tra Vinh. The area covered by extensive and semi-intensive shrimp farms amounts to approximately 550,000 hectares, accounting for 89.8% of the total area under Black Tiger shrimp culture. Ca Mau Province accounts for 253,300 hectares and is considered to be largest area for extensive and semi-intensive shrimp farming. The yield of extensive shrimp farming ranges from 0.3 to 0.6 tonnes/ha/cycle. The yield of semi-intensive farming ranges from 0.8 to 1.0 tonnes/ha/cycle.

The production of shrimp from intensive culture systems was estimated at about 192,769 tonnes per annum. In Vietnam the area under intensive culture of Black Tiger shrimp is estimated at about 62,845 hectares, concentrated in the Provinces Soc Trang and Bac Lieu. The average yield of intensive shrimp farming ranges from 2.4 to 6.5 tonnes/ha/cycle.

#### 2. Pacific White shrimp

The area covered by farms growing Pacific White shrimp has increased rapidly since the species was introduced in 2004. In 2010, the total area covered by farms culturing Pacific White shrimp amounted to 25,397 hectares. White Leg shrimp is mainly cultured in the North and Central regions that account for 17,961 ha or 72% of the total farm area for Pacific White shrimp. Most farms producing Pacific White shrimp apply intensive culture systems which are relatively large-scale and have a good infrastructure. The yield of Pacific White shrimp farms is, on average, 11.7 tonnes/ha/cycle.

It is very important to realise that the relationship between farmers and exporters differs widely from province to province and even from district to district. Factors such as the size and production volumes of farms, the question as to whether there has been a tradition of extensive shrimp farming and the background and competitive position of farmers that entered the subsector have a great influence on the dynamics in the local supply chain. Important to note here is that the level of vertical integration in the shrimp sector is lower than in the Pangasius sector. The main reason is that the Pangasius sector is to a lesser extent dominated by smallholders. Moreover, in terms of

<sup>10</sup> Corsin, F. (2011), A market analysis of Vietnamese shrimp production (report commissioned by IDH).

diseases and crop failure, pangasius production is less risky than shrimp production. Therefore, compared to the number of shrimp exporters and processors that have integrated production facilities, there are more pangasius processors and exporters that have integrated production facilities.

In general, shrimp farms in Vietnam are small in size with less than 1.5 hectares in production and 1.5 tonnes per crop per year in productivity. This accounts for approximately 70-80% of all farmers. Although large-scale Black Tiger shrimp farmers and Pacific White shrimp farmers are often independent and take care of their own input supplies and marketing channels for the farm output, these small farmers depend heavily on their relationship with middlemen.

#### *Middlemen*

In Vietnam, middlemen play a crucial and critical role in the shrimp farming sector. Small farmers not only depend on middlemen for the farm inputs such as seed, feed and working capital, but also depend on middlemen for harvesting the shrimp and marketing it to the processors and exporters. This position in the supply chain gives middlemen a lot of power and influence in the subsector. However, as also noted during the conference, the interest of middlemen to make the supply chain more efficient and sustainable is low because they make a good profit in the current situation. However, as a result of pressure from various export markets, local government agencies, producer associations and NGOs are making efforts to restructure the value chain and move towards more vertical integration between processors and farmers. These efforts mostly focus on encouraging farmers to form cooperatives, while at the same time encouraging exporters to build up more direct and long term relationships with farmers through contract farming.

Two levels of middlemen can be distinguished through which 70 or 80% of the total production volume is marketed to the processors (Corsin 2010). The first group are the middlemen that operate at the primary production level in the middle of shrimp farm areas. These middlemen offer many services to the farmers, from supplying inputs to harvesting and transporting the yields of the farm. These middlemen often have their own preservation facilities and function as the first level of consolidation of shrimp supply at the local level. The second level of middlemen often has more financial wherewithal and finances both small middlemen and farmers. These middlemen are often located in the central towns of each farming area and are the second level of consolidation. These middlemen mostly have direct ties with processing companies.

The most important issue is that if shrimp are not marketed directly from farmers to exporters, the shrimp changes ownership several times before reaching the processing factory. This can have major implications for issues such as food safety and traceability that are crucial in international trade. One complaint, for example, is that middlemen add special substances to the shrimp they source in order to maintain the weight of the shrimp before it reaches the processing company. Other accusations are that middlemen are uneducated and unaware of the significance of food safety issues and that they take excessively high commissions, which results in low profit margins for the farmers. However, farmers often prefer to sell to middlemen because exporters are accused of deliberately delaying payment while farmers urgently need the money to immediately pay their debts to banks and others. Also, if they sell to middlemen they always have a 100% guarantee that all the shrimp will be purchased, while some exporters may reject a part of the harvest.

#### *Processors and exporters*

As already mentioned, formal relationships between farmers and exporters are rare. Only large-scale farmers who have large supply volumes supply directly to exporters. They do this mostly on a spot market basis. Contract farming agreements are scarce but are growing in number due to the efforts to organise farmers in cooperatives, which makes it more lucrative for exporters to invest in longer term relationships. Many large processing companies have their own shrimp farms in order to secure a minimal volume of

supply for the factory. However, the production volume of the integrated farms is never sufficient and therefore most processors have to engage in relationships with middlemen whom they consider their dealers. The lack of long term, formal relationships between farmers and processors is noted as one of the main reasons for the inefficiency of the shrimp sector in Vietnam and will be discussed in the final part of this section.

In total there are almost 100 shrimp processing companies in Vietnam, of which more than 50% are located in the Mekong Delta. Most of these processors are also exporters. However, some also sell to agents who operate as merchant exporters who buy from multiple processors and sell to international buyers. In 2010 more than 300 companies exported shrimp from Vietnam. However, for the aim of this project and also with regard to efficiency in the subsector, we focus here on the processors who export their own products. Table 4.3.2 shows the categorisation of the 100 largest shrimp export companies based on their export volume and value of shrimp.

<b>Table 4.3.2 Categories of most important processing establishments according to export volume and value</b>			
	<b>Average Production Volume (tonnes)</b>	<b>Average export value (million USD)</b>	<b>Number of companies (estimate)</b>
Small	<1.400	<10	53
Medium	1.400 - 6.000	10 - 50	37
Large	6.000 - 10.000	50 - 100	8
Very large	>10.000	>100	2

Source: VASEP (2011).

### ***Flow of products along the value chain***

In terms of share of production volume for the Black Tiger shrimp value chain: about 77.5% of Black Tiger production volume is traded by middlemen while only 22.5% is sold directly to processors. Mainly larger commercial farms and farms owned by processors supply shrimp directly to processors. About 4.4% of the shrimp from traders and processors is supplied to the domestic market, while 95.6% of Black Tiger shrimp production is exported.

In terms of share of production volume for the Pacific White shrimp value chain: about 75% of Pacific White shrimp production volume is traded by middlemen, while only 25% is sold directly to processors. Larger commercial farms and farms owned by processors supply shrimp directly to processors. About 10% of the Pacific White shrimp from traders and processors is sold on the domestic market, while 90% of Pacific White shrimp production is exported.

The figures for Pacific White shrimp, in particular, are surprising, because in other countries such as Thailand and India processors engage more closely with Pacific White shrimp farmers because the production volumes are much higher which makes it more efficient for exporters to buy directly from the farm. These figures underline the crucial role that middlemen have in the supply chain of Black Tiger as well as Pacific White shrimp.

### ***Supporters and influencers within the value chain***

#### ***Government authorities***

For the shrimp sector, especially the MARD departments that relate to the aquaculture sector have an important role in supporting and regulating the sector. These are especially the department of aquaculture and NAFIQAD, which are responsible for registration of shrimp farms and also for issuing health certifi-

ates for exports to the EU market. Also the department that is responsible for regulating the inputs of medicines and chemicals plays a crucial role in preventing the use of forbidden substances that might cause rejections by health authorities in the export markets.

#### *Research institutes*

Research institutes, universities and vocational schools with a special interest in shrimp include RIA 2, the Research Institute for Marine Products in Hai Phong City, the University of Agriculture and Forestry in Ho Chi Minh City, Can Tho University, the Fisheries University in Kien Giang and the vocational school in Ho Chi Minh City.

#### *Producer and exporter associations*

There are few small-scale producer associations for shrimp farmers and their influence is very limited. Of course VASEP also represents shrimp exporters.

#### *Certification bodies*

Through 2010, two Naturland certificates for 5,348 hectares of farmland in Ca Mau were issued, producing approximately 1,069 tonnes of Black Tiger shrimp and 15 ACC certificates for 1,834 hectares of shrimp farms producing approximately 7,336 tonnes of Pacific White shrimp (Truong Hoang Minh, 2010). According to VASEP, the number of ACC certificates in 2011 increased to 18. Moreover, in 2010 and 2011, the first Vietnamese companies received GlobalGAP for Pacific White shrimp for about 1,500 tonnes of product.

#### *Financial institutions*

Although, as explained in Section 4.2, banks play an important role in providing loans on the basis of collateral (property or agricultural land), access to these bank loans is not sufficient to cover the shrimp farmers' needs. Informal sources of credit, such as moneylenders and middlemen, are regularly used to finance the working capital and investments of shrimp farming operations.

Information about how different stakeholders should be involved in a possible seafood programme is presented in a stakeholder assessment grid for the shrimp subsector in Appendix 1. The assessment grid differentiates between different degrees of involvement, ranging from merely keeping stakeholders informed to regular face-to-face contact to ensure a strong commitment.

#### ***Bottlenecks and solutions***

From the desk study, fieldwork and discussions with the conference participants a long list of bottlenecks was established which has been categorised into five priority bottlenecks which are crucial for the further development of the shrimp industry in Vietnam. In this section the priority bottlenecks are discussed in more detail. Furthermore, solutions, required actions, the specific stakeholders and the donors that are already working on a solution will be discussed for each bottleneck separately. In contrast to the results of the conference in the Philippines and Indonesia, there were not really any concrete actions identified in Vietnam that can be taken in the short term, but rather the discussion focussed more on general solutions for the identified problems.

<b>1. Shrimp disease</b>	
	<p>Disease outbreaks are a serious threat to the stability of shrimp exports from Vietnam. They occur mainly as a result of a lack of proper water quality control but also as a result of the lack of a quality seed supply. The shrimp farm subsector in Vietnam is regularly hit by disease outbreaks for which there is not yet a good solution. In order to reduce the risk of disease outbreaks, farmers regularly use medicines and antibiotics that are not tolerated in international trade of shrimp products.</p>
Solution and actions	<p>During the conference a range of actions were identified that need to be taken in order to deal with the problem.</p> <ul style="list-style-type: none"> <li>- Development of a national program on Specific Pathogen Free (SPF) seed or anti-pathogen seed coordinated by Department of Animal Health (DAH) and the Department of Aquaculture (DoA and RIA). India has already reached an advanced stage in the development of SPF seed and expects to have the seed commercially available in 2012.</li> <li>- Improved quality control of imported shrimp seed led by DAH. This applies specifically to the import of cheap Black Tiger and Pacific White shrimp seed from China.</li> <li>- Development and promotion of a community shrimp health management system must intended to make farmers more aware of the value of working together in preventing widespread disease outbreaks.</li> <li>- MARD and especially DARD should have more capacity to enforce strict farm regulations on the use of antibiotics and other medicines. MARD should also implement a stricter farm certification system which forces farmers to adopt better practices but also improves traceability of products. MARD is planning to implement a compulsory farm registration program for the pangasius sector.</li> </ul>
Stakeholders	<p>Researchers, hatcheries, nurseries, seed traders and government agencies (DAH and DOA)</p>
Donors already working on it	<ul style="list-style-type: none"> <li>- The Vietnam Government has supported RIA (1,2,3) in the development of water quality monitoring systems and a disease early warning system for aquaculture including shrimp since 2004.</li> <li>- DANIDA has supported training to increase awareness so as to reduce misuse of drugs and chemicals.</li> <li>- RIA2 is studying a vaccine for shrimp.</li> <li>- The World Bank is going to work on shrimp health management under their coming project on 'Coastal Resources for Sustainable Development'.</li> <li>- The World Bank has asked LEI, part of Wageningen UR to investigate whether disease management systems developed for salmon culture in South America might be applicable in Vietnam in order to reduce the risk and consequences of crop failure for shrimp farmers in Vietnam.</li> </ul>

<b>2. Lack of vertical cooperation in the supply chain</b>	
Description	<p>The level of integration in the shrimp value chain is limited. Only a small portion of farms are directly linked to processors through vertical integration or contract agreements. Middlemen traditionally have a very strong position in the value chain. They have a lot of influence on production and trade but a low incentive to work together with others to achieve greater vertical integration, food safety or sustainability. The lack of direct relationships between farmers and processors and the critical function of middlemen results in problems surrounding issues such as traceability and food safety. These issues are increasingly important for exports to the most important export markets in the US, Japan and the EU. However, both farmers and processors are still hesitant to engage in contract farming as a result of previous bad experiences related to violation of the contract from both sides.</p> <p>Important to note here is that the level of vertical integration in the shrimp sector is lower than in the Pangasius sector. The main reason is that the Pangasius sector is to a lesser extent dominated by smallholders. Moreover, in terms of diseases and crop failure, pangasius production is less risky than shrimp production. Therefore, compared to the number of shrimp exporters and processors that have integrated production facilities, there are more pangasius processors and exporters that have integrated production facilities.</p>
Solution and actions	<p>During the conference, participants identified five actions that need to be taken. Most of the actions suggested by the sector representatives focus on value chain efficiency. Although the role of middlemen will remain critical until productivity at the farm level increases and farmers gain stronger positions, many action focus on increasing vertical integration in the supply chain.</p> <ol style="list-style-type: none"> <li>1. Development of vertical linkage or contract farming for shrimp, led by processors and facilitated by associations (VASEP, VINAFIS or shrimp association).</li> <li>2. Small farmers or processors need to be better organised to improve their bargaining position. With higher production volumes they should be able to perform more activities by themselves and be able to engage in a closer relationship with processors. Here, the formation of associations in which farmers and processors work together, as already happens with pangasius in An Giang Province, can function as an example. This could be coordinated by VINAFIS or the SME association.</li> <li>3. Small-farmer organisations need to hire legal experts and aquaculture specialists to help enable them to work well with other stakeholders to ensure that they know and understand the rights and duties that are part of contract farming agreements.</li> <li>4. MARD needs to reform the regulation and provide a supportive environment for contract farming (e.g. fines/penalties for those who violate the contract) and regulation of insurance for contract farming constructions; VASEP and VINAFIS need to be more active in advocating the urgency of the matter to MARD.</li> <li>5. If these efforts do not produce results in the short term, more emphasis needs to be put on a national programme for raising awareness about issues such as food safety, traceability and sustainability among middlemen and traders.</li> </ol> <p>After some additional discussion, the conclusion is that although it is good to work on increasing vertical integration in the value chain, it is absolutely necessary to raise awareness about the importance of issues such as food safety and traceability among middlemen because it is likely that for most of the shrimp farming areas their role will remain critical in the coming years.</p>
Stakeholders	VASEP, VINAFIS, government and all functional actors



<b>2. Lack of vertical cooperation in the supply chain</b>	
Donors already working on it	<ul style="list-style-type: none"> <li>- GIZ has conducted value chain analysis for shrimp, hard clam and pangasius only. However, there has not been much significant intervention on how to improve the value chain.</li> <li>- The Dutch Embassy has a project on public/private partnerships for improving the value chain of pangasius in An Giang Province. Currently the embassy is also considering investment in a programme for the shrimp sector.</li> <li>- The Vietnamese Government has issued Decision 80/2002-QD/TTg on contract farming for agriculture, including shrimp.</li> <li>- In 2005, the EU trade program had a training programme for middleman related to food safety and traceability, but this has not been repeated since then.</li> </ul>

<b>3. Lack of capital investment in shrimp sector infrastructure</b>	
Description	Farmers, processors and hatcheries complain that there is a lack of investment in logistics, seed production and farm irrigation. This results in lower quality products and economic losses for stakeholders across the sector.
Solution and actions	<p>Two fields of actions to solve this issue that are both focussed on a more active role of the government were identified:</p> <ol style="list-style-type: none"> <li>1. MARD and MOIT are already active in calling for investment through Business to Business (B2B) or Public Private Partnership (PPP) arrangements in seed technology, and irrigation for aquaculture, but the calls for investment have to be intensified and more directly aimed at relevant national and international companies and research institutes.</li> <li>2. VASEP, VINAFIS and SME associations need to be more proactive in advocating government investment policies for upgrading transportation/logistics in shrimp farming areas and in harbours (e.g. the World Bank and the Asian Development Bank).</li> </ol> <p>Although it is the responsibility of the government to invest in infrastructure, private companies should also be encouraged to invest in the subsector infrastructure. However, as a result of the lack of integration and disconnection between farmers and processors, processors are unlikely to make investments in farms with which they have no formal long-term relationship. It is expected that when the shrimp subsector further integrates, investments at the farm level will be catalysed by processors who want their suppliers to deliver the best product for the best price.</p>
Stakeholders	MARD, MOIT, VASEP, VINAFIS, large-scale processing, farm and hatchery companies and financial donors/bank.
Donors already working on it	<ul style="list-style-type: none"> <li>- The World Bank is going to work on Specific Pathogen Free (SPF) seed by enhancing the broodstock and hatcheries facilities starting in 2012.</li> <li>- The provincial governments of a number of provinces have revised the irrigation system for aquaculture including shrimp. However, the central government has no plan for irrigation systems for aquaculture including shrimp.</li> <li>- There are no donors working on transportation/logistics for the shrimp subsector. Only a few donors, e.g. JICA and Japanese fund investing in upgrade container harbours.</li> </ul>

<b>4. Lack of cooperation between value chain actors and BSOs</b>	
Description	<p>In general there is a lack of cooperation between processors, farms, the government and other supporters of the shrimp industry. There are three specific complaints:</p> <ul style="list-style-type: none"> <li>- There is a lack of cooperation with academics, research institutes and the government in efforts to improve the quality of shrimp seed.</li> <li>- It is very difficult for farmers and exporters to access bank loans due to complicated procedures and high interest rates.</li> <li>- To present there have been no insurance companies that are willing to insure shrimp farming operations and only a limited number of banks that are willing to give substantial loans to small-scale shrimp farmers.</li> </ul>
Solution and actions	<p>The following actions were identified to deal with this bottleneck:</p> <ol style="list-style-type: none"> <li>1. MARD should adopt a value chain approach to management of the shrimp subsector and reform the legal and policy environment accordingly. This mainly entails a holistic approach which includes strict policies and regulations for hatcheries, farmers, middlemen and processors.</li> <li>2. The government should issue stricter regulations on farm registration and management, the use of drugs/chemicals (higher fines) and better formulation and enforcement of a shrimp development plan. This should be done through NAFIQAD at the national level and DARD at the provincial level. Lessons about how to do this can be learned from past experiences, such as the way in which the Indian government and private sector agreed to adhere to stricter regulations in the shrimp sector after threats of a EU ban on Indian shrimp.</li> <li>3. The government should enable RIA (1, 2 and 3) to work more intensively on the development of quality seed production.</li> <li>4. The government must relax procedures so that seafood SMEs and farmers can gain access to the credit systems.</li> <li>5. The government should encourage insurance companies to do business in the seafood sector by matching seafood exporters with insurance companies (favour environment for insurance company to work on seafood insurance), e.g. insurance for contract farming.</li> </ol> <p>The two last solutions or actions focus on financing and insurance. From experiences in other countries it is clear that financial institutions will only re-enter the shrimp sector if lead companies prove that they can take responsibility for farmers. In India in particular, there are two companies that have all inputs for the shrimp farms integrated in their own operations and moreover agree to guarantee the loans that the involved bank provides to farmers. In this system with optimised control of the export company over the farmers, the company has convinced a bank and insurance company that the risk is limited and, as a result, has been able to set up a tripartite contract farming agreement which benefits all parties.</p>
Stakeholders	Government (MARD, NAFIQAD, DARD) and associations (VASEP, VINAFIS, Livestock Association), RIA and all operators in the value chain.
Donors already working on it	No donors working on these aspects.

