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UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

SEAFOOD INDUSTRY IN VIETNAM

CURRENT SITUATION, OPPORTUNITIES AND CHALLENGES

UNIDO COUNTRY OFFICE IN VIETNAM

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OVERVIEW

This study gives an overall picture of fisheries sector in Vietnam and shows the current status of the sector, as well as its development trends. The report has two main objectives: (1) to review the status and needs of the fisheries, aquaculture and aquatic ressource management in Viet Nam; (2) to identify the areas of intervention that can increase production, improve the competitiveness of the vietnamese products, diversify the national seafood production, industrial and modernize the seafood value chains, and ameliorate environmental management of the sector on a sustainable and competitive production.

Aknoweldgments

Florian Despons, UNIDO Country Office in Viet Nam, prepared this paper under the overall guidance and direction of Patrick Gilabert, UNIDO representative in Viet Nam. More information can be obtained at office.vietnam@unido.org. Writing this paper would not have been possible without the precious help of Mr Nguyen Song Ha from the FAO Vietnam; Mr. Nguyen Hoai Nam, Deputy General Secretary of VASEP; Ms. Lê Hang, Deputy Director of VASEP; Mr. Hoang Thanh, Programme Officer – Climate change and Environment in the Cooperation and Development Section of the Delegation of the European Union to Vietnam; Ms. Nguyen Thi Bang Tam, of the Directorate of Fisheries Department of Aquaculture under the MARD; Mr. Nguyen Thanh Binh of Science, Technology and International Cooperation under the MARD; and all the UNIDO Country Office team, Patrick Gilabert, Ms. Lê Thanh Thao, Ms. Hoang Mai Van Anh; Ms. Tran Tuyet Van; and Mr. Clément Morel; Ms. Lisanne Brummelhuis, and Mr. Nicolo Cora.

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LIST OF ABBREVIATIONS

AFF	Agriculture – Forestry – Fishery
ASC	Aquaculture Stewardship Council
ASEAN	Association South East Asian Nations
BAP	Best Aquaculture Practice
BRICS	Brazil, Russia, India, China and South Africa
COFI	Committee on Fisheries (of the FAO)
CPRGS	Comprehensive Poverty Reduction and Growth Strategy (Vietnam)
EIA	Environmental Impact Assessment
EMS	Early Mortality Syndrome
EU	European Union
FDA	Food and Drug Administration
FAO	Food and Agricultural Orgnization of the United Nations
GAA	Global Agriculture Alliance
GAP	Good Agriculture Practice
IAA	Integrate Agriculture-Aquaculture
IFIS	Import Food Inspection Services (Japan)
ITC	International Trade Centre
IUU	Illegal, Unreported and Unregulated (Fishing)
JICA	Japan International Trade Cooperation Agency
MARD	Ministry of Agriculture and Rural Development of Vietnam
MIL	Mandatory Inspection List (Canada)
MOIT	Ministry Of Industry and Trade
MPI	Ministry of Planning and Investment
MRL	Maximum Residue Level
MSC	Marine Stewardship Council
NAFIQAD	National Agro–Forestry–Fisheries Quality Assurance Department
NAFIQAVED	National Fisheries Quality Assurance and Veterinary Directorate
NGO	Non-Governamental Organization
NORAD	Norwegian Agency for Development
OECD	Organization for Economic Cooperation and Development
RASFF	Rapid Alert System for Food and Feed (EU)
SPS	Sanitary and Phytosanitary
TBT	Technical Barriers to Trade
TPP	Trans-Pacific Partnership
UNIDO	United Nations Industrial Development Organization
VASEP	Vietnam Association of Seafood Exporters and Processors
VNCPC	Vietnam National Cleaner Production Center
Viet GAP	Vietnamese Good Agriculture Practice
VCCI	Vietnam Chamber of Commerce and Industry
VKFTA	Vietnam-Korea Free Trade Agreement
WCPFC	Western and Central Pacific Fisheries Commission
WTO	World Trade Organization
WWF	World Wide Fund

EXPLANATION OF TERMS

1. **Fishery Industry** includes business operating in the field of exploiting, aquaculturing, processing, preserving, storing, transporting, marketing or selling seafood or seafood products. The commecial activities are aimed delivering seafood products for human consumption or as input factors in other industrial process. In some diret or indirect ways, lives of over 500 million of people in developing countries depend on fisheries and aquaculture (2,5 million in Viet Nam).

2. **Fisheries Ressources** means aquatic living resources existing in naturel waters and having economic and scientific value for the development of capture fishery, conservation and development of fisheries resources.

3. **Rehabilitation of fisheries resources** means the renewable process, enhancement and increase of fisheries resources.

4. **Fishing operations** means the capture of fisheries resources at seas, in rivers, lakes, lagoons and other natural waters.

5. **Fishing Ground** menas sea areas with a high concentration of fisheries resources identified for fishing vessels coming to fish.

6. **Aquaculture Land** includes land with inland water surface including ponds, lakes, lagoons, rivers, channels; coastal and riverine alluvial land, coastal sandy beaches; land used for farming economy purposes, non-agricultural land with water surface allocated and leased for aquaculture purposes.

7. **Marine Areas for Aquaculture** means sea areas that are planned for aquaculture purposes.

8. **Fishing Vessel** includes vessel, boat and other floating structures to be used specializedly in fishing operations, aquaculture, preservation and processing of fish and fisheries products.

9. **Fishing Port** means a specialized port for fishing vessels including land of port and roadstead. The land of port covers an area of pier, warehouse, workshop, administration, logistic service, trade, import and export of fish and fishery product.

10. **Exclusive Economic Zone** (EEZ) is a concept adopted at the Third United Nations Conference on the Law of the Sea (1982), whereby a coastal State assumes jurisdiction over the exploration and exploitation of marine resources in its adjacent section of the continental shelf, taken to be a band extending 200 miles from the shore.

11. **Traceability** is "the ability to follow the movement of a food throught specifiec stage(s) of production, processing and distribution " (the Codex Alimentarius Commission Procedural Manual) . Traceability is included in the regulations in major seafood importing regions and countries such as the European Union, the United States of America and Japan. Traceability is also present in the official TPP text in the chapter of SPS and TBT. It is an important component in many private ecolabelling schemes.

12. **Vietnam good Aquaculture Practices (called VietGAP):** regulates the principles and requirements to be applied in aquaculture to ensure food safety, environmental integrity, aquatic animal welfare, labors' safety and benefit, and traceability.

13. **Probiotic, chemical products** are substances or compounds derived from minerals, animal, plant, microbial and related products are used to adjust the properties of physical, chemistry, biological in treatment and improve the environment of aquaculture.

14. **Veterinary drugs** are substances, compounds derived from animals, plants, microbial, minerals, chemicals including antibiotics, vaccines, probiotics, chemicals used for preveting and treating disease in aquaculture.

FISHERY INDUSTRY AT A GLANCE

NATURAL CONDITIONS

Coastline:	3,260 km
EEZ Zones	more than 1 million square miles[1]: 3,000 islands, 2,000 species of fish.
Territorial Waters:	226,000 km^2 (good environment for aquaculture)

KEY NATIONAL ECONOMIC SECTOR

Labour Force	4, 5 million people (10% of total agricultural sector)

Take 4/5% of GDP
Take 5-6% of total national export turnover
Rank 4th global for seafood export (after China, Norway, Thailand)
Rank 5th national for export value (follow: electronics, garment, crude oil, shoes)

SEAFOOD IMPORT-EXPORT

Total Production 2014:	6, 332,500 tons (Capturing: 2, 919 MT & Aqua: 3, 413MT)
Total Production Jan-Jun 2015	3,027,323 tons
EXPORT	
Revenue 2014:	US$ 7, 84 billion (up 16, 4 % than 2013)
Revenue 2015 (Jan-Nov)	*US$ 6, 6 billion (lowest than USD 1, 2 bill than 2014)*
Annual Growth (2000 to 2014):	12, 92% (by year)
Export value:	*folded by 5, 3 times between 2000 and 2014)*
Importers Markets:	166 countries (4 major markets share 64, 4%: US, EU, Japan and South Korea)
IMPORT	
Fish Consumption:	27 kg per capita – 790,000 tonnes in 2014 940,000 tonnes in 2020
Total Seafood Imported in VN:	USD 720,274,033 (in 2013). Total seafood import from ASEAN countries (Jan-Sept 2015) represents USD 87,777,000 (45% shrimp, 17% tuna)

[1] According to the UN Convention on the Law of the SEA grants nations the right to declare an Exclusive Economic Zones (EEZ) of 200 nautical miles from an established coastal baseline over which it has exploitation rights to all natural resources.

SEAFOOD BUSINESSES IN VIETNAM

Businesses in Fishery Sector:	from 356 in 2007 to 628 in 2014 (increased near by two times)
Quantity of harvesting businesses:	from 926 in 2007 to 668 in 2014 (change in development of fishery businesses – harvesting volume being remplaced by farming volume)
Seafood Processing Plants:	567 (450 of them qualfified for the EU market, 35 more than 2013)
Establishments (NAFIQAD)	625 (dried, frozen, fish sauce, canned, alive, chilled) : 26 establisments in northern regions; 128 establishments in central regions; 471 establishments in southern regions

I. INTRODUCTION

"Rice and Fish are like mother and children"
(Traditional saying in Vietnam)

Viet Nam, a peninsular country in Southeast Asia, has a coastline 3 260 km long and the Exclusive Economic Zone covers more than one million km^2. The seafood sector plays an important role in the social and economic development of Viet Nam. The sector is estimated contribute 4 -5 % to the Vietnamese GDP and fish provides around 40% of the animal protein consumption. In 2014, total fisheries production was estimated at 6, 332,500 tons, of which 2,919,000 tons came from marine capture fisheries and 3,413,000 tons from aquaculture. In the same year, fish exports amounted to US$ 7, 84 billion (VASEP, 2015).

According to this extraordinary competitive performance that shown Vietnam during the last decades, the fishery sector is currently an important source of employment among all the country (Northern Region, Central Regions, and particularly the Mekong Delta Region). However, fishery sector is a good example in terms of Gender Equality (ex: seafood processing factories accounts for nearly 75% of women employed). The sector represents also for Vietnam an important role regarding poverty reduction and according to the government has participated to the socio-economic development of the national economy during the last decades. Moreover, the sector is relevant for domestic consumption. Fish and fishery products represent the most important source of protein for the Vietnamese people. The national consumption of seafood is also expected to increase, as the country's middle class population (will increase from 12 million to 33 million by 2020 – *Boston Consulting Group, 2014*).

The biodiversity of Vietnam provides a production with a large diversity. Pangasius and shrimp represent the two mainly products of the sector. Both value chains employ thousands of people in all the country, especially in the Mekong Delta Area. But a competitive country is not only an economy with high capacity export products but also an economy with a large variety of export products. Vietnam is also a big tuna producer and exporter, but the country products also bivalve molluscs (scallop, oyster, and mussels), squid and octopus, lobster, crab and surimi for example. In order to diversify the seafood exports, the national stakeholders (producers, processors, exporters and authorities) need to maintain efforts. In this study, we will see the different bottlenecks of these sectors and propose some recommendations.

During the last decades and especially last years, the Government of Vietnam made efforts in order to internationalize the Vietnamese economy. The multiplication of Free Trade Agreements (FTAs') represents for Vietnamese producers, processors and exporters important tax privileges, within the major importing markets of seafood (EU, Japan, US, South-Korea). The year 2015 represents for Vietnam an important step for the integration of its economy in the world market (TPP, EU-VN FTA, Eurasian Union, etc). But the internationalization of the Vietnamese economy represents also a considerable challenge for the Vietnamese exporters in order to meet the international standards set

by importing markets. More the market is large, more competition is stronger, and more requirements are strict. If Vietnam wants to make use Free Trade Agreements, the seafood sector should respect standards of certification enforced by importing markets. In this report, we will study why Vietnamese seafood products are such victims of international barriers? What are the reasons for import rejections of Vietnamese fish and fish products in importing markets? What is the current situation of the Vietnamese standards? Are they aligned to the international standards? We will endeab=vour to answer all these questions in this report. And we will see that aquaculture products represent a great solution for traceability issues.

Lastly and not least in importance, we will examine the Vietnamese seafood sector regarding problems associated with environmental issues. Firstly, with a study of the environmental risks for fishery sector, directly related to climate change. Vietnam is ranked as a very vulnerable country face to climate change effects. Impacts of warming waters on marine capture fishing in the South China Sea are particularly relevant. But also with the problems of the vulnerability in the Mekong Delta (the most important region for aquaculture production in Vietnam) front of sea level rise and flooding issue. Secondly, the impact of the aquaculture production and marine capture fishing on the environment and ecosystem (aquaculture production and water pollution with uses of antibiotics, mangrove destruction, overfishing, and illegal fishing).

In order to help us better understand the context, opportunities and challenges of the Vietnamese seafood sector in 2015, we will examine the plan for the seafood industry for 2020 and the vision for 2030, put in place by the Government. Regarding the seafood sector in Vietnam, opportunities are great and challenges are rigorous if Vietnam wants to make use opportunities of the tax advantages from the Trade Agreements.

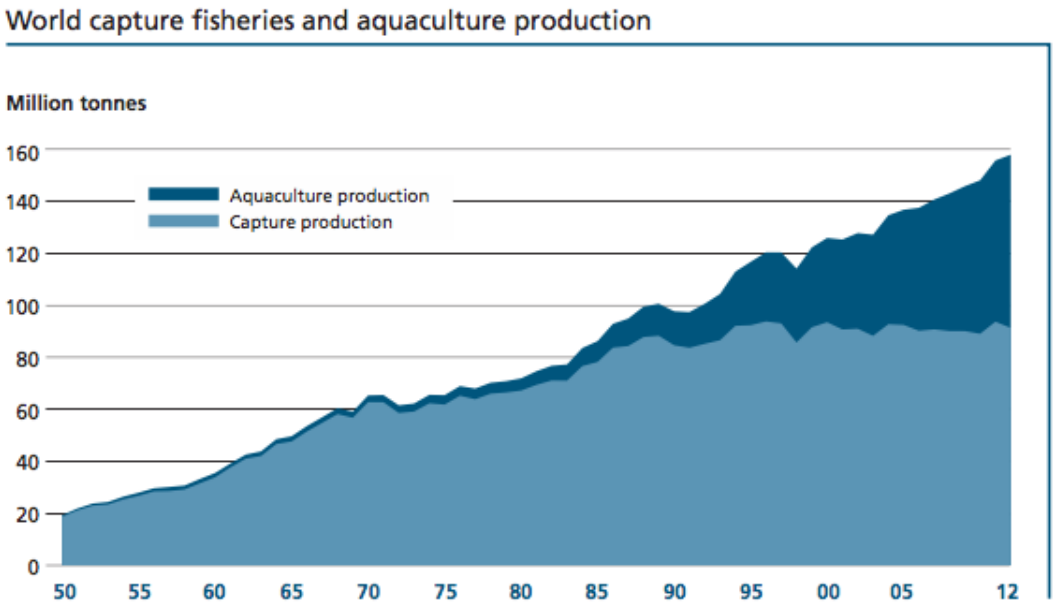
II. THE IMPORTANCE OF THE SEAFOOD INDUSTRY IN THE WORLD

The seafood industry is more of a global business than any other animal protein industry. Total trade flow value was more than US$ 140 billion in 2014, having doubled in the past five years. This growth comes from the rise of aquaculture, but can also be explained by processing in regions with lower labour costs. In the coming years, China is expected to maintain its leading role as a seafood exporter. Other growing export-oriented countries such as Vietnam, Thailand, India, Norway or Ecuador are also positioned to further boost exports.

In order to understand how the fishery sector is important for Vietnam and its economy, first it is primordial to have an overview to the state of world fisheries and aquaculture. In this first part of the report, we based our researchs on two general reports: 1/"The State of the World Fisheries and Aquaculture 2014" (FAO) and 2/ "Fish to 2030: Prospects for Fisheries and Aquaculture" (World Bank, 2013).

