



CBI  
Ministry of Foreign Affairs of the Netherlands

# The Indonesian seafood sector

## A value chain analysis

Compiled for CBI by LEI Wageningen UR

August 2012





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*Ministry of Foreign Affairs of the Netherlands*

## **CBI Report - The Indonesian seafood sector**

### **A value chain analysis**

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# Management summary

The Asian region is a major supplier of fish products to the EU market. Over the past five years in particular, the aquaculture sector in some Asian countries has become an important producer as well as exporter of whitefish and shrimps. Within the Asian region, CBI is currently exploring the possibility 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.

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

- Shrimp
- Seaweed
- Tuna
- Pangasius and tilapia

## **Shrimp subsector**

Total cultured shrimp production reached 400,000 tonnes in 2008 but then fell back to just over 300,000 in 2010. The main reasons for this decline were production problems and crop failure caused by bad weather. The only two important species for exports are Pacific White and Black Tiger shrimp. Black Tiger shrimp accounted for 36% and Pacific White shrimp for 64% of total production in 2009. Although the geographical production of Black Tiger and Pacific White shrimp varies slightly in general, production is concentrated on the island of Sumatra (including Lampung), which accounts for 42% of the total shrimp production. On Sumatra, 64% of the total production volume is Pacific White shrimp. Three main bottlenecks for the export potential of the Indonesian shrimp subsector have been identified as a result of the desk study, the field work and the validation workshop. These are presented in Table 1.

<b>Bottlenecks</b>	<b>Level in the value-chain</b>
The competitiveness of Pacific White shrimp in the EU market	All levels
The lack of supply of Black Tiger shrimp	Primary production
EU buyer requirements and food safety regulations	Processors/exporters

The Indonesian shrimp sector is relatively mature and professional. While there are still companies that need to find their way to the high-end international markets, most large and medium-sized companies have well established links with the EU, the US and Japanese markets. Some of the large companies have integrated farms that guarantee them a minimum volume of quality shrimp which is certified by ACC, Naturland or GlobalGAP. These mature companies do not necessarily need further assistance to increase their export volumes to the EU markets. However, some of the small and medium-sized companies that currently do not yet have EU approval need support to obtain EU approval.

Furthermore, as a result of the maturity of the sector, there is great potential for increasing the share of sustainable certified products. As many of the large and medium-sized companies have their own farms, the barrier to investing in certification is low compared with companies that do not have their own farms. If sustainable certificates such as ASC become a pre-requisite for exporting to the EU market, some of these companies will need help applying for certification. However, an important question is whether these companies might be able to move towards certification on their own.

### Seaweed subsector

Seaweed production has increased significantly over the past few years and reached almost 3 million tonnes in 2009 and even 3.6 million in 2010. All this seaweed is documented as *Gracilaria* and *Eucheuma* species. Currently the export volume of carrageenan is still limited. However, as the Indonesian government has decided to limit exports of raw dried seaweeds, it can be expected that new processing facilities for carrageenan will be built and production and exports of the value-added product will rise rapidly. Seaweed exports are dominated by raw dried seaweed. As a single market, China, Vietnam and the US are particularly important. However, the EU as a whole is the second largest market after China. All importing countries import raw dried seaweed from Indonesia as a raw material for the local carrageenan processors. Five main bottlenecks for the export potential of the Indonesian seaweed subsector have been identified as a result of the desk study, the field work and the validation workshop. These are presented in Table 2.

<b>Table 2 Main bottlenecks of the seaweed subsector</b>	
<b>Bottlenecks</b>	<b>Level in the value-chain</b>
Limited information about EU market potential	Processors/exporters
Lack of knowledge about and overly strict EU regulations	Processors/exporters
Lack of knowledge and technology about carrageenan production	Processors/exporters
Lack of knowledge about seaweed Good Aquaculture Practices (GAP)	Primary production
Lack of quality seeds	Input supplies

As a result of the industrialisation policy of the government it is expected that new processing facilities for carrageenan will be built and that production and exports of value-added products will increase. If the number of processing establishments and processing capacity is increased by creating an enabling environment for investors and processors and by disseminating knowledge about seaweed processing to interested companies, new opportunities will arise. Several seaweed processors are interested in the EU market but lack both the understanding of EU regulations and an overview of market opportunities in the EU. Export companies require additional assistance from the government and donor organisations to increase their export volume and value of value-added products to the EU.

### Tuna subsector

Skipjack is the most important tuna species for the Indonesian tuna sector. During the period 2006-2010, a yearly average of about 300,000 tonnes of Skipjack was caught. Yearly catches of Yellow fin tuna amount to 100,000 tonnes. Other tuna species with high catches are Frigate tuna and Eastern little tuna. Besides the catches of tuna species mentioned in the table below, small amounts of Bullet tuna and Bluefin tuna are also caught. Canned tuna is the most exported product type in tuna production. In 2010 almost USD 190m of canned tuna was exported. Although the EU, US and Japan are important markets, several countries in North Africa and the Middle East also import significant volumes of canned tuna from Indonesia. Six main bottlenecks for the export potential of the Indonesian tuna subsector have been identified as a result of the desk study, the field work and the 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>
Handling and cold storage of tuna after catching	Primary production
Traceability (EU-catch certificates/E-logbook)	Primary production
Eco-labelling	All levels
Trade barriers relating to tuna exports to the EU	Processors/exporters
Lack of capacity for small/medium processors to do market intelligence	Processors/exporters
Fluctuating tuna catches	Primary production

The bottlenecks for the Indonesian tuna industry occur at several stages of the value chain. Because processors and exporters mainly depend on the catches of the Indonesian tuna fleet, it is essential to optimise the potential of the fishing fleet. Better handling and storage of tuna can produce more high-quality tuna for export, benefitting processors and exporters too and preventing the need to further exploit tuna stocks. As there are many small landing sites, it is also crucial that tuna landed at these sites can be transported efficiently. Although several exporters of frozen and canned tuna are already EU certified, there is still potential to help small exporters meet EU requirements. Furthermore, there is a growing demand for sustainable and eco-labelled tuna in the EU market, which could have potential for Indonesian exporters. Also the lack of traceability throughout the entire value chain implies that support for fishermen, middlemen and processors/exporters is required.

### **Pangasius and tilapia subsector**

The production volume of pangasius and tilapia has increased significantly over the past 5 years, with production of both species tripling between 2007 and 2010. The most important production regions for both species are in Sumatra, Java and Kalimantan. Currently, pangasius and tilapia tend to be for domestic consumption. At the moment, pangasius in particular is not exported at all. Tilapia is also largely domestically consumed (+- 80%) but it arguably has a much higher export potential than pangasius. The government is currently developing policies to boost exports of tilapia. Due to the favourable climate in Indonesia, tilapia can be produced all year round and thus compete with tilapia from China that is only produced during the hot season. Six main bottlenecks for the export potential of the Indonesian pangasius and tilapia subsector have been identified as a result of the desk study, the field work and the validation workshop. These are presented in Table 4.

<b>Table 4 Main bottlenecks of the pangasius and tilapia subsector</b>	
<b>Bottlenecks</b>	<b>Level in the value-chain</b>
Lack of good/certified fry leads to low production/higher feeding	Primary production
High operational costs and lack of financing for farmers by banks for producers	Primary production
Lack of infrastructure	All levels

The bottlenecks that have been identified occur at all the different stages of the value chain. Compared with other subsectors, most of the production comes from small-scale producers. To be able to increase exports, this subsector has developed from many small-scale producers to a smaller number of large-scale producers. Increased collaboration between farmers might result in the creation of cooperatives that can supply producers and exporters with a more stable supply of fish. These cooperatives would also have a stronger position within the value chain. For pangasius, it was also mentioned that Indonesian producers would be better focusing on the domestic market rather than facing competition with Vietnamese pangasius. The contribution of producer and export associations to solving bottlenecks might be underestimated. In general, support at production level to produce good quality fish in the long term could also benefit processors and exporters.

# 1 Introduction

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## 1.1 Rationale/Background

The Asian region is a major supplier of fish products to the EU market. Over the past five years in particular, the aquaculture sector in some Asian countries has become an important producer as well as exporter of whitefish and shrimps. Within the Asian region, CBI is currently studying the possibilities of developing integrated programmes for the seafood sector for specific countries. 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 sector of Indonesia, additional research on the value chains of the most relevant seafood products in Indonesia is required.

## 1.2 Objectives

The main objective of this research is to identify the bottlenecks in four distinct but related seafood export value chains in Indonesia and to advise CBI whether an intervention is possible, feasible and is 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 which a supply and demand analysis was performed for the Indonesian seafood sector. 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 Indonesia. These local experts were specifically hired to collect missing data, assess the situation and engage 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 could hinder exports were discussed and possible intervention strategies to overcome the main bottlenecks were identified. The fourth phase consisted of the reporting. Based on the results of the previous phases, during this final phase the value chains analysed were described and depicted.

## 1.4 Structure

This final report consists of five chapters. Chapter two contains the general features and trends of the seafood sector in Indonesia. In this chapter, the significance of the different subsectors for the national economy and the general features and trends in the different subsectors is described. Information about the EU market for seafood products with the main trends and barriers for Indonesia is provided in chapter three. Chapter four 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 solved will be identified. Chapter five presents the general conclusions. Appendix one provides a stakeholder assessment grids for each subsector, with information about the interest and influence of the different stakeholders. In Appendix

two, the relevant baseline data for each of the subsectors are included as a point of reference to monitor and evaluate the results of the seafood programme.

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

### 2.1 Introduction

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

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

- Shrimp
- Seaweed
- Tuna
- Pangasius and tilapia

### 2.2 Significance of the different subsectors for the national economy

Figure 2.2.1 presents a map of Indonesia with the different provinces.



Indonesia is the world's second largest seafood producer with a total capture fisheries and aquaculture production of over 9.8 million tonnes in 2009, almost 50% of which comes from aquaculture. Seafood contributes approximately USD 4bn (or 1%) to the Gross Domestic Product (GDP). In 2009, only about

10% of the total volume of seafood production (881,000 tonnes) worth USD 2.8bn was exported. Overall, around 5 million people depend on the fisheries and aquaculture sector for their livelihoods.<sup>1</sup>

The Indonesian government described and explained its ambition and strategy with regard to the seafood sector in its industrialisation policy. The keywords are market strengthening, industrialisation and community empowerment. The government states that marine and fisheries industrialisation is a process to enhance production systems to increase value adding capacity, productivity and the scale of production of fisheries products through modernisation. This is supported by an integrated policy between macroeconomic development, infrastructure development, business and investment climate, knowledge, technology and human resources for community welfare.

Table 2.2.1 shows the production volumes of the main aquaculture species. Production of shrimp and seaweed constitute the largest share. Most noteworthy is the increasing share of seaweed (from 5% in 2003 to 63% in 2009). Besides shrimp and seaweed, the production of species like pangasius, shells and common carp is increasing rapidly. It is important to note that shrimp production reached over 400,000 tonnes in 2008 but declined to 338,000 tonnes in 2009 due to diseases.

<b>Species</b>	<b>2003</b>	<b>2009</b>	<b>2003-2009 (%)</b>	<b>Share 2009 (%)</b>
Shrimp	192,912	338,060	75%	7%
Seaweed	233,156	2,963,556	1,171%	63%
Grouper	8,637	8,791	2%	0%
Common carp	192,912	249,279	29%	5%
Milk fish	227,854	328,288	44%	7%
Clarias	58,614	144,755	147%	3%
Pangasius	12,904	109,685	750%	2%
Giant gourami	22,666	46,452	105%	1%
Shells	2,869	15,857	453%	0%
Mud crab	3,172	7,516	137%	0%
Nile tilapia	71,947	323,389	349%	7%
Baramundi	5,508	6,400	16%	0%
Others	164,568	166,734	1%	4%
<i>Total</i>	1,224,192	4,708,565	285%	100%

Source: MMAF (2011).

Table 2.2.2 shows the production volume of the most important capture fisheries species. As a single product tuna - eastern little tuna, Skipjack and tuna - is clearly the most important captured species (20% share of total capture fisheries production in 2008). However, the category 'other fish', which includes other species such as snapper and barramundi, is noteworthy considering its major significance in production and export volume. The fact that these species are not mentioned separately suggests that their catch volume is limited. Nevertheless, in Indonesia there are several export companies that specialise in this category of other fish, thus making it a potentially interesting subsector. The category 'other fish' differs from the category 'other' in that the latter includes other products than fish, such as cuttlefish and squid.

<sup>1</sup> MOMAF, 2011, Indonesian Fisheries Statistics Index 2009. Ministry of Marine Affairs and Fisheries, Jakarta.

<b>Table 2.2.2 Production volume capture fisheries (tonnes)</b>				
<b>Species</b>	<b>2003</b>	<b>2009</b>	<b>2003-2009 (%)</b>	<b>Share 2009%</b>
Other fish	3,157,465	3,381,673	7	70
Tuna	627,891	945,586	50	20
Shrimp	240,438	236,870	-1	5
Seaweed	64,610	3,030	-95	0
Others	292,699	245,076	-16	5
<i>Total</i>	<i>4,383,103</i>	<i>4,812,235</i>	<i>10</i>	<i>100</i>

Source: MMAF (2011).

Tables 2.2.3 and 2.2.4 present the main export products according to volume and value respectively. According to volume, the category other fish (which is the same category as just noted in capture fisheries production) is by far the largest export product. According to value, shrimp is by far the most important export product, followed by other fish and tuna.

<b>Table 2.2.3 Export volumes (tonnes)</b>				
<b>Species</b>	<b>2003</b>	<b>2009</b>	<b>2003-2009 (%)</b>	<b>2009(%)</b>
Other fish	470,045	430,513	-8	49
Shrimp	138,588	150,989	9	17
Tuna	117,092	131,550	12	15
Crab	12,041	18,673	55	2
Others	120,971	149,688	24	17
<i>Total</i>	<i>857,783</i>	<i>881,413</i>	<i>3</i>	<i>100</i>

Source: MMAF (2011).

<b>Table 2.2.4 Export value (1,000 USD)</b>				
<b>Species</b>	<b>2003</b>	<b>2009</b>	<b>2003-2009 (%)</b>	<b>2009(%)</b>
Shrimp	850,222	1,007,481	16	41
Other fish	341,494	723,523	53	29
Tuna	213,179	352,300	39	14
Crab	91,918	156,993	41	6
Others	146,730	225,904	35	9
<i>Total</i>	<i>1,643,542</i>	<i>2,466,201</i>	<i>33</i>	<i>100</i>

Source: MMAF (2011).

It is estimated that the fisheries sector employs a total of over 7,000,000 people both directly and indirectly. Many of these people work in processing facilities. In total there are more than 500 processing facilities, of which in 2011 more than 150 were EU approved.

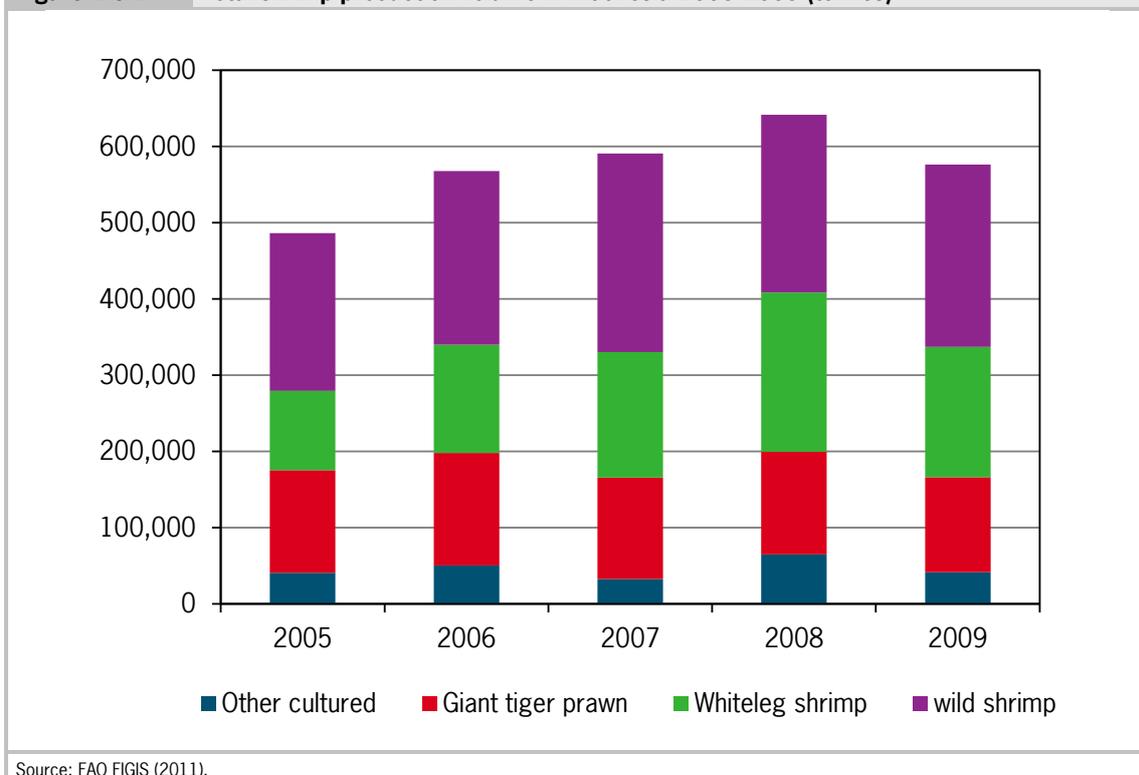
## 2.3 Shrimp subsector

### *Shrimp production*

Total production increased from 2005-2009 (see Figure 2.3.1). As wild shrimp is not very important for exports, this report focuses mainly on the production of cultured shrimp. The main increase in production from 2005-2009 is accounted for by Pacific White shrimp. Total cultured shrimp production reached 400,000 tonnes in 2008 but then fell back to just over 300,000 in 2010. The main reasons for the de-

cline in production were production problems in the farms of CP Prima and crop failure due to bad weather circumstances.

**Figure 2.3.1 Total shrimp production volume in Indonesia 2005-2009 (tonnes)**



Source: FAO FIGIS (2011).

The only two important species for exports are Pacific White and Black Tiger shrimp. Black Tiger shrimp accounted for 36% and Pacific White shrimp for 64% of total production in 2009 (see Figure 2.3.1). Although the production of Black Tiger and Pacific White shrimp varies slightly with regard to geography, production is generally concentrated on the island Sumatra (including Lampung) which accounts for 42% of total shrimp production. On Sumatra, 64% of the total production volume is Pacific White shrimp.

**Table 2.3.1 Production of Black Tiger and Pacific White shrimp per island in 2010 (in tonnes)**

Island	Pacific White shrimp	Share	Black Tiger shrimp	Share	Total
Sumatra	86,428	62%	53,027	38%	139,445
Sulawesi	12,445	42%	17,860	58%	29,305
Java	59,946	69%	26,684	31%	86,630
Kalimantan	9,018	37%	15,168	63%	24,186
Bali	2,530	100%	-	-	2,530
Nusa Tenggara	32,627	100%	-	-	32,627
<b>Total</b>	<b>201,994</b>	<b>64%</b>	<b>112,739</b>	<b>32%</b>	<b>314,733</b>

Source: MMAF (2011).

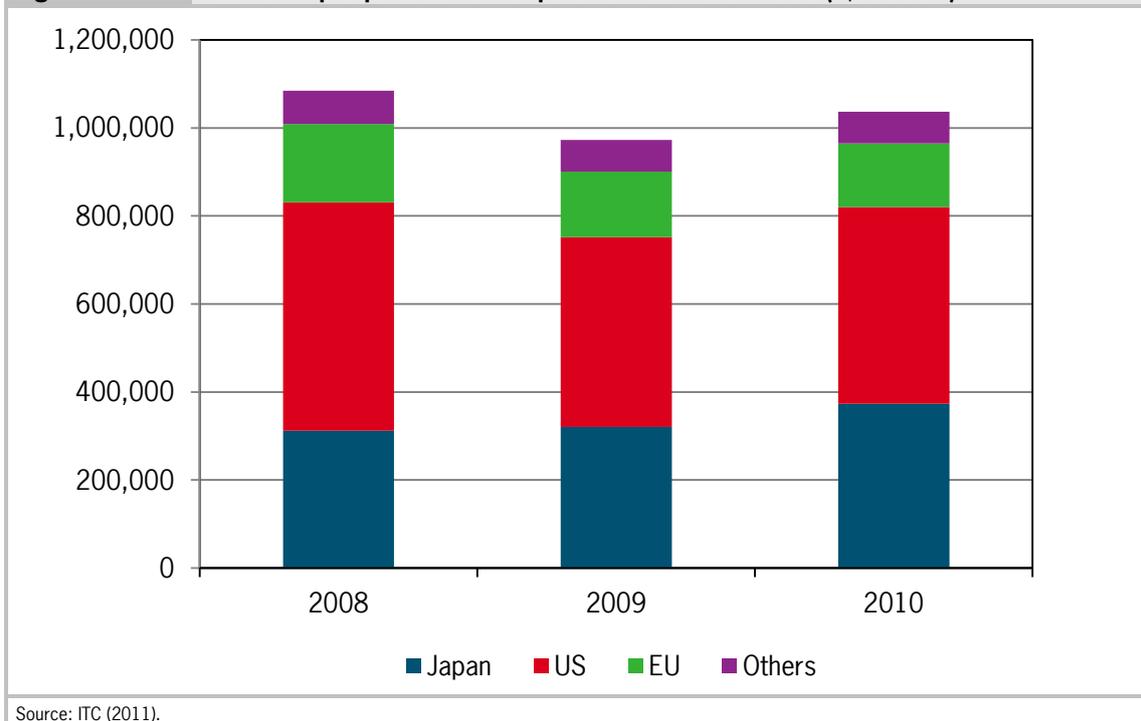
#### *Shrimp exports*

Although the value of shrimp exports has fluctuated over the past few years (see Figure 2.3.2), it remains around the USD 1 billion tipping point. The fluctuations in exports correlate with fluctuations in production which are mainly caused by the climate and in some cases disease outbreaks or crop failures. Although exact figures are missing, it can be assumed that Pacific White shrimp accounts for 70% of total exports,

Black Tiger for 20% and wild shrimp for 10% of the export volume. For the EU, these figures are slightly different. According to industry insiders, Black Tiger accounts for 70%, wild shrimp for 20% and Vannamei for only 10%. However, this figure does not include the export volume of CP. CP claims to take account for about 60-70% of the total export volume to the EU and exports only Pacific White shrimp. If this figure is correct, the remaining 30-40% is 70% Black Tiger, 10% wild shrimp and 20% Pacific White shrimp. The main reason why CP is able to export Pacific White shrimp to the EU is that the farms are GlobalGAP certified and thus have access to the highest end retail markets in the EU.

The most important market for Indonesian shrimp is the US. Exports to the US mainly consist of Pacific White shrimp. Although the EU and Japan also import Pacific White shrimp, these markets are less favourable for this species and generate lower profit margins for the exporters. Japan is the second most important market while the EU is only third.