<b>5. Lack of sustainability including production volume</b>	
Description	The main issue brought forward here is that the competency of farmers is a main barrier for sustainable shrimp production. There is a lack of attention for environmental issues and a lack of skilled labour. The result is that there is a limited supply of sustainable shrimp and that the potential of the shrimp farm sector is not yet reached. However, it must be noted that Vietnam compared to some other countries is already exporting a relatively large volume of certified shrimp products by for example GlobalGAP, ACC and Naturland. Most of these certified products come from producers that are either integrated by processing farms or from farmers that are organised in associations and maintain close ties with export companies.
Solution and actions	<p>Two solutions were identified to increase production of sustainable shrimp:</p> <ol style="list-style-type: none"> <li>1. The government must provide incentives for farmers and processors to voluntarily comply with sustainable certification (e.g. priority in term of infrastructure investment for farming area, or access to credit)</li> <li>2. NAFIQAD, DoA and VINAFIS should develop and implement a national program on extension for shrimp aquaculture, focus on traceability, Best Aquaculture Practices (BMP), and certification.</li> </ol> <p>Both solutions focus on the role of the government. However, it is unlikely that the Vietnamese government alone can increase the production of certified shrimp. Also in this case increased integration between farmers and processors through contract farming is a key factor to solve the issue. If processors are convinced of the benefits from contract farming they are likely to be more willing to invest in farmers to create a premium supply chain for sustainable products. Particularly for processors that do not have the capital or strategy to invest in vertically integrated farms, contract farming is the best option to have access to certified shrimp products.</p>
Stakeholders	Government (NAFEC, DoA) and VINAFIS, VASEP, individual export and farming companies, groups of farmers, international NGOs and international buyers that want to invest and support certification initiatives.
Donors already working on it	<ul style="list-style-type: none"> <li>- WWF/DANIDA promote certification for shrimp and have a pilot project to support small-holders to influence the standard development and costs for Aquaculture Stewardship Certification (ASC) in the Mekong Delta.</li> <li>- The Sustainable Trade Initiative (IDH) and the Netherlands Development Organisation (SNV) are working on promotion of sustainability for Vietnam seafood including shrimp. Initially, they will set-up an aquaculture platform to address the level of sustainability of the aquaculture sectors, with a focus on pangasius and shrimp.</li> <li>- The Spanish government supports the development and promotion of VietGAP for shrimp and pangasius.</li> </ul>

It is important to note that some of the donors that are currently active in the Vietnamese shrimp sector or planning to exit the sector or to change their focus. DANIDA will leave the Vietnamese fisheries sector in 2012; the Norwegian Agency for Development Cooperation (NORAD) plans to exit their fisheries law project in 2013; and GIZ focuses more on the conservation of mangrove and climate change rather than on the sustainability of shrimp production itself.

### ***Conclusion***

As is clear from the discussion above, there is a lot of overlap between bottlenecks and therefore certain action can benefit several issues. Most of the solutions to the bottlenecks relate to increased integration and cooperation between public and private actors across the shrimp sector. The most important bottle-

necks for exports - traceability, food safety and sustainability - can be solved by increasing control and influence of lead firms over the value chain. Contrary to the problems at primary production such as disease and high input costs, these problems are directly related to exports as non-compliance with traceability and food safety regulations will result in market access denial by especially the EU health authorities. This is even more the case when exporting to the EU retail market segment where food safety, traceability and sustainability requirements are even stricter and more complex. The only way to achieve increased control in the supply chain is through creating a competent base of suppliers who are not too risky to work with for lead firms or by creating cooperatives of small-scale farmers that are not completely dependent anymore on credit systems in order to buy farm inputs but that have such a bargaining position that they can engage in direct relations with shrimp exporters. If Vietnam succeeds to organise its farmers in competent cooperatives that are able to engage directly with exporters, and to convince exporters to invest in sustainable relationships with shrimp farmers than the prospect of the sector is flourishing. However, this process will take time and on the short term there needs to be given attention to solutions that can help to improve the current situation by for example raising awareness and competencies of middlemen and by helping exporters to find partners to invest in sustainable shrimp production.

#### **4.4 Pangasius subsector**

Figure 4.4.1 presents the pangasius value chain in Vietnam and includes the priority bottlenecks which are crucial for the export potential of the pangasius industry in Vietnam. The Pangasius value chain is to a large extent comparable with the shrimp value chain. However, the marketing channels differ slightly.

In the Vietnamese pangasius value chain four main categories of operators can be distinguished:

1. Input suppliers: hatcheries, feed suppliers, medicines and chemicals, and equipment
2. Farmers: household farmers and large-scale commercial farmers
3. Middlemen: small and large middlemen
4. Processors/exporters

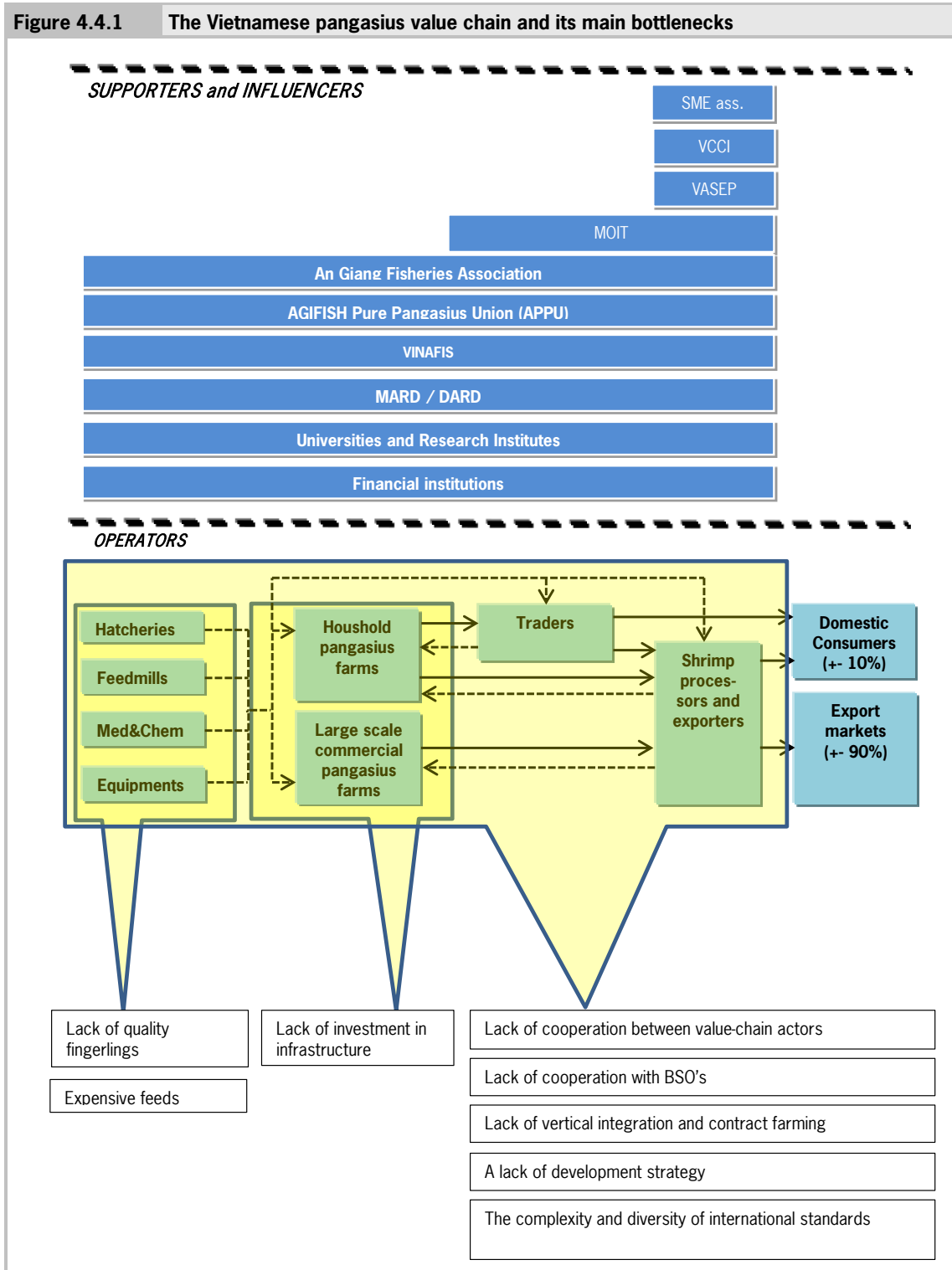
Furthermore, five different categories of influencers and supporters can be distinguished:

1. Government authorities (MARD, DARD, VCCI, MOIT)
2. Research institutes
3. Producer and exporter associations; (VINAFIS, VASEP, AFA, APPU, SME associations)
4. Certification bodies
5. Financial institutions

Finally five main bottlenecks have been identified as a result of the desk study, field work and validation workshop:

1. Lack of integration and cooperation in the value chain
2. Lack of quality fingerlings
3. Complexity and diversity of international buyer requirements
4. Lack of cooperation between stakeholders in the value chain and BSOs
5. Lack of investments in infrastructure

**Figure 4.4.1 The Vietnamese pangasius value chain and its main bottlenecks**



**Operators within the value chain**

*Input suppliers*

There are four main inputs being supplied to the pangasius farmers: 1) seed, 2) feed, 3) chemicals and medicines and 4) equipment. In general these inputs are sold through two marketing channels: 1) directly

from the producer to large-scale commercial farmers or 2) through local distributors who are often middleman or export companies that also provide working capital and (post) harvest services. The way in which farmers purchase their inputs depends on their financial situation. Farmers with sufficient financial resources will buy directly from the producers for a slightly better price while those with a lack of financial resources will buy through traders and pay a slightly higher price. Equipment is distributed through the same retail outlets as for shrimp and therefore not discussed here. The other three inputs will briefly be discussed below.

#### 1. Seed

In a hatchery fish fingerlings are produced under controlled conditions. Types of hatcheries in Vietnam range from state owned firms, to large and small-scale 'backyard' private businesses. Private small-scale hatcheries smaller than 1 hectare are very common. These are often family businesses producing large quantities of fingerlings. There are only a few large-scale private hatcheries that are better equipped and managed than the small-scale hatcheries. State-owned hatcheries are larger and better equipped than private ones. State owned hatcheries have a large influence on the pangasius sector: e.g. they conduct research on indigenous species, improve aquaculture techniques and maintain the quality of brood-stock. However, the state-owned hatcheries supply only 20% of the fingerlings for the Mekong River Delta<sup>11</sup>. Therefore, especially small-scale farmers rely on the private hatcheries. The quality of seed produced by private hatcheries is often very low. The low quality of seeds is one of the main causes for the high mortality rates at the pangasius farms.

#### 2. Feed

In 2000 almost 90% of pangasius farmers were still using home-made feeds. In 2005 more than 50% of the farmers shifted to using commercial feeds and by 2011 it is estimated that even over 90% of the pangasius farmers use commercial feeds. The use of commercial feeds increases the productivity of pangasius farms, but also makes pangasius farming a more cost intensive business. In November 2011 1 kg of pangasius feed costs approximately USD0.55 while a farmer needs 1.6 kg of feed to produce 1 kg of pangasius (FCR = 1.6). The costs of commercial feed accounts for 60-80% of total production costs or approximately USD0.85 of a total cost of USD1.15. Large-scale commercial pangasius producers mostly buy the feed directly from the feed companies while small-scale producers often buy feed on a credit basis from local distributors. More than 70% of the pangasius feed production is estimated to be in the hands of foreign companies.

#### 3. Chemicals and medicines

Although exact figures are not available it is well known that many farmers use additional medicines to reduce the mortality rate of the fish. Most products used are Vitamin C supplements and Vitamin mixes. Just as antibiotics, vitamins are used as a prevention for diseases. However, it is assumed that also other medicines such as antibiotics, probiotics are used to prevent disease and that some chemicals are used to maintain water quality. These inputs are regularly supplied by feed distributors and aquaculture shops in the provinces. Although some of these inputs are legal, it is argued that many farmers also use illegal substances that they can easily buy from local pharmacies and distributors.

#### *Pangasius farmers*

No detailed information about the number of pangasius farms can be given. According to Phan et al. (2009) in the provinces of An Giang, Dong Thap and Vinh Long there were about 3,900 farms in 2008. Al-

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<sup>11</sup> Le Nguyen Doan Khoi 2011, Quality management in the Pangasius export supply chain in Vietnam: the case of small-scale Pangasius farming in the Mekong River Delta, University of Groningen.

so In Can Tho another 1,600 hectares were allocated to the farming of pangasius, the number of farmers there however was unknown.<sup>12</sup> During the last few years, the development in the pangasius sector has resulted in more large-scale producers and the disappearing of several small-scale producers. Although the number of commercial large-scale pangasius farms is increasing the vast majority of pangasius farms is still smaller than one hectare.<sup>13</sup> This especially is the case in provinces that have a long standing fish farming tradition such as An Giang where more than 70% of pangasius production originates from small-scale producers. Provinces that are located more downstream in the Mekong River Delta where pangasius farming only arose when it became clear that it had a great export potential have more large-scale commercial farms. These are often directly owned and managed by export companies.

The productivity of pangasius farms is very high. Depending on the price that exporters pay for the product, farmers harvest their ponds ideally after 6 months when they can harvest fishes of 700 grams which is the preferred size by exporters. If the price is low, farmers can decide to grow their fishes to 1 kg with the hope that prices will improve. If a farmer harvest after 6 months he or she can harvest approximately 1.8 times per year. This yields approximately 250 tonnes of pangasius per harvest from a 1 ha pond. In November 2011 the farm gate price of pangasius is approximately between 25,500 - 27,000 VND or USD1.2-1.3 / kg.

It is important to realise that most of the large-scale commercial farms are owned and operated by export companies while most of the small-scale farms are operated by individual households. International markets put a lot of pressure on pangasius farmers to move towards more sustainable production methods. The large-scale commercial farms are therefore quickly moving towards more sustainable production and certification of the pangasius farms. For household farms that lack the required investment capital, this process is going slower. However, the Vietnamese government and NGOs are helping farmers to organise themselves and to develop infrastructure through which small-scale farmers can also proceed towards certification.

The high level of organisation, the high productivity, and the relatively low risk of crop failure of pangasius farms result in a more vertically integrated value chain than is the case in the shrimp sector. Only a small share of production is marketed through middlemen or traders. FAO estimates that more than 84% of the small-scale farmers sell their product directly to processing companies while this is the case for 100% of the farms that are larger than 0.5 hectares<sup>14</sup>.

#### *Middlemen and transporters*

As noted above, the role of middlemen is not very significant. Most of the time, farmers directly sell their product to processors with the help of companies specialised in harvesting and transporting. Most of the time these transporters are directly affiliated with processing companies. The reason that the level of vertical integration in pangasius is higher is that pangasius farms have much higher production volumes than shrimp farms. Only about 10% of total production is traded through middlemen and of this 10%, approximately 80% is sold as whole fish on the local market while 20% is sold to processing companies.

The transporters mostly use special boats with a huge capacity and facilities to keep the fish alive to transport fish from the farms to the processing factories. However, upstream the Mekong River Delta transporters use trucks as large boats cannot reach many of the farms. The average capacity of the boat is 20 to 40 tonnes of pangasius. Skippers try to transport the fish to the processing companies on the

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<sup>12</sup> Phan, L.T. et al., 2009, Current status of farming practices of striped catfish, *Pangasianodon Hypophthalmus*, in the Mekong Delta in Vietnam. *Aquaculture* 296.

<sup>13</sup> Corsin, F. 2011, personal communication.

<sup>14</sup> <http://www.fao.org/uploads/media/UpgradingPangasiusFINAL.pdf>

same day, because the longer the transport takes, the more weight the fish will lose. The transporters cooperate with a technician from the buying division of the export companies to check the quality of fish and the presence of malachite green, chloramphenicol and nitrofurantoin. In some cases, large export companies use their own trucks and boats to collect the pangasius from the farms from which they buy directly. The main difference with the middlemen is that these transporters never buy or sell the product but get paid per ton of material they transport.