CAPTURE AND AQUACULTURE PRODUCTION

Figure: Fisheries and Aquaculture Production in the World (1950-2012)

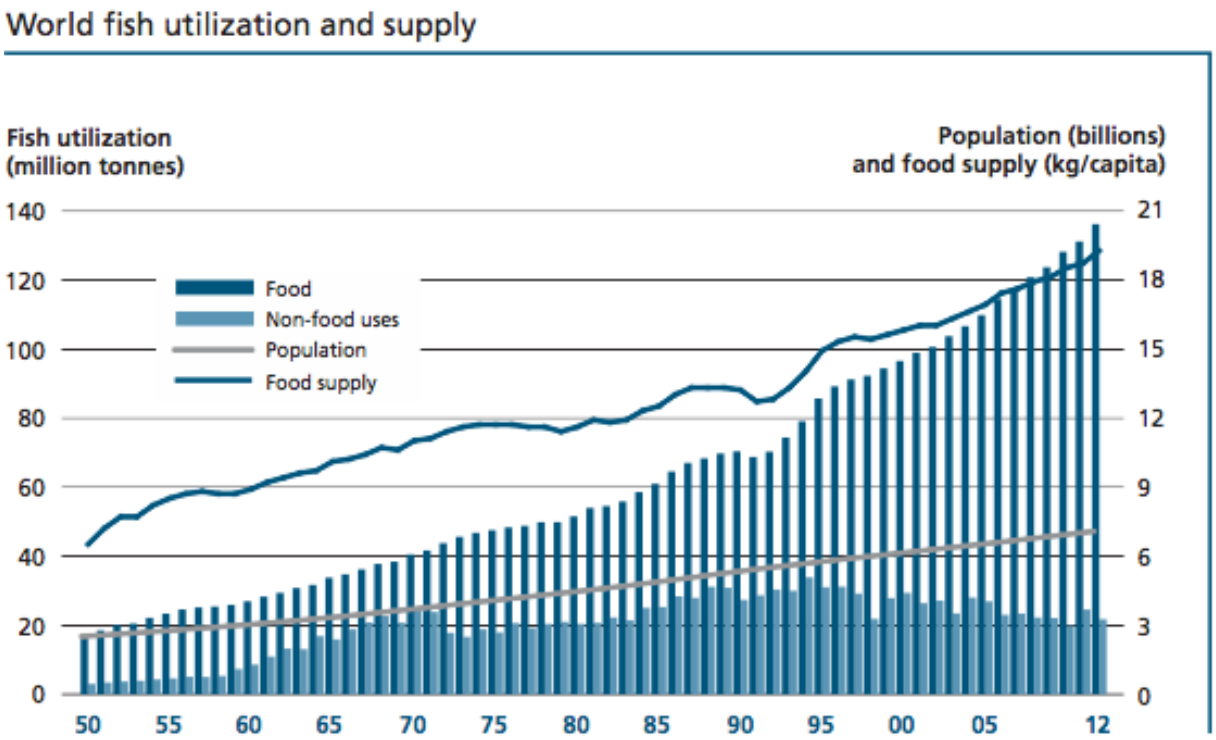


Source: FAO, 2012

Global fish production has grown steadily in the last five decades (Figure 1) with food fish supply increasing at an average annual rate of 3,2 percent, outpacing world population growth at 1,6 percent. World per capita apparent fish consumption increased from an average of 9,9kg in the 1960's to 19,2 kg in 2012 (Table 1). This development

has been driven by a combination of population growth, rising incomes and urbnization, and facilitates by the strong expansion of fish production and more efficient distribution channels.

Figure: World Fisheries and Aquaculture Production and utilization



Source: FAO, 2014

World aquaculture production continues to grow. According to the latest available statistics collected globally by FAO, world aquaculture production attained another all-time high of 90,4 million tonnes in 2012 (US$ 144,4 billion) , including 66,6 million tonnes of food fish (US$ 137,7 billion) and 23,8 million tonnes of aquatic algae.

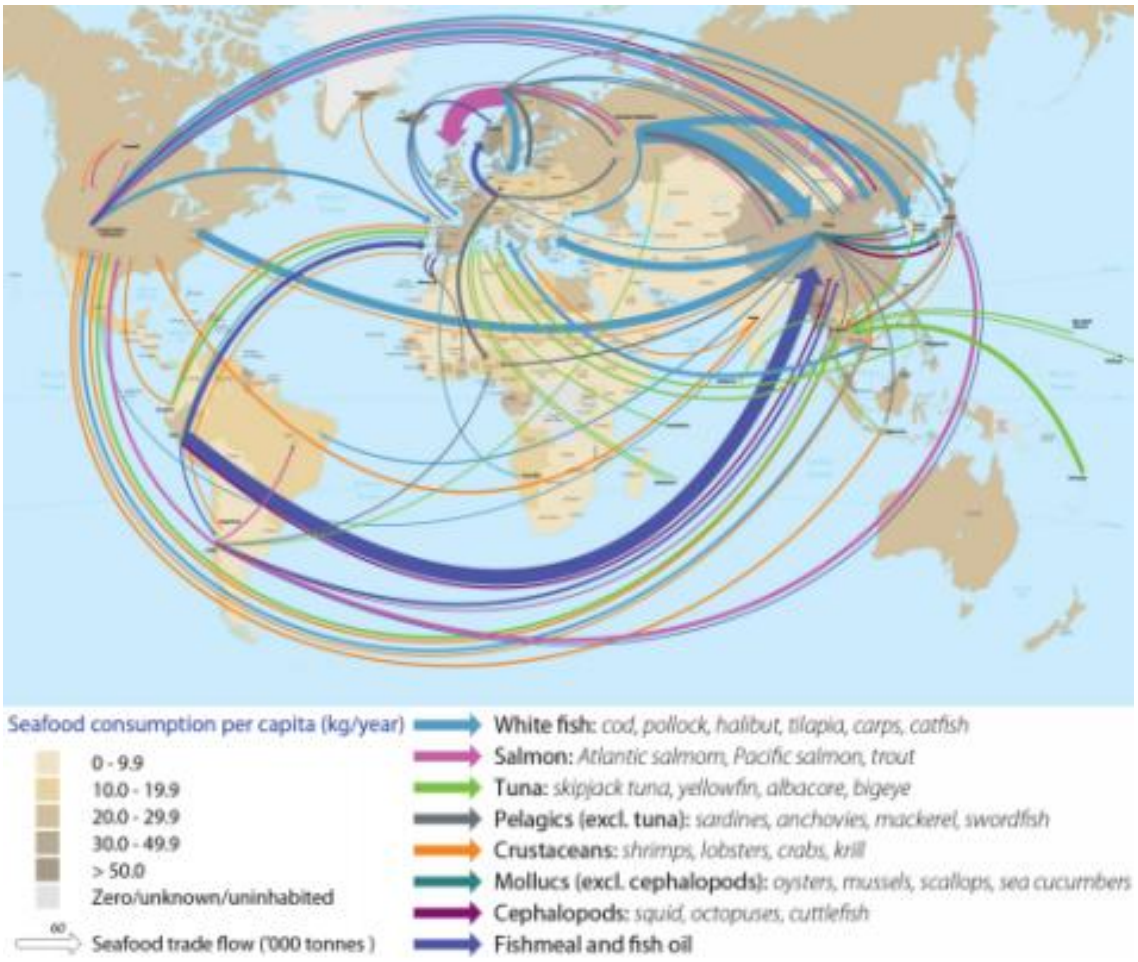
With an average annual growth rate exceeding 6 percent in the last decade, aquaculture expansion continues to outcape that of the other food-producing industries. If the trends in demographics population still increasing and capture fisheries production persist stable, global aquaculture production will need to continue growing in order to ensure a sufficient supply of safe and quality fish and other aquatic foods to the world's population.

Neverthless, interest in the certification of aquaculture production systems, practices, processes and products is increasing. The motives are to adress environmental and consumers concerns and secure better market access. In response, aquaculture certification schemes have been developed and implemented at the international and national level. Food safety standards have been raised.

IMPORTANCE OF THE SEAFOOD TRADE IN THE WORLD

Fish remains among the most traded food commoditites worldwide. Fishery trade has expanded considerably in recent decades, as the fisheries sector operates in an increasingly globalized environment. The way fishery products are rpepared, marketed, and delivered to consumers has changed significantly, and commodities may well cross national bundaries several times before final consumption. Fish can be processed in one country, processed in a second and consumed in a third.

Map: Global Seafood Trade Flows (2014)



Source: Rabobank, 2015

In 2012, about 200 countries reported export of fish and fishery products. The fishery trade is especially important for developing nations, in some cases accounting for more than half of the total value traded commodities. In 2012, it represented about 10 percent of total agricultural exports and 1 percent of world merchandise trade in value terms. Fish trade plays as a driver of economic activity: generate employment, source of foreign exchange. In 2013, the UN FAO Committee on fisheries (COFI) recognizes seafood has

been the number one traded food for a long time ago. For many countries and for numerous insular, coastal and inland regions, fishery exports are essentiel to the economy.

In Asia especially, seafood's industry represents an important source of employment. Some 58, 3 million people were engaged in the primary sector of capture fisheries and aquaculture in 2012. Of these, 37 percent were engaged full time. In 2012, 84 percent of all people employed in the fisheries and aquaculture sector were in Asia, followed by Africa (more than 10 percent).

FISH CONSUMPTION IN THE WORLD

People have never consumed so much fish or depended so greatly on the fisheries and aquaculture sector for their nutrition as they do today. Fish and fishery products play a critical role in global food security and nutritional needs of people in developing and developed countries. Global food fish supply has grown steadily in the last five decades, at an annual rate of 3, 2 percent, outpacing world population growth (1, 6 percent). World per capita apparent fish consumption increased from an average of 9,9 kg in the 1960s to 17,0 kg in the 2000s and 18,9 kg in 2010, with preliminary estimates for 2012 poiting towards further growth to 19,2 kg.

The demand for fish is growing and there are still huge numbers of hungry and malnourished people on the world. Aquaculture plays an essential role in meeting these challenges.

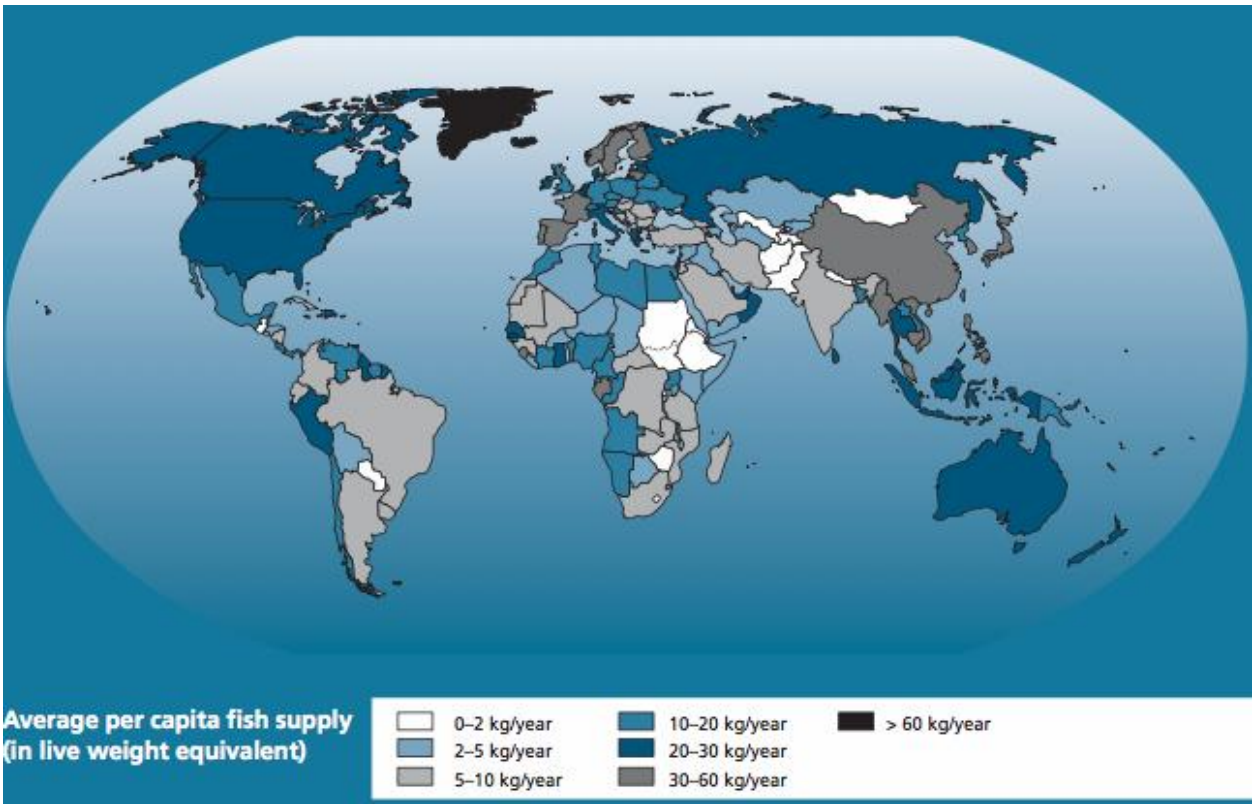
Table: Total and per capita food fish supply by continent and economic grouping in 2010

	Total food supply	Per capita food supply
	(million tonnes live weight equivalent)	*(kg/year)*
World	**130.1**	**18.9**
World (excluding China)	85.7	15.4
Africa	9.9	9.7
North America	7.5	21.8
Latin America and the Caribbean	5.7	9.7
Asia	89.8	21.6
Europe	16.2	22.0
Oceania	0.9	25.4
Industrialized countries	26.5	27.4
Other developed countries	5.5	13.5
Least-developed countries	9.6	11.5
Other developing countries	88.5	18.9
LIFDCs[2]	30.9	10.9

Source: FAO, 2014

The table summarizes per capita fish supply by continent and major economic group. Of the 130,1 million tonnes available from human consumption in 2010, fish supply was lowest in Africa, while Asia accounted for two-thirds of the total, with 89,8 million tonnes (21,6kg per capita), of which 45,4 tonnes outside China (16,1 kg per capita). Marked differences exist between and within countries and regions in terms of quantity and variety consumed per capita and the subsequent contribution to the nutritional. These dissimilarities in consumption depend on tha availability and cost of fish and other alternative foods, disposable income and the interaction of several socio-economic and cultural factors (food tradition, tastes, demand, income levels, seasons, prices, health infrastructure and communication facilities). It is important to notice that fish chain is driven by supply rather than demand.

Map: Fish as Food: per capita supply (2010)

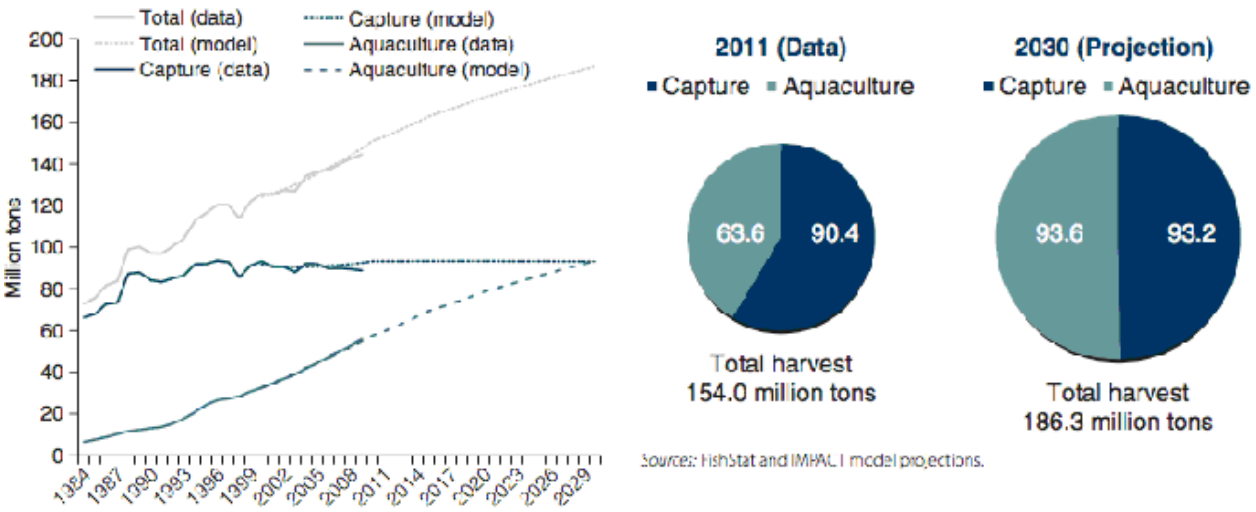


Source: FAO, 2014

PROJECTIONS OF FISHERY SECTOR TO 2030

The Fish to 2030 report is based on the results of IFPRI's IMPACT model, which simulated outcomes of interactions across countries to make projections to 2030.

Figure: Volume and Share of Capture and Aquaculture production – Production in global harvest



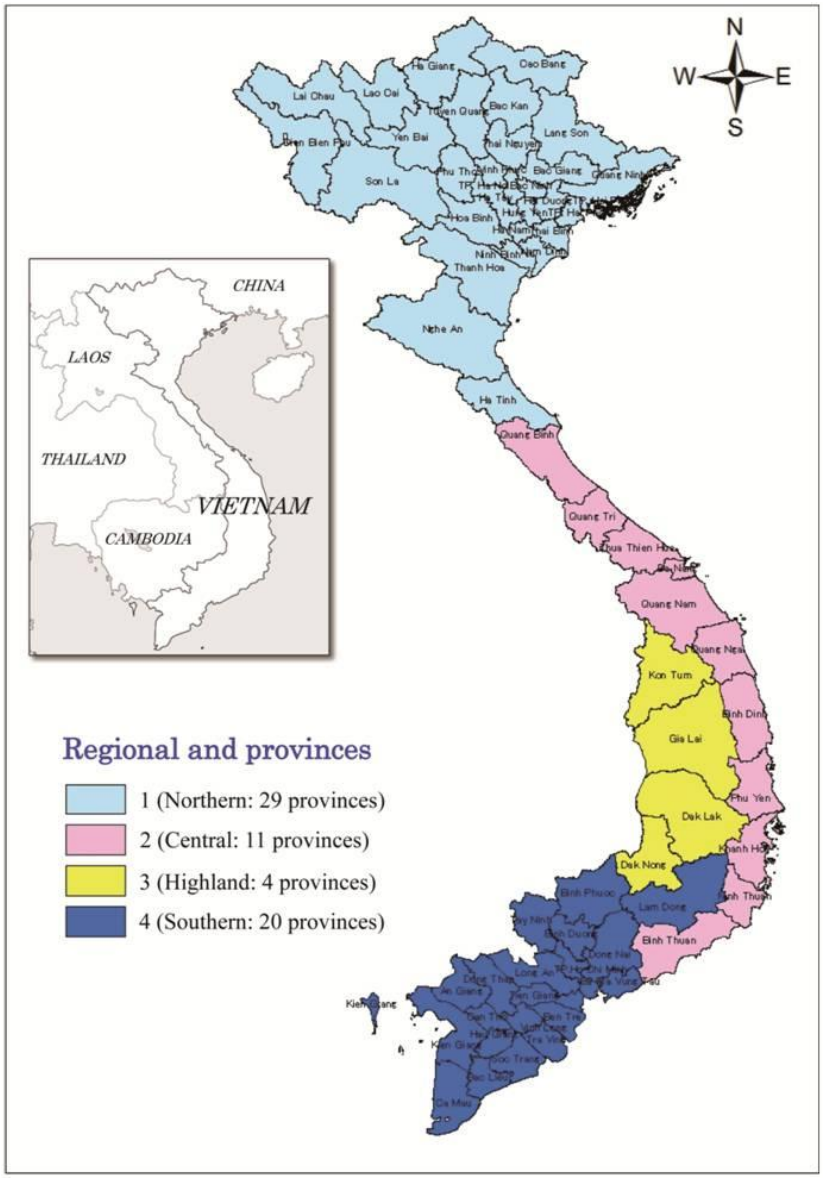
Total fish production is projected to rise 187 million tonnes in 2030, up almost 45 millions on 2008. With capture fishering stable, major growth will come from aquaculture, albeth expanding more than previously. By 2030, capture fisheries and aquaculture will be contributing equally to global fish production, and with aquaculture probably dominating beyond 2030. Aquaculture is projected to supply more than 60 percent of fish destined for direct human consumption by 2030.