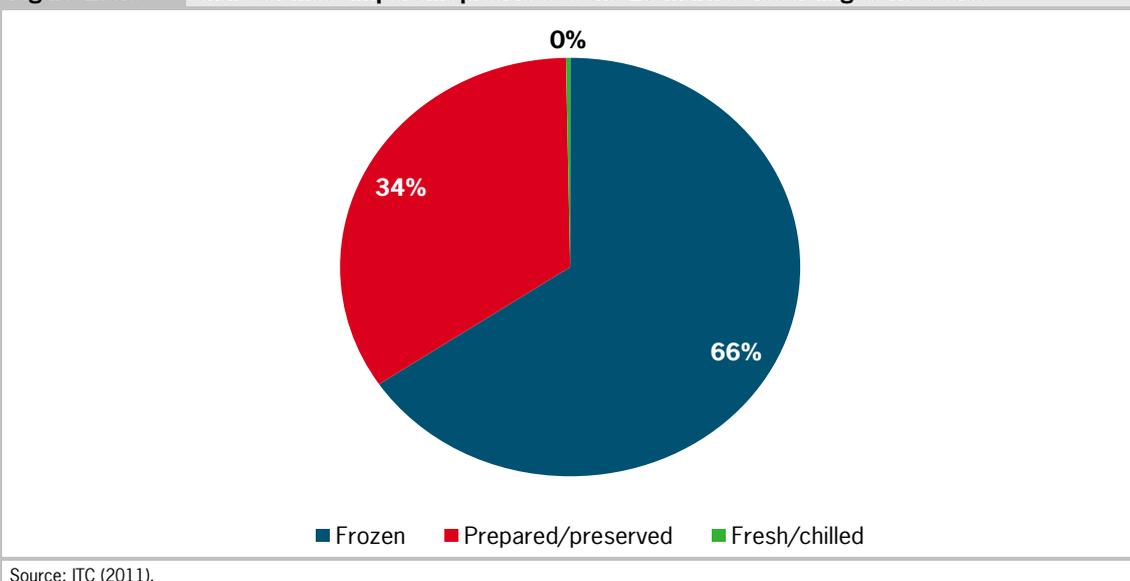
**Figure 2.3.2** Total shrimp exports to main export markets 2008 - 2009 (1,000 USD)



Source: ITC (2011).

Figure 2.3.3 shows that the largest share (66%) of the export volume to the EU is frozen shrimp, with 34% being exported as prepared/preserved. This figure is slightly different for global exports where 76% is frozen and only 23% is prepared/preserved.

**Figure 2.3.3** Share of most important products to the EU market according to HS codes

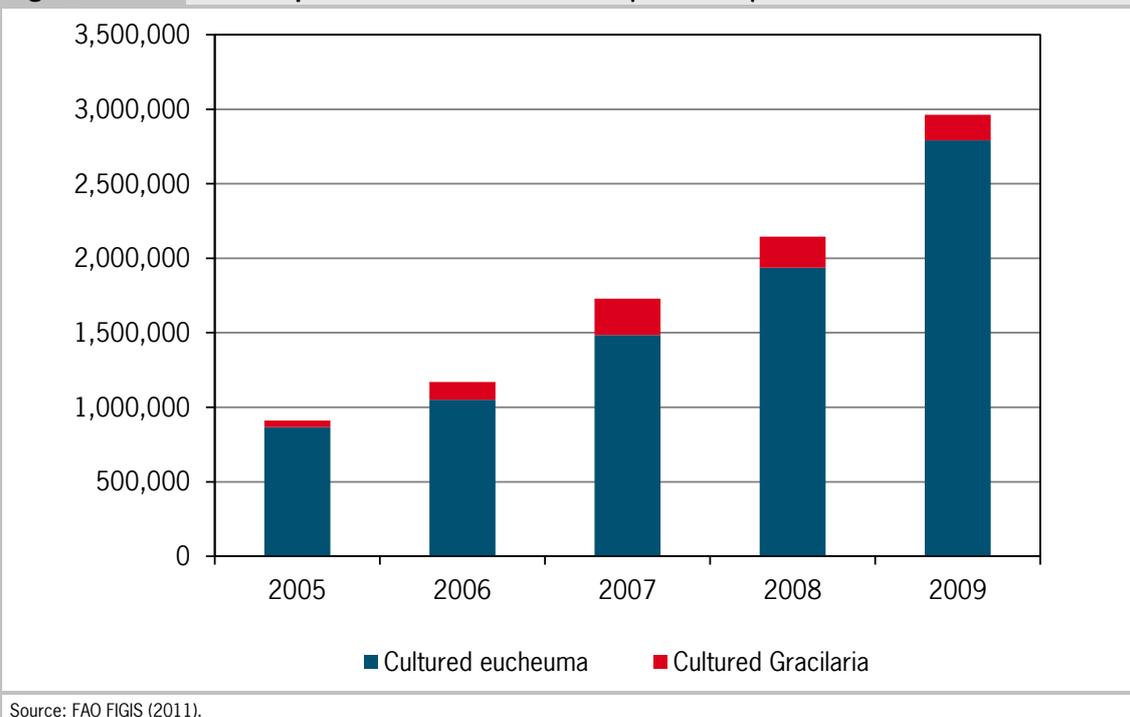


## 2.4 Seaweed subsector

### *Seaweed production*

The focus is on commercial species that are already exported to the EU for use in the production of carrageenan as well as alternatives such as liquid fertiliser. Seaweed production has increased significantly over the past few years and reached almost 3 million tonnes in 2009 (see Figure 2.4.1) and even 3.6 million in 2010 (not in Table 2.4.1 because it is only an MMAF estimate). All this seaweed is documented as Gracilaria and Eucheuma species.

**Figure 2.4.1** Seaweed production volume 2005-2009 (wet tonnes)

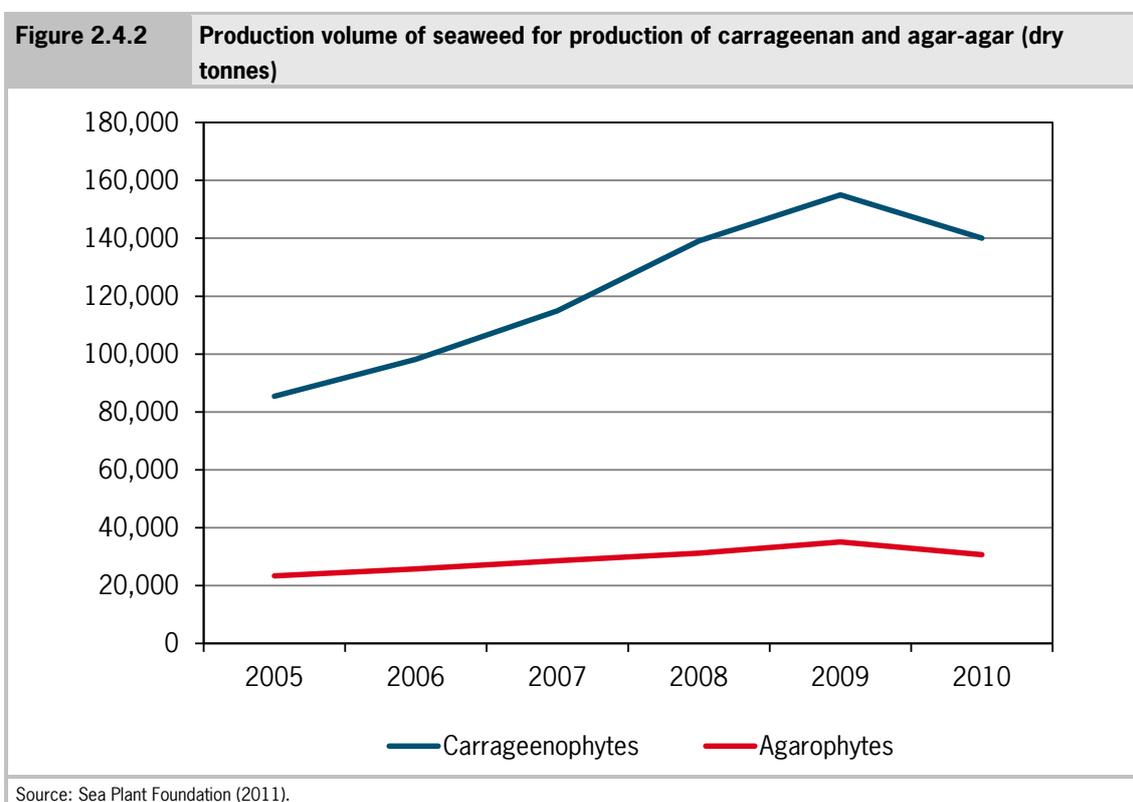


Production of seaweed is concentrated on Sulawesi, which produces almost 65% of the total production volume. Sumatra and Kalimantan are insignificant for the seaweed industry.

Region	Production	Share
Sulawesi	2,323,031	63%
Nusa Tenggara Timur	510,137	13%
Java Timur	388,952	11%
Others	476,096	13%
<b>Total</b>	<b>3,698,217</b>	<b>100%</b>

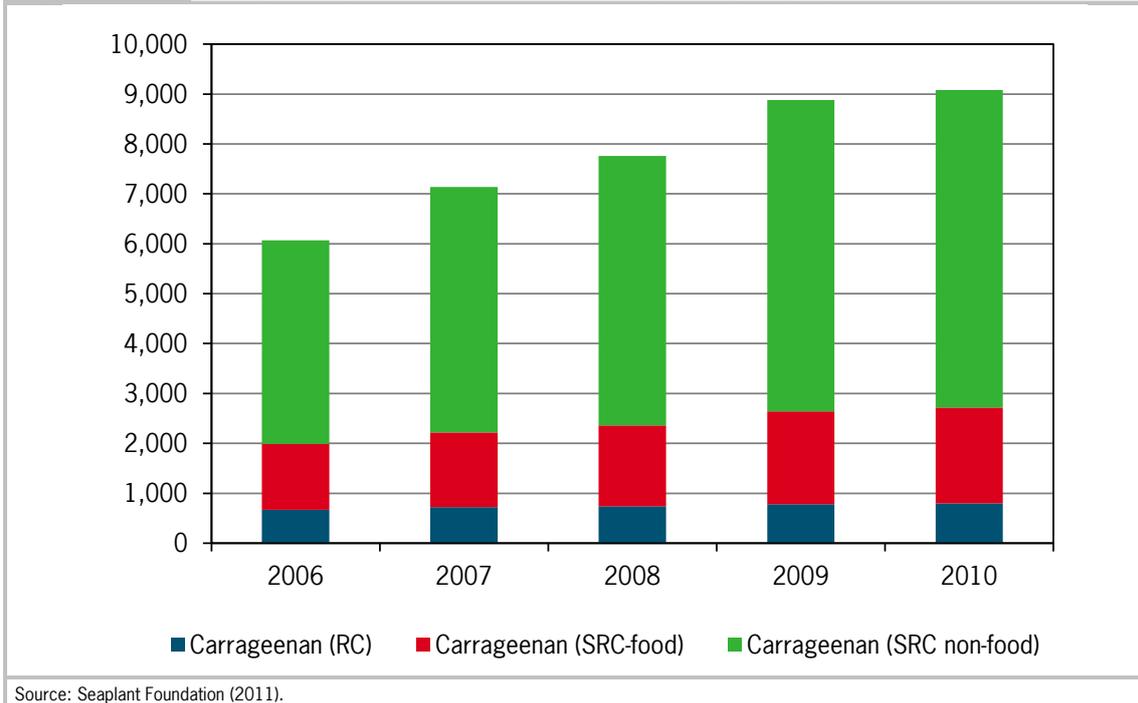
Source: MMAF (2011).

Figure 2.4.2 shows the production volume (dry tonnes) of the species used for the production of carrageenan and agar-agar. Together these species account for a total production of around 170,000 dry tonnes.



In 2010, the carrageenophytes are subsequently processed into approximately 9,000 tonnes of different quality levels of carrageenan (see Figure 2.4.3). In 2010, 9% of carrageenan production was refined, 21% semi-refined for consumption purposes, and 70% semi-refined for non-food purposes. The production of seaweed is expected to continue rising in the coming years.

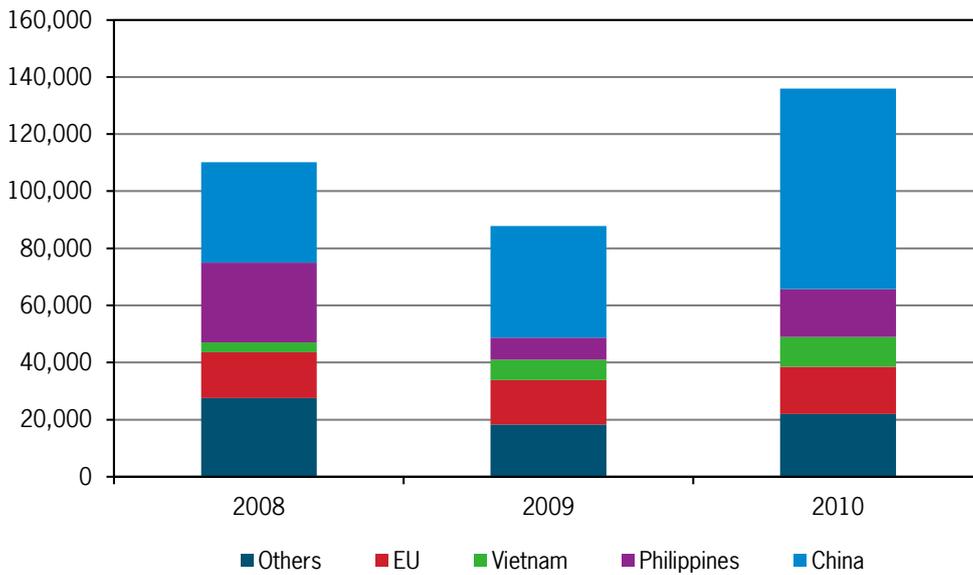
**Figure 2.4.3 Carrageenan production volumes (tonnes) (excl. agar agar)**



#### *Seaweed exports*

Unfortunately, there are no exact export figures for carrageenan from Indonesia. It is estimated that the export volume is still limited. The Indonesian government cancelled its plan to restrict exports of raw dried seaweeds. However, as a result of the industrialisation policy, it is expected that new processing facilities for carrageenan will be built and that production and exports of value-added products will increase in the coming years. Shemberg, the largest carrageenan processor in the Philippines, has already started to build a new factory in Indonesia. At present, raw dried seaweeds dominate seaweed exports. Figure 2.4.4 shows the trend and distribution of Indonesian raw dried seaweed over the world. It is clear that as a single market, China, Vietnam and the US are particularly important. However, after China, the EU as a whole is the second largest market. All importing countries import raw dried seaweed from Indonesia as a raw material for the local carrageenan processors.

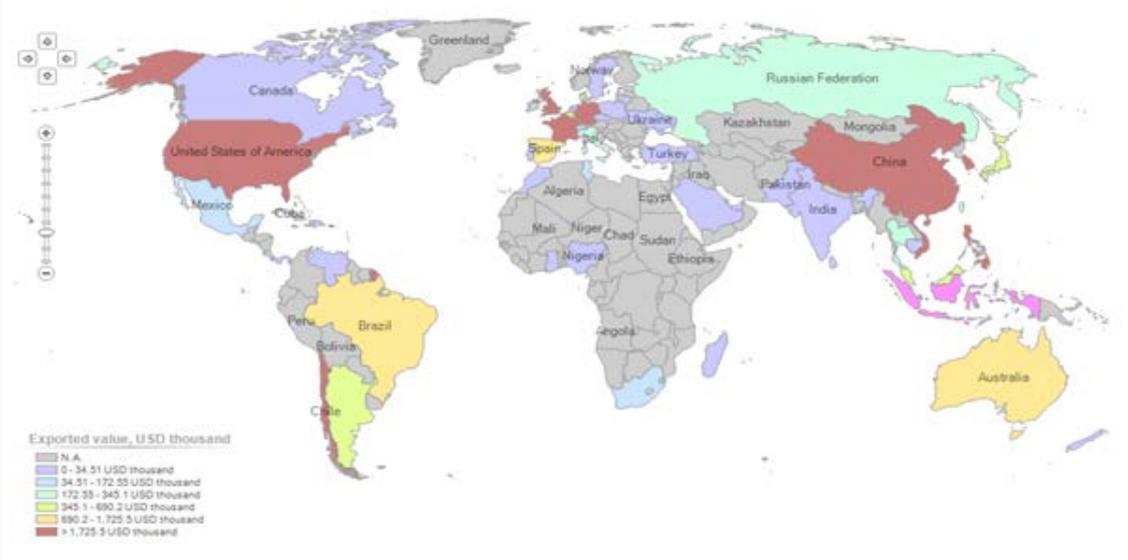
**Figure 2.4.4** Export markets for Indonesian raw dried seaweed 2008-2010 in volume (tonnes)



Source: ITC (2011).

Figure 2.4.5 shows the geographical distribution of raw dried seaweed from Indonesia.

**Figure 2.4.5** Export markets for raw dried seaweed from Indonesia in 2010



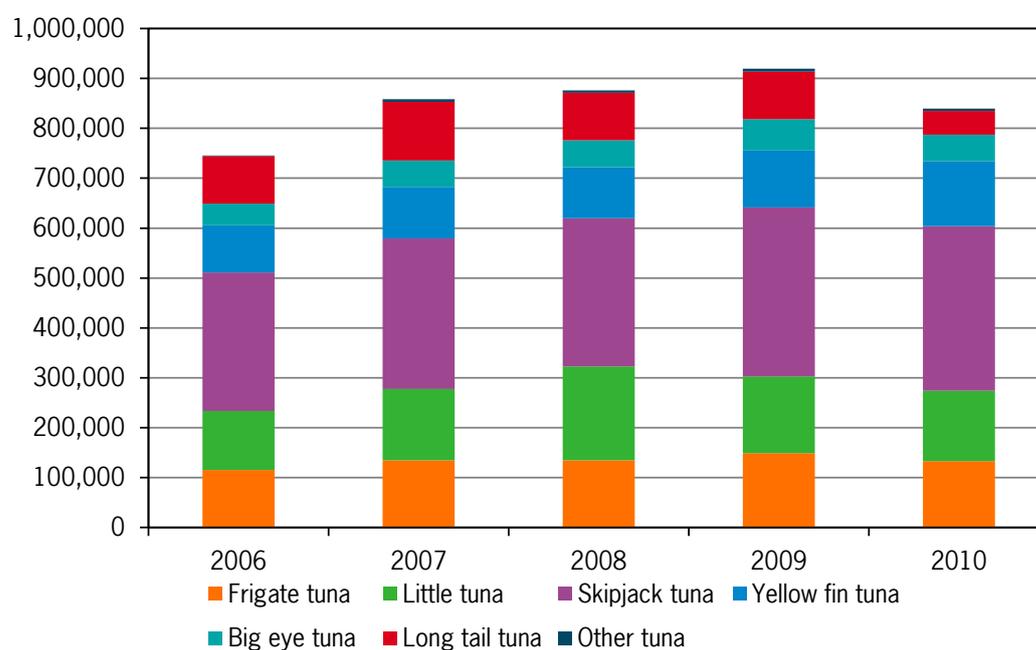
Source: ITC (2011).

## 2.5 Tuna subsector

### *Tuna production*

Skipjack is the most important tuna species for the Indonesian tuna sector (see Figure 2.5.1). In the period 2006-2010, a yearly average of about 300,000 tonnes of Skipjack was caught. In 2009 and 2010, Skipjack catches were higher than in previous years. Yearly catches of Yellow fin tuna amount to 100,000 tonnes. Other tuna species with high catches are Frigate tuna and Eastern little tuna. Big eye tuna catches in 2010 were almost half of the catches in previous years. Besides the catches of tuna species mentioned in the table below, small amounts of Bullet tuna and Bluefin tuna are also caught. No detailed information about the different catching areas of tuna and the composition of the tuna fishing fleet in Indonesia is available.

**Figure 2.5.1** Catches of tuna species in 2006-2010 (tonnes)



Source: MMAF (2011).

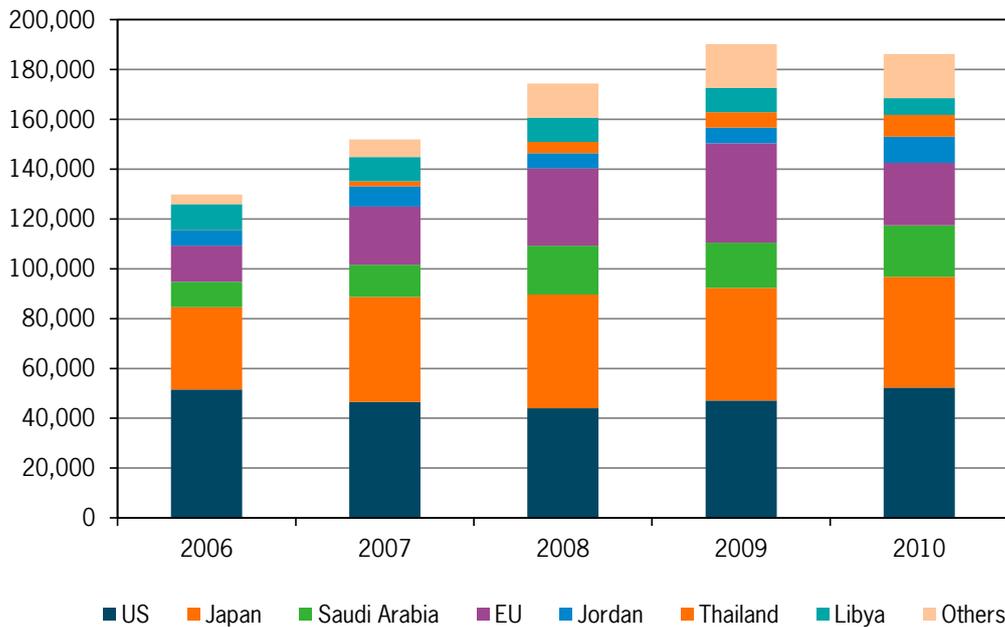
According to other trade statistics, Indonesia also imports tuna as raw material for processing. In 2010 Skipjack with a value of USD 13m was imported, as well as USD 8m worth of frozen Yellow fin tuna (ITC, 2011).<sup>2</sup>

### *Tuna exports*

Export statistics of tuna from Indonesia show that canned tuna is the most exported product type in tuna production. In 2010 almost USD 190m of canned tuna was exported. Although the EU, the US and Japan are important markets, several countries in North Africa and the Middle East also import significant volumes of canned tuna from Indonesia. Figure 2.5.2 shows the main markets for canned tuna. For the EU, Germany (62%), Belgium (15%), the UK (10%) and Italy (4%) are the most important countries.