#### *Processors and exporters*

In Vietnam there are more than 140 processing establishments for fish that are certified for exports. The vast majority of these processing establishments are located in the provinces in the Mekong River Delta (see Table 4.4.1).

Province	Processing unit	Export volume (thousand tonnes)	Export value (million USD)
An Giang	15	159	342
Dong Thap	12	115	277
Can Tho	22	166	350
Tien Giang	13	97	202
Hau Giang	1	6	14
Ben Tre	3	14	32
Vinh Long	2	11	19
Ho Chi Minh	19	37	78
Tra Vinh	2	6	16
Kien Giang	1	3	6
Vung Tau	1	1	2
Da Nang	2	3	4
Others	>47	42	87
<b>Total</b>	<b>&gt;140</b>	<b>660</b>	<b>1,429</b>

Source: VASEP (2011).

Table 4.4.2 shows the categorisation of pangasius exporters according to export value and volume based on the most recent VASEP data. It is obvious that there are a couple of extremely large export companies but that the largest group are companies that export between 1,000 and 5,000 tonnes per year equal to USD2-12m. It can be expected that especially the medium, large, and very large companies have their own farms. This group of companies is most likely to engage on the short term in sustainable certified pangasius exports.

	Production volume (tonnes)	Export value (million USD)	Number of companies
Very Small	<1,000	1 to 2	11
Small	1,000 to 5,000	2 to 12	52
Medium	5,000 to 10,000	10 to 25	18
Large	10,000 to 30,000	20 to 60	16
Very large	>30,000	> 60	3

Source: VASEP (2011).



The total export volume of pangasius amounts to 659,400 tonnes representing a value of almost USD1.5bn. Similar to the shrimp subsector there are different categories of pangasius exporters. Not only based on their production and export volume but also based on the way in which they organise their businesses. Most of the medium and large size exporters have their own farms with which they secure a minimal supply volume to keep their factories running. Many of the large companies also engage in contract farming agreements with farmers cooperatives in order to supplement their integrated production. The remaining capacity of their factories is only used if the market situation allows it and the required supply is sourced through spot market relationships with farmers.

Although there is not one single explanation why relatively more pangasius exporters have their own farms than shrimp exporters, two important explanations are that farming pangasius is less risky than farming shrimp and that investments are relatively low. The relatively high level of integration in the pangasius sector compared to for example the shrimp sector may be seen as an advantage for the sector as a whole.

The final process before being transported to the export harbours involves the preparation of fillets by the processing factory for export. The average capacity of a firm is roughly 40-50 tonnes of fresh fish per day. All raw materials are inspected upon arrival and must be approved by the quality inspection team before being allowed into processing areas. After purchasing live pangasius, the fish are washed, beheaded, gutted, filleted, skinned, trimmed, sized and classified, inspected on quality, frozen, and packaged for export or the local market. Fish waste from fillet production such as the head, tail, skin and viscera is processed into fish meal or fish oil. On average, fillets account for 30-40% of the weight of a whole fish (the dress out ratio). More specifically, 3.2 kg of live pangasius are required to produce 1 kg of fillet. Frozen fish is the most common product, followed by dried products and fish sauce or paste. In supermarkets in the EU, pangasius is also sold as fresh fillets. These products however are not imported as fresh fish but refer to frozen fillets that are refreshed and sold as fresh pangasius fillets. Moreover, high-value added products such as ready to cook or surimi are also produced by various processors.

### ***Flow of products along the value chain***

As already noted earlier over 90% of the products are directly supplied by farmers to processors. Processors export about 98% of their supply to international markets while the remainder, which often lacks the required quality, is distributed to the local market. The 10% share of the total production volume that is marketed through middlemen is mostly (80%) distributed to wholesalers and retailers who market it on the domestic market. The remainder is supplied to processing companies by the middlemen. Although these figures are estimations, they are confirmed by different sources (e.g. Khoi 2011). It is important to realise that these figures may differ from province to province depending on the size and productivity of pangasius farms.

### ***Supporters and influencers within the value chain<sup>15</sup>***

#### *Government authorities*

The main source of technical support for fish farmers is the Fishery Extension Centre (FEC) officers within the District Department of Agriculture and Rural Development (DARD). They provide training to hatchery and grow-out farmers in new aquaculture technologies and instruct farmers on governmental policies to increase pangasius hygiene and safety. In addition, there are a range of technical programmes for farms including irrigation projects, and projects to upgrade hatcheries. More specialised support on veterinary issues is provided by the National Fisheries Quality Assurance and Veterinary

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<sup>15</sup> <http://www.fao.org/uploads/media/UpgradingPangasiusFINAL.pdf>

Directorate (NAFIQUAD), which is also in the pangasius sector responsible for checking, controlling as well as certifying feed, fingerlings, farms and processing establishments.

#### *Research institutes*

Research institutes, universities and vocational schools that work especially at Pangasius include RIA 2, the Research Institute for Marine Products in Hai Phong City, the University of Agriculture and Forestry in Ho Chi Minh City; Can Tho University, the Fisheries University in Kien Giang and the vocational school in Ho Chi Minh City.

#### *Producer and exporter associations*

As already noted, the level of organisation in the pangasius sector is much higher than in the shrimp sector. Here we will give two examples of organisation in the pangasius sector.

In An Giang province, where small-scale production dominates the sector, VASEP sponsors the An Giang Fisheries Association (AFA). This is an organisation that unites farmers, hatcheries, feed distributors and processors and was set up after the U.S Anti-dumping case against Vietnamese pangasius in 2003. The mandate of the AFA is to advocate farmer's interests in policy and to negotiate contracts between farmers and processing companies. However, a study found that only half of the respondents believed the AFA operated effectively. The remaining respondents thought the AFA was ineffective because the association had no decisive role in facilitating contract negotiations between members and processing companies, banks or feed companies. One in ten respondents said that the position of the AFA was in favour of processing companies, as a result, farmers doubt that the AFA actually advocates their interests. The AFA is currently still operating and noted as an example for other provinces.

Another example of an organisation of producers in the pangasius sector is the AGIFISH Pure Pangasius Union (APPU). Although the APPU is an initiative of one single export company, it is an example of how export companies can serve as lead companies in restructuring and organising the value chain creating an added value for all stakeholders. The objective of the APPU is to produce pangasius products free of banned antibiotic and chemical residues, reduce negative impacts caused by price fluctuation and ensure constant supply of raw fish for the AGIFISH company. For international buyers, the APPU provides high quality and traceable products. Through contract agreements the APPU coordinates the activities of all the in and out put suppliers in the value chain. The APPU provides technical and financial support to its members in the form of high quality fingerlings, credit on feeds, free fish-disease testing, and disease prevention/treatment advice. In return AGIFISH implements a buy back system in which farmers are forced to sell their yields to the company.

For exporters in the pangasius subsector VASEP lobbies for their concerns and promotes pangasius in the international market. Also the SME's associations that operate at the provincial level offer business development and trade promotion services to exporters.

#### *Financial institutions*

As already noted in Section 3.2 there are several commercial and state banks that offer credit for aquaculture producers, including pangasius farmers. However, commercial loans are often too expensive and cheaper loans from special banks are often not sufficient to cover the needs of pangasius farmers. Therefore, especially household farms depend on credit systems and buyback arrangements with input suppliers, middleman and exporters. Pangasius exporters can more easily access commercial banks for long term loans and mostly have sufficient financial resources to cover their operational costs by themselves.

Information about how different stakeholders should be involved in a possible seafood programme is presented in a stakeholder assessment grid for the pangasius subsector in Appendix 1. The assessment grid

differentiates between different degrees of involvement, ranging from merely keeping stakeholders informed to regular face-to-face contact to ensure a strong commitment.

***Bottlenecks along the value chain***

From the desk study, the fieldwork, additional input from interviews conducted in a later stage, and discussion with the conference participants a long list of bottlenecks has been identified. The bottlenecks from this list are eventually categorised into five priority bottlenecks which are crucial for the further development of the pangasius industry in Vietnam.

In this section the priority bottlenecks are discussed in more detail. Furthermore, solutions, required actions, the specific stakeholders and the donors that are already working on a solution will be discussed for each bottleneck separately.

<b>1. Lack of integration and cooperation in the value chain</b>	
Description	Although the role of middlemen in the pangasius subsector is limited and there is a higher level of vertical integration and cooperation, the vast majority of farmers still operate on a spot market and do not have sustainable long-term relationships with their buyers. There are two main reasons for the lack of sustainable long term relationships in the pangasius sector. One is the fluctuation of raw material prices which makes it difficult for farmers as well as processors to make pre-harvest arrangements about the price. Most farmers experience the opportunity to fetch high prices as more important than the risk of low prices. For exporters the opposite is the case as the risk of paying more than the market price is experienced as too high compared to the opportunity of securing supply. Moreover, signing a contract is often a high barrier for farmers as well as exporters as there is a lack of experience in how to formulate contracts in order to protect the benefits of both farmers and processors.
Solution and actions	The Government of Vietnam should create an enabling environment for farmers and processors to increase the number of contract agreements. This can be done through subsidy schemes and other benefits that are only accessible for contract farms. Another more concrete action by the conference participants was that the sector needs to hire a lawyer who helps the sector to design a concept contract for farmers and processors which protects both the benefits of farmers and processors. By doing this in an organised way, organisations as VASEP and VINAFIS can disseminate information and assistance to farms and companies that are interested to engage in contract farming.
Stakeholders	All value chain operators in combination with VASEP, MARD and VINAFIS could play a role in setting this up.
Donors already working on it	DANIDA is working on stimulating exporters to tighten their control over supply through contract farming agreements.  From 2005-2009 GIZ had a program that aimed to transform organic pangasius from niche to mainstream market. The program also aimed to improve cooperation within the value chain to make trade more efficient.

**2. Lack of quality fingerlings**

Description	A main complaint is that there is a lack of quality fingerlings. The quality of fingerlings has a great effect on the productivity of pangasius farms and the profitability of the sector. It is generally noted that public hatcheries are better equipped and produce better quality fingerlings but cannot meet the local demand. Therefore many farmers depend on private hatcheries that provide lower quality seeds and imported seeds from for example China.
Solution and actions	There are several solutions for this problem: <ol style="list-style-type: none"> <li>1. Universities and research institutes have to intensify research programs on the production of fingerlings with stronger strains which result in fish with less fat and that are longer in size.</li> <li>2. State owned hatcheries have to increase their capacity in order to provide larger quantities of quality broodstock. This needs to be coordinated above the provincial level because some provinces have a shortage of supply whether others have a surplus.</li> <li>3. Stricter regulations need to be implemented for the management of private hatcheries. This has to result in higher quality fingerlings.</li> <li>4. Processing companies should be encouraged to invest in research programs for improved fingerling production, which is in their own interest.</li> </ol>
Stakeholders	Hatcheries, Nurseries, Researchers, Processing companies, MARD, NAFIQAD
Donors already working on it	Until last year DANIDA together with MARD had a selective breeding program for Pangasius in An Giang. Also, in this program DANIDA trained hatcheries in artificial breeding. It was a USD40-m project.

**3. Complexity and diversity of international buyer requirements**

Description	Pangasius exporters are confronted with a wide diversity of standards required by international buyers that supply to different countries and markets. The most common standards confronted with at the moment are Aquaculture Certification Council (ACC) for the US retail market, Global Good Aquaculture Practices for the EU retail market, ASC for EU retail market and increasingly also bio standards such as Naturland and Kraft. Although exporters that have their own farms are currently increasingly investing in the farm infrastructure to meet these international standards, for most exporters it is impossible to comply with all. There-with, international buyers' requirements force exporters to focus on a limited numbers of markets. Moreover, exporters that do not have integrated farms depend on the supply of certified products from independent farmers. The supply volume of certified pangasius from independent farms is currently still close to zero. One of the major challenges faced by the sector is how to create a competent base of pangasius farmers that can comply with the highest international standards and supply certified pangasius to the export companies.
Solution and actions	There are a few solutions to this problem: <ol style="list-style-type: none"> <li>1. One option is the current development of a national standard VietGAP that forces farmers to adopt a minimal standard in their farms. According to the pangasius sector this reduces the size of the gap between the Vietnamese average and international buyer standards. For Dutch importers of pangasius that are interested in sustainable and certified pangasius however VietGAP is seen as a step in the process towards ASC certification. For EU importers in South and Eastern Europe that are less interested in sustainability, the VietGAP standard might be sufficient.</li> <li>2. More attempts need to be made to organise farmers into cooperatives and associations and to link them directly to exporters through contract agreements or other kind of long-term relationships to increase their financial power which should enable them to attract investors and move towards certification as a group.</li> <li>3. If an enabling environment is created to encourage contract farming it is likely that exporters who have the required capital are more willing to invest in farms that that are not</li> </ol>

**3. Complexity and diversity of international buyer requirements**

	<p>directly owned to them.</p> <p>4. As the move towards certified products is driven by buyer requirements, international buyers and NGOs must be attracted to help pangasius farmers to organise themselves but also to provide loans and grant schemes which must help farmers to collect the capital that is required to make the investments needed for meeting the standards for certification.</p>
Stakeholders	International NGOs, MARD, DARD, VASEP, Producer Associations, farmers, exporters.
Donors already working on it	<p>The EU Food Security Strategy Program in Vietnam now has a tender opportunity to support Vietnamese producer associations to strengthen their organisational capacity. Aquaculture and Fisheries is one of the focus sectors for their program.</p> <p>IDH and other Dutch NGOs and government institutions plan to open a local office in Vietnam where interested farmers can get information on GlobalGAP and ASC certification and can also apply for grants.</p> <p>DANIDA works in An Giang Province on organising farmers, processors and other stakeholders in in order to encourage contract farming and increase vertical integration. They do this directly through the An Giang Fisheries Association.</p> <p>Wageningen University works in a PPP with Dutch pangasius importers and Vietnamese exporters and research institutes to design a new production model that improves water quality and productivity and helps to meet some parameters for ASC certification.</p> <p>Wageningen also has several PhD students that work on the pangasius sector and sustainable production methods. Some of these PhDs directly relate to work towards certification and meeting the requirements of international buyers.</p>

<b>4. Lack of cooperation between stakeholders in the value chain and BSOs</b>	
Description	<p>Most actors in the value chain have no complete overview of which BSOs are active in the fisheries and aquaculture sector. There is a lack of information about support programs, grant and subsidy schemes and also about NGO programs that aim to support the sector in optimizing sustainability in the sector. Also, it is argued that the dissemination of technical knowledge from research programs is not reaching a large part of the sector. This should be improved.</p>
Solution and actions	<p>An overview of all BSOs that are active in the pangasius sector and what specific services they offer needs to be created. This has to include services of both public and private bodies as well as research institutes and NGOs.</p> <p>It is also suggested by the participants of the conference that there must be established a new association which can unite the entire sector from exporters to producers, to universities, to the government and financial supporters. At this moment VASEP does not have strong enough ties with research institutes and producers while VINAFIS is too much focussed at the producer level.</p>
Stakeholders	<p>NGOs, research institutes, VASEP, VINAFIS, MARD, DARD, and all the operators in the value chain</p>
Donors already working on it	<p>Although getting this overview is a part of the CBI seafood value chain analysis project, the level of detail is still limited. To make it useful for local actors in the pangasius sector the overview should be very detailed and also specified at least at the provincial level.</p> <p>Organisations as GIZ and DANIDA have made efforts to organise the pangasius sector but there is no clear overview about what exact programs are on-going at this moment.</p>

<b>5. Lack of investments in infrastructure</b>	
Description	Currently, the development of the pangasius sector has been largely unplanned and largely uncontrolled. Conference participants complain that there is no master plan to develop the pangasius sector. The unorganised character of the sector does not attract a lot of investment. The lack of investment relates both to the physical infrastructure of the sector as well as to required investments in a digital infrastructure and regulatory framework that needs to enable the government to monitor and control the pangasius sector.
Solution and actions	<p>The most important challenge to increase the availability of capital for investment in the pangasius sector from the point of view of the private sector is to convince banks and insurance companies that the risk of investing in the pangasius sector is limited and controlled. This can be achieved by exposing successful business models such as the model of APPU as discussed in the previous section or other examples from companies in Thailand and India. All successful business models where banks and insurance companies are providing their services to aquaculture farmers include very strict contract farming agreements where exporters guarantee quality input supplies to farmers and where exporters are willing to be responsible if farmers cannot repay their debts.</p> <p>However, conference participants emphasised that also the government should invest more in the pangasius sector. Suggestions are that:</p> <ul style="list-style-type: none"> <li>- The government and private sector together should develop a master plan for the pangasius sector.</li> <li>- The government should encourage banks to provide loans with favoured interests for companies that want to make investments in the physical infrastructure.</li> <li>- The government should actively call for Foreign Direct Investment (FDI).</li> <li>- The government should invest in a system that enables them to monitor and control the pangasius sector more closely than is happening at this moment.</li> </ul>
Stakeholders	MARD, MOIT, VASEP, financial institutions, exporters etc.
Donors already working on it	IDH will start to provide capital injections for farmers that want to make investments for ASC certification.

Besides the donor initiatives noted above there are many NGOs such as WWF, Oxfam, GIZ, AUSAID, NORAD and DANIDA that have been and still are working on helping farmers to adapt to better aquaculture practices. It is however unclear of what programs are currently still running. As already noted in the previous subsection on shrimp, DANIDA and GIZ programs are almost finished. However, other donor programs such as that of USAID and World Bank are still in an early stage of project design.

### ***Conclusion***

There is a lot of work to be done to link the different actors and supporters in the pangasius sector together. More integration and long term sustainable relationships between farmers and exporters but also between value chain actors and BSOs will benefit everyone. It seems that from the conclusions of the conference and in line with the conclusions in the shrimp sector the future of pangasius is prosperous if the sector succeeds to make the move towards sustainable production. This must be achieved through improving the capacity and capability of pangasius farmers either through organising farmers horizontally or by increasing the formal relationships between farmers and processors which will encourage processors to make investments in pangasius farms.