Some other key messages emerge from the analysis of the World Bank of the global and supply, demand, and trade of fish. First, the remarkably dynamic character of the aquaculture sector and underscores the tremendous demand that will be made by the Asia region, in particularly in meeting the growing world world seafood demand in the next 20 years. The growth of global aquaculture production is projected to continue as a strong pace, until it matches the production of capture fisheries by the year 2030. China will likely still be at the top of the producers and exporters of seafood products, but other Asian countries will become stronger contributors of future aquaculture growth.

III. SIGNIFICIANCE OF THE SEAFOOD INDUSTRY FOR THE NATIONAL ECONOMY

Seafood sector represents an important part of the national economy of Vietnam. Fish and Fishery sector are an important source of employment, because nearly 4 million and half people are working directly with the sector. Seafood products exports are the fourth major products exported in term of total value (following electronic, textile, footwear, etc). Moreover, the seafood sector in Vietnam has participated to the national poverty reduction during last decades, and in the future is expected to contribute to a sustainable economic development. The next figure presents a map of Viet Nam with the diferent regions. North Viet Nam refers to the North East province, North West province and the Red River Delta.

Map: Regional and Provincial Map of Viet Nam



The fishery sector plays an important role for the national economy of Vietnam. Firstly, Vietnam has an important biodiversity in terms of marine resources. Secondly, the fishery products have a special place among the export products and more especially among the agricultural export products. But fishery sector in Vietnam, represent also a non-negligeable source of employment employment, poverty reduction and healthy.

1. POTENTIALY OF NATURAL RESSOURCES

Vietnam is a peninsular country with a coastline of 3,260 km and 112 estuaries. Every land area of 100km^2 is a 1km coastline on average or about every 30 km coastline there is one estuary. Among 64 provinces/cities, there are 28 coastal provinces with their population of over 46 million, occupying 51,5% of total population of the whole country (General Statistics Office, 2010). Exclusive Economic Zone is over 1 million km^2, whicih triples mainland. In the sea area of Vietnam, there are over 3,000 islands, of which many islands have people living in such as islands of Van Don, Cat Ba, Phu Quy, Con Dao, and Phu Quoc, many of those could be not only favourable fishing grounds but also good places for development of marine culture and building of logistical bases for fisheries. These natural conditions are favourable for developing marine economics in general and fisheries in particular. All these elements can participate and encourage the maritimisation of the Vietnamese economy.

MARITIME CONFLICT WITH CHINA AND CONSEQUENCES FOR VIETNAMESE CAPTURES

Vietnam's capture fishing grounds are vast. The UN Convention on the Law of the Sea (UNCLOS) grants nations the right to declare un Exclusive Eocnomic Zone (EEZ) of 200 nautical miles from an established coastal baseline over which it has exploitation rights to all natural resources.
The Southeast Asian region's open sea fisheries are located amidst a complex security architecture featuring several overlapping maritime territorial claims. Vietnamese fishing vessels following the northward fish migration or reacting to fisheries depletion within the EEZ are likely to be intercepted by Chinese patrol vessels, fkanning the flames of existing maritime territorial disputes. A handful of disputes such as that surrounding the Spratly Islands cause Vietnam to be in conflict with neighboring states but China is the most strategially significant. The map bellow illustrates each littoral country of the South China Sea claims to an EEZ under UNCLOS relative to China's claim.

Map: Exclusive Economic Zones in South China Sea and China Claims

Source: UNCLOS, 2015

Vietnam seas are situated in the sphere of Western and Central Pacific. Its fisheries resources are abundant and diversified which are considered as one of the fishing grounds in the international sea zones having high stock. Among marine fish stock, there are over 2,000 fish species, of which species with high economic value are about 130 fish species, 225 shrimp species, 663 seaweeds and other valuable species such as abalone, pearl oyster, granular, ark and red coral. According to research in marine resources done by RIMF, marine fish stock in Vietnam's sea area was evaluated at about 3,5 to 4 million tons with TAC of 1,8 –2 million tons per year.

For a long time, Vietnam's people have had a strong attachment to the sea. Fisheries with long tradition have been close with inhabitants living in the coastal area but also with people living in inland area where there are many rivers, channels, natural and man-made rservoirs, system of ponds and low fields, which are favorable for freshwater aquaculture. It could be said that, natural characteristics of marine resources are abundant in forms of waterface in both sea and inland, making good conditions for developing fisheries in various area such as marine capture, aquaculture, seafood processing, fisheries trade, fisheries logistics and services. Potentially of natural ressources for Vietnam economy represents as an opportunity as a challenge in order to preserve and protect the richness of its unique diversity.

With the advantage of the natural conditions, fisheries sector has changed from a secondary profesion in agriculture to become an important sector in the national economy, which achieved highest growth in the group of agriculture, forestry and fisheries. Vietnam's fisheries have got high position in the world fisheries community.

THREE STAGE OF DEVELOPMENT OF THE AQUACULTURE SECTOR

There were three major periods in the development of the aquaculture sector in Vietnam. During the first period from 1957 to 1980, there were few state-owned

processing companies in the industry. The first one was Halong Canned Seafood, which was established in 1957 in northern Vietnam. Later, during this period, ten more processing companies were set up in southern Vietnam. In 1978, the Sea Product Import-Export Corporation (SEAPRODEX) was establisehd and became the largest state-owned processing and exporting company in the country. The second period from 1980 to 1990 saw the establishment of more than 100 state-owned food processing companies belonging to SEAPRODEX all over the country. The third period is from 1990 up to now. Economic reforms policies (*Doi Moi*) started in 1986 and became effective in the 1990s, creating favourable conditions for the production and export aquaculture products. Reforms included trade liberalisation, provision of transferable land use rights, and encouragement of the private sector including household enterprises. In this period, the number of seafood processing and exporting enterprises has increased considerably. These private enterprises have been competing with a replacing the state-owned enterprises in procssing and exporting aquaculture products. Since then, the aquaculture sector has had remarkable success in both production and export.

2. SPECIAL PLACE OF FISHERY PRODUCTS AMONG THE VIETNAMESE EXPORTS

The policy of the government of the government of Vietnam aims to guide the seafood sector towars a global-leading position as seafood exporter and is set out in the fisheries development strategy plan to 2020. The following aspects of this plan are relevant[2]:

- Total fisheries outputs amounts to 6, 5 million tones, of which aquaculture production accounts for 65-70%.
- By 2020, the seafood industry contributes 30 to 35% of the agro-forestry sectors' GDP, with a growth rate of 8-10% annualy.

In 2014, the structure of the economy was constituted of 18, 12% or agriculture forestry and fishery; 38, 50% of industry and construction and 43, 38% of services (the corresponding structure in 2013 was: 18, 38%; 38, 31%; 43,31%)[3]. During the same year, the value of merchandise exports was 150 billion USD (128,9 billion in 2013), a 13,6% increase compare to the same in 2013.

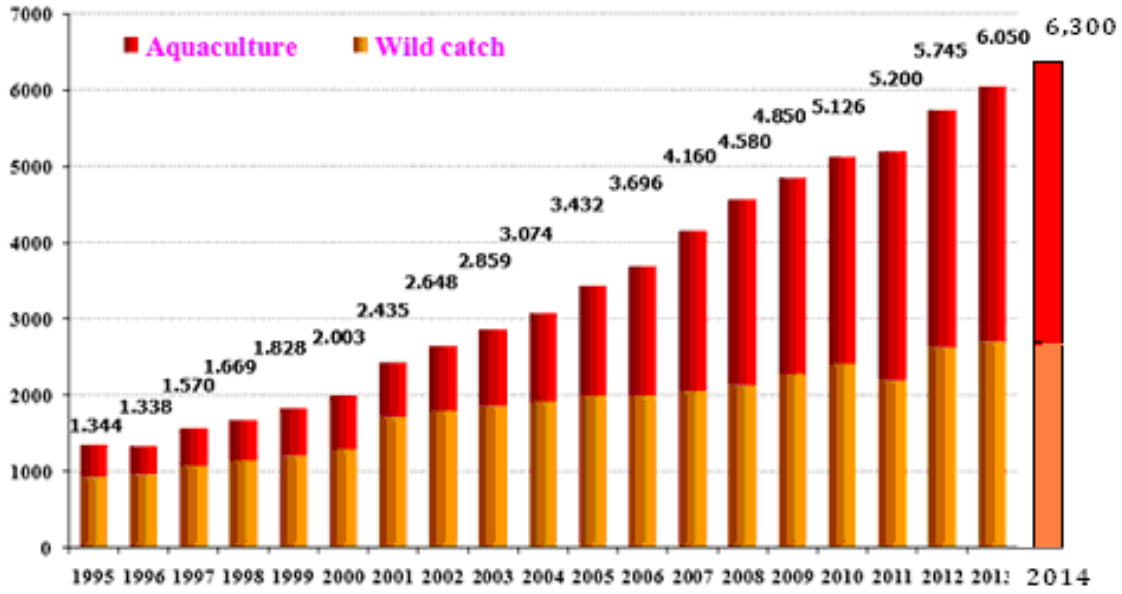
Merchandises with higher export values compared to the preceding year include: phones and components with 24,1 billion USD, a 13,4 increase; garments and textiles with 20,8 billion USD, a 15,8% increase; footwear with 10,2 billion USD, a 21,6% increase; electronic products, computers and components with 11,6 billion USD, a 10% increase; fishery products with 7,9 billion USD, a 17,6% increase, coffee with 3,6 billion USD, a 30,8% increase, rice with 3 billion USD, a 1,8% increase, cashew nuts with 2 billion USD, a 22,4% increase.

[2] The Vietnamese seafood sector: a value chain analysis. CBI Ministry of Foreign Affairs of the Netherlands, March 2012, p.11-12.

[3] Vietnam Business Annual Report 2014 – Theme of the year: Enterprise Development in Agribusiness, Vietnam Chamber of Commerce and Industry.

As one of major exports of Vietnam, wth annual export turnover of over US 1 billion $; in 2014 alone, aquatic products reached US$ 7,8 billion, ranking the fifth, below telephone, textiles, electronics, footwear, crude oil and the first one out of the exports of agricultural. As one of major exports of Vietnam, seafood products represent an important source of employment for the Vietnamese economy and also a way of combatting the poverty reduction and malnutrition in Vietnam.

Figure: Aquaculture and Fishery Producion in Vietnam (2000- 2014)



Source: VASEP, 2015

3. SIGNIFICIANCE OF THE SEAFOOD INDUSTRY IN VIETNAM: EMPLOYMENT AND POVERTY REDUCTION

The Vietnamese fishery sector has a substantial contribution to the national economy and has had a major impact on reducing poverty in Vietnam, especially when majorities of Vietnamese population work in agricultural sector.

3.1 EMPLOYMENT IN THE FISHERY INDUSTRY IN VIETNAM

Employed population on Primary Sector in Vietnam: Agriculture-Forestry-Fishery

The following table presents the proportion of employed population classified by sector. In details, as of quarter 2 of 2015, the employed population was estimated about 52, 5 million people. Agriculture, forestry and fishery sector reprensent the major sector

of employment for the Vietnamese population, with 44,7% of people, followed by services (33,2%) and industry and construction sector (22,1%) [4].

Table: Percentage distribution of employed population classified by industrial sector and economic sector in quarter 2, 2015

Unit: %

Basic characteristic	Industrial sector			Economic sector		
	Agriculture, forestry and fishery	Industry and construction	Services	State	Non-state	Foreign investment
Entire country	**44,7**	**22,1**	**33,2**	**9,5**	**86,6**	**3,9**
Urban	12,8	27	60,2	18,1	75,8	6,1
Rural	58,3	20	21,7	5,9	91,1	3,0
Sex						
Male	43,0	25,6	31,4	9,5	87,9	2,6
Female	46,5	18,5	35	9,5	85,2	5,3
Social-economic region						
Northern Midlands and Mountains	67,1	13,2	19,6	9,3	88,5	2,2
Red River Delta	33,4	28,5	38,1	12,6	83,5	3,9
Of which: Hanoi city	21,2	26,5	52,3	18,6	78,1	3,3
North and South Central Coast	51,5	17,8	30,7	9,3	89,6	1,1
Central Highland	72,7	6,5	20,8	7,7	92	0,3
Southeast	14,4	38,1	47,5	9,9	77	13,1
Of which: Hochiminh city	2,8	34,8	62,4	11,7	81,9	6,4
Mekong River Delta	49,6	18,1	32,3	6,8	91,3	1,9

Source: MARD, 2015

In Agriculture –Forestry – Fishery sector, 12, 8% of workers are located in urban area, against 58, 3% situated in urban area. Also, the table indicates that 43% of workers in this sector are male and 46, 5 are female.

Businesses in Agricultural-Forestry-Fishery Sector

The number of AFF businesses increased from 2,397 in 2007 to 3,635 in 2013. Agriculture sector had the highest percentage of businesses in term of quantity with 1,707 businesses in 2013, making up for 46, 9% of the total number of business in Agricutlure Forestry and Fishery sector. Fishery is the second ranked sector with 1,296 businesses accounting for 35, 7%. Forestry ranked the last with 632 businessesn accounting for 17, 4%.

Employed population in Fishery Sector

The labour force in Vietnamese fisheries has been estimated at around 4,5 million, and some 670,000 of these in aquaculture.
In the Tuna industry, it has been estimated that between 8 and 10 persons work on each fishing boat. With a capacity of some 1,900 tuna vessels in 2012, this would amount to

[4] Report on Labour force survey, Quarter 2 – 2015, Ministry of Planning and investment of Viet Nam and General Statistics Office

between 16,200 and 19,000 persons employed in tuna fishery (SeaFish, Septembre 2015).
Seafood processing has generated considerable employment over the past two decades, today, the processing chain represents an important sector for the Vietnamese fishery sector.

Case Study:
Gender Equality Recommandations for Aquaculture supply chain in Vietnam

While recent figures could not be found, earlier analysis points to the importance of this industry for job creation and poverty alleviation[5]. Fishery Sector in Vietnam represents also an important role in terms of Gender Equality, especially within the Aquaculture value chain.

In Vietnam, the majority of seafood producers operate on small-scale farms with the family systems. In terms of adressing gender equality and enabling all members of households to be involved in aquaculture, a World Bank's Report, *Gender Analysis of Aquaculture – Value Chain in Northeast Vietnam and Nigeria* (2009), recommended the following measures:

1/ Stimulate small-scale producers, especially women, by establishing postive environment to start cooperatives and unions; assisting them with training and extension support; developing code of conduct; and simplifying access to credit. Farmers's technical know-how still need to be improved and to enhance their performance, smallholders should be assisted in creating viable asssociations supported through training and extension support provision. Once on-farm management is improved, community by community and cooperative by cooperative, not only are the benefits from aquaculture anticipated to increase, but the risk profile of smallholder aquaculture and access to credit for sustainable production growth is expected to improve.

2/ Increase public sector spending, both in terms of expanding the number of aquaculture specialists and improving their incentives by making their wages adequate. Programs that provide financial and organizational support to women's associations specifically will improve a woman's ability to engage in large-scale extensive shrimp farming.

3/ For households in coastal areas, consideration should be goven to stimulating marine cage aquaculture in which women, albeit in limited numbers, already exhibit the potential for successful involment.

4/ A review of unionization rules that would increase the ability of workers to create their own independent unions is anticipated to increase the (predominantly female) worker's ability to protect their interests vis-à-vis their employers in terms of working conditions, wages, and the creation of safety nets.

[5] Eg. Dao Thanh Hong and Quan Vu Le, "Analysis of policy changes in the seafood processing industry in Vietnam", Pacific Economic Rview 13:5 (2008), pp. 521-549.

Women represent the majority of the labor force in fishery processing firms, and yet economic benefits their involment, such as wages, appear to be disminishing in real terms. The value chain analysis also suggests that women are under represented in the management and ownership of firms in the fishery processing sector. Creating programs that will build women's capacity in theses areas is strongly recommended in order to increase their participation in and ownership of processing and cooperativ firms. Creating in-job training programs, funding scholarships for management and technical training, and helping women establish associationsthat promote their interests are potential avenues to help adress the imbalance of women's voice and power in the fishery processing industry.