<sup>2</sup> ITC 2011, International Trade Centre, available at [www.trademap.org](http://www.trademap.org)

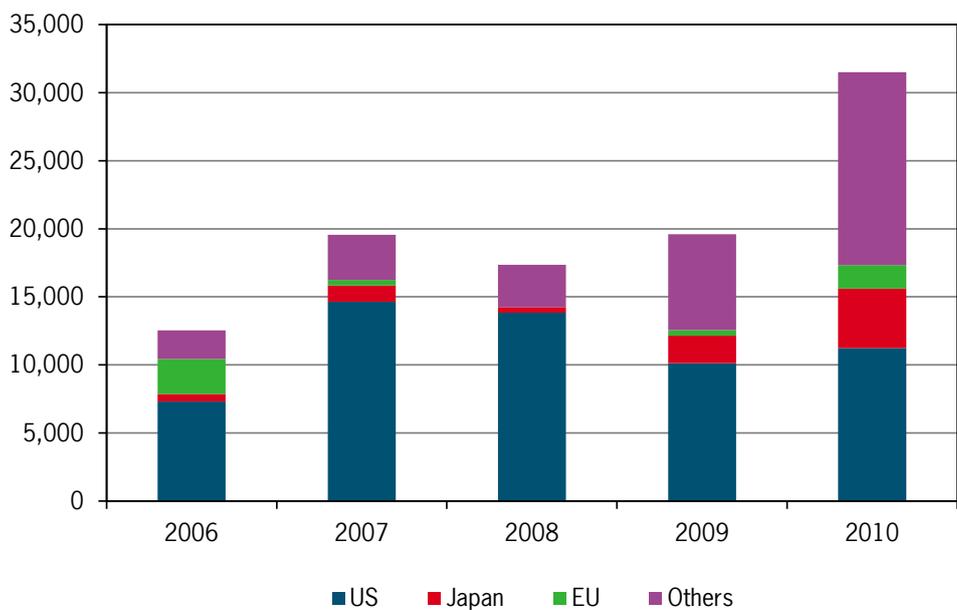
**Figure 2.5.2** Export destinations of canned tuna in 2006-2010 (1,000 USD)



Source: ITC (2011).

Exports of frozen Yellow fin tuna (in various product types) from Indonesia have increased in the last five years. In 2006 USD 13m was exported, while in 2010 the export value has more than doubled to USD 31m. Most of the frozen Yellow fin tuna is exported to the US. However, MMAF export statistics show that for the total export of frozen tuna (Yellow fin tuna as well as other species), export values were significantly higher. In 2010 the export value of frozen tuna to Japan was USD 22m, while exports to the US amounted to USD 18m. Other species that are exported as tuna will most likely concern Bigeye tuna.

**Figure 2.5.3** Export destinations of Yellow fin tuna in 2006-2010 (1,000 USD)

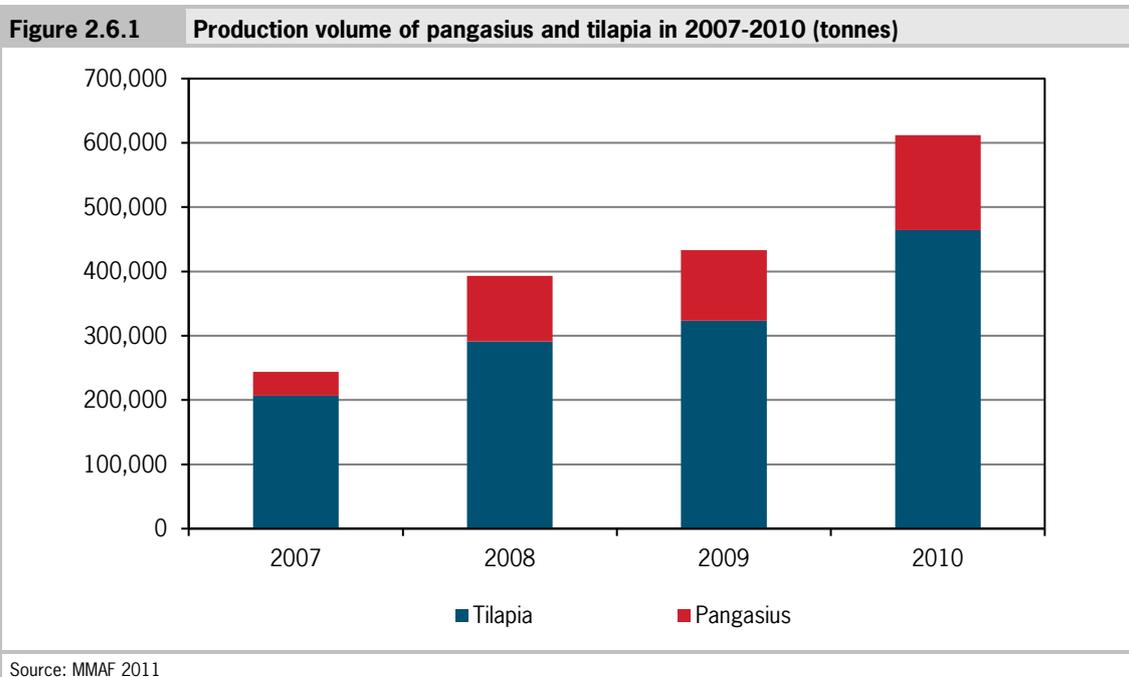


Source: ITC (2011).

## 2.6 Pangasius and tilapia subsector

### Production

The production volume of pangasius and tilapia has increased significantly over the past 5 years (figure 2.6.1). The production of both species tripled between 2007 and 2010. The most important production regions for both species are in Sumatra, Java and Kalimantan (Table 2.6.1).



**Table 2.6.1** Production of pangasius and tilapia in 2010 (tonnes)

Island	Pangasius	Tilapia
Sumatra	97,000	204,100
Java	19,900	158,800
Kalimantan	23,500	24,800
Sulawesi	-	16,200
Other provinces	7,500	60,300
<b>Total</b>	<b>147,900</b>	<b>464,200</b>

Source: MMAF (2011).

### Exports

Currently, pangasius and tilapia are mainly domestically consumed. Because pangasius is not currently exported at all, not much attention is paid to it in chapter four. Tilapia is also largely domestically consumed (+- 80%) but arguably has a much higher export potential than pangasius. The main exporter of tilapia from Indonesia is Regal Springs, the world's largest tilapia producer, which operates its large-scale integrated farm from which it produces tilapia at a competitive price for the international market. The government is currently developing policies to boost exports of tilapia; due to the favourable climate in Indonesia, it is expected that tilapia can be produced all year round and thereby compete with tilapia from China that is only produced during the hot season. Although detailed figures are missing and tilapia cannot easily be separated from other fish exports, some general figures are available in export statistics. Additionally, 1,500 tonnes live weight of tilapia were exported to the EU in the first six months of 2011. Although tilapia is apparently also exported to other Asian countries, no figures are available.

## 3 EU demand for seafood products from Indonesia

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### 3.1 Introduction

This chapter provides an overview of EU demand for seafood products from Indonesia. Relevant information about suppliers of seafood to the EU located elsewhere 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 EU demand for seafood in general, and EU demand for seafood from Indonesia. Relevant barriers for 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 like 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.<sup>3</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 declining. In terms of absolute volumes, the EU fish processing industry has become increasingly dependent on imports. During the period 2000-2009, imports from third countries rose 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 rather than fresh products due to 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) or pose new threats (additional import restrictions) to developing countries.
- New EU regulations regarding fishing activities. Illegal, Unregulated and Unreported (IUU) fishing came 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 southern European countries in particular, consumers prefer fresh products. In North-Western Europe, most consumers seem to be indifferent.
- Sustainable seafood is becoming the standard. Sustainably produced seafood is increasingly becoming the standard to gain access to important market channels such as supermarkets. The environmental aspects of production in particular are receiving more and more attention. However, in other market channels sustainability is still not the standard. Nevertheless, supermarkets are emerging as the most important market channel. This development is visible in 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 companies in Northern Europe selling fish products to maintain their market position. In Southern European countries, certification and eco-labelling also are receiving increased attention.

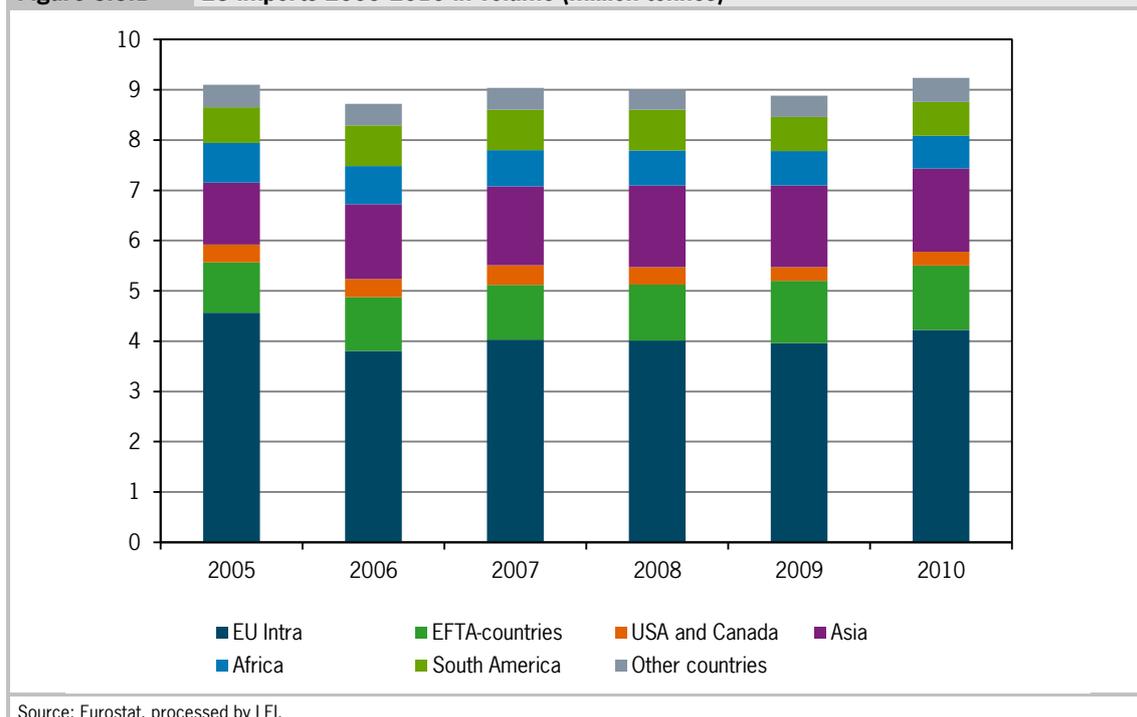
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<sup>3</sup> PBL, The protein puzzle; the consumption and production of meat, dairy and fish in the European Union. PBL Netherlands Environmental Assessment Agency, The Hague, 2011.

### 3.3 General EU demand for seafood products

In the period 2005-2010, the EU member states imported about 9 million 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 concerns intra-EU trade while Asian countries have a share of 16% of the total EU import value. Compared with intra-EU trade, Asian countries supply higher volume/low value products.

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

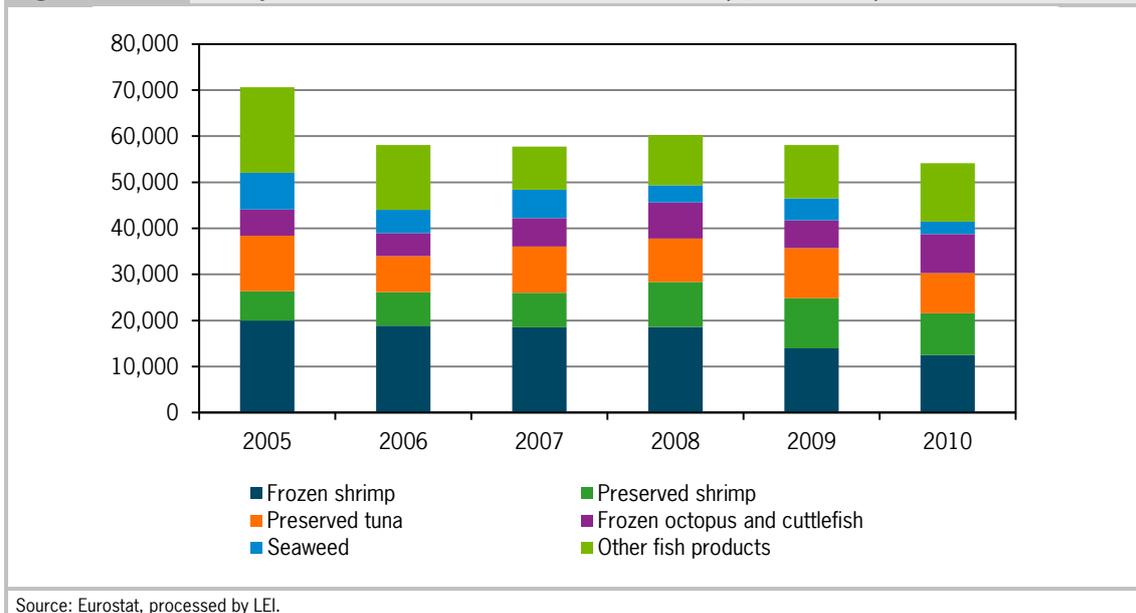


Most of the imports from countries other than EU member states consist of raw materials or primary processed products that are further processed and traded in the EU. In 2010, the main imported product categories in terms of volume were frozen fish fillets (21%), frozen fish (20%) and fresh/chilled fish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

### 3.4 EU demand for seafood from Indonesia

In 2005-2010, the import volume from Indonesia to the EU declined by nearly 25%. Frozen and preserved shrimps are the main export products from Indonesia to the EU. Other important products are preserved tuna, frozen octopus and cuttlefish and seaweed. Although imports in general declined, imports of preserved shrimp and frozen octopus and cuttlefish are growing.

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



### 3.5 Barriers for to export to the EU market

There are two main barriers for exports to the EU market, namely food safety standards and import tariffs. Both aspects are discussed briefly in this section. Ultimately the competitiveness of the subsectors in Indonesia largely depends 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 but especially alternative markets such as South Korea or the Middle East. This may constitute a barrier for exporters for whom the costs of compliance are too high.

For example, for cultured shrimp, 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 some reason the local supply chain in shrimp-producing countries cannot meet these requirements or are unable to pass the tests that need to be carried out, this may constitute a reason to export to other countries instead. In recent years, faced with rejection by EU (and US and Japanese) health authorities based on the presence of antibiotics, for example, exporters shifted their focus to other markets with less stringent health standards than in the EU. Ultimately, this results in different supply chains for specific end markets, each with their own levels of quality. Contrary to other barriers such as import tariffs, this barrier may be solved in the shrimp-producing countries, as institutions can be strengthened and producers trained to comply with EU standards.

Traceability is an issue in aquaculture production as it is used as a means to trace the origins of unsafe seafood. However, it is also an issue for capture fisheries as since 2009, the EU requires the availability of catch certificates for each fish imported in the EU. These certificates are part of EU regulations concerning Illegal, Unreported and Unregulated (IUU) fishing. As many fisheries in developing countries consist of small vessels that are often not properly registered and largely operated by uneducated fishermen, the introduction of catch certificates has proved to be a barrier for exports to the EU. However, it is reported that most of the main fisheries have now registered all vessels and implemented new policies that help fishermen and export-

ers provide the documents required for export to the EU market. The CBI modules may be useful tools to deal with this barrier as many of the solutions can 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 widely debated as Indonesia 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 like Vietnam and the Philippines. Countries like Fiji and Papua New Guinea have signed (interim) Economic Partnership Agreements (EPAs) with the EU and thus enjoy comparatively favourable conditions for trading tuna and other fish products. For shrimps, tariff issues currently focus on the US where anti-dumping duties act as a barrier for shrimp exporters 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 affect the competitive position of one country compared to another. At this time, Indonesia falls under the General System of Preferences (GSP) system in the EU. However, as the status of all the countries is being reviewed, in the future they may be 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 fell dramatically while exports to the US increased rapidly. Shrimp exports to the EU only recovered slightly after the tsunami in 2004 when Thailand regained its preferential status. A major problem with import tariffs is that the procedures to fight cases against it are often long and slow.

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

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

#### *Shrimp*

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

#### *Seaweed*

In 2010, EU market demand for seaweed was 56,000 tonnes. In 2005-2010, the import volume of seaweed from the EU declined by over 20%, but growth potential seems promising. Seaweed is a versatile product with several other applications besides human consumption such as fertiliser, animal nutrition and cosmetics. These applications require high value/low volume seaweed.

Seaweed products from South-east Asia and South America are offered to the EU market at competitive prices compared to seaweed in the EU.<sup>4</sup> Indonesia is one of the main producers of seaweed. In 2010, the country supplied more than 10% of the total imports of seaweed to the EU. Most seaweed from Indonesia and the Philippines is supplied to China. Although the current EU market demand is low compared with

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<sup>4</sup> AquaFUELS, Algae and aquatic biomass for a sustainable production of 2nd generation biofuels; deliverable 3.2 Technological Assessment including downstream added value products. AquaFUELS FP7 - 241301-2, Coordination Action FP7-ENERGY-2009-1. 2009.

China, growth potential seems promising.<sup>5</sup> Furthermore, demand from China and USA is growing. Because of the different applications of seaweed, there is potential for adding value in some market segments.

### *Tuna*

Market demand and growth potential for tuna products is strong. Product differentiation has resulted in a demand for different tuna products in different market segments such as traditional products (canned tuna) but also more convenience products. Furthermore, demand for sustainably produced tuna is increasing in North-Western Europe.<sup>6</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.

### *Pangasius and tilapia*

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 to the EU market and the highest export growth is expected in Eastern Europe (Ukraine and Russia), and South American countries. In the US, a programme for the mandatory inspection of catfish products has been proposed. In the long term, these regulations may cause a slowdown in imports of pangasius.<sup>7</sup> As demand will exceed the production level, import prices of pangasius are expected to rise. 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, sustainably produced pangasius can provide added value.

Market demand for tilapia is strong, although the level of EU imports of tilapia are not as high as for pangasius. Most tilapia are produced and processed in China. Tilapia competes with other whitefish species in the market for frozen fillets. A possible reduction in the supply of pangasius creates opportunities for other whitefish species such as tilapia. Since the competition in the frozen fillets market is strong, growth potential is limited. In 2010, Indonesia supplied 1,500 tonnes of frozen tilapia fillets to the EU, while Vietnam supplied less than 150 tonnes. Furthermore, there is some production of tilapia in a number of EU countries (UK and the Netherlands) for the fresh fish market. As for pangasius, value added potential is relatively low for tilapia, but might be interesting for high-quality niche markets. Sustainably produced tilapia could also have value added potential.

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<sup>5</sup> Bixler, H.J. and H. Porse, 'A decade of change in the seaweed hydrocolloids industry.' In: Journal of Applied Phycology, May 2010.

<sup>6</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>7</sup> Globefish, Market report pangasius - August 2011. Globefish, Food and Agricultural Organization, 2011.

## 4 Subsector value chains and bottlenecks for exports

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### 4.1 Introduction

In this chapter, the value chains of the selected subsectors in Indonesia 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. Furthermore, it provides information about the flow of products and the relationships within the value chain. The second section includes the key bottlenecks of the value chain 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 already working on specific bottlenecks are mentioned.

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

### 4.2 The influencers and supporters of the Indonesian seafood industry

The first part of this section describes the main government authorities that shape the institutional framework in which the Indonesian seafood industry operates. The descriptions of the institutions are general and limited to their overarching roles and responsibilities in regulating, supporting and promoting the seafood sector. The second part elaborates on all the other supporters of the Indonesian 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 section 4.3 to section 4.6.

#### *The Institutional Framework*

##### *Ministry of Marine Affairs and Fisheries (MMAF)*

Indonesia's main fishery authority is the MMAF. It is responsible for marine and fishery sector planning, management and administration in Indonesia. The Ministry comprises six line offices consisting of an Agency for Marine Affairs and Fisheries and five Directorate Generals covering Aquaculture, Capture Fisheries, Coastal and Small Islands, Marine and Fisheries Resource Controls and Processing and Marketing.<sup>8</sup> These five directorates cover all aspects of the seafood industry from resource management, to development support, to information dissemination, to the implementation of regulations to the support of international marketing activities. The EU has also appointed the MMAF as the Competent Authority (CA).

MMAF also has a large research agency which conducts research in all areas of the seafood industry (the Marine and Fisheries Research Agency). Furthermore, MMAF has a Marine and Fisheries Human Resource Development Agency that provides training for the fisheries, aquaculture and processing sector. Both agencies are under the direct authority of MMAF.

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<sup>8</sup> European Commission 2010, Indonesia's Trade Access to the European Union: Opportunities and Challenges. European Commission, Brussels.

*Provincial Marine and Fisheries Service (Dinas Kelautan dan Perikanan Propinsi) (also referred to as Department of Marine Affairs and Fisheries (DMAF))*

Responsibility for local-level marine fishery management rests with the PMAF, which has offices at provincial, district and sub district levels. Since the adoption of Law No. 22/1999, the Provincial Marine and Fisheries Services have been given more responsibilities as well as greater autonomy in carrying out their functions, being no longer under the technical supervision of the MMAF.<sup>9</sup> The provincial authorities run the laboratories that are licensed to issue health certificates required for exports to the EU and are also responsible for licensing aquaculture farms and fishing vessels.

*The Ministry of Trade (MoT)*

The MoT is responsible for the formulation of national policy, policy implementation and technical policies in the field of trade. The Ministry consists of five Directorates and two agencies:

- DG of Domestic Trade
- DG of Foreign Trade
- DG of International Trade Cooperation
- DG of National Export Development
- DG of Standardisation and Consumer Protection
- Commodity Futures Trading Supervisory Agency
- Trade Policy Analysis and Development Agency

For the seafood sector, the position of the Directorate General for National Export Development (DG Ned) is relevant. DG Ned has been formed to act as a special service agency of the Ministry of Trade. DG Ned operates as a forum for Indonesian exporters and foreign importers to source trade-related information.

The role of DG NED is to develop exports through:

- Product development
- Promotion
- Exporters and foreign buyers convergence
- Market and buyers information services

Its objective is to assist and support local manufacturers in identifying and penetrating overseas markets for their products by providing market research information and relevant advice.

***Research institutes***

There are several universities with fisheries and aquaculture research programmes. Unfortunately, there is no overview of all the involved universities.

***Producer and exporter associations***

There are some smaller associations like the Indonesian Fisheries Association, but there is not much information on these associations. They seem to be very location and sector specific. The only two overarching producer and export associations are the Seafood Service Centre (SSC) and the Association for Fish Processing and Marketing Companies in Indonesia.

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<sup>9</sup> European Commission 2010, Indonesia's Trade Access to the European Union: Opportunities and Challenges. European Commission, Brussels.

### *Seafood Service Centre (SSC)*

The SSC in Surabaya provides consultancy and training on market information, market access requirements (including EU market requirements), export assistance, export marketing and management training - and the diversification for value-added products. The SSC provides Training of Trainers on export marketing and development and trends in the European market for fishery products. This centre has been cooperating with Dutch, Swiss and Indonesian projects and is probably the only professional private organisation in Indonesia that provides such services. This organisation appears to work quite effectively for its customers. The SSC was established with support from CBI.

### *Association for Fish Processing and Marketing Companies in Indonesia (Asosiasi pengusaha pengolahan dan pemasaran perikanan Indonesia (AP5I))*

AP5I is a processing and marketing association of Indonesian fishery processors which is involved in the development of the Indonesian fishing industry. AP5I acts as a forum for export and import companies operating in Indonesia involved in processing and production, distribution, transportation, storage and the marketing of fishery products. The association also supports fishery-related activities such as the provision of laboratories, packaging, retail sales and certification issues. AP5I organises seminars, training, workshops and meetings with business stakeholders, providing information on markets and applicable regulatory legislation. It regularly publishes the AP5I Newsletter on the above issues but does not yet have a website. AP5I aims to align the interests of employers and the Government in improving quality, safety and sustainability. The Association also supports developing human resources in the fields of planning, production, fishing, cultivation, processing and marketing of fishery products. Furthermore, it provides advice and input for the Government and other organisations to help improve the image of the Indonesian archipelago. Lastly, AP5I endeavours to increase the awareness of its members about quality, quality improvement, and product safety standards - such as required GMP standards, HACCP food safety management system and ISO standards.<sup>10</sup>

Although AP5I represents a large number of the Indonesian seafood processors, the strength of the organisation is not comparable to the Vietnamese Association of Seafood Exporters and Processors (VASEP), for example.