## 4.5 Tuna subsector

Figure 4.5.1 presents the tuna value chain in Vietnam and the prioritised bottlenecks that are crucial for the export of the tuna industry in Vietnam.

In the Vietnamese tuna value chain four main categories of operators can be distinguished:

1. Fishermen: i.e. long line, purse seiners and gillnet fisheries
2. Fish landing sites
3. Middlemen
4. Processors/exporters

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

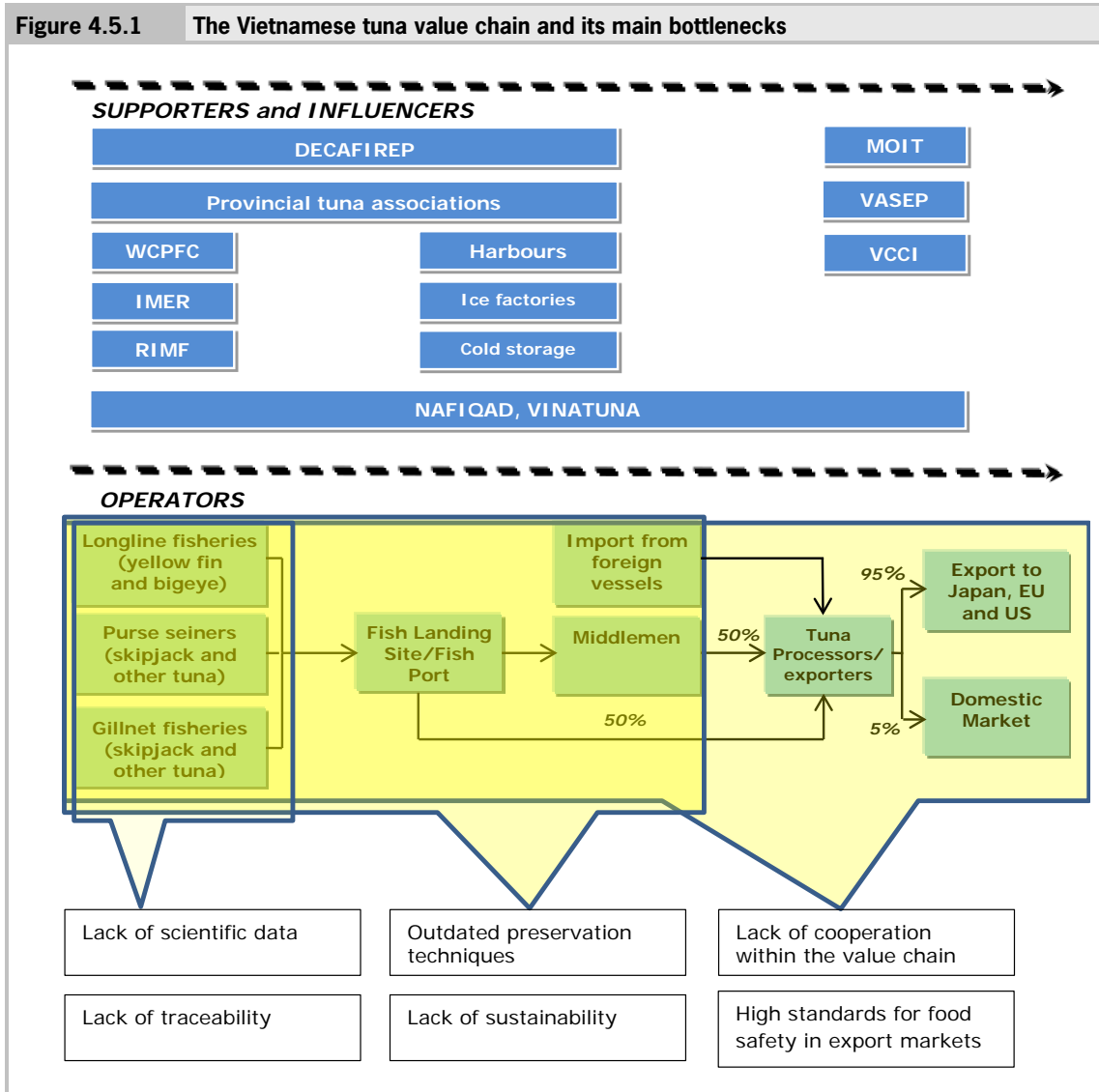
1. Government authorities (DECAFIREP, NAFIQAD, MOIT, VCCI)
2. Research institutes (RIMF, IMER)
3. Producer and exporter associations (VINATUNA, VASEP)
4. Other supporters and influencers (WCPFC, harbours, ice factories and cold storage facilities)

Six main bottlenecks have been identified as a result of the desk study, the field work and the discussions at the strategic conference:

1. Outdated preservation techniques
2. Lack of scientific data
3. Lack of cooperation within the value chain
4. Lack of traceability
5. Lack of sustainability
6. High standards for food safety in export markets



**Figure 4.5.1 The Vietnamese tuna value chain and its main bottlenecks**



### *Operators within the value chain*

#### *Fishermen*

Detailed information about the number of vessels as well as the composition of the tuna fishing fleet in Vietnam is not available. Most of the tuna vessels are medium-sized vessels with engines of 90-400 HP. It is estimated that there are 45 large-scale fishing companies that are engaged in tuna fishing as well as export. These companies have large vessels with engines of 200-750 HP. The remaining vessels are small vessels with engines of less than 90 HP. Fishermen sell their catch to middlemen or processors/exporters. Tuna fishermen in general do not have official contracts with middlemen or processors/exporters. They depend heavily on middlemen in terms of loans and credit (in cash or in kind). In particular for small vessels, cold storage on board is mentioned as an important bottleneck. There are about ten small fishing groups engaged in tuna fishing that are equipped with advanced cold storage, but these are just a small part of the total fishing fleet. Most of the fishermen fish individually with poor cold storage, made mainly by wood (not composite or metal). On account of poor cold storage it is estimated that 50% of the tuna harvest has to be discarded and therefore cannot be used for either export or do-

mestic consumption. Low quality tuna that cannot be used for processing and export is sold at local markets or as low-value or trash fish that is used for the production of fishmeal.

#### *Fish landing sites*

Most of the fish landing sites in Vietnam are relatively small and can only receive the vessels with engines smaller than 400 HP. Besides landing the catch the function of the landing sites is the provision of fuel, ice and foodstuff. Another function of the landing sites is to pre-process tuna before transport to the processing companies. This mainly involves sorting fish by size and species. In general as a result of a lack of freezing and full processing functions storage facilities at fish landing sites in Vietnam are poor. Finally fish landing sites are also an important marketplace for trading tuna.

#### *Middlemen*

Similarly to shrimp and pangasius, the function of middlemen is to first gather the catch from fishermen and then to supply the fish to other middlemen (often larger middlemen, also sometimes referred to as traders) traders, processors/exporters and local markets. Middlemen themselves do not import tuna to supply to processors/exporters. In the most important tuna fisheries provinces middlemen play different roles. In the tuna value chain in Binh Dinh and Phu Yen provinces, the relations between middlemen and fishermen is critical as middlemen play an important role in providing loans and credit. In exchange for providing financial support, middlemen have the option to either buy tuna first, to buy the best quality tuna, or to buy at preferred prices. Some middlemen have contracts with processors/exporters. In Khanh Hoa province the value chain is dominated by processors/exporters. Some middlemen also started to process and to export tuna. Many middlemen have become a processor or exporter. Only few middlemen remained in their original position.

#### *Processors/exporters*

Tuna processors and exporters buy tuna from Vietnamese landing sites for processing, exporting, and importing for re-export of tuna. In 2010 there were 144 Vietnamese companies that exported tuna. Of these companies, there were sixteen large companies with an export volume of more than 1,000 tonnes of tuna per year. Together these companies exported 85% of the total export volume.

#### ***Flow of products along the value chain***

As mentioned in the previous section the most important tuna fisheries are longline, purse seine and gillnet fisheries. Longline fisheries target Yellowfin tuna (*Thunnus albacares*) and Bigeye tuna (*Thunnus obesus*) while purse seine and gillnet fisheries catch mainly Skipjack tuna (*Katsuwonus pelamis*) and other tuna species. It is estimated that 50% of the tuna is sold through middlemen while the other 50% is supplied directly to processors/exporters. These shares are for the tuna fisheries in general and they may differ by province or by landing site. For example in Khanh Hoa more tuna is supplied directly from the fishermen to the processor without intervention of middlemen. Of the processed tuna 95% is exported, while only 5% is consumed domestically (often of a lower quality). There is no detailed information available about the 144 companies that export tuna. The largest companies are most likely canning companies. Exporters that export small volumes mainly export frozen tuna products.

#### ***Supporters and influencers within the value chain***

##### *Government authorities*

Under the Directorate of Fisheries of the Ministry of Agriculture and Rural Development (MARD), DECAFIREP is in charge of the national management of the tuna sector. DECAFIREP is responsible for issues such as vessel registration, catch control, fishing area regulation, and traceability certificates. DECAFIREP is also supporting Vietnam to become full-member of the Western Central Pacific Fisheries

Commission (WCPFC). NAFIQAD is responsible for the quality control of tuna. NAFIQAD is the only organisation that can certify vessels for food safety standards for foreign markets such as EU, US and Japan. An observed weakness is that there is no national standard for the quality of the tuna, so that the quality of tuna cannot be measured according to specified standards. Furthermore, at this time the regular monitoring programme of residues in quality of seafood conducted by NAFIQAD is only applied for shrimp, pangasius and bivalves (heavy metals, marine bio-toxics), but not yet for tuna. As part of the Ministry of Industry and Trade (MOIT), the Vietnam Chamber for Trade and Industry (VCCI)-a semi-government, semi NGO is responsible for granting the certificate of the origin for the export of seafood products including tuna.

#### *Research institutes*

The Research Institute for Marine Products (RIMF) operates under MARD, and is responsible for bio stock assessment for marine species including tuna. The most recent stock assessment for tuna was conducted in 2005. The Institute of Marine Environment and Resources (IMER) conducts research in several sectors in the marine environment and also provides scientific education and consultancy. IMER is part of the Vietnam Academy of Science and Technology. IMER was mentioned during the strategic conference as a research institute that might be able to provide scientific data about tuna stocks and important fishing areas for tuna.

#### *Producer and exporter associations*

The Vietnamese Tuna Association (VINATUNA) was established in 2010. VINATUNA supports the strengthening of cooperation between fishermen, the government and processing plants as well as other actors in the tuna sector. Also they protect the voices, and rights of members including the advocacy to the policy level. VINATUNA plays a role in supporting the marketing and exporting for tuna processors/exporters and provides training and awareness raising for members. However, VINATUNA does not engage in catch control or export. At provincial level three provincial tuna associations are established in Binh Dinh, Phu Yen and Khanh Hoa provinces that look after the interests of tuna fishing companies and processors/exporters in these provinces. At a national level VASEP supports exporters of fishery and aquaculture products, including tuna.

#### *Other supporters and influencers*

Within the value chain for tuna no certification bodies and financial institutions were mentioned as highly relevant supporters or influencers. Other important supporters and influencers in the value chain for tuna are harbours, ice factories, cold storage facilities and the Western Central Pacific Fisheries Commission (WCPFC).

In harbours processed tuna is loaded on large container ships and is transported to foreign countries. Due to the fact that most Vietnamese harbours are small and far from the capturing and processing areas and fish landing sites, many of the shipping containers first have to be transported to large harbours or harbours in foreign countries such as Singapore or Hongkong. This means additional costs and lower quality tuna products. Since 2009, the situation has improved because of the development of the harbour of Ho Chi Minh city. Still many shipping containers containing tuna first have to be transferred by truck since the majority of the tuna comes from Binh Dinh, Phu Yen and Khanh Hoa provinces, which are 450-800km from Ho Chi Minh City.

Ice factories are located at the fish landing sites and provide ice for the storage of tuna following capture. There are a good number of ice factories at the different landing sites, although the quality of the ice is not always sufficient. Often the same ice is used for tuna (longer time at sea) as for other more low-value fish. Most of the small vessels use ice for the storage of tuna on board and buy this directly from ice factories or from the middlemen.

Cold storage facilities at fish landing sites are mentioned as an important influencer. Besides the fact that cold storage on board of most of the fishing vessels is poor, the same situation holds for most of the fish landing sites. Lack of cold storage leads to degradation of tuna quality following landing. It also implicates that the tuna has to be transported to the processors/exporters directly after landing, otherwise the quality of the fish will decrease.

The WCPFC Convention seeks to address problems in the management of high seas fisheries resulting from unregulated fishing, over-capitalisation, excessive fleet capacity, vessel re-flagging to escape controls, insufficiently selective gear, unreliable databases and insufficient multilateral cooperation in respect to conservation and management of highly migratory fish stocks' (WCPFC, 2011). Currently Vietnam is not yet a full member of the WCPFC, but is in the process to become a full member. During the fieldwork stakeholders mentioned that a full membership of the WCPFC can be an important condition for international buyers. In some cases foreign buyers reject Vietnamese tuna as they fear that this tuna can be illegally caught and unsustainable.

Information about how different stakeholders should be involved in a possible seafood programme is presented in a stakeholder assessment grid for the tuna subsector in Appendix 1. The assessment grid differentiates between different degrees of involvement, ranging from merely keeping stakeholders informed to regular face-to-face contact to ensure a strong commitment.

### ***Bottlenecks along the value chain***

#### *All bottlenecks preventing tuna exports*

The desk study, fieldwork and the outcomes of the conference resulted in six prioritised bottlenecks for the Vietnamese tuna sector. During the conference only the three most crucial bottlenecks were discussed in detail. In this section the priority bottlenecks are discussed in detail and for each bottleneck solutions, required actions, the specific stakeholders and the donors that are already working on a solution are discussed.

<b>1. Outdated preservation techniques</b>	
Description	Outdated post-harvest preservation techniques were indicated as the most critical bottleneck for the tuna subsector. Particularly smaller vessels lack on-board cold storage facilities. This results in quality degradation. Also at most of the fish landing sites cold storage facilities are insufficient to maintain the quality of the tuna. Most of the small fishing vessels go out at sea for a maximum of 15 days. In general the quality of the tuna decreases within seven days after the tuna has been caught. To store the tuna vessels need cold storage facilities where the tuna can be frozen at -40 or -60 Celsius. Another related bottleneck is that there are no national regulations or quality standards with respect to for instance the killing and the on-board primary processing of tuna.
Solution and actions	To improve the preservation techniques of the fishing vessels and on the fish landing sites, a reorganisation and restructuring of the fishing fleet is needed. According to the conference participants, the government should initiate a programme for restructuring the fishing fleet and provide investment or subsidies for vessels to improve their facilities. However, such a restructuring programme will be costly, and it is not clear whether the government is willing to provide the necessary funds. Another option that was mentioned is to develop partnerships between processing companies and fishermen, where processing companies invest in the improvement of on board facilities. In turn the fishermen supply the processors/exporters with premium quality tuna.
Stakeholders	The most important stakeholders mentioned are MARD (DECAFIREP) and VINATUNA although support from fishermen is a prerequisite.

**1. Outdated preservation techniques**

Donors already working on it	The World Bank will provide financial support to the Vietnamese fisheries sector. The support will focus on infrastructure, traceability, seafood health, monitoring and management and disease control. It is unclear if financial support for improving on-board cold storage facilities will also be provided.
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**2. Lack of scientific data**

Description	The lack of scientific data focusses especially on the lack of information about tuna fishing grounds and stocks. Also the absence of monitoring of stocks was mentioned. Improved scientific data can result in more effective management plans for catching tuna and managing stocks. The last stock assessment for tuna was conducted in 2005 by the Vietnamese government.
Solution and actions	Investment in research activities for stock assessments and monitoring programmes is needed. A first step would be to address the lack of scientific data by the government (MARD) and to emphasise that better scientific insight can improve the management of the tuna fisheries. This can also have a positive effect on other actors further along the value chain. For solving this bottleneck funding from the government or international organisations may be necessary.
Stakeholders	MARD (RIMF) and IMER (in cooperation with fishermen) are pointed out as the main stakeholders that can solve this bottleneck. Another option is to attract international research institutes that might be interested to conduct marine research.
Donors already working on it	No donor agencies are working specifically on stock assessments or monitoring programmes. The French Government however, has provided Official Development Assistance (ODA) to Vietnam for the Movimar project. In this project positioning devices to monitoring the off-shore fishing vessels, including tuna vessels, are provided.

**3. Lack of cooperation within the value chain**

Description	Lack of cooperation between producers, middlemen and processors/exporters takes place at several stages of the value chain. Because of competition among fishermen to catch good quality tuna, little information is shared about the fishing grounds. Also the position and dominance of the middlemen in some provinces, prevents cooperation between fishermen and processors/exporters. There are limited contracts between fishermen and processors/exporters.
Solution and actions	During conference discussions it became clear that middlemen and fishermen often have conflicting interests and that direct linkages between fishermen and processors/exporters might improve the value chain. Therefore it is important to invest in mutual trust between different actors (especially between fishermen, middlemen and processors/exporters) and show the benefits of cooperation within the value chain.
Stakeholders	Although the government (MARD) is pointed out take the lead, all actors in the value chain should contribute to solve this bottleneck. VINATUNA and VASEP are mentioned to play an important role to increase cooperation within the value chain.
Donors already working on it	No donor agencies are working specifically on this bottleneck in the tuna sector.

<b>4. Lack of traceability</b>	
Description	Most of the Vietnamese tuna vessels are small vessels that do not have the financial capacity to document and measure their catches. Therefore it is difficult to trace these catches, what is required for exporting to the EU. Except for the EU other markets do not have these high requirements regarding traceability.
Solution and actions	This bottleneck was not discussed during the conference. Traceability at the level of the fishermen and fish landing sites should be improved. To realise this, investments in small vessels are required as well as the training of fishermen to document catches.
Stakeholders	DECAFIREP and VINATUNA most likely are the stakeholders that should address this bottleneck.
Donors already working on it	As mentioned in the bottleneck of outdated preservation techniques The World Bank is going to provide financial support the Vietnamese fisheries sector including the tuna industry. Traceability is mentioned as one of the subjects that will be targeted.