In total, close to 10% of all agricultural labourers in Vietnam are working for the fishery industry. Moreover, the country has got a young labour force, and 40% of Vietnam's 90 million people are between 15 and 49 years old. This population does not suffer of malnourishment and the largest part of the population is literate.

But, on fishery sector, there are some lakes on human ressources. For example, quality of labourers in marine fishing is still low. Almost fishermen had a low level of education and were not trained on occupation. They went to fish maily based on their own experience. Thus, it was short of a labour force with good skill of fishing to developp offshore fishing, especially tuna longline. Should be important to improve the communication focused on the ressources protection[6]. The country has got important marine ressources and people working in these areas daily need to be informing by experts and specialists.

3.2. FISHERY INDUSTRY AND POVERTY REDUCTION

The Comprehensive Poverty Reduction and Growth Strategy (CPRGS) of Vietnam frequently refer to the fisheries sector as an important area for poverty reduction[7]. The Government in 2002 identified the sector as key determinant for poverty reduction.

The links between the CPRGS and the fisheries sector are identified in Part IV: Major Policies and Measures for the Development of Sectors and Industries to Ensure Sustainable Growth and Poverty Reduction as follows:

- Ensure food security;
- Diversify agricultural production;
- Attach importance to market research and ensure timely provision of information; increase investments in agriculture;
- Link the production of high value crops to developing storage and processing facilities;
- Promote research and efficient use of natural resources;

[6] Seafish Ethics profile – Vietnam, September 2015
[7] Comprehensive Poverty reduction and growth strategy of Vietnam, 2002, Socialist Republic of Vietnam.

Expand agricultural, forestry, fishery activities and extension activities in a manner that is suitable to production conditions in different areas and is driven by the demands of the poor;

- Develop fisheries and diversify aquaculture; and
- Develop a disaster prevention strategy to minimize losses and stabilize livelihoods and production in disaster-prone areas.

The fisheries sector has without doubt played an important role in poverty alleviation over the two last decades. The positive contributions derived from the expansion of the fisheries sector include:

- Increasing seafood exports from US$ 550 million in 1995 to US$ 6,850 billion in 2014.
- Increasing number of seafood processing enterprises from 1999 to 2015
- Average employment of enterprises
- Aquaculture output has increased from 400,000 tonnes in the mid 1990s to more than 3,413 million tonnes in 2014.
- The number of traders (mainly private entrepreneurs) working between aquaculture farmers and the fishers has increased substantially.

The employment effect generated by the fisheries sector has provided significant for livelihood improvements of many people living in coastal and inland areas.

3.3 DOMESTIC CONSUMPTION OF SEAFOOD

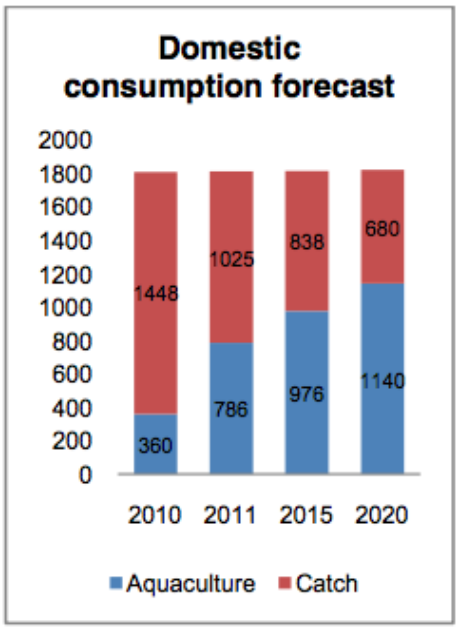
With the population of more than 90 millions, the domestic market is potential. Fish demand is increasing in the Vietnamese domestic market, especially in Hochiminh city, the most dynamic and populated economic area in Vietnam. The number of supermarket rises every year. The UN FAO, on its last report about the State of World Fisheries and Aquaculture, 2014 evocated the consumption of seafood by countries.

In Vietnam, the average annual level of fish consumption is 14,6 kg/capita in 2011. This represents 8,5% of protein consumed and 40% of animal protein consumed. Consumption levels vary considerably throughout the country, ranging from 6,8 kg/capita per year in the midlands and northern mountainous areas to 24,4 kg/capita per year in the Mekong Delta. On a national level, fresh fish and shrimp make up 66,7 percent of consumption, with fish and various dipping sauces accounting for 27,6 percent and dried/processed fish for 5,7 percent. Rural and urban level are similar at 14,8 and 14,2kg/ capita, respectively.

Comparing to other domestic consumption in South-east Asia, Viet Nam is not an important consumer of seafood per habitant, in comparaison to its neighborsin 2011:

- Indonesia: 12,8kg/capita
- Lao People's Democratic Republic: 19,1kg/capita
- Myanmar: 21,02 kg/capita
- Thailand: 31,4 kg/capita
- Philippines: 40,15 kg/ capita
- Cambodia: 63,15 kg/capita

However the domestic market accounts for a small proportion of seafood consumption. According to the DOF's report in 2012, consumption volume of domestic processed products is approximately half of export volume; however, its value is only 9% of the export value[8].
In terms of the seafood business' revenue, the revenue from domestic market is very low (less than 5%). This is due to almost all kinds of fresh water fish are consumed in domestic market, while the strenght of most businesses is frozen products for export. The selling amount of frozen products and canned products is quite modest, 5% to 10% (VietinBank, 2013).



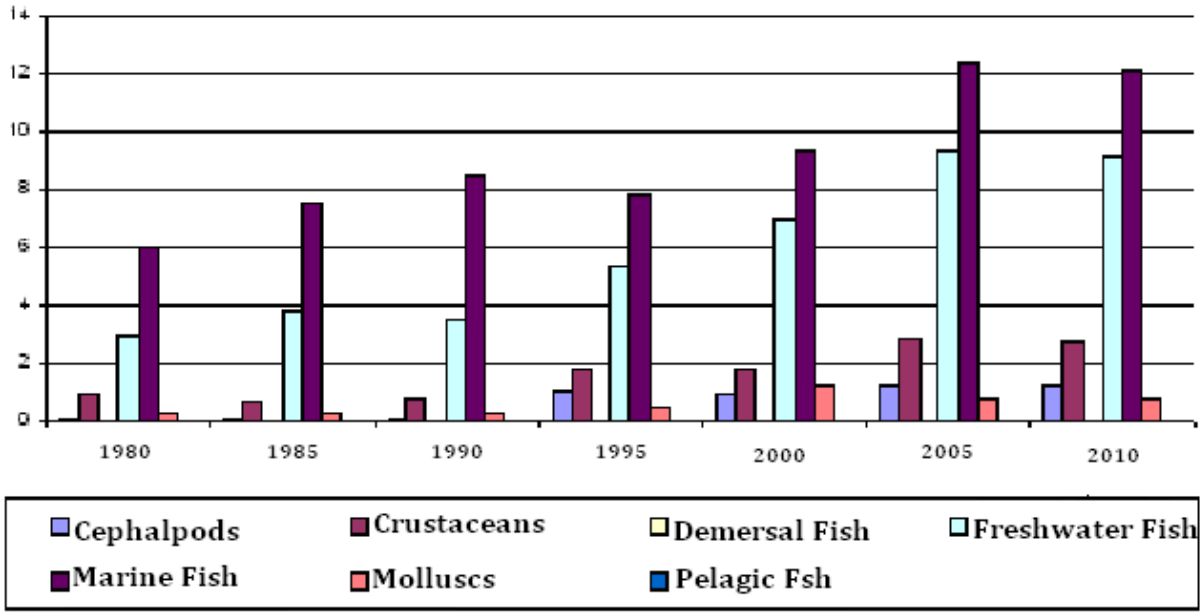
Source: DOF 2012

The value of domestic fishery consumption is estimated to increase 5, 37% per year. Level of domestic consumption in 2015 is forecasted to be 790,000 tons and 940,000 in 2020, of which frozen prodcucts would account for over 30%.

This increase of domestic fishery consumption is due to the fact that Vietnam is blooming consumer market with the fastest middle classe expansion in Southeast Asia (Asian Development Bank, 2014). The country's middle classe population will increase from 12 million to 33 million by 2020 (Boston Consulting Group, 2014). This middle class emerging will give an important part of the domestic consumers with a more important buying power, and with quality's requirements more strict.

[8] Fishery Industry in Vietnam, VietinbankSc Industry Report, December 2013, Nguyet A. Vu.

Figure 5: Vietnamese Domestic Consumption of Fish Products



Source: Own Design

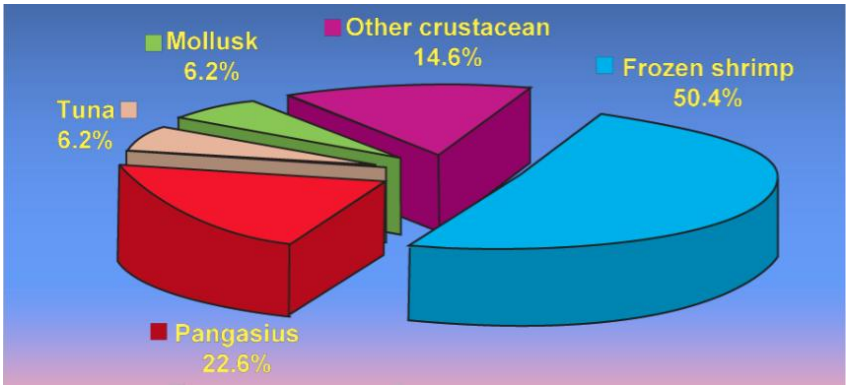
Vietnamese people consume mostly fish (including freshwater and marine fish) in fishery structure consumption. In a recent study, most of Vietnamese consumers prefer eating fresh products of fish to frozen ones. For frozen fish products, however, ratio of favor to the products is 37% higher than the ratio of unfavor (10%). The reasons, which lead Vietnamese consumers, choose processed fish for their daily meals include the comfort and time saving in prepare meals with processed fish.

IV. MAJOR PRODUCTS OF THE VIETNAMESE SEAFOOD INDUSTRY

Shrimp and pangasius products play a key role by accounting for 73% of total export value in 2014. Other seafood products are increasing and participating to the diversification of the seafood exports, such as tuna products, tilapia filets, and mollusks. It is important to increase the diversity of Vietnamese seafood products in order that Vietnam is competitive and have access to other markets with new consumers demand.

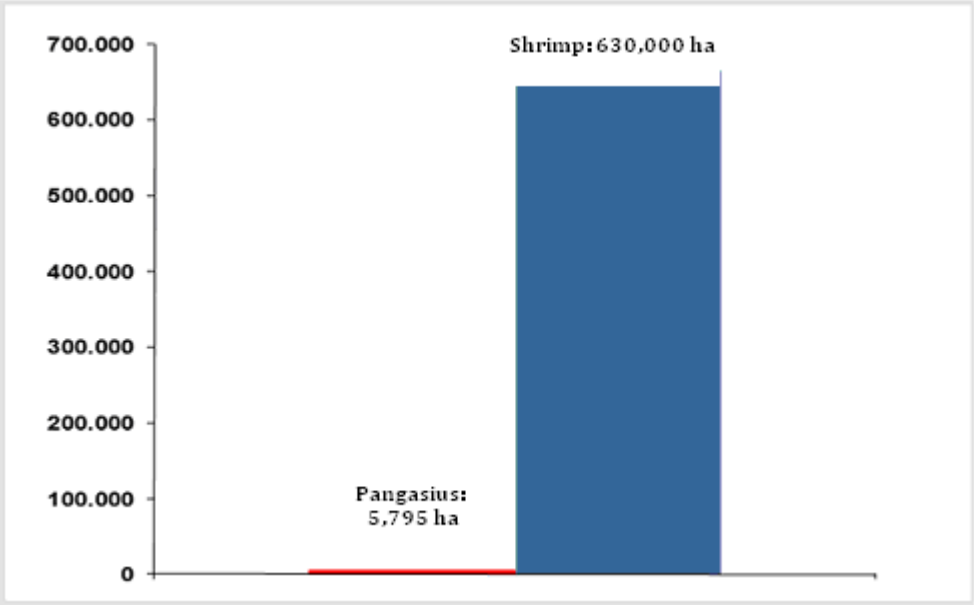
Figure: Products segmentation in 2014

Products	Export Markets	Export Structure	Major markets
Shrimp	96	50,4 %	US, Japan, EU
Pangasius	137	22,6 %	EU, US, Japan
Tuna	99	6,2 %	EU, US, Japan
Squid and octopus	71	5,6%	Korea, Japan, EU
Bivalve molluscs	42	6,4%	EU, Japan, US
Tilapia	65	1%	China, the US



Among Vietnam's seafood exports, shrimp and Pangasius play important role. In 2014, the total shrimp export represented 50, 4% of the total export value. During the first months of 2015, despite a decrease of nearly 28,0% for the period January-June, shrimp exports represent the most important Vietnamese product exported in global markets. Pangasius products represented 22, 6% of the total export value in 2014. In the first months of 2015 (January-June), the pangasius products total export value represented 24, 8% of seafood exports. In term of production area, shrimp areas in the country represented in 2014, 630,000 hectares and Pangasius areas: 5,795 hectares.

Aquaculture Production Areas in Vietnam (Pangasius vs Shrimp) in 2015



Source: VASEP, 2015

1. SHRIMP INDUSTRY

Shrimp is the main seafood export product of Vietnam among fishery products with three main forms: frozen, canned and fresh shrimp. In 2015, Vietnam shrimps are exported to 96 markets in the world (compared to 85 markets in 2013).The U.S, Japan and the EU are three most important markets. Vietnam is the biggest shrimp supplier to Japan, the third largest to the U.S and the fourth to EU.

Shrimp aquaculture in Vietnam has many advantages diferent raising conditions in comparison with other countries. In 2014, in term of global shrimp production, Vietnam was ranked 5th, after China, Indonesia, Ecuador and India. Vietnam export two types of shrimp: black tiger and whiteleg. Shrimp export value is expected to increase in the coming years, especially whiteleg shrimp (VietinBank, 2013).

A/ HISTORY OF THE SHRIMP INDUSTRY

Shrimp growing has a longer history than Pangasius and dates about 100 years. In fact, brackfish wate aquaculture in both southern and northern Vietnam is dominated by shrimp farming. The Mekong River Delta is the most important region for cultivating aquaculture products in general and shrimp in particular. According to Le (2012), Black tiger prawn is the major aquaculture productin Vietnam a cultivation area of 570,000 hectarescovering 94% of the total brackish and marine culture area. In Vietnam, the Mekogn Delta is the most important area, accounting for around 72%. The Whiteleg

shrimp was only introduced in 2000, but have increased sharply thaks to its production broadened.

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

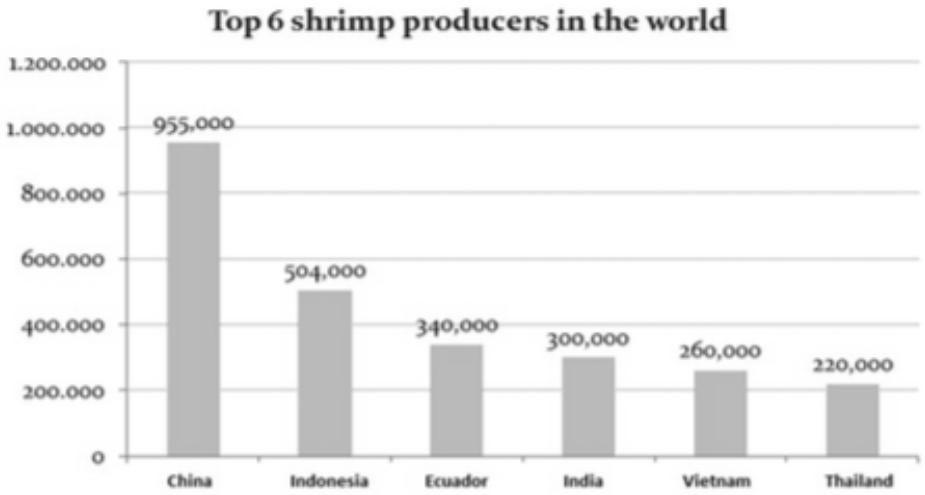
Shrimp products for export include block frozen shrimps, canned shrimps and processed shrimps. Of these, block frozen shrimps account for the largest proportion of total export value. Processed shrimp are, however, gradually expected to over traditional frozen shrimp in the future. Apart from being exported,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

In 2014, the total export value of Vietnamese shrimps reached a new record of US$ 3,2 billion. Of these, Whiteleg shrimp represents US$ 2,2 billion (400,000 MT), and black tiger shrimp accountd for US$ 1,3 billion (260,000 MT).

B/ SHRIMP PRODUCTION

In 2014, global whiteleg shrimp production increased to 3, 05 million of tons compared than 2,7 million of tons in 2013. Black tiger shrimp output decrease from 743,000 MT to 534,800 MT (VASEP, 2015). In 2014, Vietnam was ranked 6th shrimp producer in the world, after China, Indonesia, Ecuador, India and followed by Thailand.