### ***Financial institutions***

Seafood processors and exporters generally have no problems accessing commercial bank loans. However, producers face major constraints in their access to financing. There are several NGOs, e.g. the International Financing Cooperation (IFC), which provide micro-financing programmes. More importantly, MMAF provides several loan schemes for farmers and fishermen and also lobbies for the sector with banks in order to facilitate programmes for small and short-term loans. MMAF initiated the credit schemes by itself. The first programme is called Community Based Credit (KUR) which provides credit without collateral. The second programme is Support for Fish Culture Business Development (BPUPB). However, at the moment many of the producers still depend on informal credit systems provided by middlemen.

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<sup>10</sup> European Commission 2010, Indonesia's Trade Access to the European Union: Opportunities and Challenges. European Commission, Brussels.

### 4.3 Shrimp subsector

In the Indonesian shrimp value chain, four main categories of operators can be distinguished (figure 4.3.1):

1. Input suppliers: e.g. hatcheries, feed suppliers, medicines and chemicals, and equipment
2. Farmers: ranging from extensive Black Tiger to intensive Pacific White shrimp
3. Middlemen: e.g. small and large middlemen
4. Processors/exporters

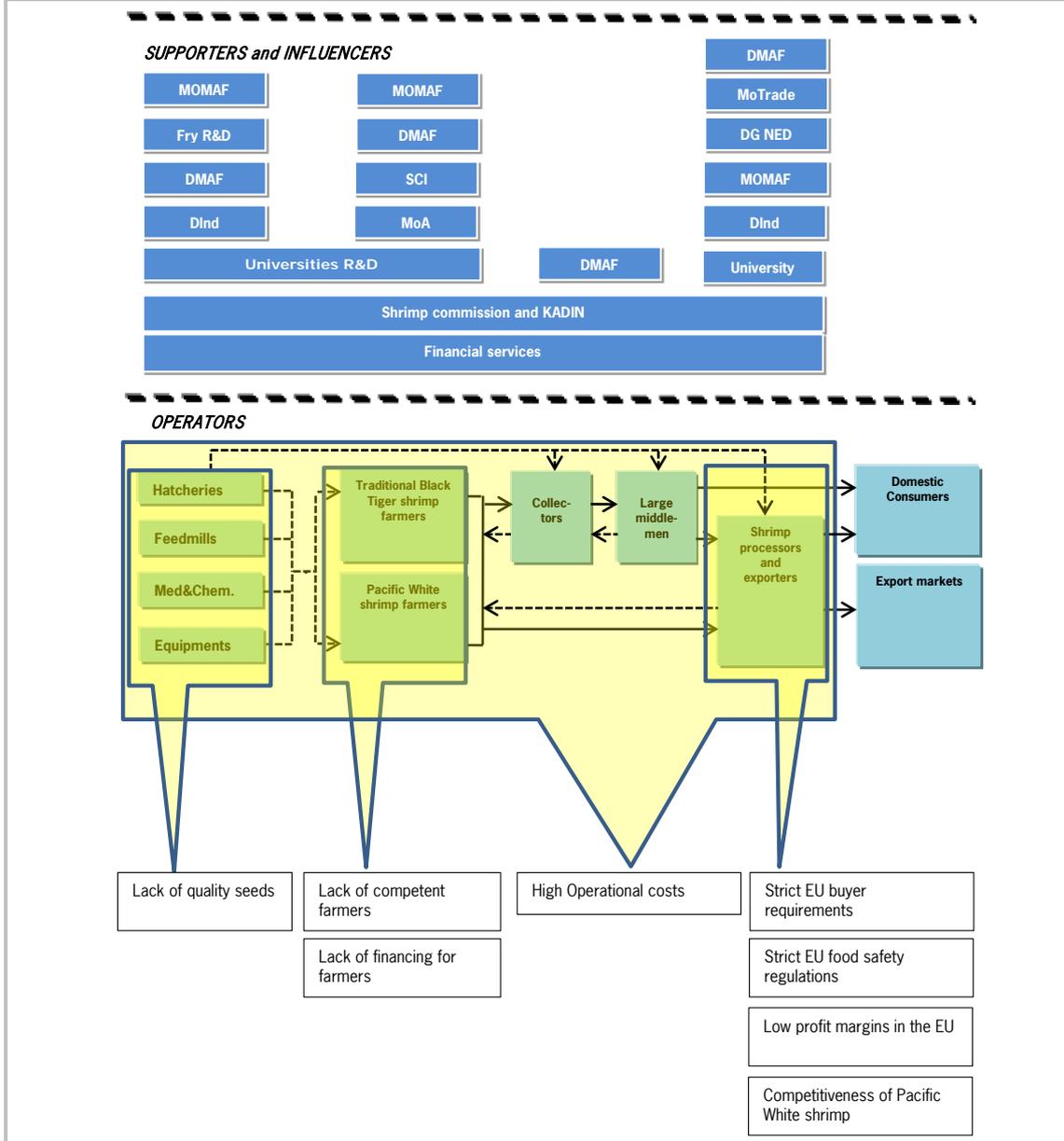
Furthermore, five different categories of influencers and supporters can be distinguished:

1. Government authorities (MMAF, DMAF, MoTRADE, DG Ned, MoA, Shrimp Commission and KADIN)
2. Research institutes
3. Producer and exporter associations; (SCI, AP5I, SSC)
4. Certification bodies
5. Financial institutions (DInd)

After discussing the bottlenecks identified in the desk study, the field work and the validation workshop, three priority bottlenecks were emphasised:

1. The competitiveness of Pacific White shrimp in the EU market
2. The lack of supply of Black Tiger shrimp
3. EU buyer requirements and food safety regulations

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



**Operators within the value chain**

*Input suppliers*

1. Seed

Black Tiger and Pacific White shrimp brood stock are distributed in different ways. While Black Tiger brood stock are collected from the wild, brood stock of Pacific White shrimp are mostly imported from the US, Hawaii, Taiwan or China where hatcheries are specialised in producing Special Pathogen Free brood stocks that are less disease-prone than wild brood stocks.

Before the majority of shrimp farmers changed to the production of Pacific White shrimp, both large and small-scale hatcheries produced Black Tiger shrimp seeds. Currently most large-scale hatcheries

have started producing Pacific White shrimp seeds. Black Tiger shrimp seeds are currently mostly produced by small-scale backyard hatcheries concentrated in specific regions like Aceh. There have been many complaints about the quality of Black Tiger shrimp seeds as hatcheries lack the motivation and capital to improve the quality of seed production. The quality of Pacific White shrimp seed also apparently varies widely. The main problem is that SPF brood stocks are very expensive and that many hatcheries therefore choose not to import the highest quality from the US and Hawaii but to import cheaper variants from especially China. Large hatcheries that supply Pacific White shrimp seeds are often owned by large fully integrated companies like CP prima (the Indonesian part of the Thai CP group).

## 2. Feed

The Directorate of Aquaculture is in charge of the feed supply control as well as the control of distribution and usage of fish and shrimp feed. There are 165 types of feed currently registered by 20 feed providers. However, plenty of feed available in the market is still uncontrolled.<sup>11</sup> Although numerous companies produce shrimp feed, CP prima dominates the supply and is said to account for 50% of the country's shrimp feed supplies. A major issue for shrimp feed is that much of the feed ingredients have to be imported from other countries. A 2005 IFC report says that the dependency on imported ingredients results in shrimp feed prices that are 15 to 40% higher than in Thailand. In 2007, there were 20 feed mills that produced shrimp feed in six provinces across the country.<sup>12</sup> Although the situation has changed slightly and feed is produced with more local ingredients, according to insiders the feed industry still depends on imports of feed ingredients, resulting in relatively high feed prices. Unfortunately there are no more recent data available on the dependency on feed ingredient imports.

## 3. Drugs and Chemicals

Various drugs including antibiotics are used in shrimp farming to prevent or treat diseases. By December 2009, 147 products were registered by 12 drug and chemical manufacturers. These 12 manufacturers are licensed by the Directorate General of Aquaculture. However, many unregistered products from unlicensed producers can be found in the market. The use of veterinary medicine is supposed to be controlled by the Directorate for Fish Health and Environment within MMAF (EU, 2010).

## 4. Equipment

Equipment for the shrimp farming sector is distributed through middlemen and local retail shops. These shops are present in all farming areas.

### *Shrimp producers*

According to industry insiders, almost all farmers apart from those using traditional pond systems have now shifted from producing Black Tiger to producing Pacific White shrimp.

There is a wide range of production techniques and owner-management arrangements, but the primary production techniques are extensive and semi-intensive:

- Small-scale extensive or traditional farmers are typically less than 5 hectares and are likely to be operated by the household that lives in a nearby village or on the farm itself. The productivity of extensive culture systems is limited to 500 kilograms per hectare per farming cycle. Extensive farms often use polyculture systems in which they combine shrimp culture with the culture of milkfish.
- Small-scale, semi-intensive farms are typically less than 5 hectares in total pond area. Semi-intensive farms are mostly operated by households. However, these households require more access to financing or own capital because the investments are higher. Semi-intensive farms are sometimes also

<sup>11</sup> European Commission 2010, Indonesia's Trade Access to the European Union: Opportunities and Challenges. European Commission, Brussels.

<sup>12</sup> USDA 2007, Indonesia Fishery Products Shrimp Report, USDA, Washington.

owned by companies who hire labourers to operate the farms. Although semi-intensive farming used to be dominated by Black Tiger, most farmers have now shifted to Pacific White shrimp. Stocking densities of Black Tiger are between 10-40 seeds per m<sup>2</sup>, while Pacific White shrimp is mostly stocked with at least 70 seeds per m<sup>2</sup>.

- Intensive shrimp farms currently all produce Pacific White shrimp that is stocked with between 70 and 150 seeds per m<sup>2</sup>. These systems require careful management of water, plankton and feed to keep the water environment optimal and minimise stress to the animals. Additional capital investments are required to optimise pond and farm infrastructure. Intensive shrimp farms are always owned by companies that hire specialised staff to operate them. Many exporters have their own fully integrated farms.
- The final types of farms are those that are integrated through a unique Nucleus-plasma model where shrimp farmers (plasma) operate ponds under the full control of a lead firm (nucleus). The nucleus provides all the necessary inputs for the farmers but also buys back the shrimp for pre-set prices. Farmers do not receive a salary but are only paid for the product they sell. Therefore, in the case of crop failure, farmers can run up heavy debts. This system is criticised by many international NGOs. The main company applying this system is CP prima which operates more than 10,000 hectares of shrimp farm under this system. In recent years, CP prima has faced many issues with farmers objecting to the management of CP because promises about investments in ponds and fair prices for the products are not kept. Although CP and other companies applying this system are being criticised, many international buyers source here because the shrimp is sold at a competitive price and because many of these farms are either GlobalGAP or ACC certified.

Over 120,000 households are involved in producing shrimp. There are 86,000 households working on monoculture farms while 34,000 work on polyculture farms.<sup>13</sup>

Every region in Indonesia is characterised by the type of shrimp farms located there. Table 3.3.1 gives a general overview of the regions and the most common type of shrimp farms.

Type of shrimp farm	Region
Extensive (poly and monoculture)	East Kalimantan, Sulawesi, East Java
Semi-intensive	East Java, Sulawesi, Aceh, West Kalimantan
Intensive	East Java, South Sumatra, Lampung
Fully integrated	East Java, South Sumatra, Lampung

It is estimated that approximately 70% of the farms are extensive and semi-intensive. However, these produce only about 30% of the total production, while the intensive shrimp farms produce 70%.<sup>14</sup>

#### *Middlemen*

Shrimp farms are usually located in remote areas and most processors do not regard it as economically viable to collect directly from the small farmers. Therefore middlemen, also called collectors, are used. The harvested shrimps are either brought to the agreed collection point by the farmers or are collected by the middlemen directly from the farmers. In any case, cooling boxes with ice are only used occasionally

<sup>13</sup> Dyspriani, P. 2007, Governance and the study of shrimp revitalization program in Indonesia. University of Tromso, Tromso.

<sup>14</sup> Van der Pijl, W. 2010, A Report on the Cultured Shrimp Industry in Indonesia, Opportunities for Certification. IDH, Utrecht.

during transport. The middlemen visually check and sort the shrimps according to quality and sell them to the processors or in a local market.<sup>15</sup>

Middlemen play an important role in the shrimp farm sector. They are also referred to as *Tokeh*. Middlemen are often SMEs with their own pre-processing facilities where shrimp is collected from multiple collectors, weighed and sorted according to size, quality and species to be distributed to several buyers. Middlemen often provide loans to farmers to cover their operational costs. In return, middlemen implement a buy-back system with shrimp prices that are often below the actual farming prices. As farmers also often lack the means to organise activities like harvesting and transport, these services are often offered by middlemen who thus increase their control over the farmers. The middlemen generally have no control over the larger shrimp farms which have the financial resources to organise and operate all the activities themselves. These farmers are usually directly linked to exporters. Contrary to other countries, it appears that middlemen in Indonesia largely manage to maintain traceability. However, especially the yield of extensive polyculture farms is still mixed and not traceable.

According to the EU (2010), hygiene and food safety is still unsatisfactory at middlemen level.<sup>16</sup> Good Handling Practices which are promoted by MMAF are generally not implemented, ice is not sufficiently used and the weight of the shrimp is purposely increased by storing the product in water without ice. There is not a good link between MMAF and most middlemen, resulting in a lack of systematic information flow to the middlemen and insufficient knowledge of Good Handling Practices.

#### *Processors and exporters*

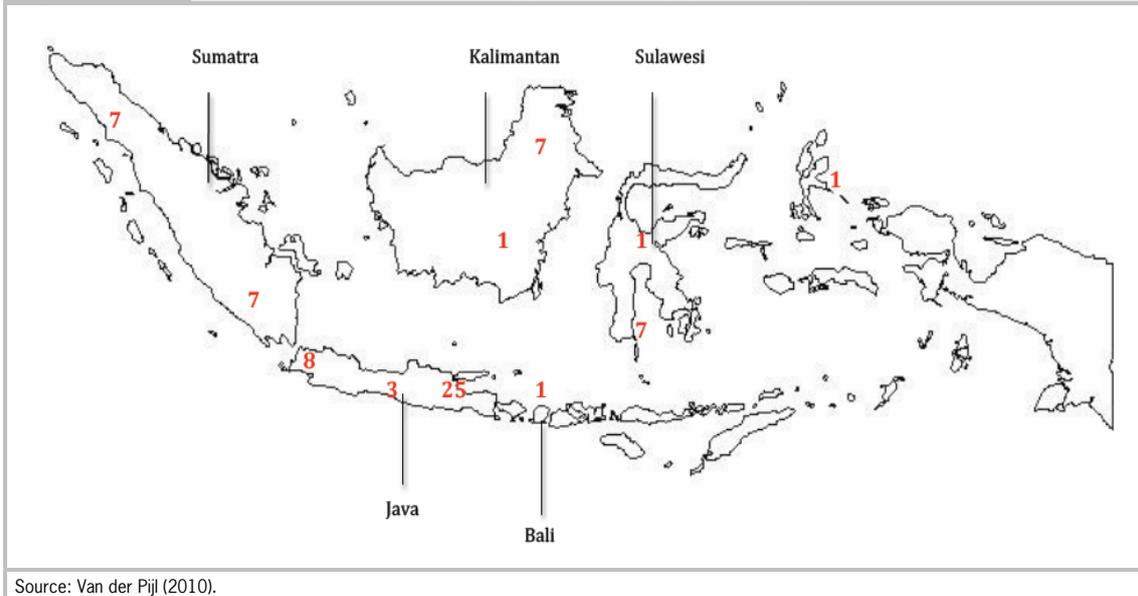
In 2010, 68 shrimp processing factories were approved for exports to the EU market. This number increased slightly to around 80 in 2011. Pijl (2010) reported that in 2010 the majority of these exporters were located in East Java (see Figure 3.3.2) while the rest were spread over the country. It is important to note here that while exporters in the different regions generally only source from local suppliers, many of the exporters in East Java collect shrimp from the entire country. The processing establishments are concentrated in East Java because Surabaya, the main city in the region, has one of the major export harbours from where containers can be shipped directly to destinations across the globe.

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<sup>15</sup> European Commission, 2010, Indonesia's Trade Access to the European Union: Opportunities and Challenges. European Commission, Brussels.

<sup>16</sup> European Commission, 2010, Indonesia's Trade Access to the European Union: Opportunities and Challenges. European Commission, Brussels.

**Figure 4.3.2 Geographical location of EU approved shrimp processing establishments in 2010**



Most of the shrimp exporters in Indonesia are large and medium-sized companies, averaging between 1,000 and 2,000 tonnes. However, CP exports over 40,000 tonnes of shrimp on its own. Most of the shrimp exporters have well-established relationships with overseas buyers. It is important to note the existence of many joint venture companies. Particularly in provinces where large Black Tiger shrimps are produced, as in East Kalimantan, many Japanese companies have large shares in export companies particularly focusing on exports to the Japanese market. In 2010 there were already seven companies that were certified by ACC for Vannamei for the US retail market. These companies tend to have integrated farms managed by highly educated professionals. Two companies, both located in East Kalimantan, were certified by Naturland for Monodon shrimp. Additionally in 2011, two companies were certified for GlobalGAP Vannamei. One of the companies was CP Prima, the other one is unknown.

Of the total export basket, 70% is Pacific White, 20% Black Tiger, and 10% wild shrimp. For the EU, it is estimated that CP Prima is responsible for 60-70% of the total export volume which entirely consists of Pacific White shrimp. All CP shrimp from Indonesia is GlobalGAP certified. Therefore, EU buyers compete for CP products. Industry insiders argue that of the remainder of the export volume to the EU, 70% is Black Tiger shrimps, 20% Pacific White shrimps and 10% wild shrimps. The reason why other exports only supply a limited volume of Pacific White shrimps to the EU is that it is argued that without GlobalGAP Pacific White shrimps are not competitive compared to other suppliers like Thailand and Vietnam. Shrimp products for export are frozen shrimps with value added modifications. Typical value added products are breaded shrimps or peeled shrimps, head off shrimps and semi-peeled shrimps where the last part of the shell is still attached to the shrimp at the tail. The share of value-added products exported from Indonesia is higher than for example from Vietnam, but still lower than from Thailand.

The main activities in shrimp processing are washing, peeling, cutting, packing and freezing. These production process steps are supported by quality assurance measures such as incoming inspection, in-process inspection, checking of products with a metal detector, and final inspection. Processing companies exporting to the European Union are required to implement Good Manufacturing Practices (GMP), certified with the 'Sertifikat Kelayakan Pengolahan' Grade A (SKP A) and must be certified for Hazardous Analysis and Critical Control Point (HACCP). The fishery processors are also required to conduct second

party audits on their suppliers and must ensure traceability to their sources of raw material. Quality and food safety must be controlled at all relevant steps in the production process.<sup>17</sup>

The EU concluded in 2010 that SMEs are finding it very difficult to cope with all the stipulated requirements due to the complexity and required level of knowledge and experience with HACCP and GMP and the financial resources required. Additionally, small producers do not always have direct access to information on EU regulations and the information flow from the MMAF to the companies is often too slow and information channels are not always efficient.

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

Information about the flow of products along the shrimp value chain are described previously. Most of the processed shrimp are exported. 70% of the total export is Pacific White shrimp, 20% Black Tiger shrimp, and 10% wild shrimp.

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

#### *Government authorities*

In particular the Directorate of Aquaculture (DoA) of MMAF and the provincial government authorities play a significant role in the shrimp industry. The DoA is especially concerned with training and facilitating shrimp farmers and with setting national policies for the development of shrimp farming areas.

Since decentralisation efforts in the structure of the Indonesian government since 2000, the provincial fisheries authorities are responsible for managing the aquaculture sector at provincial level. The responsibilities include the registration of shrimp farms, the operation of testing laboratories, issuing health certificates to farmers and providing extension services. The unclear distribution of responsibilities of MMAF and DMAF is argued to be one of the main reasons of food safety issues within the shrimp sector. Also, the Directorate General For National Export Development (DG NED) within the Ministry of Trade is a relevant government authority.

#### *Research institutes*

The research institutes for fisheries, including shrimp, have already been mentioned in section 4.2. None of them focus exclusively on shrimp culture.

#### *Producer and exporter associations*

The Shrimp Club of Indonesia (SCI), a shrimp farmers association, was established in 2005 to tackle global issues in shrimp farming and processing such as dumping, sustainable aquaculture, traceability and food safety.

#### *Certification bodies*

Several companies are licensed to audit for ACC, GlobalGAP and other certification labels. However, the names of these companies are unknown.

#### *Financial institutions*

MMAF undertakes special efforts to arrange funds and programmes to provide shrimp farmers with credit. However, most intensive farmers are able to get loans as they have collateral; most extensive and semi-intensive farmers face many constraints in getting access to commercial loans and the available credit

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<sup>17</sup> European Commission, 2010, Indonesia's Trade Access to the European Union: Opportunities and Challenges. European Commission, Brussels.

programmes are not sufficient. Most of these farmers therefore depend heavily on informal credit systems provided by middlemen.

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

The desk study, the fieldwork and discussion with the conference participants resulted in a long list of bottlenecks for exports in general but with special attention for exports to the EU.

1. Lack of supply of raw material
2. Lack of competency of farmers
3. Strict buyer requirements in the EU - i.e. product and size specifications
4. Lack of good/certified shrimp seeds lead to low productivity
5. Lack of financing for farmers by banks
6. Competitiveness of Pacific White shrimp in the EU market
7. High operational costs (seed, feed, transport etc.)
8. Low profit margins for exporters in the EU due to testing requirements

These bottlenecks were categorised and prioritised into three priority bottlenecks that were further discussed and analysed during the CBI/MMAF stakeholder conference in November 2011. The discussions and outcomes are described below.

<b>1. Competitiveness of Pacific White shrimp</b>	
Description	According to local exporters, the competitiveness of Indonesian Pacific White shrimps in the EU is limited as a result of high operational costs and the low productivity of Pacific White shrimp farms. It is argued that the mind set of farmers needs to be changed. At the moment, most farmers use too high stocking densities in pond systems that are not optimal for the production of Pacific White shrimp. Farmers must become aware that reducing the stocking density to approximately 70 per m <sup>2</sup> will reduce the risk of crop failure and result in slightly larger shrimps, lower mortality rates and eventually higher productivity. As one of the conference participants explained, farmers must change their mind set from short term to long term. This mainly applies to semi-intensive, small-scale farmers who often lack the competency and capacity to monitor and manage the ponds in such a way that high stocking densities are beneficial. The change of mind set would result in more sustainable and more stable production volumes which would benefit the sector as a whole.
Solution and actions	In order to achieve this, MMAF should increase the number of extension workers and educate farmers about Good Aquaculture Practices and sustainable production. The Seafood Service Centre could also play an important role here by training and employing extension workers. It was also suggested that processors should work in closer cooperation with farmers.
Stakeholders	Farmers, MMAF, NGOs, Processors, Seafood Service Centre
Donors already working on it	The Aquaculture and Fisheries group of Wageningen University is planning to launch a programme to increase productivity in Indonesian shrimp farms. The proposal is being developed and will be submitted in the Dutch Partners for Water Programme.