<b>5. Lack of sustainability</b>	
Description	Besides traceability, according to the stakeholders the level of sustainability of tuna fishery is insufficient. To date there is no management plan for the Vietnamese tuna fisheries (currently under development by VINATUNA). Also the fact that Vietnam is still no full member of the WCPFC is considered a bottleneck for the tuna subsector. Finally, it was also mentioned that no tuna fishery in Vietnam is certified by an Eco label such as the Marine Stewardship Council (MSC) or Friends of the Sea (FOS). In 2008, WWF conducted a confidential assessment of the potential access of Vietnamese fisheries, including tuna, to obtain the MSC certificate. One of the key principles to obtain this certificate is to have an existing good management system and data of tuna catches. The lack of sustainability affects the competitiveness of the tuna fisheries in Vietnam.
Solution and actions	This bottleneck was not discussed during the conference. A management plan for tuna seems to be an important step towards sustainable management of the tuna stocks. Also full membership of the WCPFC and commitments of this membership might contribute to the level of sustainability.
Stakeholders	DECAFIREP and VINATUNA are in the position to stimulate the stakeholders within the value chain to focus more on sustainability. However the stakeholders also have their individual responsibilities.
Donors already working on it	DECAFIREP is supporting Vietnam to become full-member of WCPFC and is currently participating in the working in the West Pacific East Asia Oceanic Fisheries Management of the WCPFC that is also supported by the Southeast Asian Fisheries Development Centre (SEAFDEC).

<b>6. High standards for food safety in export markets</b>	
Description	Although the bottleneck of foreign trade is related to the lack of traceability, it was identified as a separate bottleneck. In particular, the strict standards regarding food safety (in the EU) are difficult to meet for both processing companies and fishermen.
Solution and actions	This bottleneck was not discussed during the conference. Because the standards for food safety are not set by Vietnamese stakeholders it is difficult to tackle this bottleneck. To meet these standards most likely investments have to be made at the level of the fishing fleet, fish landing sites and the processors/exporters. Also lobbying activities of the Vietnamese government may be a possible option.
Stakeholders	At the level of the tuna fishing fleet DECAFIREP and VINATUNA can work on this bottleneck while at the level of the exporters VASEP and VCCI may be able to address this bottleneck.
Donors already working on it	No donor agencies are working specifically on this bottleneck in the tuna sector. The future support from the World Bank however might also benefit the removal of this bottleneck.

### **Conclusion**

The majority of the bottlenecks that are previously discussed occur at the stage of the fishing fleet, and the fish landing sites. Most of the small fishing vessels are depending on the middlemen. Also the fact that out of the 144 exporting companies only sixteen companies export more than 1,000 tonnes per year indicates that there are many smaller exporters that do not all export on a regular basis. An issue that has not been raised during the conference is the fact that Vietnamese exporters in 2010 exported about 80,000 tonnes of frozen and canned tuna, while only 37,000 tonnes of tuna were caught by the domestic fishing fleet. Data from VASEP show that Vietnam imported more than 52,000 tonnes of tuna in 2010, while in 2009 42,000 tonnes of tuna was imported from several countries, Vietnamese processors/exporters seem to be more dependent on imported tuna than on the raw material supplied by the domestic fleet. Also Dutch importers of tuna from Vietnam point out that most large processing companies depend on large foreign vessels. An important aspect for importing tuna from Vietnam that has not been discussed during the conference is that tuna caught by Vietnamese vessels has lower import tariffs than tuna that has been caught by foreign vessels. Frozen yellow fin tuna from Vietnam has a tariff of 14.5% while yellow fin tuna that has been processed in Vietnam but caught by other vessels has a tariff of 18%. For pre-cooked skipjack from Vietnam the tariff is 20% while not caught by Vietnamese vessels it is 24%. If up to 50% of the catches cannot be sold to processors/exporters because the quality of the tuna has deteriorated due to insufficient cold storage facilities, it appears that significant improvements at the stage of the fishing fleet can be achieved. Having in mind the lower tariffs for Vietnamese caught tuna, also processors should have an interest in improving the quality of the catches. Therefore the position of the fishing fleet within the value chain needs to be strengthened. The recently formed VINATUNA can contribute to the strengthening of the position of the fishing fleet. It should however also be noted that the discussions about the bottlenecks during the conference were dominated by stakeholders from the fishing fleet. Perceptions of processors therefore might be different. To maintain the quality of the tuna after catching significant investments have to be made and it is not sure if the government is able to provide the requested support. Also the steps Vietnam is currently taking towards a full membership of the WCPFC is an important improvement for the tuna sector.

### **4.6 Clams, oysters and mussels subsector**

Figure 4.6.1 present the value chains in Vietnam for hard clams (*Meretrix lyrata*). Because hard clams are the most important species in terms of production and export, the visual representation of the value chain and the discussion of the bottlenecks is focussed on hard clams. In the description of the operators, information about oysters and mussels is also included.

In the Vietnamese value chains for hard clams, oysters and mussels four main categories of operators are distinguished:

1. Input suppliers: seed collectors, hatcheries, nurseries, suppliers of medicines, drugs and chemicals and seed traders
2. Farmers: large-scale and small-scale farmers
3. Middlemen: large and small middlemen
4. Processors/exporters

Furthermore, five different categories of influencers and supporters are discussed:

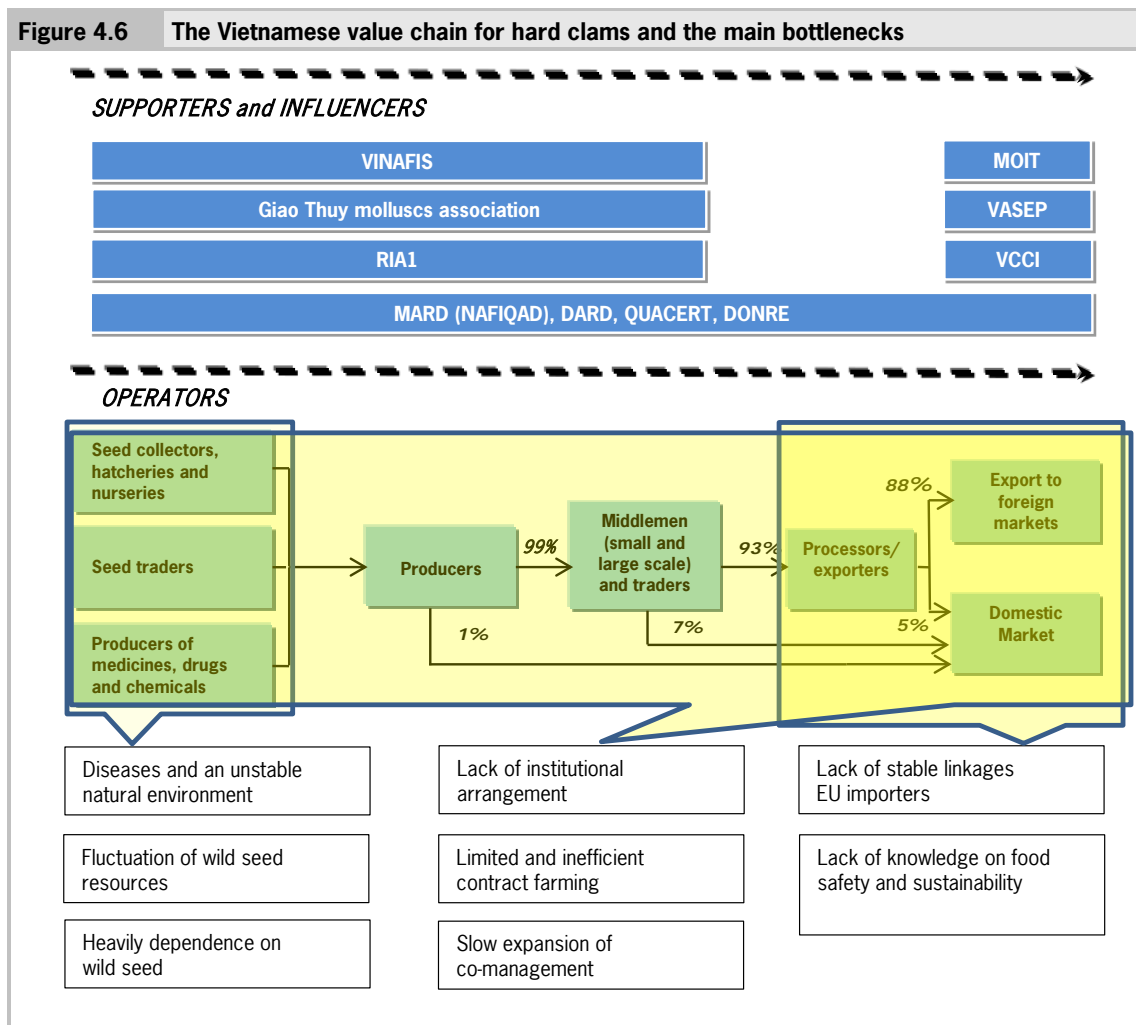
1. Government authorities (MARD (NAFIQAD), DARD and DONRE)
2. Research institutes (RIA1)
3. Producer and exporter associations (VINAFIS, Giao Thuy molluscs association and VASEP)
4. Certification bodies (QUACERT)

Finally eight main bottlenecks have been identified as a result of the desk study, field work and validation workshop:

1. Diseases and an unstable natural environment
2. Fluctuation of wild seed resources
3. Limited and inefficient contract farming
4. Heavy dependence on wild seed
5. Lack of institutional arrangements
6. Slow expansion of co-management
7. Lack of stable linkages to EU importers
8. Lack of knowledge on food safety and sustainability



**Figure 4.6 The Vietnamese value chain for hard clams and the main bottlenecks**



### *Operators within the value chain*

#### *Input suppliers*

The main inputs for farming hard clams, oysters and mussels are seed, and medicines, drugs and chemicals. Seed broodstock is provided by seed collectors or hatcheries. Nurseries grow the seed for farming. Also seed traders play a role in the value chain by trading broodstock with seed collectors, hatcheries, nurseries and farmers. Oysters and mussels are cultured while clam are both cultured and captured.

#### 1. Seed collectors and hatcheries

Seed for the production of clams, oysters and mussels in nurseries is provided by seed collectors or hatcheries. About 70% of the seed for hard clam production is supplied by seed collectors, while 30% is supplied by hatcheries. Hatcheries account for 80% of the seed production for oysters, while the remaining 20% is supplied by seed collectors. Mussel seed is supplied by seed collectors. 60% of the collected seed is sold to seed traders, while 20% is sold to nurseries. The remaining 20% is sold directly to farmers. Hatcheries produce seed for hard clams and oysters. In 2009 1,649m clam seeds and 150m oyster seeds were produced. Production of hard clam seed in particular has increased significantly. In 2002 only 160m hard clam seeds and 20m oyster seeds were produced. In 2010 Vietnam has 530 hatcheries for molluscs that produce a total of 3,820m seeds, including hard clams, oysters and other species. It is said that demand for seed exceeds

supply. Only for hard clams every year Vietnam is able to grow about 15bn seeds. Many hatcheries produce oyster seeds (mainly in Quang Ninh, Hai Phong, Khanh Hoa, and Ba Ria-Vung Tau). There are two hatcheries for hard clams, one hatchery is located in the Red River Delta and one in the Mekong River Delta). 50% of the seed that is supplied from hatcheries goes directly to producers, while the other 50% is sold to seed traders and nurseries. No distinction between clams and oysters can be made.

## 2. Nurseries

Nurseries purchase seed from hatcheries or wild seed collectors, to accommodate the grow out to the specific local conditions, or grow it to a larger size for stocking. Nurseries sell seed directly to the farmers or to seed traders. Estimations show that 50% of the grow out is sold directly to producers while 50% goes to seed traders. Also here no specific distinction can be made between, hard clams, oysters or mussels.

## 3. Seed traders

Seed traders can only trade seed, but they can also have a nursery. Seed traders can distribute seed more widely and in a more convenient way and therefore have better access to farmers. Often, seeds for hard clams, oysters or mussels must go through many stages of a nursery or a seed trader before it can be supplied to farmers. The government does not have a quality standard (yet) for produced and imported seed. Also many seed traders of clams, oysters and mussels import seed unofficially from mainly China.

## 4. Producers of medicines, drugs and chemicals

Contrary to the production of shrimp and pangasius, hard clams, oysters and mussels have not been infected seriously from diseases. However recently in 2010 and 2011, the new disease, caused by the Perkinsus parasite, occurred and resulted in serious losses for hard clam farmers. Clam producers and processors might use aluminium sulphate or sulphate-related substances to clean (whitening) the shells of especially clams.

### *Producers of hard clams, oysters and mussels*

Hard clams, oysters and mussels are supplied to middlemen and processors. More than 28,000 tonnes of hard clams were captured in 2010 while almost 152,000 tonnes of clams were cultured. For the production of hard clams there are differences between the Mekong Delta and the Red River Delta. Most of the producers of hard clams in the Mekong River Delta belong to cooperatives, and focus on collecting wild hard clams (Tien Giang, Ben Tre) or the farming of hard clam (Tra Vinh). Most producers only focus on producing and harvesting clams. Large-scale producers (farms with more than ten hectares) in the Red River Delta also whiten and clean the hard clams and package and transport them to domestic markets in big cities or export to China. Producers of hard clams in the Red River Delta do not collect hard clams from the wild, but only farm hard clams. Different from shrimp and pangasius, producers of hard clams do not depend heavily on middlemen for loans or credit as they require very little inputs. The most important reason that hard clam producers depend on seed traders is that they need seed of a reliable quality. In the Mekong River Delta hard clam producers are depending more on middlemen for marketing and selling hard clams. Very often the production of hard clam from farms is more stable compared to collection from the wild because the farms face less risks in terms of disease. Also in general producers of hard clams have low operational costs. Very often, there are no written contracts between hard clam producers (both small-scale and large-scale producers) and middlemen. For hard clams differences in sales between small-scale and large-scale producers can be observed. Also there are differences in sales between hard clam producers in the Red River Delta and the Mekong River Delta. In Table 4.6.1 the differences are presented.

<b>Table 4.6.1 Clam producer characteristics in Red River Delta and Mekong River Delta</b>		
<b>Producers</b>	<b>Red River Delta</b>	<b>Mekong River Delta</b>
<i>Small producers</i>	<i>Sells to:</i>	<i>Sells to:</i>
Small middlemen	5%	79%
Larger middlemen/traders	94%	20%
Processing plant	0%	0%
Local pedlars	1%	1%
Supply to domestic markets	0%	0%
<i>Large-scale producers</i>	<i>Sells to:</i>	<i>Sells to:</i>
Small middlemen	5%	5%
Larger middlemen/traders	64%	83%
Processing plant	0%	10%
Local pedlars	1%	2%
Supply to domestic markets	30%	0%

The number of companies that produce clams in Vietnam is unknown. Also no information about production characteristics of companies that produce oysters or mussels can be provided.

#### *Middlemen*

Middlemen are mentioned as a critical actor in the value chain for clams, rather than the value chain for oysters and mussels. Middlemen can conduct several activities such as harvesting, preserving, transporting and distributing of the products to the processors and domestic markets (restaurant, hotels, local market etc.). Relationships between middlemen and producers are on a spot market basis. Middlemen do not provide seeds, loans or technical advice to producers of clams, oysters and mussels. In general two types of middlemen can be distinguished. Small middlemen are often located nearby the farming or fishing areas and limited financial capacity. Larger middlemen are often located in the town centre or a city and have stronger financial power. Larger middlemen have closer relationships with processors. Like the producers of clams, also middlemen in the Red River Delta and the Mekong River Delta perform different (see Table 4.6.2).

<b>Table 4.6.2 Middlemen characteristics in Red River Delta and Mekong River Delta</b>		
<b>Middlemen</b>	<b>Red River Delta</b>	<b>Mekong River Delta</b>
<i>Small middlemen</i>	<i>Sell to:</i>	<i>Sell to:</i>
Other middlemen (and pedlars)	20%	20%
Traders (Vietnamese and Chinese)	79%	20%
Processors	1%	60%
<i>Larger middlemen</i>		
Small middlemen (and local pedlars)	5%	15%
Chinese traders for export to China	30%	0%
To Vietnamese traders	0%	20%
Sell to domestic markets	55%	10%
Processors	10%	65%

#### *Processors and exporters*

Hard clams are often processed and exported while oysters and mussels are only processed as they are only sold on the domestic market. The processing of clams, oysters and mussels for the domestic market takes place at processors that also process other seafood products. Processors can also have other functions such as transporting, freezing, packing and preserving. In the domestic markets, processors

provide processed products only to the large traders and supermarkets. Processors of clams, oysters and mussels do not have contracts directly with producers or cooperatives, instead they have contracts with middlemen to trade for them and to act as their agent. Only very few processors directly provide seed, loans, technical advice or information on market requirements to producers.

Although processors play a very important role in the value chain for clams, oysters and mussels they often depend on middlemen. In the Mekong River Delta, clams are auctioned before harvest. Often processors do not understand the specific harvest conditions and do not have sufficient skills to compete with local middlemen. Therefore processors are almost fully dependent on middlemen for the supply of raw material. Nevertheless, depending on a few middlemen is considered to be less risky compared to being dependent on many small producers. This also reduces the cost for the collection of raw material. There are twelve exporting companies of hard clams. Most of these companies are based in the Mekong River Delta, and besides hard clams also export other seafood products. Hard clams are exported to China without processing. Five of these companies are considered large size (production of more than 2,000 tonnes per year), while the other seven companies are middle sized companies (production of 200-1,000 tonnes per year). Furthermore there also are many small-scale processors of several mollusc species for domestic consumption.