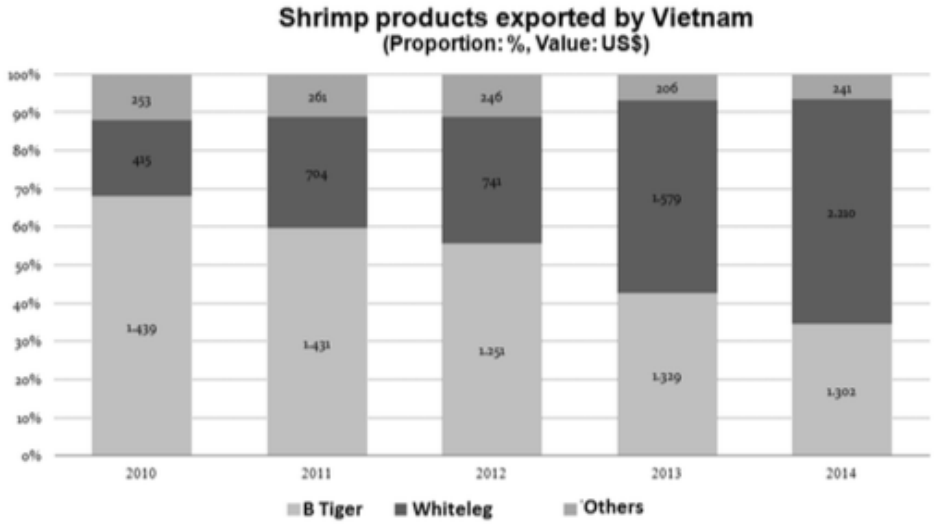
Figure: Top 6 Shrimp Producers in the World



Source: VASEP, 2015

Vietnam shrimp production is increasing 500,000 – 600,000 MT per year. Between 2012 and 2014, shrimp harvest rapidly increased thanks to higher witheleg production. In the next years, shrimp export value is expected to increase especially whiteleg shrimp (VietinBank, 2013).

Figure: Shrimp products exported by Vietnam (2010-2014)



Source: VASEP, 2015

Last year, was an important one for the Vietnamese Global shrimp trade, because of the high shrimp price in international markets, Thailand shrimp exports still downed which created more opportunities for other competitors as Vietnam. Shrimp imports into the US and EU strongly upped while imports by Japan downed. And also Vietnamese whiteleg shrimp dominated in many markets thanks to the species production broadened in farming countries.

In 2015, Global shrimp trade was affected by some important changes. First shrimp prices are in downtrend, even below production costs. In the first months of the year, global shrimp trade was affected by strong USD over other concurrencies. The effect of the increase of the USD and the decrease of Euro and Yen was lower demand of large consumer markets of shrimp as EU and Japan. 2015 is also noticied as stronger competition between shrimp producers because of recovered supply.

C/ VIETNAM SHRIMP EXPORTS

In 2014, Vietnam was ranked second in term of shrimp exporters in the world, with 3,269, 998 tons exported in 96 markets. Vietnam shrimp exports keep it stable growth during past 10 years. In 2012, shrimp exports reduced sharply due to early mortality syndrome (EMS) but quickly recovered after epidemic disease under the control. Moreover, between 2013 and 2012, export value increased by 39% to more than US$ 3 billion. Shrimp made up of the largest part of 50,4% in nationwide seafood exports in 2014, compared to 36% in 2012 and 46% in 2013.

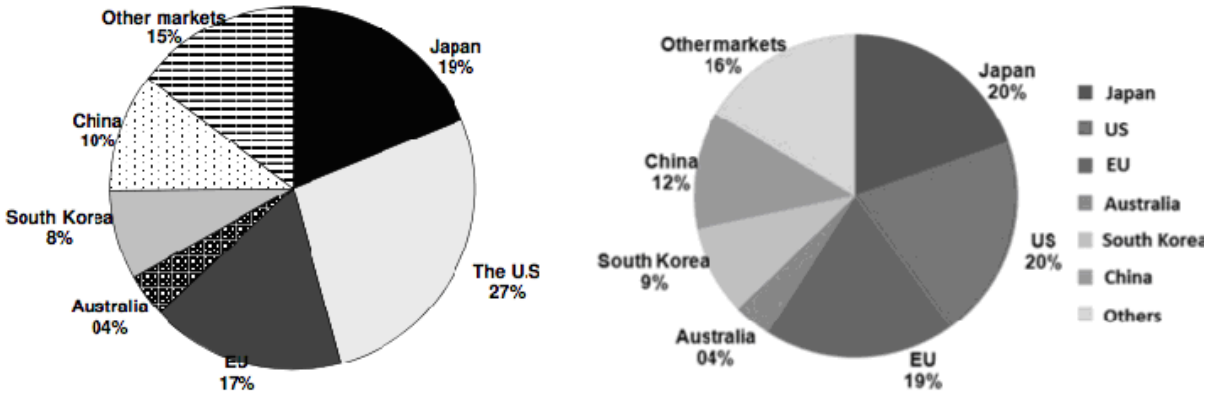
Table: Top 10 Shrimp Exporters in the World (US$ thousand)

Top 10 shrimp exporters in the world (US$ thousand)						
	Exporters	**2010**	**2011**	**2012**	**2013**	**2014**
No	**The world**	**16,866,237**	**19,624,893**	**18,817,685**	**21,769,773**	**24,839,944**
1	India	1,098,965	1,619,754	1,753,559	2,624,695	3,717,319
2	**Vietnam**	**2,081,503**	**2,412,742**	**2,185,711**	**2,998,207**	**3,269,998**
3	Ecuador	855,619	1,183,804	1,290,275	1,806,993	2,599,394
4	China	1,800,464	2,189,220	2,253,221	2,538,761	2,555,269
5	Indonesia	1,036,735	1,285,895	1,235,384	1,582,114	2,039,301
6	Thailand	3,205,022	3,668,028	3,124,249	2,286,258	2,023,729
7	Denmark	587,396	629,382	670,741	783,852	767,926
8	Argentina	471,938	515,541	477,274	616,232	759,810
9	Netherlands	651,590	684,907	663,394	643,837	715,402
10	Bangladesh	435,756	494,613	439,668	523,938	541,991

Source: VASEP,2015

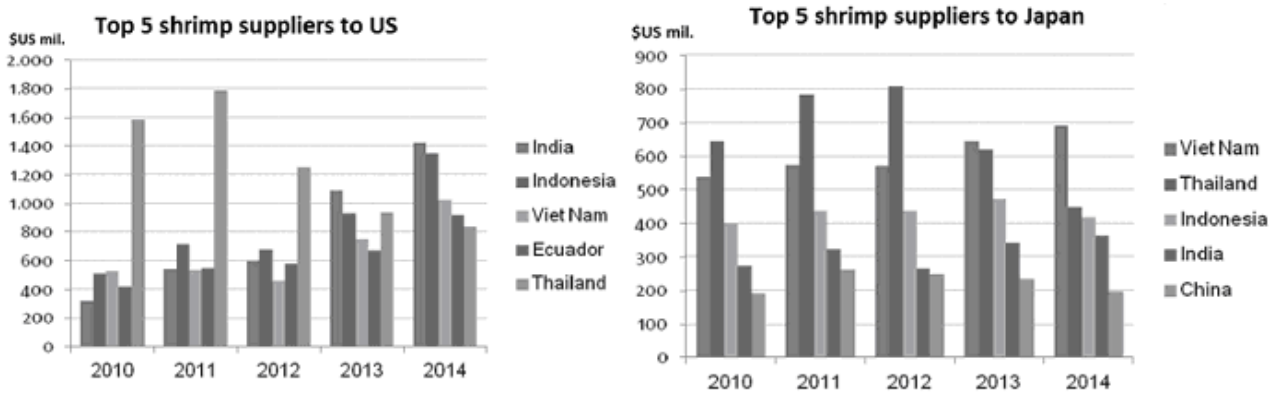
Vietnam shrimps are exported to 96 markets in the world. In which the U.S, Japan and EU are the three most important markets. Vietnam is the biggest shrimp supplier to Japan, the third to the U.S and the fourth to EU.

Figure: Main Markets imported Vietnam shrimp in 2014 and 2015 (Jan-Jun)



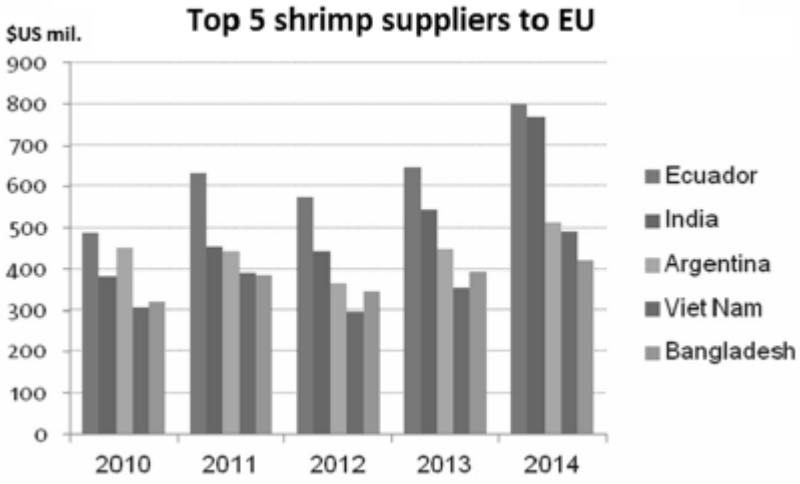
Source: VASEP, 2015

The US and the Japanese Markets



The US and Japan are the two main import markets for Vietnam shrimp exports. Between January and June of this year, the two import markets represented 20% each of the total exports. The US market was still Vietnam top shrimp importing market in June 2015, with a total value of US$ 262,709 million (representing a decrease of –50, 2%). A better situation is expected for the end of the year, with the TPP conclsuion and the end of POR 9 tax of 6%, a new POR8 tax at 0, 3%. According to Japanese market, Vietnam is still the leading shrimp supplier to Japan with big size and valued added products. Bewteen January and June of this year, shrimp products were exported to Japan for a total value of US$ 252,943 million (-18, 3% compared to the same period in 2014). The explications of this import decrease are the yen devaluation and the Japanse economic downturn. The main iem exported to Japan is Black Tiger shrimp.

European Market

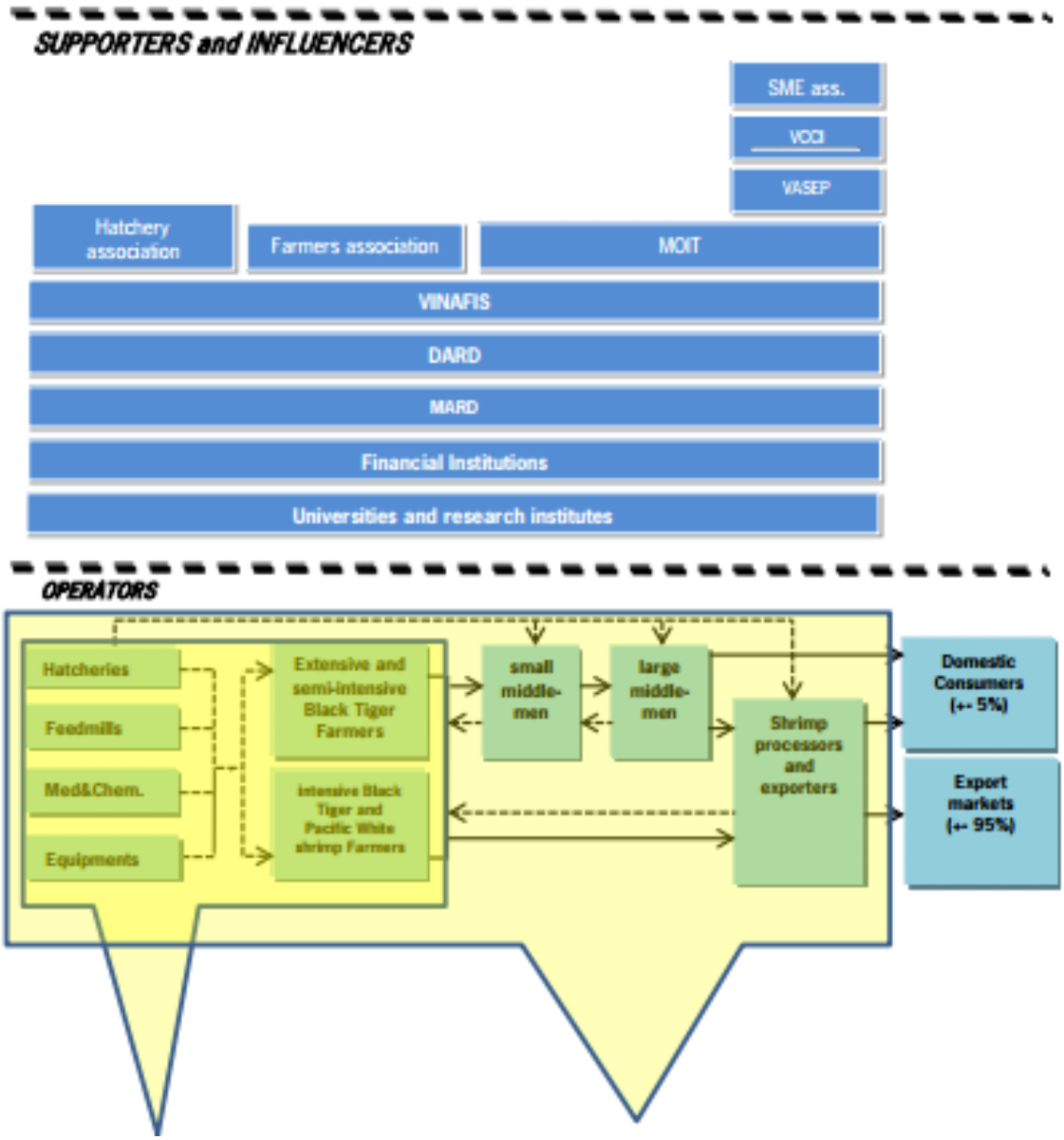


Vietnam is the fourth leading exporter to the European market with the main product of froozen cooked shrimp. Between January and June of this year, shrimp exports to EU block reached US$ 246,372 million, representing a less important decrease than other major markets, at –14,3% compared to the same period in 2014. Among European countries imported shrimp from Vietnam, Germany, the UK and Netherlands represent

the main import markets. The UK represent an interesting opportunities for Vietnamese shrimp products for the next months because this year exports increased more than +48% compared to the same period last year.

D/ SHRIMP VALUE CHAIN AND PRODUCTION PROCESS

Figure: The Vietnamese shrimp Value Chain and its main bottlenecks



Disease outbreaks

Lack of sustainability in production

Lack of Vertical cooperation in the value chain

Lack of cooperation between the actors

Lack of investment in infrasctructure

Source: Eurostat, processed by LEI, 2012

SHRIMP FARMS SUBSECTORS

1/ Seed:

In 2012, it is estimated that local hatchery production supplied about 60% of the total demand for Black tiger seed and 48% of the total Pacific whiteleg shrimp seed. The remainder of the local demand is imported from neighboring countries such as China and Thailand and also from the US. According to local experts, the imports of cheaper Chinese seeds are an important threat to Vietnamese shrimp production because the quality is often insufficient.
In Vietnam, shrimp hatcheries can be separated into small and large hatcheries. It is argued that especially the quality of seeds from small hatcheries is too low and is one one the resons behind the high mortality rates in shrimp production. There are also numbers of hatcheries, especially the larger commercial hatcheries which are certified by MARD and supply better quality seeds.
Before 2008, it was estimated that about 80% of the hatcheries were located in South Central Vietnam because the local conditions are most favourable. In recent years, many hatcheries relocated to the Mekong Delta to be closer to their buyers.

2/ Feed:

The weakness of the shrimp subsector is that the feed price is 10-15% higher compared to other countries. The main reason is that 60% of shrimp feed production is controlled by foreign companies (Grobest, Concopro, etc). According to MARD, 2, 4 tonnes of feed is consumed in the Vietnamese aquaculture sector (in 2012). 50% of the necessary inputs to produce this amount of feed have to be imported.

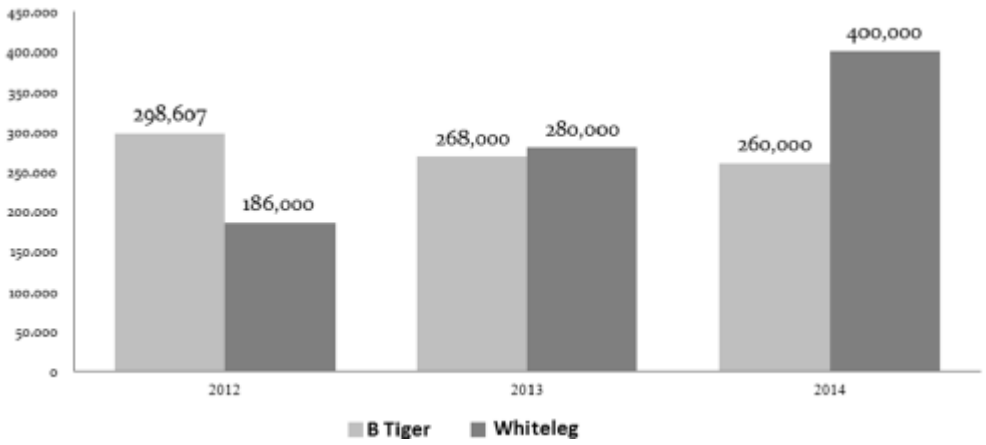
3/ Medicines-Chemicals

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

SHRIMP PRODUCERS

The Mekong Delta is the most important production region for the Vietnamese shrimp subsector. In general we can distinguish farms producing Black Tiger Shrimp and farms producing Pacific White shrimp.