**2. Lack of supply of Black Tiger shrimp**

Description	Since almost all those with semi-intensive and intensive production systems have changed to producing Pacific White shrimps, the production of Black Tiger has stagnated. However, according to some industry insiders, the production of Black Tiger might be boosted by encouraging traditional farmers to slightly upgrade their production systems and increase the stocking densities in their ponds. However, even if this is achieved, the production potential of extensive ponds remains limited. As a result of the higher productivity and reduced risk of Pacific White shrimp production, it is unlikely that other farms will return to Black Tiger production.
Solution and actions	According to conference participants, extensive traditional Black Tiger farmers in East Kalimantan, for example, must be given assistance to make pond adjustments that would make them more suitable for higher stocking densities. This can only be achieved through a support and awareness-raising programme.
Stakeholders	MMAF DoA, NGOs
Donors already working on it	<ul style="list-style-type: none"> <li>- Rabobank Foundation works with Black Tiger producers in Aceh.</li> <li>- Oxfam, IUCN and the Mangrove alliance work with Black Tiger producers in Kalimantan, Makassar and East Java.</li> <li>- Both donors work especially with Black Tiger producers and try to enhance their productivity, competitiveness and try to prepare them for ASC certification.</li> </ul>

**3. EU buyer requirements and food safety regulations**

Description	It is complained that not only are EU regulations very stringent, but also that the implementation procedures are too strict and do not take local production circumstances into account. Consequently, the Indonesian government has to respond very quickly, which is not always possible. According to participants, the main request to the EU is to give Indonesia more time to adjust local procedures and infrastructure. It is also claimed that there are differences between the regulations for different EU member states and between EU food safety regulations and additional buyer requirements.
Solution and actions	In order to have more influence on the implementation of EU regulations in the Indonesian shrimp sector, the sector should exert more pressure on the Indonesian government to represent the shrimp sector in Brussels. An MMAF representative should be appointed in Brussels to lobby for the concerns of the sector and to smooth the implementation trajectories of EU regulations.
Stakeholders	MMAF, Indonesian Embassy, Processors, AP5I, Seafood Service Centre, Shrimp Club Indonesia.
Donors already working on it	None

It is important to mention that although other bottlenecks were not discussed during the conference, it was also noted that while many export companies have now found their way to the EU market, many 'B category' export companies are finding it difficult to obtain MMAF approval for exports to the EU market. According to MMAF, these companies need additional assistance to become accredited for the A-form that is a prerequisite for an EU approval number.

While it has not been identified as a priority, exporters seem to have problems managing the different buyer requirements on product specifications and sustainability. According to several insiders, market information and coaching for specific niche markets within the EU could help exporters expand their EU market share.

## Conclusion

The Indonesian shrimp sector is relatively mature and professional. Although some companies still have to find their way to the high end international markets, most large and medium-sized companies have well established links with the EU, US and Japanese markets. Some of the large companies have integrated farms that guarantee them a minimum volume of quality shrimps certified by ACC, Naturland, GlobalGAP or other sustainability certificates. These mature companies do not necessarily need further assistance to increase their export volumes to the EU markets. However, some of the small and medium-sized companies that do not yet have EU approval need assistance to move towards EU approval.

Furthermore, as a result of the maturity of the sector, there is great potential for increasing the share of sustainable certified products. As many of the large and medium-sized companies have their own farms, the barrier for investing in certification is relatively low compared to companies that do not have their own farms. If sustainable certificates such as ASC become a pre-requisite for exporting to the EU market, some of these companies might need help applying for certification. However, an important question is whether these companies could move towards certification on their own.

### 4.4 Seaweed subsector

In the Indonesian seaweed value chain, four main categories of operators can be distinguished:

1. Input suppliers: e.g. seed and equipment
2. Farmers
3. Middlemen and cooperatives: local and district middlemen
4. Exporters: RDS exporters and Carrageenan exporters

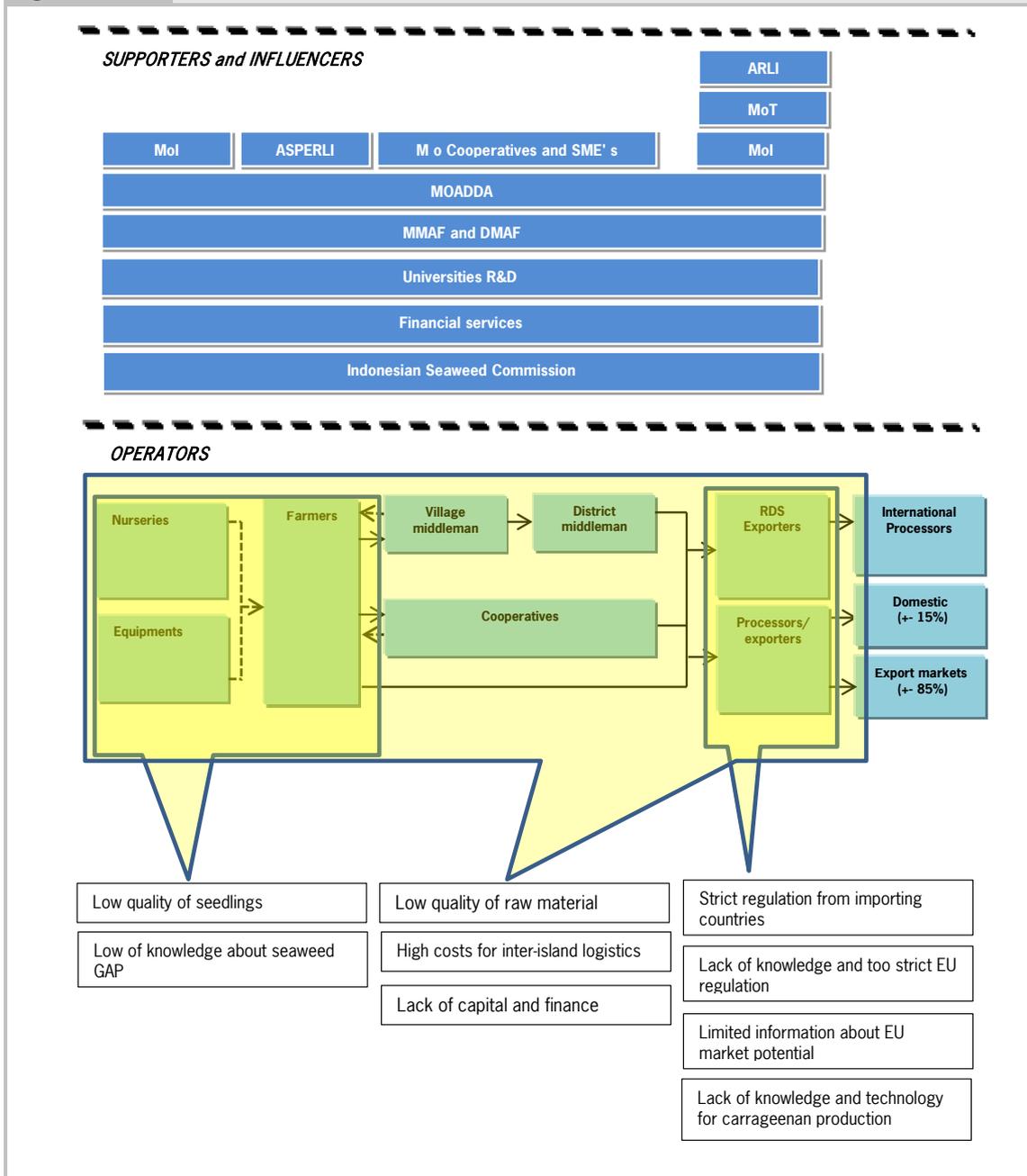
Five different categories of influencers and supporters can be distinguished:

1. Government authorities (MoADDA, MMA, MoI, MoT, MoCSME's and CBFCI)
2. Research institutes
3. Producer and exporter associations (ASPERLI and ARLI)
4. Certification bodies
5. Financial institutions

After discussing the bottlenecks identified in the desk study, the field work and the validation workshop (figure 4.4.1), five priority bottlenecks were highlighted:

1. Limited information about EU market potential
2. Lack of knowledge about and too stringent EU regulations
3. Lack of knowledge and technology about carrageenan production
4. Lack of knowledge about seaweed Good Aquaculture Practices (GAP)
5. Lack of quality seeds

**Figure 4.4.1 The Indonesian seaweed value chain and its main bottlenecks**



**Operators within the value chain**

*Input suppliers*

Farmers need equipment and seedlings. Equipment is purchased through local retail shops that sell lines and other materials required to build the production system. Seedlings are purchased through two channels. The first option is to buy them from one of the nurseries located in every major production area. These are often run by the government. Large farmers in particular purchase seedlings from the nurseries. Smaller farmers often purchase seedlings at an early stage in the farming cycle from larger farmers.

### *Seaweed farmers*

In Indonesia, *Kappaphaikus* seaweed is the species produced in the sea and used for the production of carrageenan. The *Gracelaria* species, from which Agar powder, is made is produced in ponds. Both species are used in a wide variety of industries such as food, pharmaceuticals and cosmetics.

Seaweed farming in Indonesia is mainly operated by smallholders from coastal communities. A few corporations have invested in integrated farms. So far their performance has not been promising.

Seaweed farms are generally operated by households that have other sources of income. It tends to be women who work in the seaweed farms whilst the men have other jobs. In a good season, a household could produce an average of 700 kg of Raw Dried Seaweed (RDS). At the beginning of the planting season, bigger farmers usually sell 'seedlings' to other farmers. The producers are responsible for planting, maintaining and harvesting the seaweed. Generally the price they receive is not based on the quality. Consequently the producers are not motivated to make investments that would improve the RDS quality.

### *Middlemen and cooperatives*

Village middlemen usually live in the same village as the farmers. Most middlemen also farm seaweed. In many seaweed production areas, the majority of farmers are initially financed by middlemen. Many small middlemen help farmers purchase the necessary inputs such as lines and seedlings. In return, the middlemen get all the harvest. Besides financing, the role of middlemen includes: collecting seaweed from their farmer members, determining the price based on moisture and dirt content, re-drying and re-cleaning the RDS and marketing the RDS to district level middlemen who are also referred to as traders.

Traders regularly contact the village middlemen to check the available RDS at their warehouses. The trader will arrange transport from the village to his own warehouse. Traders check the RDS quality for moisture and dirt content to settle the price. They then dry and clean the seaweed further to accepted norms. After cleaning and drying, the traders pack the seaweed in bales of approximately 100 kg each. The traders then deliver the RDS to exporters and/or local processors.

There are also various cooperatives involved in seaweed trading. Generally the development of cooperatives is supported by the ministry of cooperatives and international NGOs. The average number of members of a cooperative is 200 producers. The role of Cooperatives includes: saving and lending money to the members; providing technical assistance, particularly with respect to RDS quality control; supplying input to the members, collectively marketing RDS from cooperative members and packing and marketing the RDS directly to exporters and/or local processors.

### *Processors and exporters*

Generally exporters get their RDS supply from 5 to 10 traders in many different production areas. Currently more exporters prefer sourcing RDS from Maluku and Nusa Tenggara, as the quality is argued to be higher than RDS from South Sulawesi. In the major producing areas with good seaweed quality, the exporters end to use their own staff to liaise with the traders. Exporters source RDS from many different locations across the country. Before processing or exporting, exporters dry and clean the RDS before it is ready for local production of carrageenan and complies with international standards on RDS quality.

The majority of seaweed production in Indonesia is exported as RDS by exporters who do not have processing machinery but have contacts with overseas buyers and a network of traders in Indonesia. However, in 2010, 13 carrageenan processors produced different grades of carrageenan, ranging from Alkali Treated Cottoni (ATC), to semi-refined carrageenan (SRC), to refined carrageenan (RC). ATC is mainly used for pet food while refined carrageenan is mostly used for human consumption. The production capacities of these companies range from 250 to 6,000 tonnes per month. The production capacity also depends on

the grade of carrageenan that is produced. As a result of the industrialisation policy, it is expected that new processing facilities for carrageenan will be built and that production and exports of value-added products will increase significantly over the coming years.

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

There are no exact figures of the export of carrageenan from Indonesia. It is estimated that 85% of the production of carrageenan is exported and the 15% is sold at the domestic market. RDS is mainly exported to international processors.

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

#### *Government authorities*

The major seaweed production areas are South Sulawesi, Southeast Sulawesi, Central Sulawesi, Maluku, North Maluku, East and West Nusa Tenggara. In 2010, it was agreed, that five ministries and one agency (the Ministry of Marine Affairs and Fisheries (MMAF), the Ministry of Trade (MoT), the Ministry of Industry (MoI), the Ministry of Cooperatives and SME Development (MCSME's), the Ministry for Acceleration of Disadvantaged Areas (MFAODDA) and the Coordinating Body for Capital Investment (CBFCI)) would develop an integrated approach to develop the seaweed industry. The collaboration is being led by MFAODDA. The roles of the different ministries and the investment board are described below.

1. Ministry for Acceleration of Disadvantaged Areas (MFAODDA)
  - Provide data and inform each ministry/body related to seaweed development
  - Develop action plan for seaweed development in accordance with the action plan of each province
  - In conjunction with other ministries, prepare training modules
  - Facilitate financing system for seaweed development
2. Ministry of Marine Affairs and Fisheries (MMAF)
  - Facilitate training and coaching programme and provide extension workers
  - Facilitate the provision of production input for seaweed development
  - Facilitate business licensing arrangements
  - Facilitate quality assurance and seaweed product safety control
  - Facilitate institutional development and seaweed product marketing
  - Prepare training module for community groups
  - Synergise the increasing seaweed production
3. Ministry of Industry (MoI)
  - Support seaweed industrial development
  - Facilitate machineries and equipment availability that comply with national standards
  - Facilitate human resources development in management, entrepreneurship and marketing
  - Prepare technical modules for seaweed processing
  - Facilitate quality management and the application of GMP
  - Increase processed product quality through revision of national industry standard
  - Facilitate product certification
  - Facilitate infrastructure for research and development
  - Enhance collaboration in research for derivative product development
4. Ministry of Trade (MoT)
  - Enable community groups to use government or private warehouses
  - Facilitate acceptance of the benefit of warehouse receipts
  - Prepare training modules on warehouse receipts

- Facilitate seaweed stakeholder participation in trade fairs to promote seaweed internationally
  - Provide data and market information
  - Facilitate the marketing of processed seaweed products
  - Distribute or promote seaweed through Indonesian Trade Promotion Centres (ITPC) abroad
5. Ministry of Cooperative and SMEs Development (MCSMEs)
- Facilitate the development of cooperatives for seaweed farmers
  - Provide guidance in cooperative institutional strengthening
  - Facilitate access to financial institutions
6. Coordinating Body for Capital Investment (CBFCI)
- Promote investment opportunities to potential investors
  - Coordinate the distribution of investment to fulfil the needs of hardware and software related to seaweed product development
  - Coordinate investment to enhance the seaweed production productivity
  - Issue licences required for investments

#### *Research institutes*

There are a number of universities with research programmes for the development of seaweed farming. Unfortunately there is no complete overview of the relevant institutes. However, there is a relevant event: the Indonesian Seaweed Forum that is organised each year and where science and the industry meet each other. The website of the organisation of the forum is [www.isf.or.id](http://www.isf.or.id).

#### *Producer and exporter associations*

ASPERLI (Seaweed farmers association) represents seaweed farmers. The association acts as intermediary for credit provision to seaweed farmers and provides technical assistance to increase seaweed productivity and quality. Links seaweed farmers to local processors/exporters. ASPERLI mainly works for *Gracilaria* seaweed business.

ARLI (Indonesian Seaweed Association) represents seaweed exporters and processors. Just recently, ARLI managed to convince the government to cancel the planned RDS export ban.

#### *Certification bodies*

There are no certification bodies working in the seaweed sector apart from the companies that certify processing facilities for standards like ISO and BRC.

#### *Financial institutions*

In general, there is a lack of financing for seaweed farmers. Processors can easily access bank loans but farmers depend on informal loans from middlemen and traders. MMAF is introducing several schemes for seaweed farmers, but funds are limited. Some NGOs like USAID also financially support seaweed farmers through micro financing systems.

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

From the desk study, the fieldwork and discussion with the conference participants, a long list of bottlenecks was drawn up that limits the export potential of the Indonesian seaweed sector.

1. Low quality of seedlings
2. Lack of capital and finance (farmer and processor)
3. Lack of knowledge of seaweed GAP (farmer)
4. Low quality of raw material (middlemen)
5. Strict regulations (from importing countries)

6. Limited information about EU market potential
7. Lack of knowledge about and too strict EU regulations
8. Lack of knowledge and technology for carrageenan production
9. High costs due to inter-Island logistics

Of these, only five bottlenecks were prioritised and analysed in more detail.

<b>1. Limited information about EU market potential</b>	
Description	As processing of carrageenan is relatively new in Indonesia, many of the processors are not sufficiently aware of market opportunities in the EU. There is no clear view on who are the end users. There is no concrete list of EU buyers and most of the processors have never attended international trade fairs. Since the Indonesian sector is being forced to increase the production of carrageenan, it is very important that processors have a good and complete overview of the market potential and opportunities of processed seaweed products in the EU as well as in other regional markets. It is very likely that exports of RDS will fall substantially over the coming years and while some RDS exporters will simply sell to local processors, others may make the transition to becoming a processor themselves. Of course, in order to be able to process more seaweed locally, investments will have to be attracted to enable the industry to construct new processing establishments.
Solution and actions	According to conference participants, the most important action is to identify potential partners inside and outside Indonesia for selling and marketing processed seaweed products. More effort should be made to match processors with end users and potentially interested investors inside and outside Indonesia. In order to achieve this, processors should be made aware of all the relevant trade fairs organised inside and outside Indonesia and be financially facilitated to attend these them. Efforts to promote and accelerate development in the Indonesian seaweed sector have already been increased in recent years. However, especially for small-sized and more traditional processors, additional support may be required.
Stakeholders	MMAF, MoI, MoT, the Seaweed commission (for information distribution) and processors
Donors already working on it	Swiss contact (the Swiss Foundation for Technical Cooperation) is helping seaweed farmers and processors in Nusa Tenggara to obtain better market access.

<b>2. Lack of knowledge about and too strict EU regulations</b>	
Description	Conference participants complain that regulations for entering the product into EU are hard to find on the Internet, with Indonesian officials, or from the embassies if you are not located in Jakarta. When information is found, it is often not complete or too complicated to understand. However, EU buyers of processed seaweed products assume that suppliers know the regulations and therefore do not always offer assistance.
Solution and actions	A detailed workshop on accessing the EU market for seaweed products should be organised for processors and RDS exporters. A website should also be developed on which comprehensive, transparent and easy to understand guidelines for exports of carrageenan and RDS are available.
Stakeholders	MMAF, MoT
Donors already working on it	No donors are working on this yet.

<b>3. Lack of knowledge and technology for carrageenan production</b>	
Description	According to an industry insider, the current processing capacity for carrageenan is 120,000 tonnes per year, while total production is above 1,000,000 tonnes per year. Through MMAF, however, the government has set out a strategy to fuel the development of the local processing industry. The main action is that from 2012 onwards there will be a limitation of the permitted export volume of RDS. With this export limitation, MMAF hopes to force cooperatives, RDS exporters and carrageenan exporters to focus more on the development of and investment in local processing facilities. The ultimate aim is to increase local value-addition and thus the total value of the sector and the total contribution of the seaweed sector to the national economy. However, local producers and RDS exporters often lack the knowledge and technology to develop carrageenan processing activities. There is also a lack of consultants that support the industry.
Solution and actions	The government and the industry should invite foreign specialists in carrageenan production to assist and inform interested companies and cooperatives about the possibilities for setting up carrageenan processing machinery. An attractive environment should also be created in which foreign companies are invited to start joint ventures in Indonesia. However, the most urgent action is to identify interested companies in Indonesia who wish to produce carrageenan and subsequently hire consultants to inform and assist them.
Stakeholders	PUM (could provide consultants), MMAF
Donors already working on it	<ul style="list-style-type: none"> <li>- PUM (PUM Netherlands Senior Exports) already offers consultancy services to the seaweed sector in Indonesia but not yet on a large scale. The representative of PUM has indicated that they are interested in working with companies that request assistance.</li> <li>- CIDA (Canadian International Development Authority) is already providing local SMEs with technical assistance on seaweed processing. Through the CISPED project, they provide information about the application of processing methods for value-added products.</li> <li>- ACIAR (Australian Centre for International Agricultural Research) is conducting a research project on low level processing methods for making seaweed fertiliser from the waste water of the drying process of seaweed.</li> <li>- GIZ (German Agency for International Cooperation) is trying to advise the Indonesian seaweed sector about how to improve the dissemination of knowledge in the sector and how to improve research - sector linkages.</li> <li>- IFC (International Financing Cooperation part of the World Bank Group) has also worked on improving local processing capacities and innovative product development, as well as on improving market linkages between 2005 and 2010 in East Indonesia.</li> </ul>

<b>4. Lack of knowledge about seaweed Good Aquaculture Practices</b>	
Description	As a result of a lack of competency among farmers, the quality of Indonesian seaweed is often below standard. This causes low market prices and increases costs for pre-processing activities. The main cause of the lack of competency is that farmers are often not trained in Good Aquaculture Practices. Moreover, government extension workers are often not competent enough and there seem to be far too few extension workers compared to the number of farmers in the areas.
Solution and actions	According to the conference participants, a first easy step would be to distribute the seaweed GAP handbook more efficiently through local organisations and government units. There should also be a Training of Trainers programme through which the number of extension workers can be increased rapidly (e.g. UTZ trains extension workers in the Cocoa sectors and achieves great success with this approach). MMAF and various NGOs are already working on this but their efforts are too small scale. The programme should be accelerated as a competent base of suppliers is ultimately crucial for the quality and production costs of the final value-added products. Other important parts of this strategy are currently to link farmers together in cooperatives and provide them with access to credit schemes which enable them to buy high quality farming inputs.
Stakeholders	MMAF and various NGOs
Donors already working on it	<ul style="list-style-type: none"> <li>- NGOs like COSPERMINDO, JASUDA and SWISS contact are already working on this but their programmes are very small scale.</li> <li>- CIDA and IFC have also been working on improving the competency of seaweed farmers and facilitating the formation of cooperatives. However, both programmes have now finished.</li> </ul>

<b>5. Low quality of seedlings</b>	
Description	Seaweed farmers lack knowledge about quality seedlings as inputs for their operations. As a result, they do not attempt to buy top quality seedlings or to put pressure on seedling producers to improve the quality.
Solution and actions	The local MMAF units should increase their production capacity in seaweed nursery centres. Alternatively, private companies which also buy the seaweed should be encouraged to invest in the production of quality seedlings. This final approach would ultimately benefit the RDS buyers and carrageenan processors as the quality of the seaweed would improve. This system, which could evolve into a buy-back system, is used in many other aquaculture subsectors to ensure that farmers use high quality inputs which improve product quality and productivity. Several parties working are already working on this. MMAF through the Marine Research Centre in East Java, the private company PT Ohama and the Indonesian Institute of Science are all working on improving seaweed seedling quality and distribution.
Stakeholders	Private Companies, MMAF, DMAF, Research Institutes
Donors already working on it	No NGOs are working on this yet.