### ***Flow of products along the value chain***

It is estimated that 88% of the hard clams that are exported go to international markets and the remaining 12% goes to domestic markets. Hard clams that are exported are all processed first. Hard clams can be exported as various product types. About 60% is exported as whole shell product, while 30% is boiled without shell. Also small amounts of half shell clams and value added clams are exported. The domestic market is supplied by processors (4%), but also by traders (7%) and grow out farms (1%). Hard clams are captured or harvested from the farm and are transported by the middlemen to a trader before they are further traded to processors. Hard clams might have to pass several middlemen and traders before they reach the processing plants because of differences in the size, colour, sub species and quality levels.

### ***Supporters and influencers within the value chain***

#### ***Government authorities***

The Ministry of Agriculture and Rural Development (MARD) at the national level and the Department of Agriculture and Rural Development (DARD) at provincial level are the government agencies responsible for the state management of molluscs collection and farming including clams, oyster and mussels. Within MARD, the National Agro-Forestry-Fisheries Quality Assurance Department (NAFIQAD), plays a relevant role. NAFIQAD is responsible for the granting of food safety, traceability and health certificates for the export of mollusc, both from farm or wild capture fishing in order to access to custom documentation before export. Molluscs are required to undergo tests upon criteria on food safety and sanitation in order to receive a food and safety and sanitation certificate. These certificates are required by importing countries. At farm level, NAFIQAD supervises and deals with violations of seafood hygiene and safety monthly. Since 2000 NAFIQAD conducts monitoring programs for certain harmful substances in molluscs (marine bio-toxics, heavy metals and parasites). Bi-weekly, NAFIQAD takes random mollusc samples in culture areas. If harmful substances are detected, harvesting of molluscs from farming or fishing areas is not permitted. Presently NAFIQAD has implemented a traceability system for molluscs which will provide a “mollusc area” with a code for product traceability. Mollusc producers are required to keep records of all inputs such as seed, drugs, and environmental treatment substances. In the future this traceability system will be available to comply with the EU traceability directive to molluscs. The Ministry of Industry and Trade (MOIT) grants a certificate of origin for the export of hard clams to the EU. Finally the Department of Natural Resources &

Environment (DONRE) is mentioned as a relevant government authority at the provincial level because it is responsible for the conditions of the natural resources in Vietnam. This includes aquatic resources.

#### *Research institutes*

Research Institute for Aquaculture No. 1 (RIA1) is working on the artificial production of clams. No other research institutes such as Research Institute for Marine Products (RIMF) and the Institute of Marine Environment and Resources (IMER) are mentioned.

#### *Producer and exporter associations*

At national level, there is no Vietnamese association that specifically represents the clams, oysters and mussels subsectors. The Vietnam Fisheries Society (VINAFIS) is responsible for protecting and supporting the interest of the operators within the value chain. In the province of Nam Dinh in the Red River Delta there is one molluscs association at the district level, namely the Giao Thuy molluscs association. The association consists of about 60 clam farmers who focus on farming hard clams and hatchery operations. The functions of the molluscs association are to share the technical experience, market information and trade promotion. Recently, the molluscs association has successfully registered the geographical indications of Giao Thuy clam to the Ministry of Science and Technology (National Office of Intellectual Property of Vietnam). In the Mekong River Delta, hard clam producers gather into cooperatives. In particular in Ben Tre province, there are nine hard clam cooperatives that manage about 6,000 ha of hard clam production area with a production of 45,000 tonnes in 2010. The function of a cooperative is to manage a large clam area and to share technical experience. Recently, under the cooperative system, the Ben Tre clams have received the Marine Stewardship Council (MSC) certificate for the first sustainable fisheries in South East Asia.

The Vietnam Association for Seafood Exporters and Processors (VASEP) protects the interests of the Vietnamese processors/exporters of hard clams (and processors of oysters and mussels). The role of VASEP is limited as they focus more on the export of key commodities such as pangasius and shrimp.

#### *Certification bodies*

Besides NAFIQAD and the general position of The Vietnam Certification Centre (QUECERT), also private certification bodies play a relevant role in Vietnam. As mentioned above, in 2010 the Marine Stewardship Council awarded the Ben Tre cooperatives with the MSC certificate (with support from WWF). The nearby province of Tien Giang is also considering to apply for the MSC certificate for the management of 2,300 hectares of hard clam production area.

No financial institutions were mentioned as supporter or influencer in the value chain of (hard) clams, oysters and mussels. A possible explanation could be that most of the producers of mollusc are small companies that might not be able to get access to loans because of complicated procedures. Also for loans producers or processors might also be depending on middlemen instead of banks.

Information about how different stakeholders should be involved in a possible seafood programme is presented in a stakeholder assessment grid for the clams subsector in Appendix 1. The assessment grid differentiates between different degrees of involvement, ranging from merely keeping stakeholders informed to regular face-to-face contact to ensure a strong commitment.

#### *Bottlenecks and solutions*

Because of time constraints the bottlenecks that have been discussed at the conference were only formulated for hard clams (*Meretrix lyrata*), since this is the most important clam species for Vietnam. Based on

the results from the desk study, fieldwork and the conference eighteen bottlenecks for hard clams have been identified. Out of these eighteen bottlenecks, eight were prioritised and discussed in more detail during the conference.

<b>1. Diseases and an unstable natural environment</b>	
Description	Diseases and unstable conditions of the natural environment are identified as the most crucial bottleneck. Natural fluctuations regarding water temperature or the level of salinity can have negative effects on the production of hard clams.
Solution and actions	A good warning and monitoring system that monitors the natural conditions in areas where clams are captured or farmed and can indicate possible changes in the environment or diseases might contribute to less fluctuations in production. For such a system investments in facilities, and manpower to deal with this system are required.
Stakeholders	DONRE is pointed out as most relevant stakeholder to solve this bottleneck.
Donors already working on it	MARD has a program on water quality and diseases for aquaculture. However, the effects of the program for farming of clams is small due to the limited frequency of samples. Besides MARD no donors are currently working on this bottleneck.

<b>2. Fluctuation of wild seed resources</b>	
Description	Wild seed resources are the main source for the grow out of hard clams. Fluctuations in the availability of wild seed currently prevent clam producers from producing a stable volume of clams.
Solution and actions	Improved protection of aquatic resources in Vietnam may result in less fluctuations and a better and wider availability of hard clam seed. Also improvements in the artificial reproduction of clams as an alternative for wild seed can be an option.
Stakeholders	DARD together with research institutes as RIMF and IMER and Universities.
Donors already working on it	It is not clear if there are donor agencies that are working on this bottleneck.

<b>3. Limited and inefficient contract farming</b>	
Description	Currently there are limited or inefficient contracts between clam farmers and cooperatives, with processors. This possibly has to do with the important position of middlemen within the value chain.
Solution and actions	The establishment and development of better linkages between producers and processors within the value chain should result in more and efficient contracts. It remains unclear how these linkages can be established.
Stakeholders	Farmers, cooperatives, DARD, together with national and local producer associations.
Donors already working on it	The Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) has conducted a value chain analysis for clams in Tra Vinh. It is however not sure whether they continue to assist to improve the value chain. WWF is working to develop the Bivalve Aquaculture Standard/ASC and collect feedbacks from the producers in Vietnam. Here it is also not sure whether WWF will continue to support the farming of clams in Vietnam.

<b>4. Heavily dependence on wild seed</b>	
Description	As already mentioned at the second bottleneck wild seed is the main source for grow out of hard clams. Only 3% of the wild seed originates from hatcheries.
Solution and actions	It is important to protect natural aquatic resources in order to maintain sufficient amounts of seed for hard clams. Furthermore, improved regulations and policies were mentioned but were not further discussed in detail. Finally, the artificial reproduction of clams as an alternative for wild seed may be a solution.
Stakeholders	MARD and DONRE are pointed out as the most relevant stakeholders to solve this bottleneck.
Donors already working on it	RIA 1 is working on the artificial seed production for clams. Furthermore no donors are currently working on this bottleneck.

<b>5. Lack of institutional arrangements</b>	
Description	The current institutional arrangements are insufficient to prevent destructive fishing and poaching of the wild seed of hard clams. Also it seems that there is less concern on the protection of the broodstock of clams.
Solution and actions	The protection of aquatic resources in order to maintain sufficient amounts of seed for hard clams has been identified as the main solution. Furthermore the further introduction of a co-management system where fishermen have more responsibilities to manage the clam production areas has been mentioned.
Stakeholders	MARD MONRE are pointed out as the most relevant stakeholders to solve this bottleneck. Also local government authorities were mentioned.
Donors already working on it	The Ministry of Foreign Affairs of Denmark (DANIDA) is supporting the project on co-management, also to minimise the destructive fishing and poaching of wild clam seed. This project however will end in June 2012.

<b>6. Slow expansion of co-management</b>	
Description	The cooperative co-management system in Ben Tre has proven to be successful and to contribute to the sustainable development of the production of clams. However no further co-management systems have been introduced so far.
Solution and actions	The introduction of policies and regulations that stimulate the development of co-management systems has been proposed as the main solution to overcome this bottleneck.
Stakeholders	The further expansion of co-management should be promoted by government authorities (MARD and MONRE). Also local governments and communities, producer associations, and NGOs should be involved.
Donors already working on it	It is unclear if there are donor agencies that are currently working on this bottleneck.

<b>7. Lack of stable linkages EU importers</b>	
Description	Vietnamese exporters of hard clam have raised the issue that there are few long term relationships with EU importers. Also the marketing effort is limited and Vietnamese clams do not have a strong brand name.
Solution and actions	More investments for the marketing and promotion should be carried out to improve the market position of Vietnamese clams. The government are mentioned as stakeholder to target this bottleneck, however VASEP and exporters of clams themselves should also play an important role.
Stakeholders	MARD, MONRE, VASEP and exporters of clams
Donors already working on it	It is unclear if there are donor agencies that are currently working on this bottleneck.

<b>8. Lack of knowledge on food safety and sustainability</b>	
Description	Producers and exporters of hard clams mention that they have limited knowledge of food safety and sustainability standards, especially regarding sustainability schemes such as MSC and Global GAP.
Solution and actions	Better education and provision of information for exporters of clams about food safety standards and sustainability schemes is a straightforward solution to overcome this bottleneck. Also match-making between Vietnamese exporters of clams and EU importers has been proposed to create stronger linkages.
Stakeholders	Similar to the previous bottleneck MARD, MONRE, VASEP and exporters of clams are identified as the most relevant stakeholders to overcome this bottleneck.
Donors already working on it	It is unclear if there are donor agencies that are currently working on this bottleneck.

### ***Conclusion***

Most of the bottlenecks are related to the management of collection and farming of hard clams, and the provision of seeds for clam production. The removal of these bottlenecks will most likely be the responsibility of the government authorities although the further development of co-management also is mentioned as a possibility. From the description of the operators it also appears that middlemen and traders have an important position and that especially small producers are depending on middlemen. The position of the middlemen can prevent processors to cooperate more directly with clam producers. In none of the bottlenecks middlemen are mentioned as an operator that can contribute to removing bottlenecks. Emphasizing the role of middlemen and stimulating them to participate in value chain discussions may promote increased value chain cooperation. When exporting companies have more control on their sourcing they might be able to link with importing companies in EU and the US because these companies often require a stable supply of products.



## 5 Conclusions

Table 5.1 shows the bottlenecks of the four investigated subsectors. From the table it is clear that many of the bottlenecks are at the level of primary production. Below the table, there will be a short elaboration on the potential for increasing exports of each of products from the four different subsectors to the EU market.

<b>Table 5.1</b>	<b>Summary of bottlenecks subsectors Vietnamese seafood sector</b>	
Shrimp	Shrimp disease	Primary production
	Lack of sustainability in shrimp production	Primary production
	Lack of vertical cooperation in the value chain	All levels
	Lack of capital investment in infrastructure	All levels
	Lack of cooperation between value chain operators and BSOs	All levels
Pangasius	Lack of quality fingerlings	Primary production
	Lack of capital investments in infrastructure	Primary production
	Lack of cooperation between value chain operators and BSOs	All levels
	Lack of vertical cooperation and integration in the value chain	All levels
	Complexity and diversity of international buyer requirements	Processors and exporters
Tuna	Outdated preservation techniques	Primary production
	Lack of scientific data	Primary production
	Lack of cooperation within the value chain	All levels
	Lack of traceability	Primary production and traders
	Lack of sustainability	Primary production
	Food safety standards in export markets	Processors and Exporters
Clams, oysters and mussels	Diseases and an unstable natural environment	Primary production
	Fluctuation of wild see resources	Primary production
	Limited and inefficient contract farming	Primary production
	Heavily dependence on wild seed	Primary production
	Lack of institutional arrangements	All levels
	Slow expansion of co-management	Primary production
	Lack of stable linkages with EU importers	Processors and exporters
	Lack of knowledge on food safety and sustainability	All levels

### *Shrimp and pangasius*

From the discussion about the bottlenecks but also with the characteristics of shrimp and pangasius export companies in mind it is has become clear that the export companies in these two subsectors are relatively mature. The fact that the exporters that were interviewed and present during the conference have not indicated that market access or market visibility is an issue for them, suggests that these exporters are able to position themselves in the international market without additional support. Unless production from shrimp farms increases substantially it is unlikely that the exporters will further increase their export volumes by providing them with market intelligence or supporting them to visit international trade fairs. However, exporters as well as other stakeholders in these subsectors have indicated that they struggle to meet the increasing demand for sustainably produced products. Furthermore, they also find it difficult to find their way through the wide diversity of standards that apply to different markets within the EU, the US and Japan. Assisting and coaching exporters to identify, prepare and apply for certification schemes such as ASC, ACC, GlobalGAP or Naturland that fit best with their product, business model and existing and

prospective customers and markets may, if successful, substantially increase the export volume and value of sustainably certified pangasius and shrimp products. This might even be more the case for exporters in the shrimp subsector than for those in the pangasius subsector as the number of certified pangasius exporters is already increasing rapidly.

### *Tuna*

The options to increase tuna exports are broader than for shrimp and pangasius. Besides increasing imports of tuna from foreign vessels, production from the municipal fisheries may be increased substantially by reducing post-harvest losses that according to respondents currently reach up to 50% of the total catch. Besides increasing production there is also a large potential to stimulate exporters to source from sustainable sources, to support hand-line fishermen and to get involved in initiatives to promote sustainable tuna fisheries. However, for tuna this is a delicate issue because it is a migratory species with uncertain stocks. In order to increase the exports of sustainable certified products, a similar approach as for pangasius and shrimp is logical. There are examples of sustainable initiatives in the tuna sector, e.g. the efforts of a Vietnamese company to cooperate with the Dutch importer Culimer and WWF to source tuna from small-scale fishermen that use sustainable catch methods. These kinds of initiatives can easily increase the export volumes and values of sustainable tuna products. However, exporters must be made aware of the market potential for sustainable certified tuna.

### *Clams, oysters and mussels*

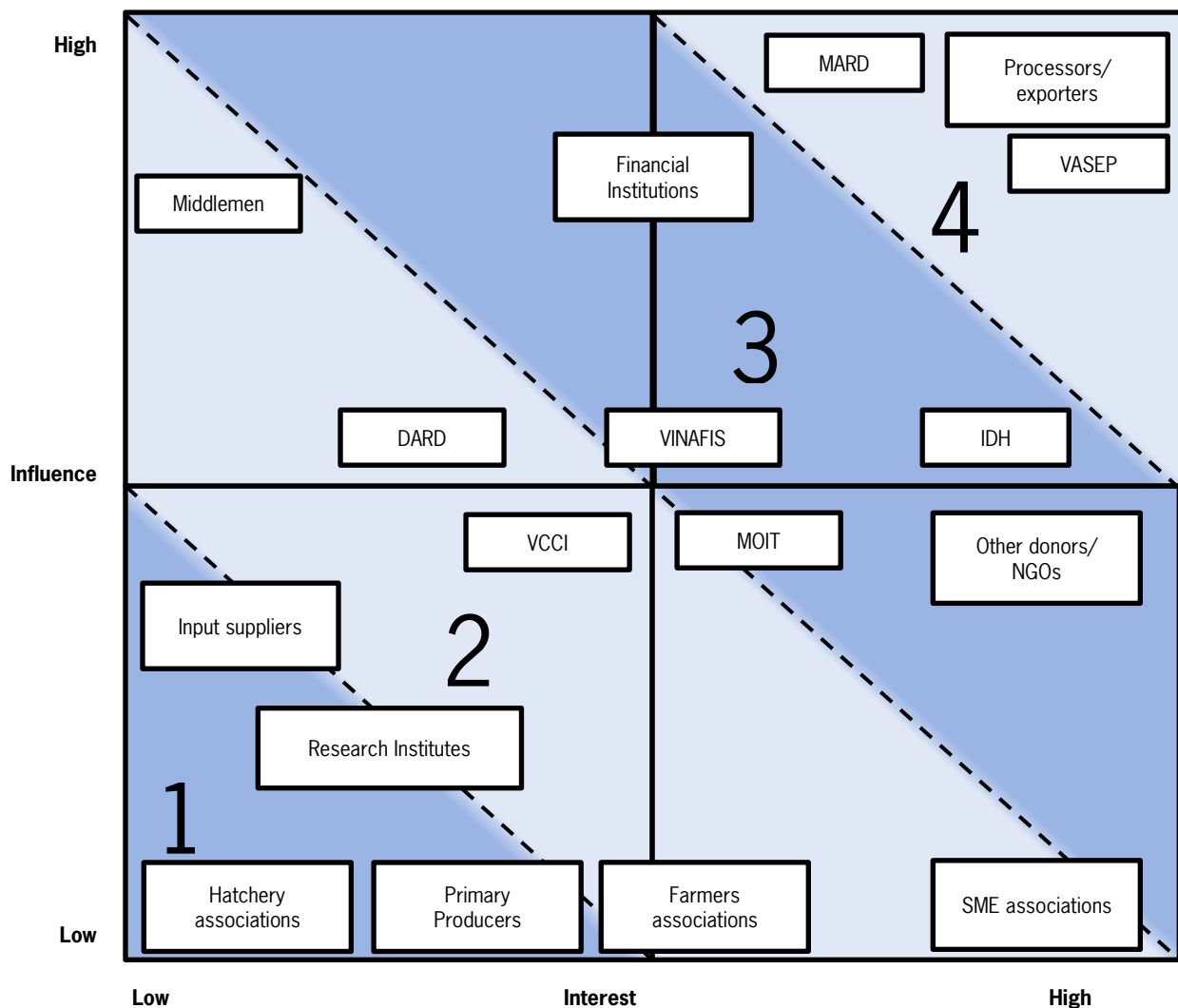
The production of clams, oysters and mussels is facing severe constraints, but there are a lot of opportunities to increase and stabilise production. Contrary to the other three subsectors, clams, oysters and mussels from Vietnam are not yet a major export product for the EU market. Although there is a major achievement with the first Vietnamese MSC certified clam supplier, Vietnamese clams are relatively new in the EU market and oysters and mussels have not yet reached the EU. Contrary to the other subsectors exporters also indicate that they lack sustainable relationships with EU buyers and they are not fully aware of the marketing potential in the EU. In order to increase their export volumes and value to the EU market they need additional support to visit trade fairs and meet more potential buyers in the international market. This is only the case for the SMEs and not for the larger exporters that export multiple products and are more consolidated in the international market.