Vietnam Shrimp Production, 2012 – 2014 (MT)



Source: VASEP, 2015

In 2014, Vietnam shrimp production was nearly 660,000 MT, with a production of 400,000 MT of Whiteleg and 260,000 of Black tiger shrimp. Since 2013, Black Tiger products are not the main shrimp species producted in the country. Thanks to higher whiteleg prawn production since 2011, shrimp harvest rapidly increased this last years. Vietnam is now still the largest black tiger shrimp producer in the world with its ouput of around 300,000 MT per year. Recently, the majority of intensive shrimp farms shifted from farming the giant tiger shrimp to Pacific white shrimp because of the white shrimp's advantages of rapid growth, high production and low risk of diseases.

Pacific White shrimp:

The area covered by farms growing Pacific White shrimp has increased rapidly since the species was introduced in 2004. Whitel leg shrimp are mainly cultured in the north and central regions that accounts for nearly 70% of the total farm area for Pacific White Shrimp. Most farms producing Pacific white shrimp apply intensive culture systems which are relatively large scale and have good infrastructure. Pacific white shrimp are harvested after 90-100 days, and the yield of white leg shrimp is, on average of 11,7 tonnes/ ha/cycle.

Black Tiger shrimp:

Most of the farms (about 92% of black tiger shrimp production area) are concentrated in the south of Vietnam in the provinces of Ca Mau, Bac Lieu, Kien Giang, Soc Trang. The area covered by extensive and semi-intensive shrimps farms amounts to approximately 550,000 hectares, accounting for 89,8% of the total area under black tiger shrimp culture. Ca Mau accounts for 230,000 hectares and is considered to be largest area for extensive and semi extensive shrimp farming. Giant tiger shrimp are harvested after 100-150 days, and the yield of extensive shrimp farming ranges from 0,3 to 0,6 tonnes/ha/cycle. For semi-intensive farming, the yield ranges from 0,8 to 1,0 tonnes/ha/cycle. And the average yield of intensive shrimp farming ranges from 2,4 to 6,5 tonnes/ha/cycle[9].

[9] Corsin, (2011), A market analysis of Vietnamese shrimp production (report commisioned by IDH).

It is very important to realise that in general, shrimps farms in Vietnam are small in size with less than 1, 5 hectares in production and 1,5 tonnes per crop per year in productivity. This accounts for approximately 70-80% of all farmers. Although large scale Black tiger and whiteleg shrimp farmers are often independent and take care of their own input supplies and marketing channels for the farm ouput, these small farmers depend heavily on their relationship with middlemen.

Case Study:
***Impacts of shrimp early mortality syndrome*:**

EMS is a serious emerging disease of cultured shrimp[10]. The causative agent, a strain of Vibrio parahaemolyticus, is a marine microorganism native in eastuarine worldwide. Three species of cultured shrimp can be affected (Penaeus monodon, P. vannamei and P. Chinensis). The impacts of EMS[11] include production losses, loss of income and profit for small-scale producers and commercial enterprises, higher shrimp prices owing to supply shrotages, and impact on trade. In Viet Nam, about 39 000 ha were affected in 2011. Malaysia estimated production losses of US$0,1 billion. In Thailand, reports from private sector enterprises indicate US$ 1 billion.

The FAO in Vietnam made recommandations pertinent to important areas such as: diagnosis, notification, reporting, internationla trade of live shrimp, shrimp products (frozen, cooked) and live feed for shrimp; advice to affected and unaffected countries; measures ar farm and hactcheries facilities; advice to pharmaceutical and feed companies and shrimp producers; actions on knowledge and capacity development; outbreak investigations/emergency response; and targeted research on various themes.

Source: FAO, State of World fisheries and Aquaculture, 2014

MIDDLEMEN

In Vietnam, middlemen play a crucial and critical role in the shrimp farming sector. Small farmers not only depend on them for the farm inputs such as feed, but also depend on middlement for havesting the shrimp and marketing it to the processors and exporters. This position gives middlemen a lot of power in the supply chain and a lot of influence. Currently, local government agencies, producer associations and NGOs are making efforts to restructure the value chain for more vertical integration between processors and farmers (like encouraging farmers to form cooperatives).

Two levels of middlement can be distinguished. The first group is the middlement that operates at the primary production level in the middle of shrimp areas. The second level

[10] Lightner, D.V., Redman, R.M., Pantoja, C.R., Noble, B.L., Tran, L. Early mortality syndrome affects shrimp in Asia. Global Aquaculture advocate, 15(1):40

[11] FAO.2013. Report of the FAO/MARD Technical Workshop on Early Mortality syndrome (EMS) or Acute Hepatopancreatic Necrosis Syndrome (AHPNS)of cultured shrimp. Hanoi, viet Nam, on 25/ 27 june 2013. FAO fisheries and aquaculture report No.1053. Rome. 54 pp.

are of middlement often has more financial wherewithal and finances both small middlement and farmers.

The most important is that if shrimp are not marketed directly from farmers to exporters, the shrimp changes ownership several times before reaching the processing factory. This can have major implications for issues such as fodd safety, tranceability and are crucial in international trade. But farmers often prefer to sell to middlemen because exporters are accused of deliberately delaying payment. Also, if they sell to middlement they always have a 100% guarantee that all the shrimp will be purchased, while some exporters may reject a part of the harvest.

PROCESSORS AND EXPORTERS

As already mentionned, formal relationships between farmers and exporters are rare. Only large-scale farmers who have large supply volumes supply directly to exporters. Contract farming agreements are scarce but are growing in number due to the efforts to organise farmers in cooperatives. Many large processing compnaies have their own shrimp farms in order to secure a minimal volume of supply for the factory.

Msot exporters have in-house labs to check chemical residue levels. They test the levels before purchasing from traders or smallholders and before shipping for export. Some exporters are also used outside labs for shipments to countries like Japan were testing is very stringent. Theses types of private labs are also available in the country.

For export, the shrimps will be processed, packed, and delivered to distributors, which ar foregin import companies, mostly located in Ho Chi Minh. For domestic market, the shrimps can be sold directly by farmers or collectors and processords to local markets, supermarkets or restaurants. In the shrimp value chain, 83 % of production is exported, while only 17% are sold to the domestic market (Le, 2012).

BOTTLENECKS and SOLUTIONS

<u>1/ Shrimp Disease:</u>

Disease outbreaks are a serious threat to the stability of shrimp exports from Vietnam. They occur mainly as a result of a lack of proper water quality control but also as a result of the lack of a quality seed supply. In order to reduce the risk of disease outbreaks, farmers regularly use medicines and antibiotics that are not tolerate in international trade of shrimp products.

In order to deal with this problem, some experts proposed the development of a national program on Specific Pathogen Free (SPF) seed or antipathogen seed coordinated by Depatment of Animal Health. It is also crucial to improve quality control of imported shrimp seed, specifically feed from China. And MARD should have more capacity to enforce strict farm regulations on the use od antibiotics and other medicines.

2/ Lack of Vertical Cooperation in the Supply Chain:

The level of integration in the shrimp value chain is limited. Only a small portion of farms are directy linked to processors through vertical integration. Middlemen traditionnaly have a strong position and their critical functions results in problems surrounding issues such as traceability and food safety. These issues are increasingly important for exports in the US, Japan and the EU. The level of vertical integration in the shrimp sector is lower than in the Pangasius sector.

In order to resolve this issue, it is important to focus on value chain efficiency. First, by the development of vertical linkage or contract farming for shrimp led by processors, and facilitated by associations (VASEP, VINAFIS or shrimp Association). Small farmers need to be better organised to improve their bargaining position. The formation of associations in which farmers and exporters work together, as already happens in An Giang Province with pangasius can function as an example. In these efforts, more emphasis need to be put on a national programme for raising awareness about issues such as food safety, traceability and sustainability among middlement and traders.

3/ Lack of capital investment in shrimp subsector

Currently in Vietnam, there is a lack of investment in logistics, seed production and farm irrigation. This results in lower quality products and economic losses for stakeholders across the sector.

MARD and MOIT are already active in calling for investment throught Public Private Partnership (PPP) arrangements in seed technology, irrigation for culture but the calls for investment have to be intensified at national and international level. The multiplication of FTAs signed by Vietnam is expected to attract more Foregin Direct Investments (FDIs).

4/ Lack of cooperation between value chain actors

In general, there is a lack of cooperation between processors, farms, the government and other supporters of the shrimp industry. For example, it is important to note the lack of cooperation between academics, institutes and the government in efforts to improve the quality opf the seed. Also it is difficult for farmers and exporters to access bank loans due to complicated procedures.

In order to response these issues, MARD should adopt a value chain approach to management of the shrimp subsector and reform the legal and policy environement accordingly. The government also should issue stricter regulations on farm registration and management and the use of drugs and chemicals. This should be done by NAFIQAD at the national level, and DARD at the provincial level. The governement should work more on the development and improvement of seed quality with universities and institutes, in order to limit imports from China for example.

5/ Lack of attention for environmental issues: Sustainable Production

There is a lack of attention for environmental issues and a lack of skilled labour. However, Vietnam compared to other countries, is already exporting a relatively large volume of certified shrimp products by for example Global GAP, ACC and Naturland.

The government must provide incentives for farmers and processors to voluntary comply with sustainable certification. NAFIQAD or other agency should also develop and implement a national program on extension for shrimp aquaculture, focus on traceability, Best Aquaculture Practice (BAP) and certification. In this case, increased the integration between farmers and processors through contract farming is a key factor to solve this issue. If processors are convinced of the benefits from contract farming they are likely to be more willing to invest in farmers to create a premium supply chain for sustainable products.

CONCLUSION

In conclusion, through several decades of development shrimp farming have become increasingly important activities and play important role in the socioeconomics of the coastal areas in Vietnam. Most of the solutions of the bottlenecks relate to increase integration and cooperation between public and private actors across the shrimp sector. The most important bottlenek for exports – traceability, food safety and sustainability – can be solved by increasing control and influence of lead forms over the value chain. Certification for shrimp farming with national and more specifically international standards is an important target in the near future in the contexte of FTAs. The shrimp industry is on the move toward sustainable development and meeting planned targets of 630,000 hectares and 700,000 metric tons by the year 2020.

2. PANGASIUS INDUSTRY

Pangasius has become very popular in EU and the US in recent years due to its low price and the ongoing weak economic conditions in these regions. Vietnam's pangasius exports accounts for about 75% of the global market share[12]. Pangasius is the second Vietnamese product for total export value (22, 6% in 2014). In 2014, Vietnamese Pangasius export turnover hit US$ 1,768 billion (up 0, 4% year on year) and was exported to 137 markets. The main markets imported Pangasius included the EU (19%), the US (19%) and ASEAN (8%), representing nearly 50% of the total export value of Pangasius. But during the first part of 2015 (January-June), Pangasius products was only exported to 128 markets, 9 market lower than the same period last year, for a total export value of US$ 749,9 million (down 9% year on year).

Despite the fact that Pangasius became very popular in EU and US markets in recent year due to its low price and the ongoing weak economic conditions in these regions, Vietnam pangasius suffered since 2012 in US and 2013 in EU to bad communications. We will explain how it's crucial for Vietnamese production to raising the quality of its products. Increase the quality of a seafood product could be reach by creation of labeling and making the product clear on the wrappings. A positive communication of Vietnamese pangasius is essential for the seafood sector in Vietnam if the producers and exporters do not want to suffer of important rejections and bad reputation into import markets.

A/ HISTORY OF THE PANGASIUS INDUSTRY

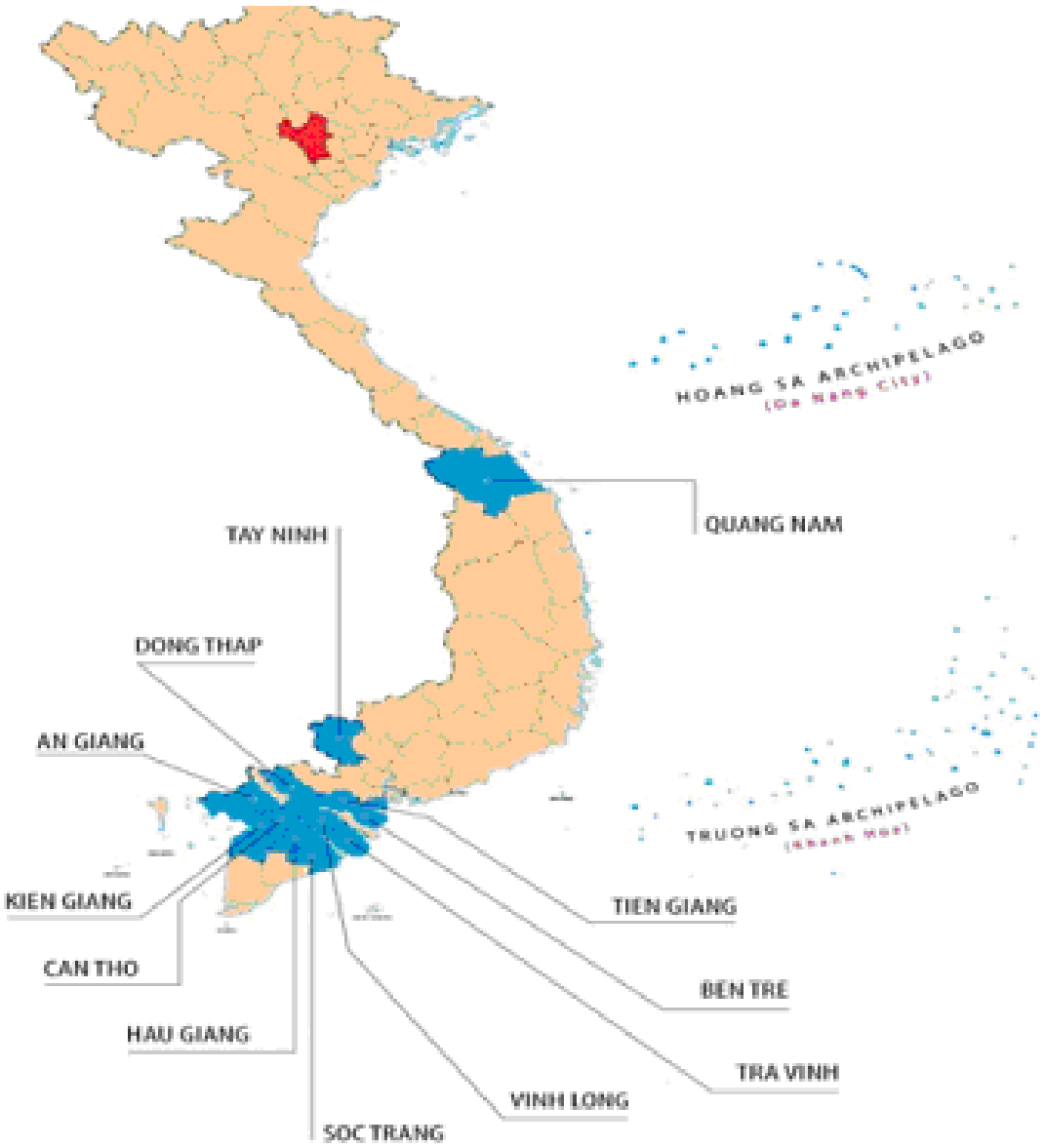
Production of Pangasius dates back more than 50 years and takes place only in the Mekong River delta, which is the main area of freshwater production in Vietnam. The Pangasius in Vietnam belong to genus Pangasius, which includes Pangasius hyphoththalmus, Pangasius bocouri, and several other species that are called "catfish" in English. Pangasius is mainly grown in freshwater provinces of the Mekong River delta including An Giang, Dong Thap, Can Tho and Vinh Long (accounting currently for over 75% of the national Pangasius production). Before 1975, pangasius used to be domestically consumed and exported to markets such as Hong Kong (China), Singapore and Taiwan (China) . It started to be exported to Australia in the middle 1980S and to the United States and Europe in the middle of 1990s.

Vietnam is the world largest producer of Pangasius, which is low-priced freshwater. There are two pangasius species in commercial aquaculture in the Mekong River delta: Pangasius bocouri (Basa in Vietnamese), and Pangasius hypophtalmus (Tra in Vietnamese). These two pangasius species originated from the former, farmed in cages in this region a few decades ago. Despites the fact that Pangasius hyphophthalmus is of lower quality; it has gradually replaced Pangasius bocouri and accounts for 95% of Pangasius production. Pangasius bocouri is only for the local market.

[12] VietinBank SC, 2013

In the first half of 2015, Pangasius farming area in Vietnam was approximately 5,795 hectares (down 7% year on year), with a yield of 1,16 thousand tons in 2014, and average yield reached 202,91 tons by hectares. The total farming area is expecting to increase until 13,000 hectares for 2020, according to MARD declaration.