### ***Conclusion***

As a result of the industrialisation policy, it is expected that new processing facilities for carrageenan will be built and that production and exports of value-added products will increase significantly in the coming years. If the number of processing establishments and processing capacity is increased by creating an enabling environment for investors and processors and by disseminating knowledge about seaweed processing to interested companies, new opportunities will arise. A number of seaweed processors are interested in the EU market but lack both the understanding of EU regulations and insight into market opportunities in the EU. The export companies might need additional assistance from the government and donor organisations to increase their export volume and value of value-added products to the EU. As there

have already been many efforts by the Indonesian government as well as international donors, it might be a good strategy to simultaneously provide exporters and processors with market information and access. This could encourage exporters in turn to make additional investments in the local infrastructure to optimise their production.

#### **4.5 Tuna subsector**

Figure 4.5.1 presents the tuna value chain in Indonesia and the bottlenecks for the export of the tuna industry in Indonesia that have been prioritised.

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

1. Fishermen
2. Fish landing sites and ports
3. Middlemen
4. Processors/exporters

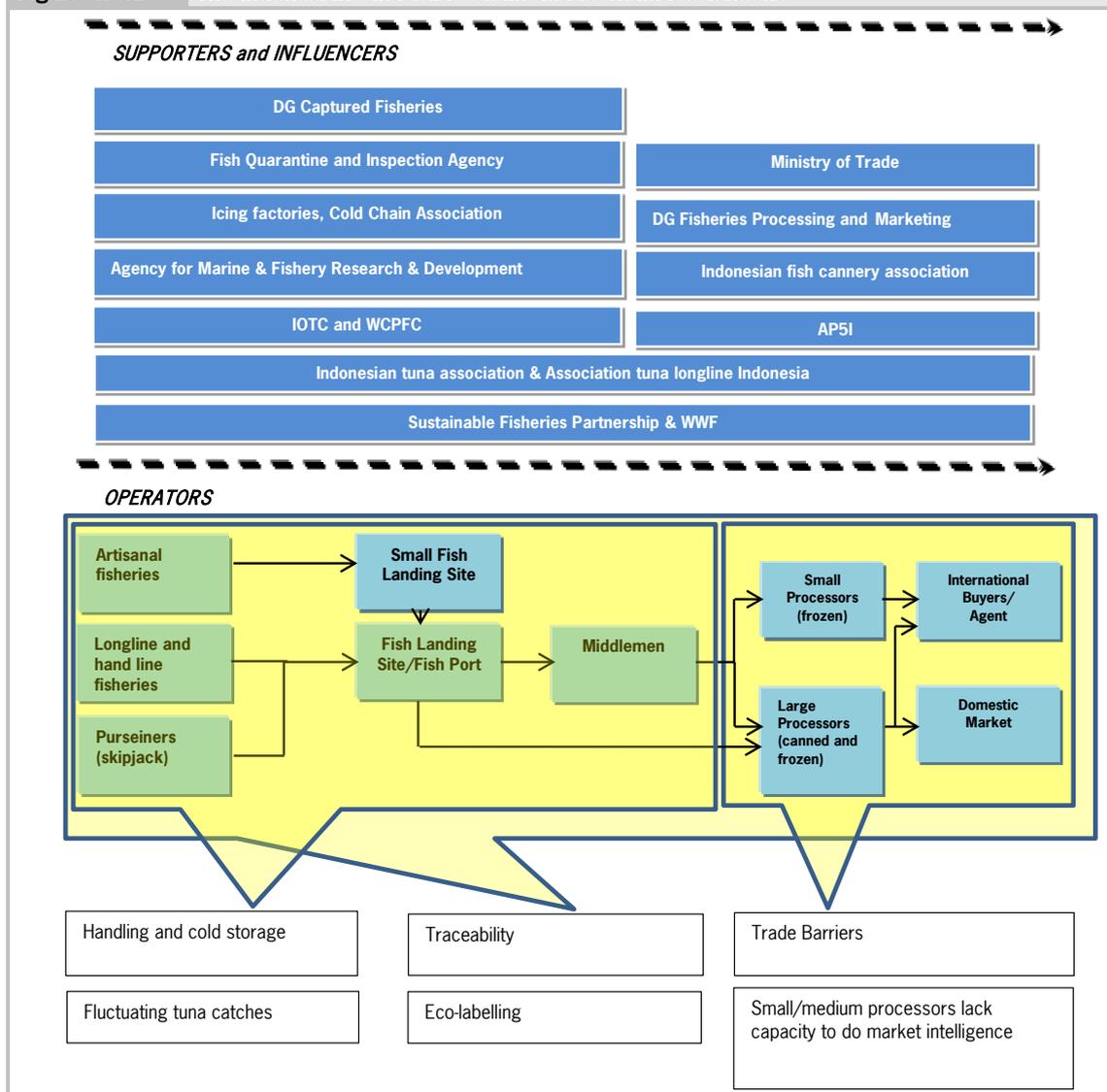
Furthermore, four different categories of influencers and supporters can be distinguished:

1. Government authorities (MMAF, Ministry of Trade)
2. Research institutes (Agency for Marine and Fishery Research and Development, SFP)
3. Producer and exporter associations (ATLI, ASTUIN, Indonesian fish cannery association, AP5I)
4. Other supporters and influencers (LPMHP, Ice factories, WCPFC and IOTC)

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

1. Handling and cold storage of tuna after catching
2. Traceability (EU-catch certificates/E-logbook)
3. Eco-labelling
4. Trade barriers of exporting tuna to the EU
5. Lack of capacity for small/medium processors to do market intelligence
6. Fluctuating tuna catches

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



**Operators within the value chain**

*Fishermen*

Indonesian fishermen catch tuna in the Pacific Ocean and the Indian Ocean. According to data from 2005, the Indonesian tuna fleet consists of 2,012 long liners, 3,872 pole and line vessels and 1,474 purse seiners.<sup>18</sup> Data from the Western Central Pacific Fisheries Committee (WCPFC) for Indonesia show that about 400 industrial fishing vessels are involved in catching tuna in the Pacific Ocean: 152 vessels are purse seiners, 162 vessels are long liners and 18 vessels use a pole and line technique. Furthermore there are 62 supporting vessels. Most vessels in the Indonesian tuna fleet appear to be fishing in the Indian Ocean. Long liners mainly catch Yellow fin and Bigeye tuna, but also Albacore and Bluefin tuna. Purse seiners mainly catch Skipjack. Artisanal fisheries also catch significant volumes of tuna. Most artisanal

<sup>18</sup> Oceanic Development, 2006. The European Tuna Sector: Economic Situation, Prospects and Analysis of the Impact of Liberalization of Trade. Report for European Commission, Brussels.

fisheries use trolling gears, small purse seiners, gill nets and Danish seiners.<sup>19</sup> There is no up to date information about the tuna catches of these vessels available.

#### *Fish landing sites and ports*

Four types of fishing ports in Indonesia can be identified (Table 4.5.1). Most of the fishing ports are fish landing sites where small vessels land their fish. Besides the fish landing sites, there seem to be many smaller landing sites in coastal fishing villages. Oceanic and Archipelagic fishing ports also have facilities for vessels that export tuna.<sup>20</sup> At some landing sites and ports, there is an auction where tuna is sold. However, auctions are not always part of a landing site. Important fishing ports for tuna are at Muara Baru (Jakarta), Bena (Bali), Bitung, Ambon and Sorong.<sup>21</sup>

	<b>Oceanic fishing port</b>	<b>Archipelagic fishing port</b>	<b>Coastal fishing port</b>	<b>Fish landing sites</b>
Number of fishing ports	5	11	17	477
Fish landing capacity (tonnes/year)	40,000	8,000-15,000	3,000-4,000	2,000
Market orientation	Local markets and export	Local markets and export	Local and domestic markets	Local markets
Fishing areas of vessels	EEZ and International waters	EEZ and Archipelagic waters	Coastal waters Archipelagic waters	Coastal waters

Source: ACIAR (2003).

#### *Middlemen*

Middlemen (also called traders) play a role in buying tuna from small fishing vessels and in selling the fish to processors. By financing the fishing operations, the traders are assured of a steady supply of tuna at a price that they can sell. Small and medium processors of frozen tuna (mostly Yellow fin and Big eye) depend on middlemen for their sourcing. Often middlemen transport the tuna from small and isolated landing sites to larger landing sites or ports where the tuna is processed. Sometimes middlemen also add value by icing the tuna to maintain the quality. Large processing companies do not depend on middlemen.

#### *Processors/exporters*

According to 2008 data, the most relevant processing companies of tuna, both frozen and canned, are located in South and North Sulawesi, Jakarta, East Java, North Sumatra, Bali. In 2008 there were 66 processing companies exporting fresh and frozen tuna and 15 companies exporting canned tuna (table 4.5.2). The canning companies are all characterised as large companies that usually own vessels that supply Skipjack for canning. Most of the companies processing fresh or frozen tuna are small or medium-sized companies.

<sup>19</sup> SFP, 2010, Indonesian Tuna Supply Chain Analysis. Sustainable Fisheries Partnership.

<sup>20</sup> ACIAR, 2003. A review of Indonesia's Indian Ocean tuna fisheries. Australian Centre for International Agricultural Research.

<sup>21</sup> SFP, 2010, Indonesian Tuna Supply Chain Analysis. Sustainable Fisheries Partnership.

<b>Province</b>	<b>Fresh/frozen tuna</b>	<b>EU-certified</b>	<b>Canned tuna</b>	<b>EU-certified</b>
South Sulawesi	7	5	-	-
North Sulawesi	15	2	4	3
Jakarta	20	8	-	-
East Java	16	10	8	4
North Sumatra	2	0	2	2
Bali	6	5	1	1
Total	66	30	15	10

Source: Personal communication.

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

No percentages could be given about the general flow of products along the value chain. Based on a description from the ACIAR study (2003) of the fishing ports of Benoa and Muara Baru, a general overview of the distribution of tuna after landing can be given. Tuna weighing over 20 kg after first hand processing (gutting and weighting the fish) is graded by buyers. Tuna can be graded as A-quality (the highest export quality) or B and C-quality (the lowest export quality). A-quality is freshly exported as whole tuna (mostly Yellow fin and Bigeye tuna) to Japan. B and C-quality tuna is further processed (loins, steaks, fillets) and exported to Japan and other export markets. Yellow fin and Bigeye tuna of a low level quality is used for canning or is processed and sold at domestic markets. In Benoa, all tuna weighing less than 20 kg is indicated as not suitable for export. At the fishing port of Muara Baru, some of the tuna that is not exported is sold at auction, while in Benoa there is no auction.

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

#### *Government authorities*

The Ministry of Marine Affairs and Fisheries (MMAF) is the main government authority for the tuna industry. Within MMAF, the Directorate General (DG) for Capture Fisheries is responsible for management and policy in the fisheries sector, including tuna. DG Fisheries Product Processing and Marketing is responsible for issues regarding the processing and marketing of fish products. The Fish Quarantine and Inspection Agency (FQIA) is also part of MMAF. The FQIA is the competent authority responsible for the certification of fish and fishery products. The Ministry of Trade was also mentioned as a relevant government authority, as most Indonesian tuna is exported.

#### *Research institutes*

Although not specifically mentioned, the Agency for Marine and Fishery Research and Development contribute to the value chain for tuna by providing research facilities. The Sustainable Fisheries Partnership (SFP) is an NGO, but also provides guidance for more sustainable business practices and support for more sustainable practices within the value chain. In 2010, the SFP launched the Indonesian tuna Fish Improvement Partnership (FIP). The objective of the FIP is to promote traceability of the catches in order to reduce illegal fishing, and to improve the availability of data about catches and by catch. The project also aims to promote collaboration with other NGOs to guide the management of the Indonesian tuna fisheries towards more sustainable tuna fisheries. About 100 tuna longliners fishing in the Indian Ocean and the Indonesia's Exclusive Economic Zone (EEZ) are participating in this project. Partners within the project are MMAF, ATLI and ASTUIN, WWF Indonesia and trading companies from the Netherlands and the US.

#### *Producer and exporter associations*

The Indonesian sector has several producer organisations. The Asosiasi Tuna Longline Indonesia (ATLI) looks after the interests of the tuna longline fisheries. The Association for Tuna Fish Companies (ASTUIN)

represents both the fishing fleet and the processing companies. Finally, the Indonesian fish cannery association focuses on the processors of canned tuna. The Association for Fish Processing and Marketing Companies in Indonesia (AP5I) is responsible for the marketing of fish processing companies for Indonesia in general.

*Other supporters and influencers*

Test laboratories are essential for the export of any food commodities, including tuna exports. By Ministry declaration, the Fishery Product Quality Testing Institute, or Lembaga Pengujian Mutu Hasil Perikanan/ Fishery Product Quality Testing Institute (LPMHP) assists the private organisations and business support groups in the establishment of Fish Test laboratories. Ice factories play an important role in the Indonesian fisheries industry. Almost all provinces, cities and some municipalities have ice factories. The Indonesian Cold Chain Association represents the cold chain industry and is also included as cold storage facilities are important for storing the tuna after landing. The Western Central Pacific Fisheries Committee (WCPFC) and the Indian Ocean Tuna Committee (IOTC) are also significant influencers for the Indonesian tuna industry. Indonesia is a full member of the IOTC but not (yet) a full member of the WCPFC.

***Bottlenecks and solutions***

*All bottlenecks preventing tuna exports*

The desk study and the outcomes of the conference revealed a number of bottlenecks that prevent the tuna industry from reaching its full potential. Six bottlenecks have been identified of which the following three were discussed during the strategic conference.

<b>1. Handling and cold storage of tuna after catching</b>	
Description	The handling and cold storage of tuna after catching is seen as a major bottleneck. In particular, smaller fishing vessels that catch Yellow fin tuna do not always have the capacity or the knowledge to store the fish properly to maintain the quality. This often results in the quality of the tuna landed not being sufficient for export.
Solution and actions	Capacity building in the handling of tuna by fishermen, at fish landing sites and middlemen. This requires training of fishermen and middlemen, and developing best practices for the handling of tuna to improve quality. A suggestion made at the conference was to launch a pilot project for a selected group of fishermen. However, capacity building will also require investments to improve on-board facilities and storage at fish landing sites. Government authorities or foreign investors might be able to invest in these facilities.
Stakeholders	DG Fisheries Product Processing and Marketing is mentioned as the most important stakeholder. As most of the smaller landing sites are situated in fishing villages, local governments can also contribute in solving this bottleneck. Also producer associations like ATLI and ASTUIN may provide their expertise.
Donors already working on it	The Indonesian tuna Fish Improvement Partnership (FIP) of the SFP does not specifically address the handling and storage of tuna. However, the objectives of the FIP can also contribute to improved handling of tuna for the longliners participating in the project.

<b>2. Traceability (EU catch certificates/E-logbook)</b>	
Description	To be able to export tuna to the EU, fishermen must provide catch certificates to ensure that fish products are traceable and not caught through illegal fishing. Fishing vessels must also use an electronic logbook to register catches and the fishing areas. Especially smaller fishing vessels have problems providing information about their catches. They often do not have the financial capacity to install such facilities on their vessels. Exporters also mentioned that export prices for fresh and frozen tuna are usually higher in Japan than in other markets, although the requirements to export to the EU are higher.
Solution and actions	Training of fishermen and middlemen on how to deal with EU catch certificates and training of the Competent Authority on how to support fishermen were mentioned as high priority actions.. DG for Capture Fisheries is now in the process of establishing an online system to gain access to all logbook data from every landing site to improve the traceability of the fisheries. The system will provide information on catch statistics, catch locations and the number of days at sea.
Stakeholders	DG for Capture Fisheries and the fisheries associations (ATLI and ASTUIN) are identified as most important stakeholders to deal with this bottleneck.
Donors already working on it	The Indonesian tuna Fish Improvement Partnership (FIP) of the SFP contributes to improving the traceability of tuna catches for the participating longline fisheries in the project.

<b>3. Eco-labelling</b>	
Description	Eco-labelling of tuna products is seen as an important step to improving the market potential of the tuna industry to EU and US. To become certified with an eco-label like the Marine Stewardship Council (MSC), stringent requirements are imposed on catching and processing tuna, as well as on the management system and relevant data collection. For fishing companies and processors, it is still difficult to fulfil the conditions for eco-labelling.
Solution and actions	Matchmaking of Indonesian companies with buyers in the EU and US to cooperate in the certification process towards eco-labelling. Another solution is that the government authorities join up with research agencies develop a work programme for eco-labelling to show the willingness of the tuna industry to become certified.
Stakeholders	Government authorities and producer associations (ATLI, ASTUIN and AP5I) might be the relevant stakeholders to initiate matchmaking. For the working programme towards sustainability, MMAF can work on this programme with support from agencies like SFP, and WWF.
Donors already working on it	The Indonesian tuna Fish Improvement Partnership (FIP) of the SFP also takes into account the opportunities for certification. This bottleneck is also relevant for organisations like ATLI and ASTUIN and WWF, although these organisations are already participating within the FIP project.

The three other bottlenecks that have been identified but not discussed are:

- Trade barriers of exporting tuna to the EU;
- Lack of capacity for small/medium processors to conduct market intelligence;
- Fluctuating tuna catches.

Exporters mentioned that trade barriers for tuna are an important bottleneck for the Indonesian tuna industry. Exporters face import tariffs up to 14.5% for frozen tuna, and up to 24% for canned tuna. African, Caribbean and Pacific countries (ACP countries) that have special agreements with the EU and do not face import tariffs have a better competitive position. Small/medium processors that are not yet EU certified often lack information on how to meet the requirements to export to the EU. These companies often do not have the possibilities to conduct market intelligence to get in contact with relevant export markets. Because tuna catches fluctuate, fishermen often have to fish in areas further out to sea. It can take several days to reach these fishing areas. This results in higher fuel and labour costs that cannot be recovered

at the landing sites. Several stakeholders also mentioned that tuna stocks are declining and that this might become a problem for fishermen and processing companies.

### *Conclusion*

For the Indonesian tuna industry, the bottlenecks occur at several stages of the value chain. Since processors and exporters mainly depend on the catches of the Indonesian tuna fleet, it is essential to fully optimise the potential of the fishing fleet. Better handling and storage of tuna can increase the availability of tuna of export quality. This benefits processors and exporters, while tuna stocks do not need to be exploited further. As there are many small landing sites, it is also crucial that tuna landed at these small landing sites can be transported efficiently.

Although several exporters of frozen and canned tuna are already EU certified, there is still potential to help small exporters to meet EU requirements. Furthermore, there is a growing demand for sustainable and eco-labelled tuna in the EU market. Also the lack of traceability throughout the entire value chain implies that support for fishermen, middlemen and processors/exporters is needed.

## **4.6 Pangasius and tilapia subsector**

Figure 4.6.1 presents the value chain for pangasius and tilapia in Indonesia and the bottlenecks for their export have been prioritised. Although 12 bottlenecks have been identified, only the three main bottlenecks are included in the map of the value chain.

Within this value chain, four main categories of operators can be distinguished:

1. Input suppliers: e.g. suppliers of fry and fingerlings, medicines and chemicals and technical inputs
2. Farmers
3. Middlemen
4. Processors/exporters

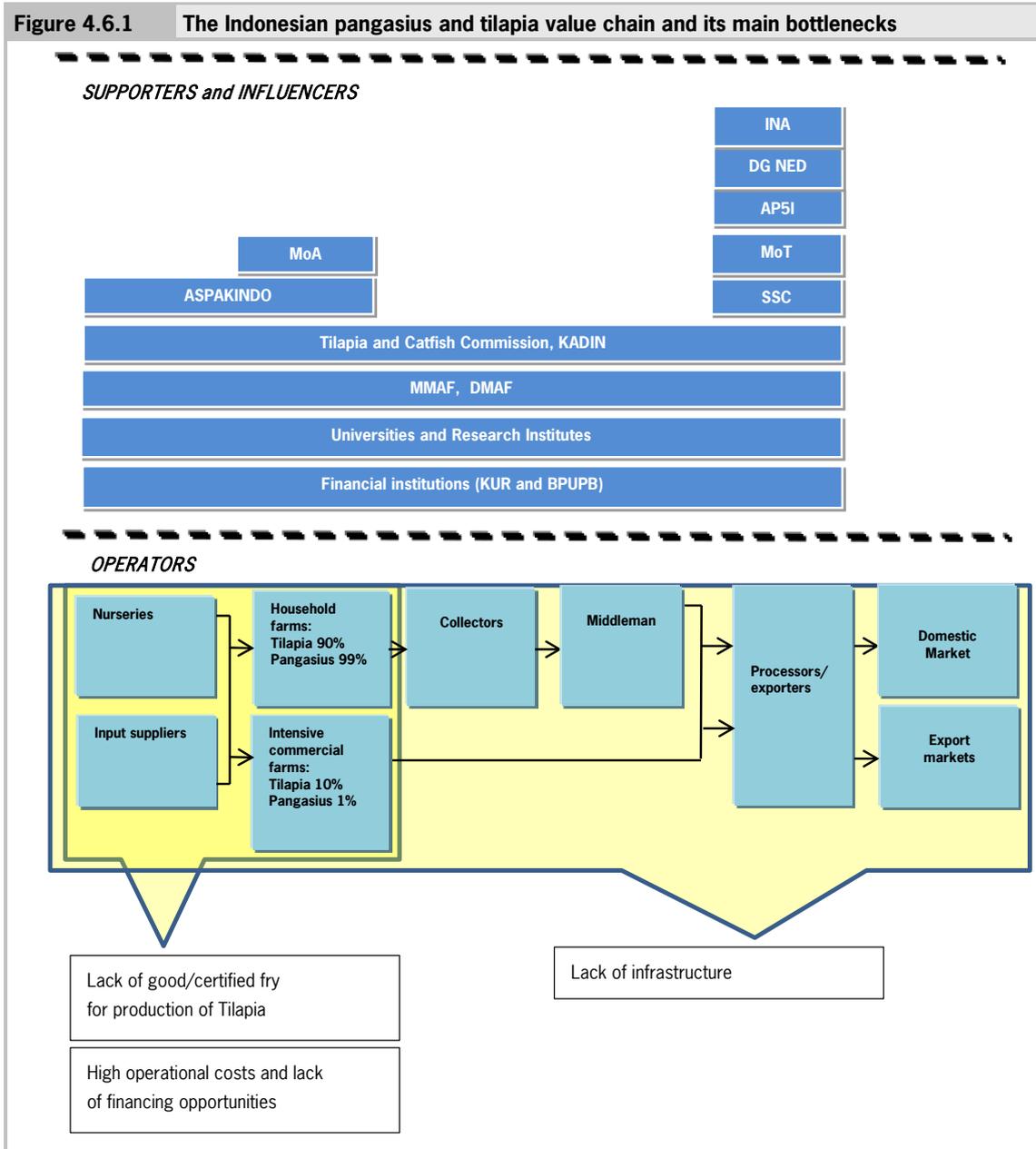
Furthermore, four different categories of influencers and supporters can be identified:

1. Government authorities (MMAF, MoT, MoA, KADIN, DG NED and INA)
2. Research institutes
3. Producer and exporter associations (Tilapia and Catfish Commission, ASPAKINDO, AP5I and SSC)
4. Financial Institutions (KUR and BPUPB)

Twelve bottlenecks have been identified as a result of the desk study, the field work and the discussions at the strategic conference. The three main bottlenecks are:

1. Lack of good/certified fry lead to low production/higher feeding
2. High operational costs and lack of financing for farmers by banks for producers
3. Lack of infrastructure

**Figure 4.6.1 The Indonesian pangasius and tilapia value chain and its main bottlenecks**



**Operators within the value chain**

*Input suppliers*

Input suppliers provide fry and fingerlings. Primary input providers include providers of fry and fingerlings. Most of the centres for fingerling production are located in Java, in Sukabumi and Subang, for example. Often these centres rely on government or donor support. Feed, medicines and chemicals are also supplied to the farmers. The input of construction materials like pumps and other technical inputs are also necessary for the construction and maintenance of the ponds. Most input providers are small-scale entrepreneurs.