# Appendix 1 Stakeholder assessment grids

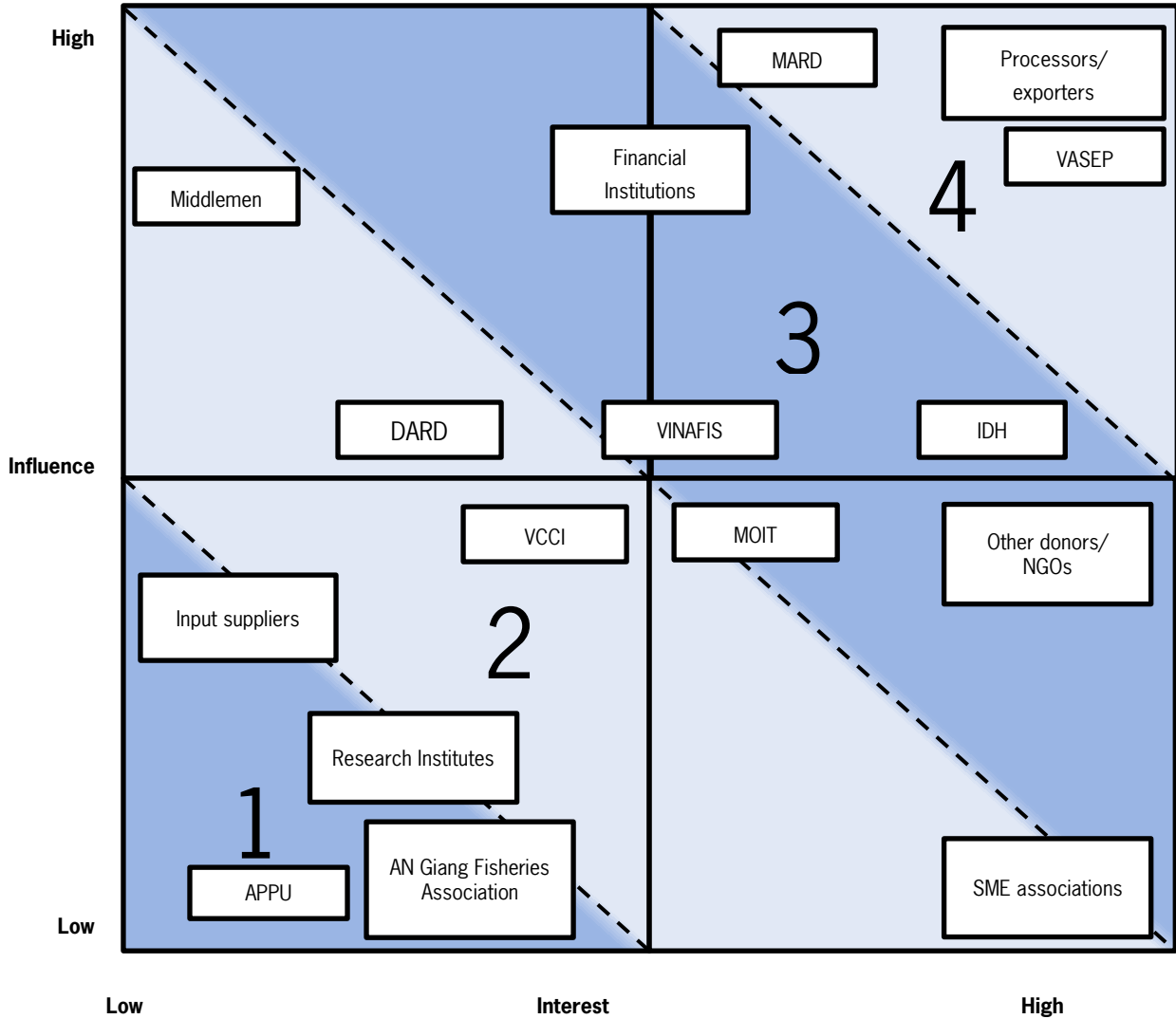
## Introduction

In this Appendix, the stakeholder assessment grids for the four subsectors are presented. Stakeholders are agencies, organisations, financial institutions, groups or individuals who have a direct or indirect in a possible intervention of CBI in the value chain. Based on the level of influence and the level of interest, the involvement of a particular stakeholder in a CBI programme can be determined.

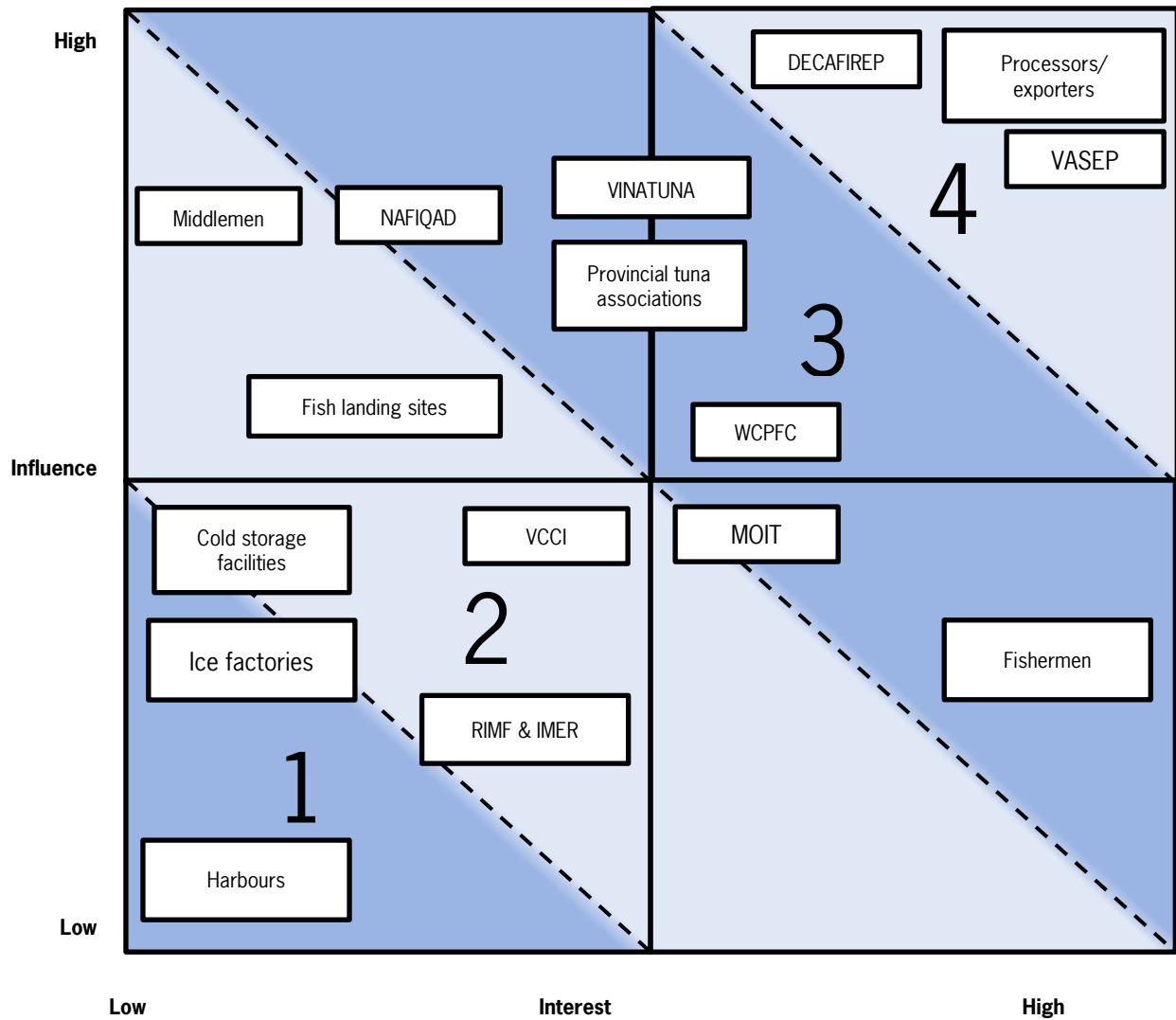
### Shrimp stakeholder assessment grid



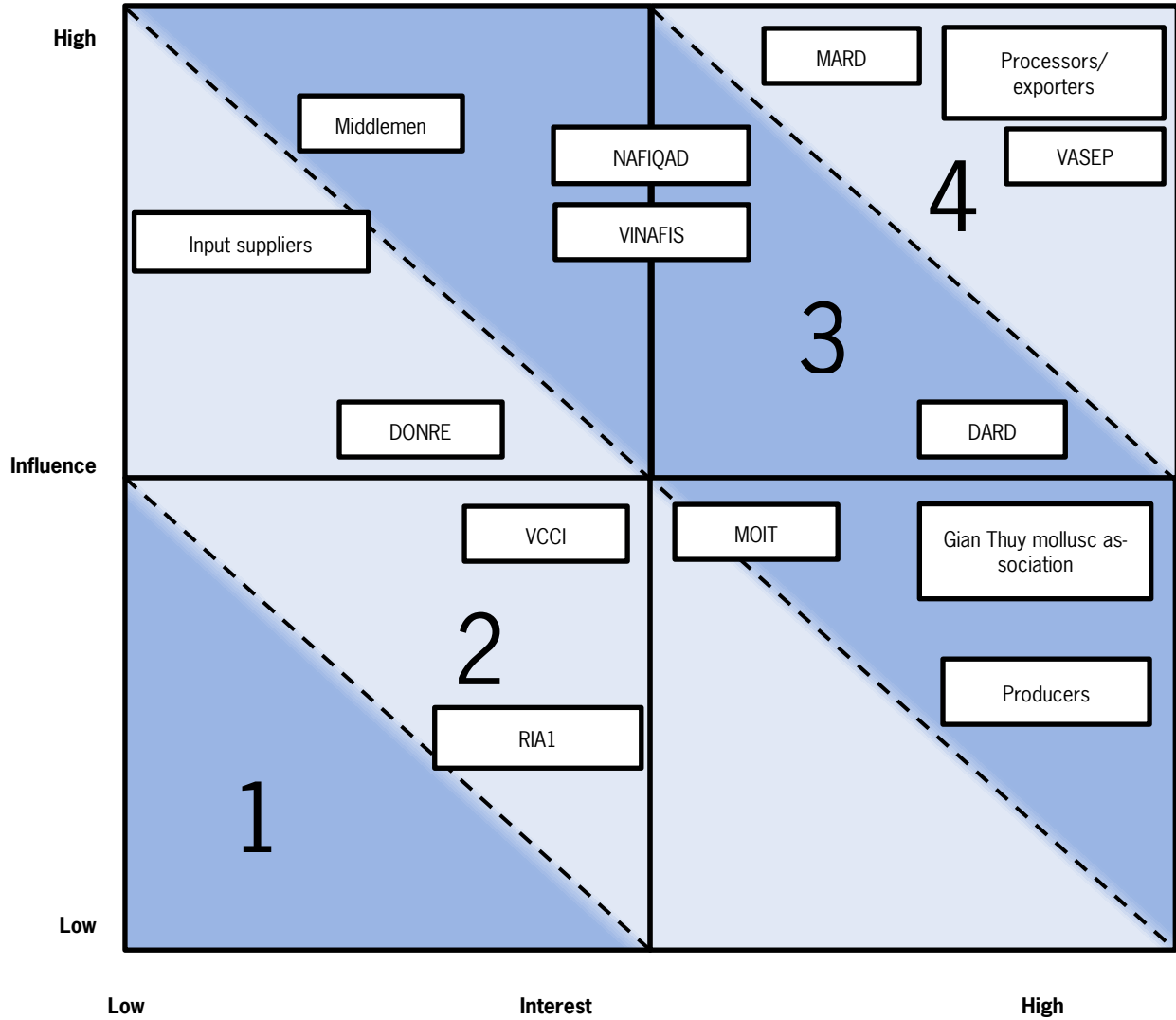
**Pangasius stakeholder assessment grid**



**Tuna stakeholder assessment grid**



**Clams stakeholder assessment grid**



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

## Appendix 2 Baseline data

### Shrimp subsector

	Production (tonnes)		Area under cultivation (ha)		Average productivity (tonnes/ha/year)	
	Monodon	Vannamei	Monodon	Vannamei	Monodon	Vannamei
Extensive	211,025	7,682	155,975	57,920	0.37	3.77
Semi intensive	64,196	2,134	109,208	25,778	0.85	6.04
Intensive	31,638	2,882	67,991	53,021	1.07	9.20
<b>Total</b>	<b>306,859</b>	<b>12,698</b>	<b>333,174</b>	<b>136,719</b>		

	Number of companies	Average export volume
Small (<1,000 tonnes)	308	141
Medium (1,000 - 10,000 tonnes)	51	3,143
Large (>10,000 tonnes)	2	18,674
Total	361	668

Source: VASEP (2011).

Company	Export volume 2010 (tonnes)	Export value 2010 (USD)	Main export products 2010
A		28,343,119	Frozen shrimp
B		47,000,000	Frozen shrimp
C		70,000,000	Frozen shrimp, Nobashi, CPTO, RPTO, Sushi
D	3,500	3,300,000	Frozen shrimp
E	9,959	22,635,109	Frozen shrimp (HLSO, HOSO, PTO, HLPD)
F	6,454	34,018	Frozen shrimp (HLSO, HOSO, PTO, HLPD)

Company	Main export markets 2010 (%)	Number of employees	Production costs (VND/kg)	Selling price per product (USD/kg)
A	EU (25% in 2010), USA and Japan	1,733	170,000 - 180,000	9 - 12
B	EU, USA, Japan, Canada, Australia, Russia and Korea	2000	160,000 - 180,000	10 - 14
C	EU (10%), USA, Japan and Canada	7,000	145,000 - 170,000	12 - 14
D	EU, US	530	NA	7 - 11
E	EU, Australia, Malaysia and Japan	1,050	NA	5 - 9
F	U.S.A, EU and Korea	7,000	NA	5 - 11

**Export volume and value for shrimp in 2000-2010****Monodon**

<b>Year</b>	<b>Export volume (tonnes)</b>	<b>Export value (USD)</b>	<b>Export of sustainable produced products (%)</b>
2001	29,335	314,680,722	n.a.
2002	37,969	368,657,070	n.a.
2003	40,188	363,149,708	n.a.
2004	60,690	596,608,107	n.a.
2005	61,280	559,757,397	n.a.
2006	56,002	551,936,788	n.a.
2007	66,519	671,420,305	n.a.
2008	54,940	510,230,164	n.a.
2009	100,150	910,492,461	n.a.
2010	141,850	1,439,261,041	n.a.

**Vannamei**

<b>Year</b>	<b>Export volume (tonnes)</b>	<b>Export value (USD)</b>	<b>Export of sustainable produced products (%)</b>
2001	3,201	15,600,744	n.a.
2002	4,017	22,884,065	n.a.
2003	3,584	20,806,465	n.a.
2004	6,151	37,714,339	n.a.
2005	5,862	35,412,645	n.a.
2006	5,399	38,498,679	n.a.
2007	13,919	88,347,594	n.a.
2008	25,193	150,008,426	n.a.
2009	43,576	258,187,817	n.a.
2010	62,479	414,593,042	n.a.

Source: VASEP (2011).



**The main export markets for Monodon in 2001-2010**

Year	EU			US		
	Volume (tonnes)	Value (USD)	%	Volume (tonnes)	Value (USD)	%
2001	2,143	16,605,963	5.3	14,132	165,448,966	52.6
2002	943	6,706,974	1.8	19,985	201,255,496	54.6
2003	894	6,311,249	1.7	19,512	183,663,625	50.6
2004	4,310	33,854,860	5.7	14,990	164,882,112	27.6
2005	7,394	57,251,021	10.2	13,869	145,737,806	26.0
2006	7,560	59,947,368	10.9	9,167	116,341,560	21.1
2007	7,762	62,247,358	9.3	16,482	207,741,036	30.9
2008	7,552	56,799,088	11.1	13,169	145,233,738	28.5
2009	17,591	130,805,881	14.4	19,350	217,392,598	23.9
2010	36,758	393,642,678	27.4	24,038	200,859,304	14.0
Year	Japan			Others		
	Volume (tonnes)	Value (USD)	%	Volume (tonnes)	Value (USD)	%
2001	9,833	103,400,271	32.9	3,226	29,225,522	9.3
2002	13,245	124,811,955	33.9	3,795	35,882,645	9.7
2003	15,567	137,409,029	37.8	4,215	35,765,805	9.8
2004	24,157	242,124,583	40.6	17,234	155,746,551	26.1
2005	24,067	230,878,173	41.2	15,950	125,890,397	22.5
2006	26,094	269,635,418	48.9	13,181	106,012,442	19.2
2007	25,446	259,995,917	38.7	16,830	141,435,994	21.1
2008	18,808	181,088,175	35.5	15,411	127,109,164	24.9
2009	28,614	281,908,324	31.0	34,595	280,385,657	30.8
2010	30,870	394,215,535	27.4	50,184	450,543,524	31.3

Source: VASEP (2011).