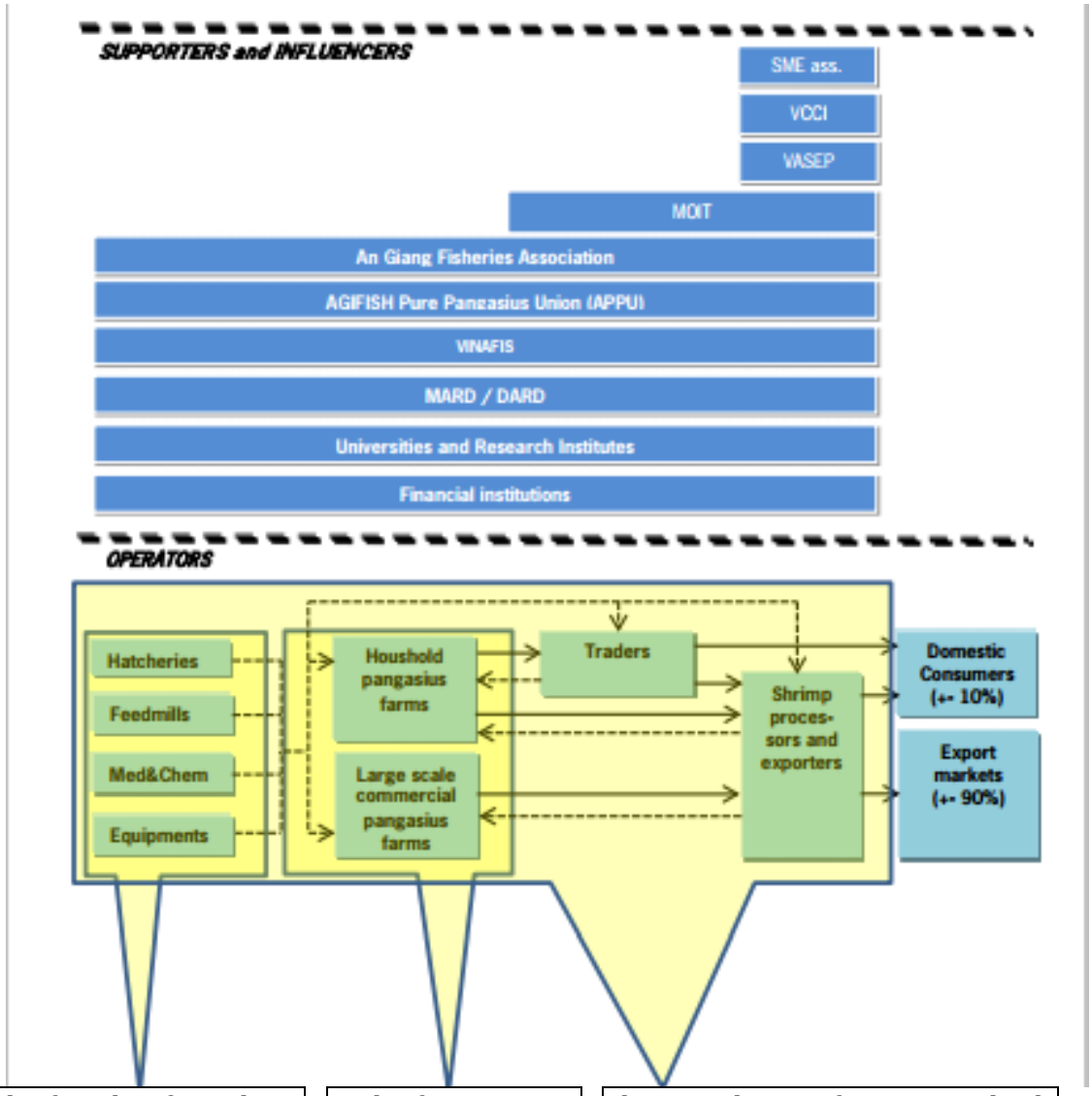
Map: In Which provinces of Vietnam have Pangasius been raising?



Source : VASEP, 2012, Pangasius 26 Q&A

B/ PANGASIUS VALUE CHAIN and PRODUCTION PROCESS

Figure: The Vietnamese pangasius value chain and its main bottlenekcs



Lack of quality fingerlings | Lack of Investment | The complexity of inter. standards

Expensive Feeds | Lack of vertical integration (contract)

A lack of strategy development

INPUT SUPPLIERS

1/ Seed:

In a hatchery fish fingerlings are produced under controlled conditions. Tyes of hatcheries in Vietnam range from state owned firms to largeand small scale private businesses. Private small scale hatcheries smaller than 1 hectare are very common.

These are often family businesses. State owned hatcheries have a large influence on the pangasius sector: they can conduct research on indigenous species, improve aquaculture techniques. Therefore, in 2012, the state owned hatcheries supplied only 20% of the fingerlings for the Mekogn Delta[13]. The quality of seed produced by private hatcheries is often very low. The low quality of seeds is one of the main causes for the hight mortality rates at the pangasius farms.

2/ Feed:

In 2000, almost 90% of pangasius farmers were still using home-made feeds. In 2005, more than 50% of the farmers shifted to use commercial feeds and by 2012 it is estimated that even over 90% of the pangasius farmers use commercial feeds. The use of commercial feeds increase the quality of pangasius farms, but also makes pangasius farming a more cost intensive business. The costs of commercial feeds account for 60-80% of total production costs. Large scale commercial pangasius producers mostly buy the feed directly from the feed companies while small scale producers often buy feed on a credit basis from local distributors. More than 70% of the pangasius feed production it estimated to be in hands of foreign companies.

3/ Chemical and medicines:

Exact figures are not available but it is know that farmers use additional medicines to reduce the mortality rate of the fish. Most products used are Vitamin C supplements. However, other medicines such as antibiotics, probiotics are used to prevent disease or to maintain water quality. Although some of these are legal, but it is argued that many farmers also use illegal substances that they can easily buy from local pharmacies and distrbutors. Farms are inspected by relevant competent autorities in the ministry.(NAFIQAD). Circulars from 2009[14], 2010[15] and 2012[16] promulgated lists of banned and restricted chemicals and antibiotics and list of veterinary drugs and products permitted to use in treatment aquaculture environment.

OPERATORS: THE PANGASIUS FARMERS

According to VASEP, the number of tra fish breeding in June 2014 was nearly 1,960. During the last few years, the development in the pangasius sector has resulted in more large-scale producers and the disapearing of several small scale producers. Although the number of commercial large scale pangasius farms is increasing the vast majority of pangasius farms are still smaller than one hectare[17].

The productivity of pangasius fams is very high. Depending on the price that exporters pay for the product, farmers harvest their ponds ideally after 6 months when they can harvest fishes of 700 grams which is the preferred size by exporters. If a farmerest after 6 months he or she can harvest approximately 1, 8 times per year, this yields

[13] Le Nguyen Doan Khoi (2011), Quality Management in the pangasius export supply chain in Vietnam: the case of the small scale pangasius farming in the mekong river delta, University of Groningen.
[14] Circular No. 15/2009/TT-BNN dates March 17, 2009.
[15] Circular No. 64/2010/TT-BN datres November 11, 2010.
[16] Circular No.03/2012/TT-BN dated January 16, 2012.
[17] Corsin, F, 2011, reported on The Vietnamese seafood sector: the value chain analysis (2012).

approximately 250 tonnes of pangasius per harvest a 1 ha pond. In June 2015, approximately 516,140 tons of tra fish were catched, representing an increase of +1,2% compared to 2014.

International markets put a lot of presure on pangasius farmers to move towards more sustainable production methods. The large scale commercial farms are moving towards more sustainable production and certification of the pangasius farms since recent years. On 2014, the government has approved the MARD Plan (Decree No. 36/2014/ND-CP), a plan which involved standards on rearing, processing and exporting tra fish products. The decree provided that before end of the year 2015, all areas rearing tra fish nationwide must get to Viet GAP standards and other international standards. Today, just half rears VietGAP certification. On November 2, 2015, Ministry asked government to extend the deadline until December 2016 to obtain certification.

OPERATORS: MIDDLEMEN

The high level of organization and productivity and low risk failure result a more vertically integrated value chain compared to the shrimp sector. Only a small share of production is marketed through middlement or traders. FAO estimates that more than 84% of the small scale farmers sell their product directly to processing companies while this is the case for 100% of the farms that are larger than 0,5 hectares[18].

OPERATORS: PROCESSORS AND EXPORTERS

In Vietnam, in 2011 we accounted for more than 140 processing establishments for fish that are certified for exports. The majority of these processing establishments are located in the provinces in the Mekong River Delta.

Table:
Number of fish processors per province including export volumes and values (2011)

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

[18] http://www.fao.org/uploads/media/UpgradingPangasiusFINAL.pdf

The next table shows the categorisation of pangasius exporters according to export value and volume based on the VASEP data from 2011 (the most recent possible to find). It is obvious that there are a couple of extremely large export companies but the largest group is companies that can export between 1,000 and 5,000 tons per year equal to USD 2-12m. It can be expected that especially the medium, large and very large companies have their own farms. This group of companies is most likely to engage on the short term in sustainable certified pangasius exports.

Table: the categorization of pangasius exporters (2011)

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

Source: VASEP, 2012

Pangasius Certified Farms in 2015

Thr first Vietnamese farm certified Global GAP, is a collective of 4 pangasius farming members in Tra Vinh by Provincial Fisheries Association. The farm was officially certified in 2014. In total in all the country, 42 tra fish farms are certified by Viet GAP. For 2015, the government plannean objective of 20% of the national pangasius production satisfies ASC certificcation. Currently 47 pangasius farms are certified and 43 are in the Mekong Delta (for only 5 in 2012).

The final process before being transported to the export harbours involves the preparation of fillets by the processing factory for export. It is importatn to notice that 90% of tra fish exported were tra fish fillets (VASEP, 2015). The average capacity if a firm is roughly 40-50 tons of fresh fish per day. All raw materials are inspected upon arrival and must be approved by the quality inspection team before being allowed into processing areas. After purchassing live pangasius, the fish are washed, beheaded, gutted, filleted, skinned, trimmed, sized and classified, inspected on quality, frozen, and packaged for export or the local market. Around 91,4 of pangasius production are being exported, and 8,6% is going to the domestic market. More specifically, 3,2kg of live pangasius are required to produce 1kg of fillet. Frozen fish is the most common, followed by fried products and fish sauce or paste. In supermarkets in Europe, the pangasius is also sold as fresh fillets. Moreover, high value added products such as ready to cook or surimi are also produced by various processors (see Vietnam Surimi subsector).

BOTTLENECKS ALONG VIETNAM PANGASIUS VALUE CHAIN

The bottlenecks from this list are eventually categorised into four priority bottlenecks which are crucial for the further developmeent of the pangasius industry in Vietnam[19].

1/ Lack of integration and cooperation in the value chain:

Although the role of middlement in the pangasius subsector is limited and there is a higher level of vertical intgration and cooperation, the vast majority of farmers still operates on a spot market and do not have sustainable long-term relationships with their buyers. The fluctuation of the raw material prices is one of the reasons because it is difficult to make pre-harvest arrangements about the price. There is also a law of experience in how to formulate contracts in order to protect their benefits of both farmers and processors, that is why signing a contract is often a high barrier.

A solution could be the creation by the government of an enabling environment for farmers and processors to increase the number of contract agreements. Farmers and processors should need to hire a lawyer who helps the sector to design a concept contract for farmers and processors which protects their benefits.

2/ Lack of quality fingerlings

The quality of fingerlings has a gret effect on the productivity of pangasius farms and the profitability of the sector. It is generally noted that public hatcheries are better equipped and produce better quality fingerlings but cannot meet the local demand. Therefore, many farmers depend on lower quality fingerlings imported from China.

There are several solutions for this problem:

- Universities and Institutes have to intensify research programs on the productivity of fingerlings with stronger strains.
- State owned hatcheries have to increase their capacity in order to provide larger quantity of quality broostock.
- Stricter regulations need to be implemented for the management of private hatcheries.
- Processing companies should be encouraged to invest in research programs for improved fingerlings production, which is on their interest.

3/ Complexity and diversity of international buyer requirements

Pangasius exporters are confronted with a wide diversity of standards required by international buyers that supply to different countries and markets. The most common standards confronted with at the moment are Aquaculture Certification Council (ACC) for the US retail market, Global Aquaculture Pratices (GlobalGAP) for the EU retail market, ASC for the EU retail market and increasingly bio standard such as Naturland. Exporters that have their own farms are currently investing in the farm infrasctructure to meet these standards, but it is impossible to comply with all. One of the major

[19] These bottlenecks identified are issue to the Report compiled by CBI, by LEI, "the Vietnamese seafood sector: a value chain analysis", (2012).

challenges faced by the sector is how to create a strong brand for Pangasius products to help the sector, especially for the European market.

There are few solutions to this problem:

- One option is the current improvement of the national standard VietGAP. VietGAP is still not recognized as an equivalent to Global GAP and it is not a stndard regonized for quality and traceability into major import markets. Indeed, VietGAP standard need to be aligned with Global GAP. This situation needs to be improving rapidly.
- More attempts nned to be made to organise farmers into cooperatives and associations and link them directly to exporters through contracts agreements of other kinf of long term relationships to increase their financial power.

4/ Lack of investment in infrastructure

The most important challenge to increase the availablity of capital for investment in the pangasius sector from the point of view of private sector is to convince banks and insurance companies that the risk of investing in the pangasius sector is limited and controlled. The governement need also to continue encourage the sector and to develop and improve national plan for pangasius product.

The decree No 36/2014/ND-CP of the government on raising processing and exporting Pangasius in the foundation for improving quality of Pangasius filets. With this decree, the government had paid special attention to develop the image of Vietnamese Pangasius. The government has developed a master plan for production and processing and has invested in research and technology and infrasctructure[20]. VNCPC also implemented a new project of two year on a sustainable supply chain in Vietnam centres and quality management centres (Title: Establishing a sustainable Pangasius supply chain in Vietnam from April 2013 to April 2017). This project in cooperation with the WWF Austria, WWF Vietnam, VASEP and the EU delegation to Vietnam is helping the pangasius industry to implement social, environment, food safety and economic responsibility along the entire supply chain. The project's objective is that by 2017, at least 70 % of the targeted production and processing enterprises, and 30% of the feed producers; hatcheries and small independent production business are actively engaged in Cleaner Production.

In conclusion, there is still a lot of work to be done to link different actors and supporters in the Pangasius supply value chain. The quality of the fingerlings also needs to be improved in order to limit feed import from China with low quality and with high production costs. It seems necessary to improve the capacity of the large national hatcheries to satisfy the local demand. Complain with national and an international standard is one of the current objectives of the government, but we may regret that the first deadline of December 2015 was reported until December 2016. Moreover, on March 2016the Food Safety and Inspection service and not the United States Food and Drug Administration, will come to inspect fish under Siluriformes including Tra and Basa Fish, during 18 months time. This control represent for Vietnam a real Non Trade Barriers, and it wil affect the export of Vietnamese products.

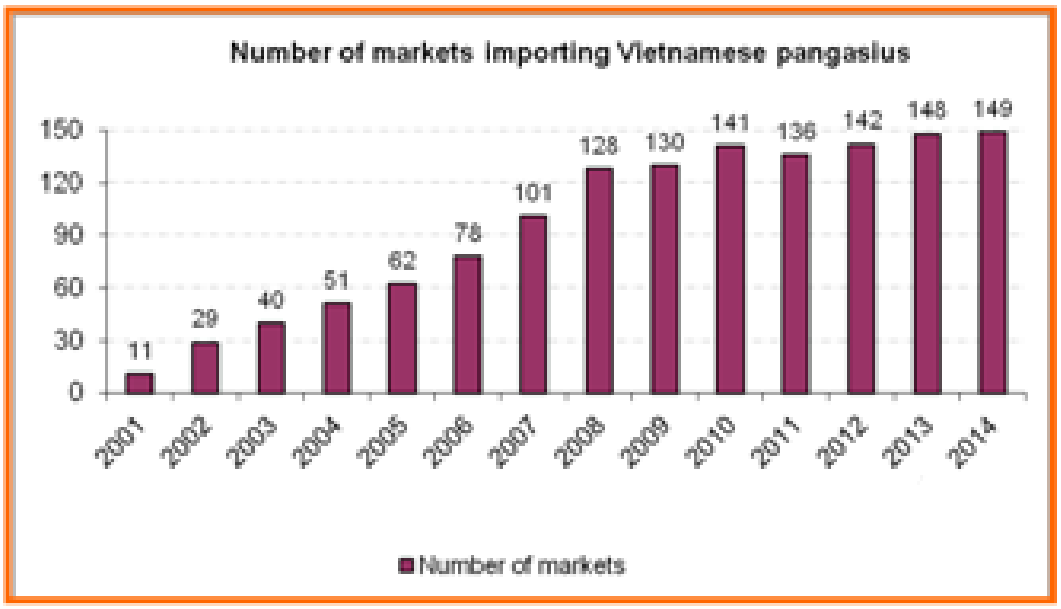
[20] According to Pham, Anh Tuan , deputy general director of Fishery Department under the MARD.

The development of a national standard (VietGAP) is a very good opportunity to ensure communication of Vietnamese products but VietGAP need to be aligned with Global GAP if Vietnamese products want to be recognized as struct quality products into main import markets. Traceability of the value chain needs to be improved, if Vietnamese exporters and farmers want to prevent rejections from imported countries and reputation issues. National processors should also diversify the production of highly processed tra fish products.

C/ PANGASIUS EXPORTS

In 2014, Vietnamese Pangasius exports reached US$ 1,768 billion (up 0,4% year on year in term of value). Between the first part of 2015, Vietnamese Pangasius exports were affected by some internal and external effects, Vietnam's pangasius was exported to 9 markets lower than the same period of last year, and the Pangasius exports hit US$ 749,9 million (down 9% year on year). The economic context of 2015 with the decrease of the euro, add with a stronger local competition and low of quality of Vietnam export products are some elements responsible of the current decrease.

How many countries, territories do they consume Pangasius originated from Vietnam? Vietnamese Pangasius are higly appreciated by local and international consumers, for its white muscle, high nutritious value and little or tasted lipid content, without horizontal bones.