### *Farmers*

For the production of pangasius and tilapia, farmers use several farming systems. Tilapia cannot only be cultured in fresh water but also in brackish water. The most traditional system for culturing tilapia is in ponds. This is traditionally done in backyards or nearby ponds. Cage culturing is a more commercial effort and a main livelihood for those involved in it. Floating net cage culture has been developed in lakes and reservoirs. The cage is made of polyethylene net. Paddy field culture involves establishing seed nurseries before these are cultured in cages or floating net cages. Pangasius is only produced by smallholders in fish cages or ponds. Most of the ponds are located in the farmer's yard. Most of the culturing practices are extensive and use low-inputs and low-level technologies. They lack the technical knowledge and skills that would enable them to adopt new or improved production methods and techniques. However, the low intensity production of freshwater aquaculture species like pangasius and tilapia is an important source of employment. Many fish farmers that have made investments in floating cages receive advance credits from potential buyers to purchase feed during the grow-out period.

### *Middlemen*

The middlemen, also referred to as traders, seem to have a dominant position within the value chain of pangasius and tilapia. There is a wide range of middlemen who distribute the fish products from the farmers to processors and local markets. Most traders in the provinces are small entrepreneurs serving local markets, who have a limited knowledge of market demands. Very basic means of transport (bicycles and motorbikes) are used, as well as the storage and marketing of the products. The lack of cold storage particularly affects the fish quality and lowers the bargaining power of fish farmers as they have to sell their fish at reduced prices at the end of the day to avoid a loss of income.

### *Processors/exporters*

Most of the larger processors and packagers, especially in the value chain for tilapia, are located in and around the production areas e.g. North Sumatra, Lampung and Central Java. The rest of them are based around Jakarta and Surabaya. Little processing is done for local markets. Some local processing activities include smoking or salting fish. About 80% of the total tilapia production is consumed domestically. Nearly all pangasius is sold in traditional markets, mostly as live fish.

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

After seaweed, tilapia is the second largest aquaculture product in Indonesia with a production volume of 464,000 tonnes in 2010. About 20% of the production of tilapia is exported. Pangasius is the seventh largest aquaculture product with a production volume of 148,000 tonnes in 2010. Nearly all pangasius goes to local markets.

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

#### *Government authorities*

Several Ministries within the Indonesian government play a role within the value chain for fresh water aquaculture, including pangasius and tilapia. The Ministry of Marine Affairs and Fisheries (MMAF) and its District Offices (DoMAF) provide institutional capacity support to the aquaculture sector. The Ministry of Trade (MoT) provides certification to fisheries products in coordination with MMAF. The Ministry of Agriculture (MoA) also cooperates with MMAF in issues related to aquaculture like land utilisation planning and feed supply. Furthermore the Kamar Dagang dan Industri Indonesia/Indonesia Chamber of Commerce and Industry (KADIN) support Indonesian business and has a specific commission on the fishery marketing and promotion. Also the Indonesian Benelux Chamber of Commerce (INA) contributes to promoting sustainability and food safety issues and principles in food sector including seafood industry. The Directorate General

for National Export Development (DG NED) supports Indonesian exporters with market intelligence and information services.

#### *Research institutes*

No specific research institutes that are specifically relevant for the value chains for pangasius and tilapia have been mentioned, but universities and research are likely to play a role in the value chain.

#### *Producer and exporter associations*

The Indonesian Tilapia and Catfish Commission acts as producer and exporter association for the pangasius and tilapia subsector. Its mission is to:

- Prepare a draft of the tilapia and catfish industry's development policy, including production, processing and international marketing development policy;
- To harmonise the downstream and upstream tilapia and catfish industries;
- To empower the tilapia and catfish entrepreneurs, especially in terms of technology, management and financial capacity.

The Asosiasi Pengusaha Sarana Akuakultur Indonesia/Indonesia Aquaculture Machinery and Equipment Industry Association (ASPAKINDO) provides Good Aquaculture Practices (GAP) for producers in the aquaculture sector. The association furthermore develops equipment for GAP by taking into account conservation and environmental issues. ASPAKINDO also provides quality inputs for aquaculture subsectors. The Asosiasi Pengusaha Pengolahan & Pemasaran Produk Perikanan Indonesia/Association of Indonesian Fisheries Product Processing and Marketing Company (AP5I) supports all fish processing and exporting companies in Indonesia. The Seafood Service Centre (SSC) in Surabaya provides consultancy and training on market information and market access requirements (including EU market requirements).

#### *Financial institutions*

The Kredit Usaha Rakyat/Community Business Credit (KUR) and Bantuan Pengembangan Usaha Perikanan Budidaya/Support for Fish Culture Business Development (BPUPB) are mentioned as financial institutions to provide support for small-scale producers, including producers of pangasius and tilapia.

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

##### *All bottlenecks preventing exports of pangasius and tilapia*

The desk study and the fieldwork resulted in 12 initial bottlenecks that prevent the pangasius and tilapia industry from reaching its full potential. During the strategic conference, three bottlenecks were discussed in more detail. The 12 prioritised bottlenecks are:

1. Lack of good/certified fry lead to low production/higher feeding
2. High operational costs and lack of financing for farmers by banks for producers
3. Lack of infrastructure
4. Lack of competency of producers of pangasius and tilapia
5. Strict buyer requirements from the EU with respect to product and size specifications, quality management and standardisation and certification practices
6. Competitiveness of the pangasius and tilapia in the EU market
7. R&D on better genetic characteristics for tilapia for farming, and dissemination and commercialisation of the research outcomes
8. Traceability of tilapia from farm level
9. Competency and capacity of MMAF field staff
10. Inconsistencies in testing requirements between buyers and the EU
11. Lack of information on export procedures and export markets for new exporters
12. Weak links between Universities and R&D institutes, and private companies

<b>1. Lack of good/certified fry for the production of tilapia</b>	
Description	Lack of fry of a sufficient quality and lack of certified fry result in a lower production and high feeding costs. Furthermore, there seems to be a lack of orientation by Indonesian farmers on the world market for purchasing high quality fry. The Indonesian government has already initiated R&D activities for the domestic production of fry, although the activities of the several government authorities are perceived as uncoordinated.
Solution and actions	Improved orientation on the world fry market is necessary. A benchmark of the world fry market would be an initial step towards better orientation. DG Aquaculture of MMAF has been appointed the coordinating authority. DG Aquaculture should also take responsibility for the coordination and integration of different R&D activities.
Stakeholders	DG Aquaculture for the support of the benchmark.
Donors already working on it	No donor agencies are working specifically on this bottleneck.

<b>2. High operational costs and lack of financing opportunities</b>	
Description	High operational costs for purchasing seed, feed and transport for producers of pangasius and tilapia. Due to an excessively high protein content feed, prices are (too) high. Furthermore, there is a lack of financing opportunities for farmers by banks for producers.
Solution and actions	Like the bottleneck for the purchasing of good quality fry, a benchmark for the provision of feed could be a solution for obtaining better market information and insight into the international feed market. With regard to the high content of proteins, local plant protein resources could be an alternative for the current feed. Adjusting the protein content in the feed was also proposed as an action.
Stakeholders	Just like the proposed benchmark for fry, DG Aquaculture could play a role in the benchmark for feed. MIT and feed companies should also participate in this benchmark.
Donors already working on it	No donor agencies are working specifically on this bottleneck.

<b>3. Lack of infrastructure</b>	
Description	A lack of infrastructure prevents both farmers and processors from further developing their business. Good transport facilities and access to good quality water are important for producers of pangasius and tilapia. Lacking infrastructure is also a barrier for the further integration of farming and processing. More generally, the lack of infrastructure is the result of a lack of regional and spatial development policies.
Solution and actions	The main proposed solution to improve Indonesia's infrastructure is to work on regional and spatial development in general. MMAF together with local governments are the relevant government authorities who should work on this bottleneck.
Stakeholders	MMAF and local governments
Donors already working on it	The industrialisation policy is an interesting initiative that could contribute to this bottleneck. The industrialisation policy aims to develop Special Economic Zones in urban regions for integrated fisheries activities (producing and processing).

### ***Conclusion***

Although significant volumes of pangasius and tilapia are produced, the contribution of these products to the seafood exports of Indonesia is not very high. The bottlenecks that have been identified occur at all the different stages of the value chain. Compared to other subsectors, most of the production comes from small-scale producers. To be able to increase exports, this subsector must develop from many small-scale producers to a smaller number of large-scale producers. Increased cooperation between farmers could result in the creation of cooperatives that can supply producers and exporters with a more stable supply of fish. These cooperatives have a stronger position within the value chain. For pangasius, it was

also mentioned that Indonesian producers would be better to focus on the domestic market rather than face competition with Vietnamese pangasius. Another observation is that most of the proposed actions and solution involve MMAF. The contribution of producer and export associations to solving bottlenecks might be underestimated. In general, support at the production level to produce good quality fish in the long term can also benefit processors and exporters.

## 5 Conclusion

### General conclusions

Table 4 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 the products from the four different subsectors to the EU market.

<b>Subsector</b>	<b>Bottlenecks</b>	<b>Level in the value-chain</b>
Shrimp	The competitiveness of Pacific White shrimp in the EU market	All levels
	The lack of supply of Black Tiger shrimp	Primary production
	EU buyer requirements and food safety regulations	Processors/exporters
Seaweed	Limited information about EU market potential	Processors/exporters
	Lack of knowledge about and too strict EU regulations	Processors/exporters
	Lack of knowledge and technology about carrageenan production	Processors/exporters
	Lack of knowledge about seaweed Good Aquaculture Practices (GAP)	Primary production
	Lack of quality seeds	Input supplies
Tuna	Handling and cold storage of tuna after catching	Primary production
	Traceability (EU-catch certificates/E-logbook)	Primary production
	Eco-labelling	All levels
	Trade barriers of exporting tuna to the EU	Processors/exporters
	Lack of capacity for small/medium processors to do market intelligence	Processors/exporters
	Fluctuating tuna catches	Primary production
Pangasius and tilapia	Lack of good/certified fry lead to low production/higher feeding	Primary production
	High operational costs and lack of financing for farmers by banks for producers	Primary production
	Lack of infrastructure	All levels

The Indonesian seafood industry is among the largest of the world. The potential of the sector for both domestic food security and exports is large. The subsectors analysed in this report are in different stages of development and the development potential varies. While tuna and shrimp are relatively consolidated subsectors, pangasius and tilapia and also seaweed are relatively new subsectors that are in an early stage of development.

### *Shrimp*

As already concluded, compared to other subsectors the shrimp sector in Indonesia is quite mature. Most of the exporters have EU approval. Although there is a group of processors that are not yet approved for the EU but are willing and interested to become EU approved in the future, in the short term it is not to be expected that total export volumes will rise unless production increases substantially. Without solving the bottlenecks at the level of production, the potential to increase exports is relatively low. However, as many exporters are large companies with good financial resources and established links with the EU, US and Japanese buyers, many of the exporters are interested and forced to look at sustainable certified products. Just like in Vietnam, there is great potential in the shrimp sector to increase the volume of sustainable certified shrimp. However, to make the right decisions about which certification to target, exporters might need additional assistance. Also, with regard to exports to the EU, exporters are still facing major constraints. Indonesia is not among the top suppliers to the EU and exporters complain that they struggle with the strict EU food safety and traceability regulations. Small and medium-sized exporters in particular might need additional assistance to understand and comply with EU food safety regulations.

### *Seaweed*

The Indonesian seaweed sector is going to experience transformations in the coming years. With limitations on the exports of Raw Dried Seaweeds (RDS), the industry is stimulated to invest in processing facilities for carrageenan and other value-added seaweed products. At the moment, compared to the seaweed processing sector in the Philippines, China and several EU countries, the processing industry is far behind. Existing processors complain that they have problems complying with EU regulations as well as with getting up to date information about market opportunities within the EU markets. The seaweed processing sector will need assistance at various levels of operations in order to progress quickly to becoming a global player in carrageenan and other innovative value-added seaweed products. Assistance may vary from knowledge transfer about processing technologies, to training on EU regulation to marketing and market information assistance.

### *Tuna*

Although the tuna sector is already an important exporter of tuna, there are still important opportunities for fishermen and producers. Small-scale fishermen need assistance and support to improve the quality of their products. Knowledge about handling procedures and standards for dealing with fish products can result in more efficient catching and a supply of higher quality tuna for exporting. Most of the canning companies are large integrated companies that are already certified. There seem to be a number of exporters of frozen tuna that do not meet the EU requirements for exporting. Market intelligence and knowledge about EU requirements for that group of companies might be relevant. Like the Philippines, the sustainable catching of tuna becomes highly relevant and might become an important condition for EU importers when sourcing tuna. Since the Indonesian fishing fleet is quite large and consists of many vessels, it is difficult to support the entire fishing fleet towards more sustainable practices. The selection of a group of fishermen and processors to train and support them might be a more effective approach.

### *Pangasius and tilapia*

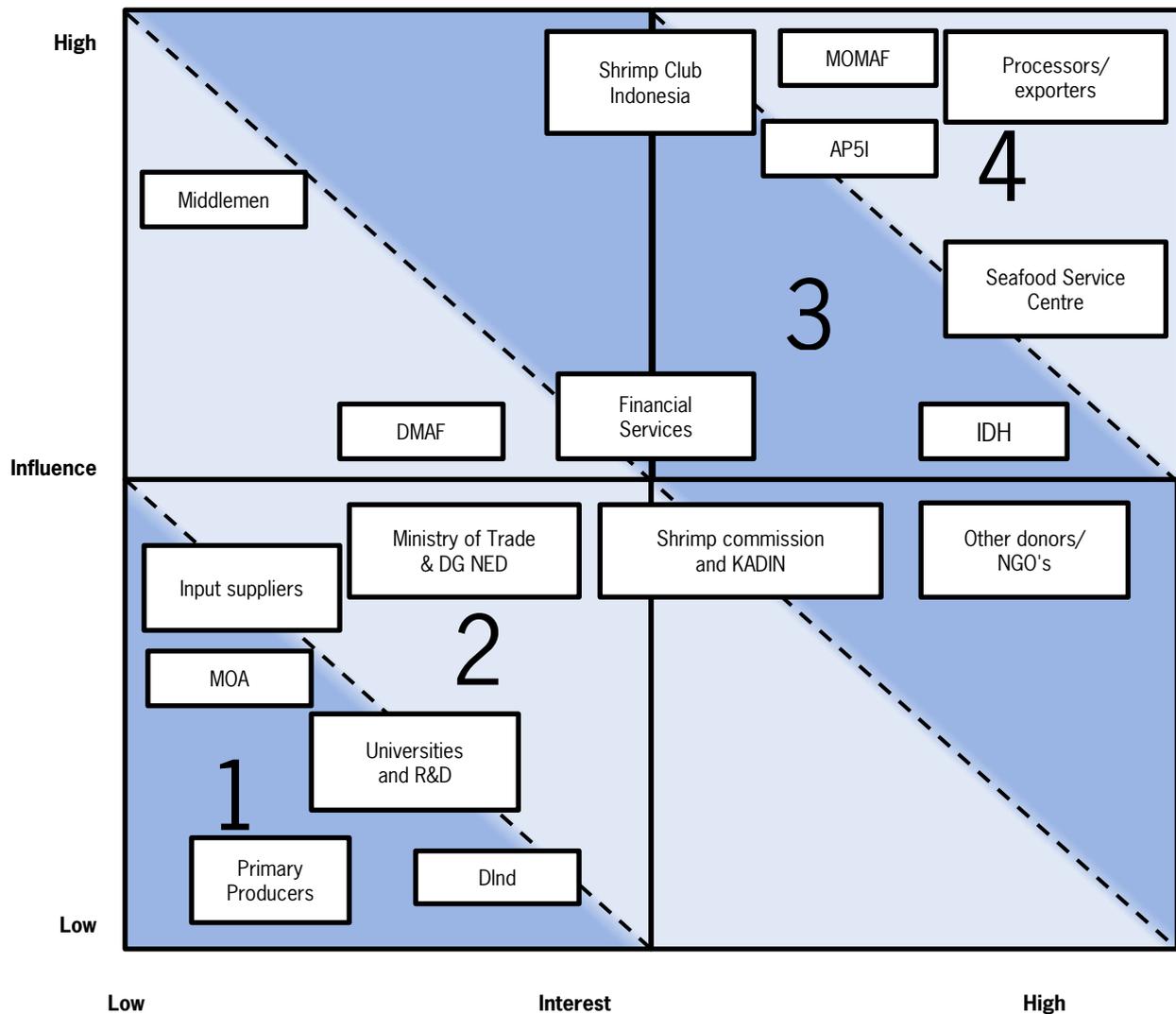
Compared with the other aquaculture subsectors, the value chain for pangasius and tilapia is dominated by small-scale producers. Pangasius is facing strong competition from Vietnamese pangasius. To be able to produce pangasius at competitive prices for the world market, significant steps must be taken. It can therefore be questioned if pangasius has a good export potential. Although tilapia is already exported, there seem to be barriers at production level to improve the quality. Small-scale producers often do not have the financial and technical capacity to develop and expand their production. To achieve this, increased collaboration of small-scale producers with the support of the government authorities and producer associations is essential. Collaboration of producers can also stimulate vertical integration within the value chain.

# Appendix 1 Stakeholder assessment grids

## Introduction

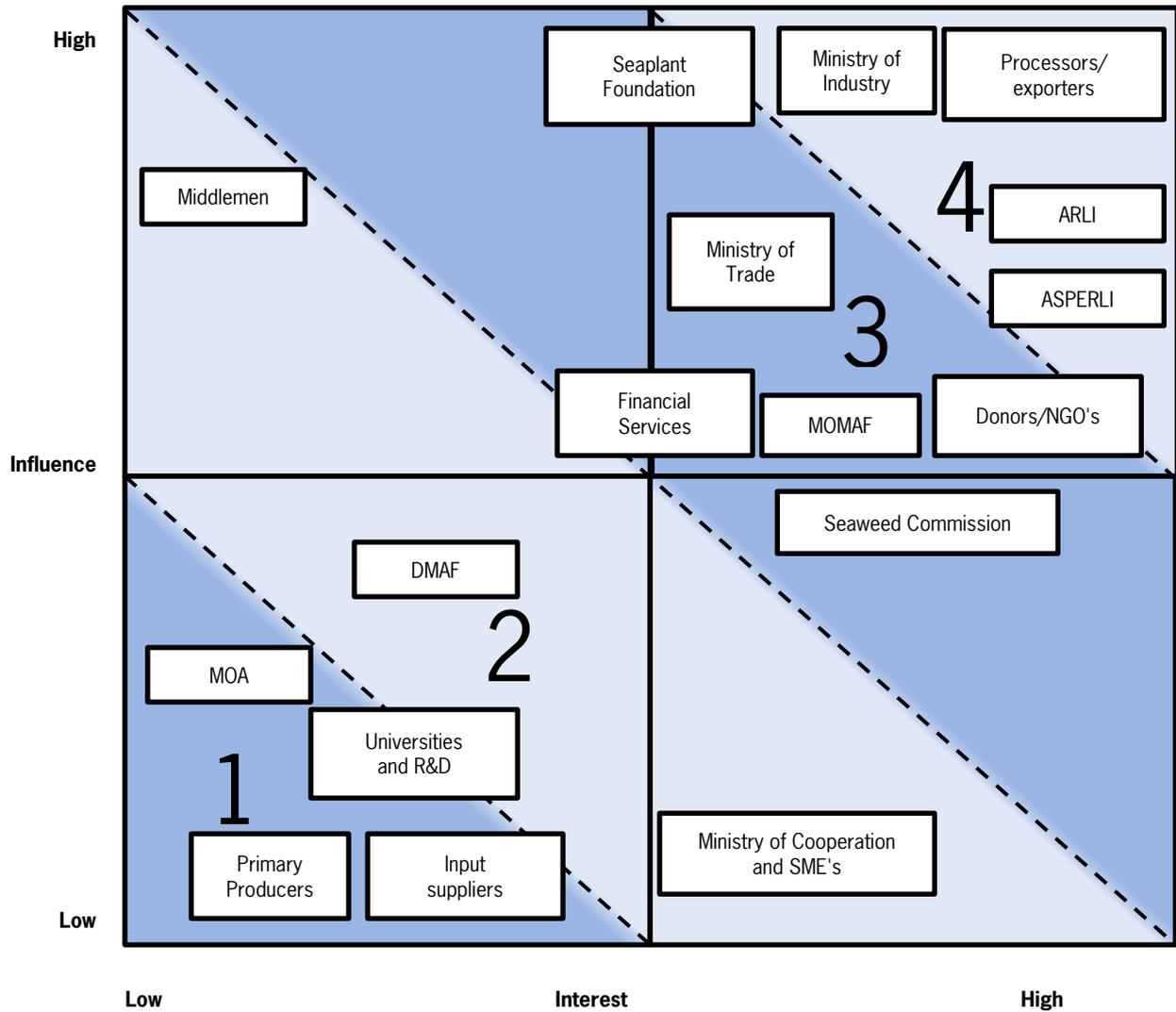
In appendix 1, the stakeholder assessment grids for the four subsectors are presented. Stakeholders are agencies, organisations, financial institutions, groups or individuals who have a direct or indirect influence in a possible intervention of CBI in the value chain. Based on the level of influence and the level of interest, the involvement of a particular stakeholder in a CBI programme can be determined.