**The main export markets for Vannamei in 2001-2010**

Year	EU			US		
	Volume (tonnes)	Value (USD)	%	Volume (tonnes)	Value (USD)	%
2001	44	147,722	0.9	155	669,291	4.3
2002	118	413,271	1.8	545	5,187,206	22.7
2003	11	59,637	0.3	1,373	9,541,071	45.9
2004	138	833,340	2.2	3,115	19,243,219	51.0
2005	247	1,637,243	4.6	3,293	18,468,906	52.2
2006	628	4,423,083	11.5	1,658	11,221,146	29.1
2007	2,066	13,415,544	15.2	3,505	17,861,523	20.2
2008	4,722	29,935,049	20.0	8,851	46,444,978	31.0
2009	9,718	58,393,576	22.6	12,653	69,957,121	27.1
2010	14,568	103,650,801	25.0	14,328	92,078,874	22.2
Year	Japan			Others		
	Volume (tonnes)	Value (USD)	%	Volume (tonnes)	Value (USD)	%
2001	2,472	12,031,965	77.1	531	2,751,766	17.6
2002	2,963	14,753,910	64.5	390	2,529,678	11.1
2003	1,916	9,434,356	45.3	285	1,771,401	8.5
2004	2,014	11,669,959	30.9	884	5,967,821	15.8
2005	1,671	11,068,081	31.3	650	4,238,416	12.0
2006	2,256	16,141,968	41.9	858	6,712,482	17.4
2007	5,575	37,078,856	42.0	2,773	19,991,671	22.6
2008	6,152	40,010,309	26.7	5,467	33,618,090	22.4
2009	7,242	45,937,347	17.8	13,963	83,899,773	32.5
2010	15,453	102,826,467	24.8	18,129	116,036,898	28.0

Source: VASEP (2011).

**Product categories for shrimp for export in 2010**

	Product category	Volume (tonnes)	Value (USD)	%	Main export markets per product
Monodon	HS 1605	25,342	248,104,255	17	The US, Japan, Australia, Germany, Canada
	HS 030613	116,507	1,191,156,786	83	The US, Japan, China & Hong Kong, South Korea, Canada
Vannamei	HS 1605	20,251	144,378,625	35	The US, Japan, South Korea, Belgium, Australia
	HS 030613	42,227	270,214,417	65	The US, Japan, South Korea, Germany, Egypt

Source: VASEP (2011).

## Pangasius subsector

<b>Production of pangasius, cultured area and productivity in 2010</b>				
<b>Province</b>	<b>Total production (tonnes)</b>	<b>Area under cultivation (hectares)</b>	<b>Average productivity (tonnes/hectares/year)</b>	
Tien Giang	39,557	207	191	
Ben Tre	110,000	657	167	
Tra Vinh	15,000	99	152	
Soc Trang	25,000	125	200	
Kien Giang	6,075	30	203	
An Giang	172,719	999	173	
Đong Thap	290,736	1,872	155	
Vinh Long	115,000	406	283	
Hau Giang	47,707	214	223	
Can Tho	150,351	782	192	
Total	972,145	5,391	180	

<b>Average production volume of small, medium and large processors and exporters of pangasius in 2010 (tonnes)</b>		
	<b>Number of companies</b>	<b>Average Export Volume</b>
Small (<1,000 tonnes)	192	145
Medium (1,000 - 10,000 tonnes)	81	3,252
Large (>10,000 tonnes)	18	20,453
Total	291	2,266

Source: VASEP (2011).

<b>Export company information of interviewed companies (1)</b>			
<b>Company</b>	<b>Export volume 2010 (tonnes)</b>	<b>Export value 2010 (USD)</b>	<b>Main export products 2010</b>
A	8,130	16,886,590	Frozen fillet Pangasius
B	7,807	17,984,919	Frozen fillet Pangasius
C	3,103	7,434,219	Frozen fillet Pangasius
D	1,117	2,221,974	Frozen fillet Pangasius
E	23,153	46,161,269	Frozen fillet Pangasius

<b>Export company information of interviewed companies (2)</b>				
<b>Company</b>	<b>Main export markets 2010 (%)</b>	<b>Number of Employees</b>	<b>Production costs (VND/kg)</b>	<b>Selling price per product (USD/kg)</b>
A	EU, Asia, Canada, USA, Mexico	1,100	25,000 - 26,000	2.5 - 3.5
B	EU, Hong Kong, Singapore, Malaysia, Japan, America	1,200	20,000 - 25,000	2.7 - 3.5
C	EU, USA, Mexico, Singapore, Hong Kong, Australia, Switzerland	905	17,000 - 22,000	1.7 - 2.5
D	EU, China, Hong Kong, Australia, Singapore, Canada, Mexico, Dominica republic, Russia, Ukraine, Middle East, Egypt	1,000	21,000 - 25,000	2.7 - 3.2
E	EU, Middle East, Asia, Australia	2,586	20,000 - 25,000	2.0 - 3.0

<b>Export volume and value for pangasius in 2000-2010</b>			
<b>Year</b>	<b>Export Volume (tonnes)</b>	<b>Export Value (USD)</b>	<b>Export of sustainable produced products (%)</b>
2000	689	2,593,267	n.a.
2001	1,970	5,617,982	n.a.
2002	27,980	87,054,882	n.a.
2003	33,304	81,898,897	n.a.
2004	82,962	228,995,276	n.a.
2005	140,707	328,152,931	n.a.
2006	286,600	736,872,499	n.a.
2007	386,870	979,035,657	n.a.
2008	640,829	1,453,098,038	n.a.
2009	607,665	1,342,915,506	n.a.
2010	657,001	1,421,850,346	n.a.

Source: VASEP (2011).

<b>The main export markets for pangasius in 2000-2010</b>						
<b>Year</b>	<b>EU</b>			<b>US</b>		
	<b>Volume (tonnes)</b>	<b>Value (USD)</b>	<b>%</b>	<b>Volume (tonnes)</b>	<b>Value (USD)</b>	<b>%</b>
2001				561	2,002,475	77.2
2002	91	279,749	5.2	1,385	4,187,542	77.1
2003	2,521	8,155,194	9.4	17,251	54,882,791	63.0
2004	6,680	17,754,884	21.7	8,931	24,228,350	29.6
2005	22,422	67,096,999	29.3	14,220	43,149,583	18.8
2006	55,172	139,393,288	42.5	14,764	35,258,177	10.7
2007	123,212	343,427,300	46.6	24,281	72,871,625	9.9
2008	172,871	469,540,577	48.0	21,196	67,606,400	6.9
2009	224,311	581,499,601	40.0	24,179	78,558,613	5.4
2010	224,073	538,797,675	40.1	41,609	134,006,695	10.0
<b>Year</b>	<b>Russia</b>			<b>Others</b>		
	<b>Volume (tonnes)</b>	<b>Value (USD)</b>	<b>%</b>	<b>Volume (tonnes)</b>	<b>Value (USD)</b>	<b>%</b>
2001				128	590,792	22.8
2002				408	961,256	17.7
2003				8,208	24,016,897	27.6
2004				17,694	39,915,663	48.7
2005	665	800,066	0.3	45,655	117,948,629	51.5
2006	3,049	5,588,694	1.7	67,722	147,912,772	45.1
2007	42,779	83,229,086	11.3	96,329	237,344,487	32.2
2008	48,728	90,185,524	9.2	144,075	351,703,157	35.9
2009	118,155	188,453,580	13.0	274,183	604,586,243	41.6
2010	39,476	64,389,252	4.8	302,507	605,723,294	45.1

Source: VASEP (2011).

## Tuna subsector

<b>Production methods/ number of boats and production volumes in 2010</b>		
<b>Fishing methods</b>	<b>Number of boats</b>	<b>Production volume</b>
Long line fisheries	n.a.	n.a.
Gill net fisheries	n.a.	n.a.
Purse seiners	n.a.	n.a.
Other fisheries	n.a.	n.a.
Total	n.a.	37,000 (estimation)

(No up to date and complete information about the composition of the tuna fishing fleet in Vietnam can be provided. It was estimated that in 2010 17,000 tonnes of Yellow fin tuna and Big eye tuna, and 20,000 tonnes of Skipjack was caught by Vietnamese vessels)

<b>Average production volume of small, medium and large processors and exporters of tuna in 2010 (tonnes)</b>		
	<b>Number of companies</b>	<b>Average production volume</b>
Large (> 1,000 tonnes)	16	4,500
Medium (100-1000 tonnes)	31	330
Small (< 100 tonnes)	97	20
Total	144	580

Source: VASEP (2011).

<b>Export company information of interviewed companies (1)</b>			
<b>Company</b>	<b>Export volume 2010 (tonnes)</b>	<b>Export value 2010 (USD)</b>	<b>Main export products 2010</b>
A	1,600	10,848,000	Canned, steak
B	3,200	10,000,000	Frozen, canned, others
C	200	2,000,000	Frozen

<b>Export company information of interviewed companies (2)</b>				
<b>Company</b>	<b>Main export markets 2010 (%)</b>	<b>Number of employees</b>	<b>Production costs (USD/kg)</b>	<b>Selling price per product (USD/kg)</b>
A	EU (60%) & USA (30%)	500	Steak: 5.6 Canned: 5.2	Steak: 6.0 Canned: 5.4
B	EU (60%), Middle-east (30%)	660	Frozen: 2.7-3 Canned: 2-2.5	Frozen: 3-3.5 Canned: 3.5-4
C	Thailand, Iran	530	7.2	10

<b>Export volume and value for frozen tuna in 2000-2010</b>			
<b>Year</b>	<b>Export volume (tonnes)</b>	<b>Export value (USD)</b>	<b>Export of sustainable produced products (%)</b>
2000	6,165	22,284,671	n.a.
2001	14,476	58,592,912	n.a.
2002	20,735	77,560,777	n.a.
2003	17,516	48,344,124	n.a.
2004	20,507	54,792,227	n.a.
2005	10,422	43,553,178	n.a.
2006	13,668	54,547,572	n.a.
2007	17,344	67,285,196	n.a.
2008	19,259	85,581,302	n.a.
2009	21,832	93,105,636	n.a.
2010	41,913	102,678,714	n.a.

Source: VASEP (2011).

<b>Export volume and value for processed tuna in 2005-2010</b>			
<b>Year</b>	<b>Export volume (tonnes)</b>	<b>Export value (USD)</b>	<b>Export of sustainable produced products (%)</b>
2005	19,334	37,645,346	n.a.
2006	31,155	62,585,407	n.a.
2007	35,498	83,653,608	n.a.
2008	33,559	103,112,473	n.a.
2009	33,982	87,800,404	n.a.
2010	37,823	175,558,494	n.a.

Source: VASEP (2011).

**The main export markets for tuna in 2000-2010 (frozen and canned tuna)**

Year	EU			US		
	Volume (tonnes)	Value (USD)	%	Volume (tonnes)	Value (USD)	%
2000	75	276,529	1,24	2,671	10,103,219	45.34
2001	1,491	1,808,183	3,09	6,389	33,211,978	56.68
2002	3,111	4,480,850	5,78	10,011	45,932,307	59.22
2003	2,642	3,633,293	7,52	7,693	26,236,804	54.27
2004	4,139	13,052,846	23,82	8,627	22,849,814	41.70
2005	7,565	20,300,128	25,00	11,569	33,321,521	41.04
2006	13,608	32,345,609	27,61	17,343	48,437,010	41.35
2007	17,094	51,102,989	33,86	17,117	48,716,027	32.28
2008	16,529	62,758,499	33,26	15,714	54,784,382	29.03
2009	17,049	56,981,155	31,50	18,913	67,361,963	37.24
2010	18,242	65,878,818	22,48	29,286	130,016,861	44.36
Year	Japan			Others		
	Volume (tonnes)	Value (USD)	%	Volume (tonnes)	Value (USD)	%
2000	3,141	11,291,549	50,67	6,137	22,212,101	99.67
2001	5,095	21,257,827	36,28	14,039	57,843,241	98.72
2002	4,692	21,750,642	28,04	19,757	75,782,177	97.71
2003	2,840	10,804,194	22,35	15,774	45,254,194	93.61
2004	2,771	8,529,742	15,57	18,773	51,150,651	93.35
2005	3,917	13,298,357	16,38	27,596	77,062,304	94.91
2006	3,789	12,677,453	10,82	41,703	109,586,628	93.56
2007	5,486	17,510,542	11,60	47,961	138,801,381	91.96
2008	5,214	23,397,380	12,40	46,415	171,023,836	90.64
2009	4,028	16,668,805	9,21	47,171	163,073,192	90.14
2010	4,535	22,102,694	7,54	31,799	75,120,492	25.63

Source: VASEP (2011).

**Import volume and value for tuna in 2006-2010**

Year	Import volume (tonnes)	Import value (USD)	Import of sustainable produced products (%)
2006	49,510	35,255,800	n.a.
2007	39,950	68,962,377	n.a.
2008	37,234	81,717,206	n.a.
2009	42,653	66,192,719	n.a.
2010	52,217	94,908,313	n.a.

Source: VASEP (2011).

## Clams, oysters and mussels subsector

<b>Production volumes for clams, oysters and mussels in 2010 (tonnes)</b>			
	<b>Captured</b>	<b>Cultured</b>	<b>Total production</b>
Clams	28,100	151,900	180,000
Oysters	-	13,400	13,400
Mussels	-	3,400	3,400

<b>Average production volume of small, medium and large processors and exporters of clams in 2010 (tonnes)</b>		
	<b>Number of companies</b>	<b>Average production volume</b>
Large (>2,000 tonnes)	7	n.a.
Medium (200-1000 tonnes)	5	n.a.
Small (<200 tonnes)	0	n.a.
Total	12	1,737

<b>Export company information of interviewed companies (1)</b>			
<b>Company</b>	<b>Export volume 2010 (tonnes)</b>	<b>Export value 2010 (USD)</b>	<b>Main export products 2010</b>
A	6,000, of which 2,000 clam	12,600,000, of which 3,780,000 clams	Frozen clam (half-shell, whole-shell)
B	3,700	7,807,000	Frozen clam (half-shell, whole-shell)
C	2,800	6,700,000	Frozen clam (half-shell, whole-shell)

<b>Export company information of interviewed companies (2)</b>				
<b>Company</b>	<b>Main export markets 2010 (%)</b>	<b>Number of Employees</b>	<b>Production costs (USD/kg)</b>	<b>Selling price per product (USD/kg)</b>
A	EU (60%), USA (20%), ASIA (20%)	5,00	0.4-0.5	1.85-2.45
B	EU (60%), USA (20%), ASIA (20%)	2,000	0.6-0.8	1.8-2.52
C	EU (65%), USA (35%)	1,200	0.5-1.4	1.9-2.61

<b>Estimation of value addition for value chain of hard clams (2010)</b>				
	<b>Grow-out farms</b>	<b>Traders</b>	<b>Processors</b>	<b>Total</b>
Selling price (VND/kg)	17,355	24,000	31,900	
Buying cost (VND/kg)	9,746	17,355	24,000	
Added value (VND/kg)	7,608	6,644	7,900	22,153
Added cost (VND/kg)	0	1,415	5,400	
% of total added value	34	30	36	100
Net income, net added value (VND/kg)	7,608	5,229	2,500	15,337
% of Net income, net added value	50	34	16	100
Net income/actor (mil. VND/year)	2,425	679	10,000	13,105
% of Net income/actor	19	5	76	100



**Export volume and value for (hard) clams in 2000-2009**

Year	Export volume (tonnes)	Export value (USD)	Export of sustainable produced products (%)
2000	4,584	11,097,559	n.a.
2001	8,875	14,729,751	n.a.
2002	12,458	20,316,415	n.a.
2003	10,702	19,202,226	n.a.
2004	5,433	13,112,611	n.a.
2005	11,020	28,780,978	n.a.
2006	12,461	31,476,796	n.a.
2007	11,915	25,746,644	n.a.
2008	13,265	28,109,460	65% *
2009	20,847	44,019,827	n.a.

\* In 2008 8,660 tonnes of clams with the MSC label were produced. Assuming that all these clams are exported, in 2008 about 65% of the export consists of sustainable produced products.

**The main export markets for (hard) clams (trend 2000-2009)**

Year	EU			US		
	Volume (tonnes)	Value (USD)	%	Volume (tonnes)	Value (USD)	%
2000	1,914	3,915,972	35,29	174	347,883	3.13
2001	2,577	4,632,788	31,45	397	855,328	5.81
2002	3,901	7,115,109	35,02	427	780,165	3.84
2003	2,832	5,435,357	28,31	802	1,698,148	8.84
2004	2,076	4,455,707	33,98	884	2,199,775	16.78
2005	7,788	18,956,193	65,86	974	2,030,217	7.05
2006	9,303	21,964,250	69,78	1,991	5,010,089	15.92
2007	8,274	17,142,297	66,58	1,759	4,245,956	16.49
2008	9,153	18,016,507	64,09	1,680	3,834,065	13.64
2009	15,961	32,134,242	73,00	2,306	5,366,660	12.19
Year	Japan			Others		
	Volume (tonnes)	Value (USD)	%	Volume (tonnes)	Value (USD)	%
2000	1,338	3,898,290	35,13	1,157	2,935,414	26.45
2001	1,430	3,724,222	25,28	4,470	5,517,413	37.46
2002	2,642	5,899,513	29,04	5,488	6,521,628	32.10
2003	2,705	6,487,023	33,78	4,362	5,581,698	29.07
2004	1,255	4,165,017	31,76	1,219	2,292,113	17.48
2005	1,175	5,599,769	19,46	1,084	2,194,799	7.63
2006	675	3,397,670	10,79	492	1,104,787	3.51
2007	526	2,743,078	10,65	1,356	1,615,313	6.27
2008	1,032	3,986,197	14,18	1,400	2,272,692	8.09
2009	1,262	4,074,906	9,26	1,318	2,444,019	5.55