## Shrimp stakeholder assessment grid

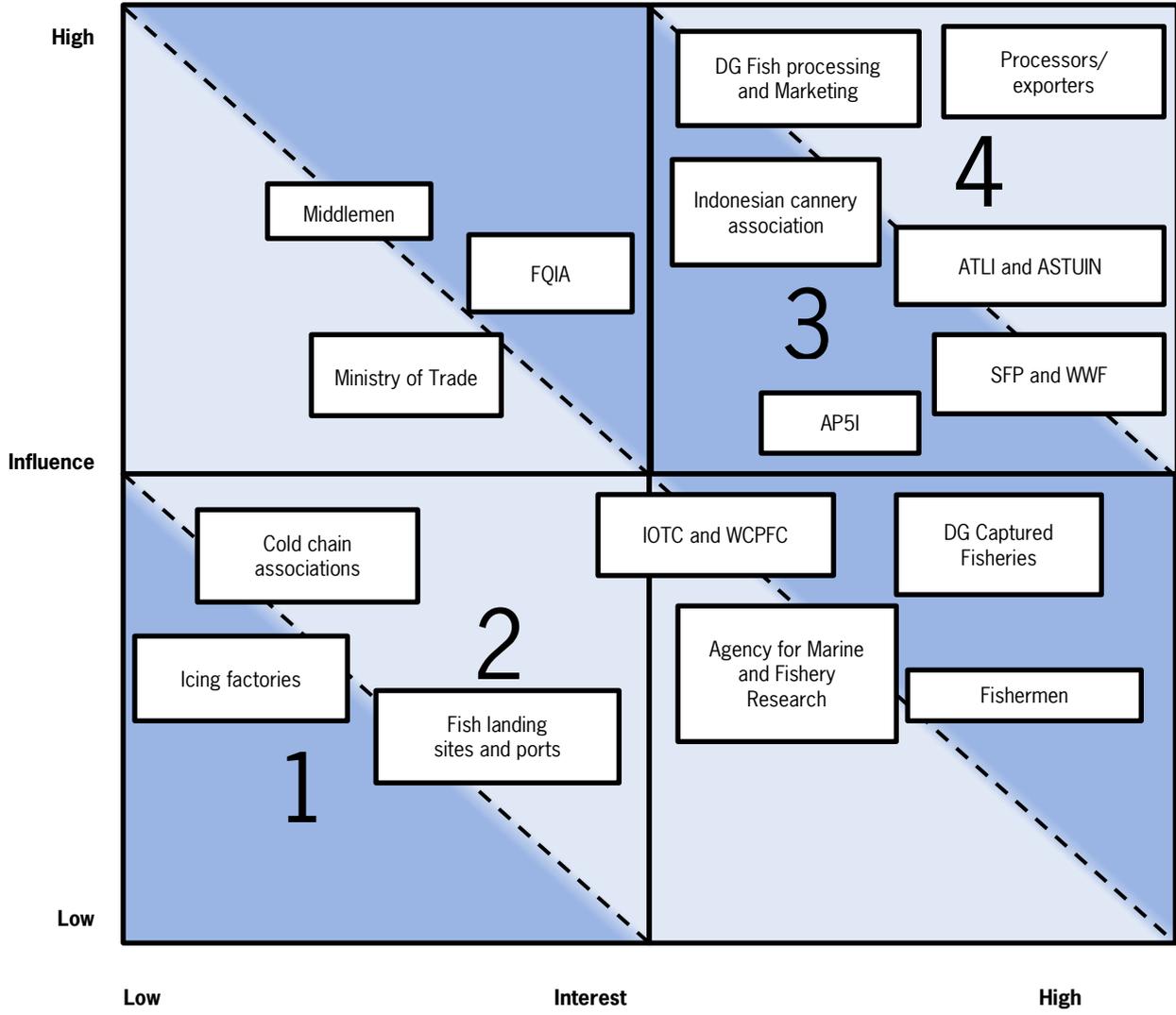


- 1 = Keep informed
- 2 = Maintain interest
- 3 = Active consultation
- 4 = Strong buy-inn required

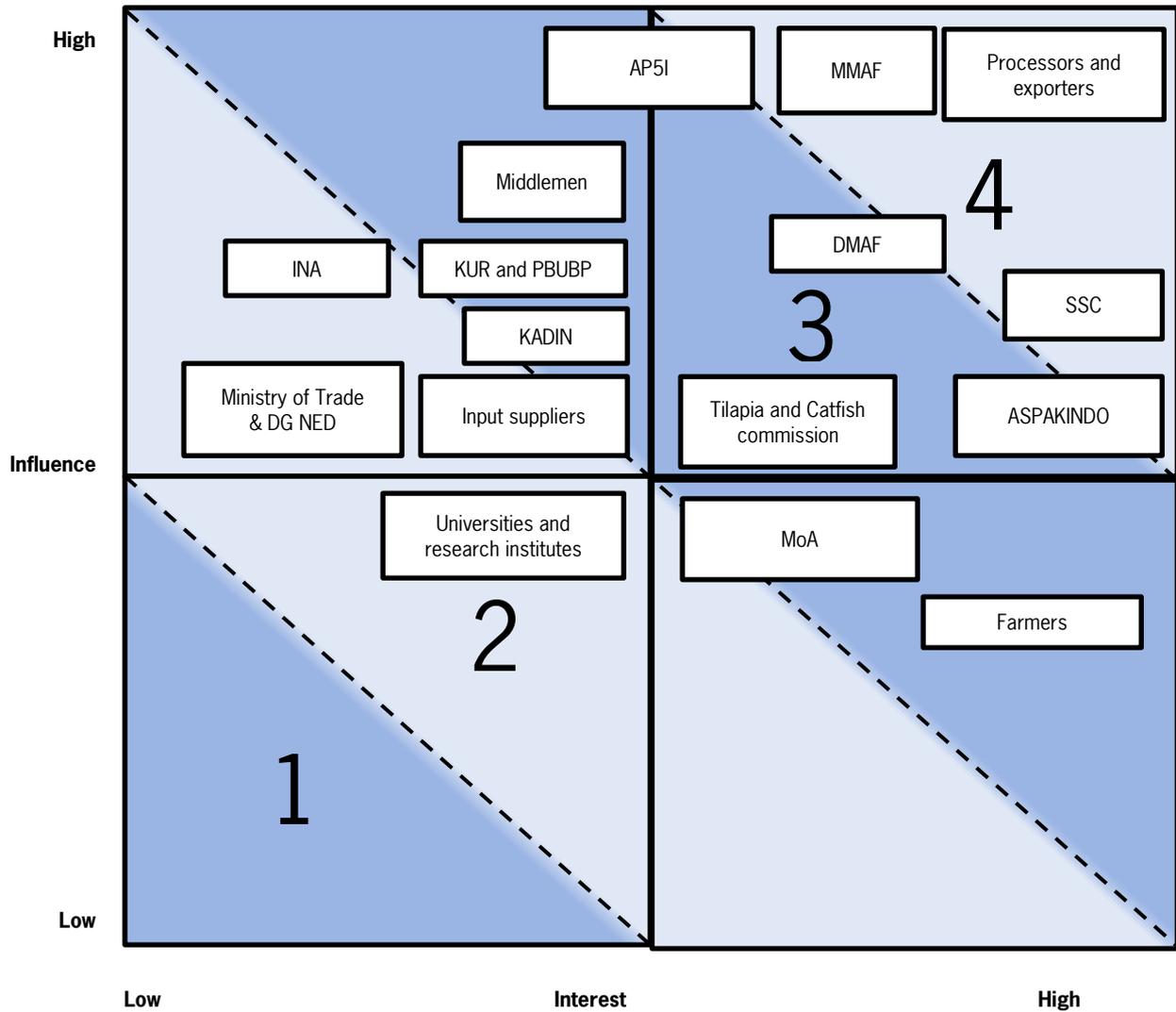
**Seaweed stakeholder assessment grid**



**Tuna stakeholder assessment grid**



**Pangasius and tilapia stakeholder assessment grid**



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

## Appendix 2 Baseline data

### Shrimp subsector

Production volume cultured shrimp in 2010					
	Production volume Black Tiger shrimp (tonnes)	Production volume Pacific White shrimp (tonnes)	Production volume other cultured shrimp (tonnes)	Production volume (tonnes)	Production value (IDR 1,000)
2005	n.a.	n.a.	n.a.	280,629	10,671,583,842
2006	n.a.	n.a.	n.a.	327,610	13,399,095,952
2007	133,114	179,969	45,842	358,925	13,302,761,452
2008	134,930	208,648	66,012	409,590	13,244,980,112
2009	124,561	170,969	42,531	338,061	11,614,859,651
2010	125,519	206,578	20,503	352,600	12,114,380,283

Source: GD Aquaculture, MOMAF (2011).

The number of shrimp processing establishments		
Province	Shrimp processing establishments *	Of which EU-certified **
Aceh	2	-
North Sumatra	10	7
Riau	1	-
South Sumatra	2	-
Bangka Belitung	2	-
Lampung	6	7
Banten	2	-
West Java	5	-
DKI Jakarta	10	8
Central Java	4	3
Yogyakarta	1	-
East Java	35	25
West Kalimantan	7	-
East Kalimantan	16	7
South Kalimantan	8	1
Central Kalimantan	1	-
South Sulawesi	13	7
South East Sulawesi	2	-
Central Sulawesi	2	1
Maluku	6	2
Papua Barat	9	-
Total	144	68

\* Source: MMAF, unpublished (2011).  
 \*\* Source: Van der Pijl (2011), but number of EU approved units may have increased slightly in 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	12 container (40 feet)	160 million	Vannamei
B	2,500	25 million	Vannamei, Monodon
C	360	624 thousand	Monodon
D	n.a.	n.a.	Monodon, Vannamei
E	Monodon: 4-5 tonnes/month Vannamei: 9 tonnes/month	Monodon: USD 200,000/month Vannamei: USD 100,000/month	Monodon, Vannamei
F	n.a.	1.25 Million/month	Monodon, Vannamei, raw 40% and value added 60%
G	66.67 ton/month	n.a.	Monodon

<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	80% Japan; 10% USA; 10% EU	1000	Excluding raw material (USD 4/kg): USD 1 - 1.5/kg for non-value added USD 1.5 - 2.5/kg for value added	10.60 - 11.80
B	55% USA; 30-35% Japan; 10-15% EU	800	11-12 with 80% raw material and 5% labour	12-13 for raw
C	100% Japan	280	80% raw material & 5% labour	18 for premium market
D	100% Japan	n.a.	n.a.	n.a.
E	Belgium, USA, Japan	200 regular, daily 400-500	1.5	n.a.
F	Japan, EU, USA, Australia, Taiwan	1,000	n.a.	Monodon: 9.1 Vannamei: 5.7
G	Japan, EU, USA, Taiwan	300	1	10

<b>Export volume and value of shrimp 2005 - 2010</b>			
<b>Year</b>	<b>Export volume (tonnes)</b>	<b>Export value (1,000 USD)</b>	<b>Export of sustainable produced products (%)</b>
2005	153,900	948,121	n.a.
2006	169,329	1,115,963	n.a.
2007	157,545	1,029,935	n.a.
2008	170,583	1,165,293	n.a.
2009	150,989	1,007,481	n.a.
2010	140,940	989,708	n.a.

Source: DG Aquaculture, MMAF (2011).

<b>The main export markets for shrimp in 2005-2010</b>						
<b>Year</b>	<b>EU</b>			<b>US</b>		
	<b>Volume (tonnes)</b>	<b>Value (1,000 USD)</b>	<b>%</b>	<b>Volume (tonnes)</b>	<b>Value (1,000 USD)</b>	<b>%</b>
2005	26,810	156,294	n.a.	50,489	327,364	n.a.
2006	35,232	196,430	18%	61,235	418,175	37%
2007	28,845	178,195	17%	60,399	420,720	41%
2008	26,825	177,855	15%	80,479	547,627	47%
2009	23,689	146,597	15%	63,592	426,995	42%
2010	19,649	144,087	15%	55,820	422,779	43%
<b>Year</b>	<b>Japan</b>			<b>Others</b>		
	<b>Volume (tonnes)</b>	<b>Value (1,000 USD)</b>	<b>%</b>	<b>Volume (tonnes)</b>	<b>Value (1,000 USD)</b>	<b>%</b>
2005	45,951	373,356	n.a.	n.a.	n.a.	n.a.
2006	50,581	419,895	38%	22,281	80,725	7%
2007	40,334	335,169	33%	27,967	96,038	9%
2008	39,582	334,980	29%	26,397	96,306	8%
2009	38,528	333,056	33%	25,180	100,833	10%
2010	35,828	338,373	34%	29,643	84,469	9%

Source: MMAF (2011).

## Seaweed subsector

Production volume seaweed in 2005-2010		
	Production volume (wet tonnes)	Production volume (dry tonnes Cottoni)
2005	866,383	56,000
2006	1,374,462	68,000
2007	1,728,475	74,000
2008	2,145,060	79,000
2009	2,963,556	85,000
2010	3,906,420	n.a.

Source: GD Aquaculture, MOMAF (2011), Bixler and Porse (2010).

The Indonesian processed seaweed export establishments		
Company	Capacity (MT/Year)	Product
PT. Agarindo Bogatama/PT Dunia Bintang Walet	1,500	Agar Powder
CV. Agar Sari Jaya	200	Agar Powder
PT. Agar Sehat Makmur Lestari	300	Agar Powder
PT. Indoking Aneka Agar - Agar Industri	300	Agar Powder and Agarose
PT. Satelit Sriti	400	Agar Powder
PT. Surya Indoalgas	720	Agar Powder
PT. Amarta Carrageenan Indonesia	1,000	ATC/SRC
PT. Bantimurung Indah	1,000	ATC/SRC
PT. Cahaya Cemerlang	250	ATC/SRC
PT. Centram	800	RC
PT. Giwang Citra Laut	700	ATC/SRC
PT. Galic Artha Bahari	700	ATC/SRC
PT. Indonusa Algaemas Prima - Malang	6,000	ATC
PT. Indonusa Algaemas Prima - Bali	3,000	ATC
CV. Karaginan Indonesia	1,000	ATC/SRC
PT. Gumindo Perkasa Industri	500	SRC/RC
PT. Phoenix Mas	180	SRC/RC
PT. Seamatec/Algalindo Persada/Seatech Carrageenan	500	SRC/RC/IS
PT. Sansiwita	500	ATC

Source: Seaplant Foundation.

Export company information of interviewed companies (1)			
Company	Export volume 2010 (tonnes)	Export value 2010 (USD)	Main export products 2010
A	n.a.	n.a.	Jelly
B	200/month	n.a.	Cottoni
C	200-300/month	2,200-3,300/month	Cottoni
D	500/month	1,200-1,300/month	Cottoni
E	n.a.	n.a.	Cottoni
F	500/month	n.a.	Semi refined carrageenan
G	Chip: 13.33/month, Powder: 25/month	n.a.	Chip & powder

<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	n.a.	n.a.	n.a.
B	EU, Japan, USA, Philippines, China, Taiwan	40	0.11	1.3
C	Philippines, Denmark	30-40	0.06	1.1
D	Asia, EU, South America (Brazil, Chile)	10	0.01	n/a
E	Argentina, Philippines, Denmark, Spain, USA, China	6	n.a.	n.a.
F	EU, Chile, Japan, Korea	34 regular & 30 daily	17.5% from selling price	7
G	England, Germany, Chile, France, China, Philippines	62 regular & 23 daily	n.a.	Chip: USD 5.8 - 6 Powder: USD 6.7

<b>Export volume and value of RDS 2005 - 2010</b>			
<b>Year</b>	<b>Export volume (tonnes)</b>	<b>Export value (1,000 USD)</b>	<b>Export of sustainable produced products (%)</b>
2005	69,264	57,515	n.a.
2006	95,588	49,586	n.a.
2007	94,073	57,522	n.a.
2008	99,949	110,153	n.a.
2009	94,003	87,773	n.a.
2010	n.a.	n.a.	n.a.

Source: DG Aquaculture, MOMAF (2011), Bixler and Porse (2010).

<b>The main export markets for seaweed in 2005-2010</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>
2005	9,583	n.a.	n.a.	1,065	n.a.	n.a.
2006	6,711	n.a.	n.a.	5,751	n.a.	n.a.
2007	8,124	n.a.	n.a.	2,454	n.a.	n.a.
2008	4,895	n.a.	n.a.	414	n.a.	n.a.
2009	6,895	n.a.	n.a.	1,764	n.a.	n.a.
2010	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
<b>Year</b>	<b>Japan</b>			<b>Others</b>		
	<b>Volume (tonnes)</b>	<b>Value (USD)</b>	<b>%</b>	<b>Volume (tonnes)</b>	<b>Value (USD)</b>	<b>%</b>
2005	375	n.a.	n.a.	58,241	n.a.	n.a.
2006	537	n.a.	n.a.	85,888	n.a.	n.a.
2007	604	n.a.	n.a.	82,891	n.a.	n.a.
2008	94	n.a.	n.a.	93,581	n.a.	n.a.
2009	225	n.a.	n.a.	85,119	n.a.	n.a.
2010	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

Source: MMAF (2011).

## Tuna subsector

<b>Tuna production volumes in 2006-2010*</b>					
<b>Tuna species</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>
Bullet tuna	553	3,712	3,604	5,369	3,696
Frigate tuna	115,111	134,593	134,744	148,663	132,733
Little tuna	118,470	143,101	187,966	154,487	141,190
Skipjack tuna	277,388	301,531	296,769	338,034	329,949
Yellow fin tuna	94,406	103,655	102,765	114,163	130,422
Bluefin tuna	747	1,079	891	641	474
Bigeye tuna	43,958	52,489	53,979	62,844	52,766
Long tail tuna	94,981	117,941	95,229	95,299	48,035
<b>Total</b>	<b>747,620</b>	<b>860,108</b>	<b>877,955</b>	<b>921,509</b>	<b>841,275</b>

\* No recent information about the fishing vessels and the number of boats is available.  
 In 2005, the Indonesian tuna fleet consists of 2012 long liners, 3,872 pole and line vessels and 1,474 purse seiners. Data from the Western Central Pacific Fisheries Committee (WCPFC) for Indonesia show that about 400 industrial fishing vessels are involved in catching tuna in the Pacific Ocean. 152 Vessels are purse seiners, 162 vessels are long liners and 18 vessels use a pole and line technique. Furthermore there are 62 supporting vessels. Source: MMAF (2011).

<b>Number of processors of frozen and canned tuna in 2008 in most important provinces</b>		
<b>Product</b>	<b>Processors</b>	<b>Of which EU-certified</b>
Frozen tuna	66	30
Canned tuna	15	10
<b>Total</b>	<b>81</b>	<b>40</b>

<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	1,200	5,400,000	Tuna and baby Tuna
B	1,000	7,400,000	Fresh and Frozen
C	240	1,700,000	Frozen
D	1,500	n.a.	Canned Tuna & Sardines

<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	Japan (100%)	250	n.a.	6
B	Japan & local 5 stars hotels (100%)	300	n.a.	6 - 8
C	Belgium (100%)	30	1	6 - 8
D	Africa	1,200	n.a.	n.a.

<b>Export volume and value for tuna in 2005-2010</b>			
<b>Year</b>	<b>Export volume (tonnes)</b>	<b>Export value (1,000 USD)</b>	<b>Export of sustainable produced products (%)</b>
2005	90,589	245,375	n.a.
2006	91,882	250,567	n.a.
2007	121,316	304,348	n.a.
2008	130,056	347,189	n.a.
2009	131,550	352,300	n.a.
2010	116,320	355,246	n.a.

Source: MMAF (2011).

**The main export markets for tuna in 2008-2010 (frozen tuna)**

Year	EU			US		
	Volume (tonnes)	Value (USD)	%	Volume (tonnes)	Value (USD)	%
2008	271.421	581,741	n.a.	3,235.393	17,378,432	n.a.
2009	885.034	2,037,285	n.a.	2,496.328	11,986,920	n.a.
2010	1,156.885	3,863,343	n.a.	3,411.891	17,697,773	n.a.
Year	Japan			Others		
	Volume (tonnes)	Value (USD)	%	Volume (tonnes)	Value (USD)	%
2008	5,360.520	7,611,751	n.a.	n.a.	n.a.	n.a.
2009	4,538.137	5,565,013	n.a.	n.a.	n.a.	n.a.
2010	16,675.644	22,233,535	n.a.	n.a.	n.a.	n.a.

Source: MMAF (2011).

**The main export markets for tuna in 2008-2010 (canned tuna)**

Year	EU			US		
	Volume (tonnes)	Value (USD)	%	Volume (tonnes)	Value (USD)	%
2008	10,772.190	31,641,326	n.a.	12,228.466	44,015,647	n.a.
2009	13,661.750	40,721,399	n.a.	8,386.631	29,302,735	n.a.
2010	10,838.687	26,472,875	n.a.	15,476.070	52,272,336	n.a.
Year	Japan			Others		
	Volume (tonnes)	Value (USD)	%	Volume (tonnes)	Value (USD)	%
2008	10,010.840	45,691,830	n.a.	n.a.	n.a.	n.a.
2009	6,871.004	30,404,759	n.a.	n.a.	n.a.	n.a.
2010	9,461.010	44,487,345	n.a.	n.a.	n.a.	n.a.

Source: MMAF (2011).

**The main export markets for tuna in 2008-2010 (all tuna)**

Year	EU			US		
	Volume (tonnes)	Value (USD)	%	Volume (tonnes)	Value (USD)	%
2005	15,384	n.a.	n.a.	21,773	60,926	n.a.
2006	2,416	7,151	2	21,212	66,491	20
2007	12,610	25,800	8	21,375	73,565	24
2008	12,345	34,293	10	18,370	69,154	20
2009	13,370	39,844	11	19,682	71,188	20
2010	11,913	29,518	8	20,268	73,637	21
Year	Japan			Others		
	Volume (tonnes)	Value (USD)	%	Volume (tonnes)	Value (USD)	%
2005	30,257	108,835	n.a.	n.a.	n.a.	n.a.
2006	30,998	109,326	33	63,567	152,220	45
2007	31,330	112,668	37	56,001	92,315	31
2008	26,710	119,410	34	74,151	129,995	36
2009	32,633	130,663	37	65,864	110,605	32
2010	36,536	146,458	41	47,604	105,634	30

Source: MMAF (2011).

## Pangasius and tilapia subsector

<b>Primary producers of pangasius and tilapia in 2010 (tonnes)</b>		
<b>Province</b>	<b>Pangasius</b>	<b>Tilapia</b>
Sumatra	97,000	204,100
Java	19,900	158,800
Kalimantan	23,500	24,800
Sulawesi	-	16,200
Other provinces	7,500	60,300
<b>Total</b>	<b>147,900</b>	<b>464,200</b>

Source: MMAF (2011).

<b>Number of small, medium and large processors and exporters and average export volume of tilapia in 2010 (tonnes)</b>		
	<b>Number of companies</b>	<b>Average Export Volume</b>
Small	n.a.	n.a.
Medium	n.a.	n.a.
Large	n.a.	n.a.
<b>Total</b>	<b>n.a.</b>	<b>n.a.</b>

<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	3,600 (production, no exports)	n.a.	Live pangasius
B	2,400 (production, no exports)	n.a.	Live pangasius
C	-	-	Fresh and frozen tilapia
D	1,440 (production, no exports)	n.a.	Live tilapia
E	360 (production, no exports)	n.a.	Live tilapia
F	240 (production, no exports)	n.a.	Live tilapia

<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	n.a.	20	1.1	1.35
B	n.a.	50	1.1	1.35
C	USA, EU	5,000	-	-
D	n.a.	22	0.2	2.35 for live tilapia
E	n.a.	15	-	2.1
F	n.a.	2	0.7	2.1

<b>Export volume and value for pangasius in 2005-2010</b>			
<b>Year</b>	<b>Export volume (tonnes)</b>	<b>Export value (IDR 1,000)</b>	<b>Export of sustainable produced products (%)</b>
2005	n.a.	n.a.	n.a.
2006	n.a.	n.a.	n.a.
2007	n.a.	n.a.	n.a.
2008	n.a.	n.a.	n.a.
2009	n.a.	n.a.	n.a.
2010	n.a.	n.a.	n.a.

Source: MMAF (2011).

<b>Export volume and value for tilapia in 2005-2010</b>			
<b>Year</b>	<b>Export volume (tonnes)</b>	<b>Export Value (IDR 1,000)</b>	<b>Export of sustainable produced products (%)</b>
2005	n.a.	n.a.	n.a.
2006	n.a.	n.a.	n.a.
2007	n.a.	n.a.	n.a.
2008	n.a.	n.a.	n.a.
2009	n.a.	n.a.	n.a.
2010	n.a.	n.a.	n.a.

Source: MMAF (2011).