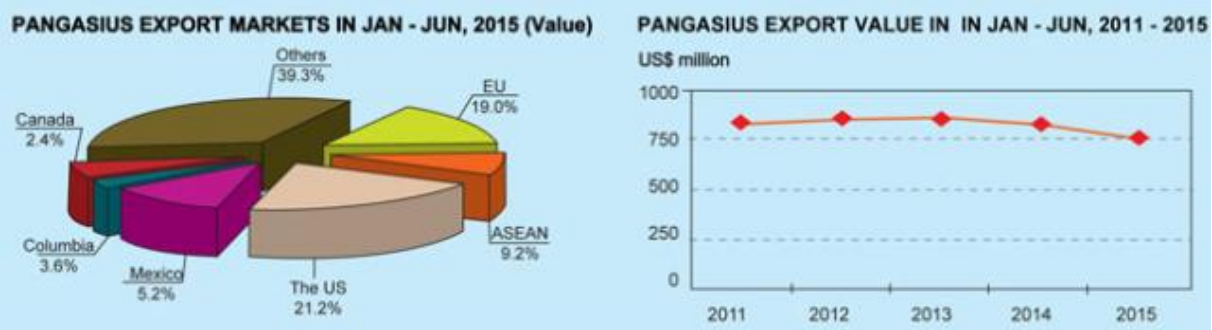
Source: VASEP, 2015

Vietnam Pangasius products have been exported and consumed in 5 continentals with over 150 countries and territories:

- EU (26/27 member countries: Spain, Germany, the Netherlands, Belgium, Italy, France, UK…).
- Eastern Europe (Russia, Ukraine, Romainia Poland)

- North America (US, Canada, Mexico).
- South America (Venezuela, Panama, Brazil, Argentina…)
- ASEAN countries (Thailand, Singapore, Malaysia, Philippines, Indonesia…)
- China and Hong Kong
- Asia (Japan, South Korea, Taiwan, India…)
- Asutralia and New Zealand
- Middle East –North Africa (Egypt, Morocco, Saudi Arabia, Israel).

Figure: Pangasius Export Markets and Value (2015)



Source: VASEP, 2015

In the first part of 2015, the largest markets imported Pangasius from Vietam included the US, the EU, China, ASEAN, Mexico, Colombia, Canada and Australia made up 72, 15% of the total export value. This year, pangasius exports to some markets posted slight rise, like the US (+4, 8%), China (+50, 7%), Canada (+2, 9%). However, Pangasius exports to some markets posted the year on year reduction: EU market (-17, 6%), ASEAN (-4, 1%), Mexico (-25%) and Colombia (-13%). The end of the year and the trade agreement (EVFTA, TPP) signed with these main import markets are expected to raise the value of the Vietnamese exports during the last months of 2015.

In a 2015's context that is characterised by economic depression in Europe and lower demand, Vietnamese Pangasius exports in the block reduced strongly. In addition, they are a global concern that can affect consumers' attitudes. For example, the fast growing Vietnam catfish (pangasius) has attracted strong criticism based on alleged environmental and food safety issues. High-density farming in the lower Mekong Delta has created a negative perception among consumers. Although many of the accusations may not be supported, the local euthrophication impacts cannot be denied. Since 2013, bad communications on Vietnamese pangasius in European market affect the consumption and the exports in Europe.

Table: Pangasius Exports to Markets – January / June 2015

Markets	QI/2015	Apr 2015	May 2015	Jun 2015	QII/2015	Variation (%)	Jan-Jun 2015	Compared to 2014 (%)
The US	**78.001**	**29.452**	**27.206**	**24.389**	**81.048**	**+19.2**	**159.049**	**+4.8**
EU	**68.226**	**25.649**	**25.081**	**23.642**	**74.372**	**-17.6**	**142.598**	**-17.6**
The Netherlands	*13.016*	*5.051*	*5.288*	*4.637*	*14.975*	*-12.1*	*27.991*	*-7.5*
The UK	*12.342*	*4.238*	*4.066*	*4.258*	*12.561*	*+29.7*	*24.903*	*+41.1*
Spain	*10.379*	*4.358*	*4.654*	*3.161*	*12.173*	*-39.9*	*22.552*	*-47.5*
Germany	*7.610*	*2.199*	*2.506*	*2.520*	*7.226*	*-32.5*	*14.836*	*-26.9*
China	**30.042**	**11.862**	**13.094**	**15.202**	**40.157**	**+56.4**	**70.199**	**+50.7**
Hong Kong	*7.303*	*2.666*	*3.346*	*2.895*	*8.907*	*-15.4*	*16.211*	*-15.3*
ASEAN	**33.603**	**11.936**	**12.419**	**11.311**	**35.666**	**-10.5**	**69.268**	**-4.1**
Thailand	*10.727*	*4.331*	*5.124*	*4.149*	*13.603*	*-3.2*	*24.331*	*-1.8*
Singapore	*8.975*	*2.837*	*3.012*	*2.532*	*8.381*	*-20.5*	*17.356*	*-8.4*
Philippinnes	*7.653*	*2.184*	*2.308*	*2.427*	*6.919*	*-3.9*	*14.572*	*-0.2*
Mexico	**26.820**	**3.698**	**3.788**	**4.474**	**11.961**	**-49.7**	**38.781**	**-25.9**
Colombia	**17.265**	**2.828**	**3.263**	**3.704**	**9.796**	**-34.5**	**27.061**	**-13.2**
Canada	**8.763**	**3.397**	**3.191**	**2.898**	**9.487**	**-10.5**	**18.249**	**+2.9**
Australia	**8.067**	**2.552**	**2.459**	**2.854**	**7.866**	**-22.2**	**15.933**	**-15.1**
Others	**86.064**	**34.380**	**43.466**	**44.948**	**122.794**	**-7.4**	**208.858**	**-19.9**
Total	**356.851**	**125.755**	**133.968**	**133.423**	**393.146**	**-5.5**	**749.997**	**-9.0**
**Value: US$ mil.*								

Source: VASEP, 2015

The FTA reached between European Union and Vietnam will apply tax reduction for seafood products during the next years, including catfish fillets. However, EU will apply more strict regulations and standards related to traceability, quality, food safety and standards. It is important for Vietnam to invest and to improve its current bottlenecks in order to transform these challenges into opportunities.

3. TUNA INDUSTRY

Revenue from tuna exports is ranked the third behind shrimp and Pangasius products. In Tuna Global market, Vietnam is ranked 10th, after Thailand, China, Indonesia, Philipines as regional competitors. In 2014, Vietnamese tuna exports were nearly US$ 500 million, down 7% year on year. The decline began in 2012, is due to weaker demands from EU and Japan, where inventories have been so hight after boosting tuna purhcase in 2012. Stricter quality requirements from these markets and Vietnm's shortage of raw material for processing to export were also other reasons.

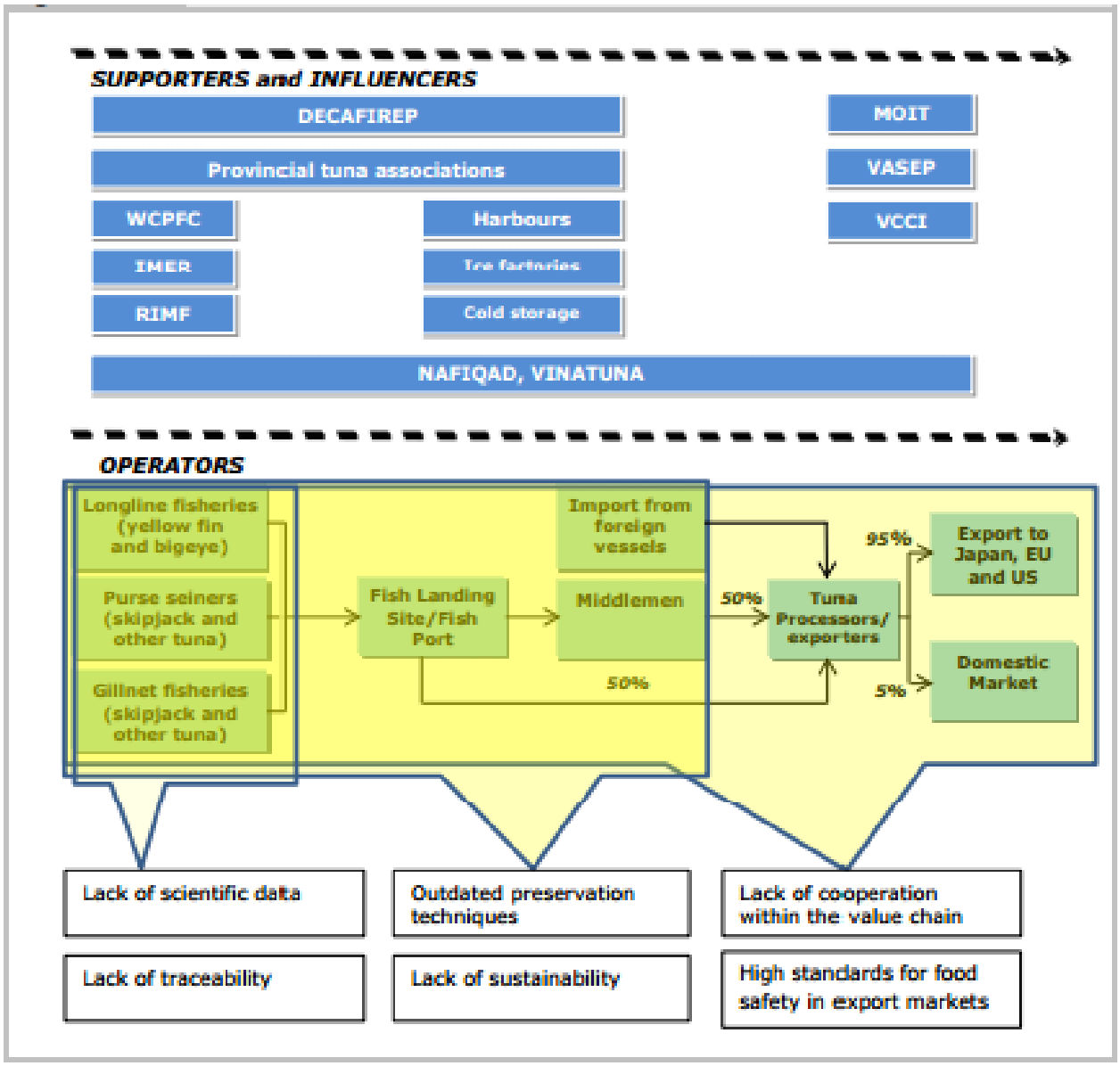
A/ TUNA PRODUCTION

In 2014 in Vietnam, tuna exports are ranked third in term of revenue behind shrimp and pangasius. But tuna fisheries are considered to be the most important type

of fishery in Vietnam. However, availability on data regarding tuna catch and species is limited. In 2014, some 200,000 MT of tuna catches were estimated, including 9 species of tuna. (VASEP, 2015).

Tuna is caught using long line, pursue seines and gillnets. Long lines are used only in the three central provinces of Vietnam (i.e Binh Dinh, Phu Yen and Khanh Hoa). Its main targeted species are bigeye and yellowfin tuna. The gillnet and purse seine fisheries appear in almost central coastal provinces and their catches are mainly skipjack tuna.

Figure: The Vietnamese Tuna Value Chain and its main bottlenecks



Source: Lei, 2012

PRODUCTION IN 3 MAIN PROVINCES

Source: WWF

In 2014, tuna output in the EEZ of Vietnam is estimated at 27,000 MT. Binh Dinh is the top tuna catching province with 9,000 MT , followed by Khanh Hoa with 5,000 MT, and Phu Yen with 4,000 MT.

- Binh Dinh Province

In 2011, total catch of fisheries in Binh Dinh province was estimated about 152,109 MT, contributed about 8.6 % of Binh Dinh's GDP. Tuna fisheries have recently played an important role in Binh Dinh province. In 2011, the total tuna catch was 38,887 metric tons accounted for about 26% of the total marine catch in Binh Dinh province, in which the yellowfin and bigeye tuna accounted for about 12%.

Since the end of 2011, tuna handlines using lights have been developed from tuna longliners and become popular in Binh Dinh due to high production and longer fishing season. There are currently (2012) 1060 tuna handline boats and 786 tuna purse seine boats in Binh Dinh province[21].

[21] Vietnamese Tuna fishery profile: Binh Dinh, Phu Yen, Khanh Hoa (2012) by Western and Central Pacific Fisheries Commission (WCPFC) and Department of capture and fisheries ressources protection (DECAFIREP).

- Phu Yen Province

Longline, purse seine and gillnet are main fishing gears for tuna fisheries in Phu Yen province. In 2011, there were 831 tuna boats, in which longline boats accounted for about 67 %, tuna purse seine accounted for 15.5% and gillnet accounted for 17.4% of the total number of tuna boats. Tuna longline boats are mainly registered in Tuy Hoa city and Tuy An district and its main products are yellowfin tuna and bigeye tuna. Total landing of these two species in Phu Yen was 4,986 metric tons in 2010 and 5684 metric tons in 2011.

Case study:
Phu Yen longline/ handline tuna fishery

Fleet Structure:

There are two gears used in Phu Yen: handline and longline. Based on fishermen interviews, 90% of boats are geared for handline and 10% for longline. Contrary to other tuna provinces, fishing vessels in Phu Yen have not been transitioning to handline very quickly. Handline was introduced to the PhuYen province in April 2012. In 2014, 175 vessels are using handline.
The main difference between the two techniques is that handline uses a single hooked line attached on a bamboo pole to catch the fish and the fish is quickly raised out of the water. Additionally, handline boats have 10-30 lamps on board to attract squid (bait).

Tuna Species Caught:

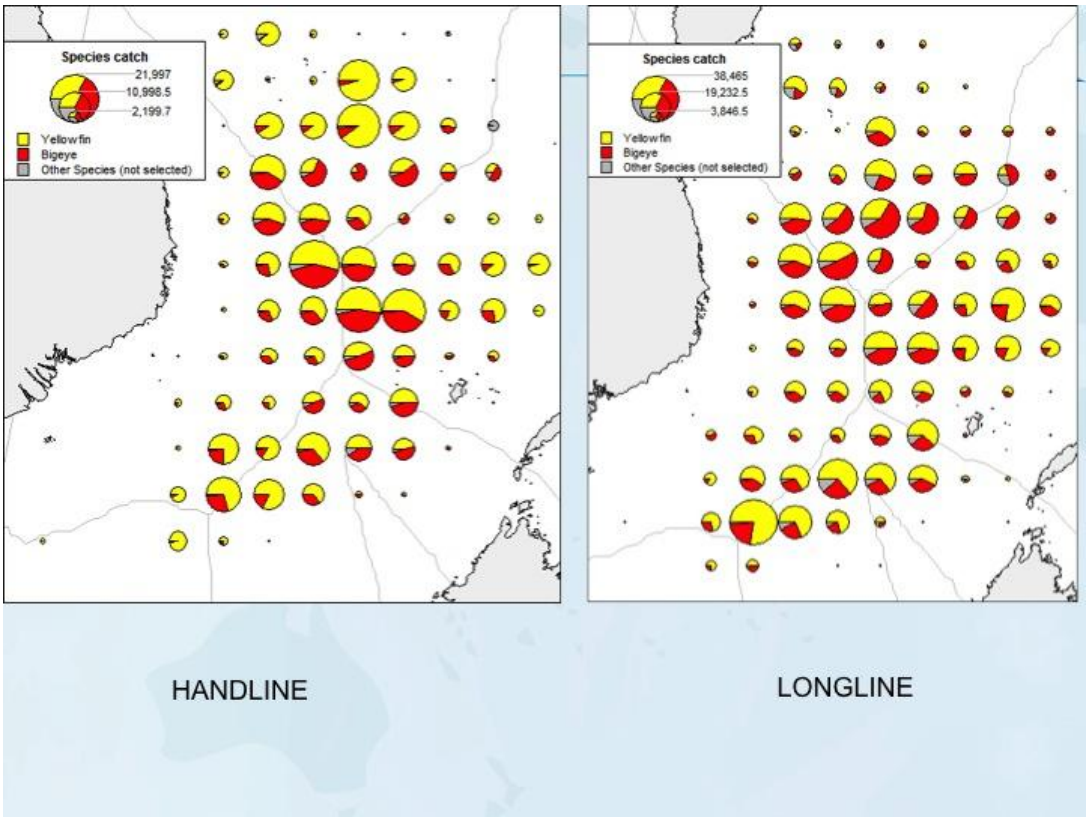
- Bigeye tuna (Thunnus Obesus) are distributed in tropical and sub-tropical regions with circumglobal distribution. Their migratory patterns are poorly known and they are relatively fast growing. Juveniles and small adults tend to school at the surface whereas larger adults stay in deeper waters. Longline catches in the WCPO since 2004 have ranged from 67,000 to 77,000mt/year. In 2012, Vietnam reported Bigeye catches of 4,627MT of which 81% was caught with longline/handline.

The latest stock assesment (2011) indicates that Bigeye tuna stocks are currently under going overfishing but are not yet in overfishing state (explained, in part by higher than average recruitment in recent years).

- Yellowfin tuna (Thunnus albacares) is a highly migratory and relatively fast growing species and are distributed in tropical and sub-tropical regions. These are found in the upper 100m of the water column. Longline catches in the WCPO have been stable at 70-80,000t/year since the 1980's. In 2012, Vietnam reported catches of 15,896MT of Yellowfin in its EEZ of which 78% (12,548MT) was caught with longline/handline.

The latest stock assesement (2011) indicates that the stock is not overfished and not under going overfishing, althought the stock is fully exploited in some su-regions.

Fishing Grounds:



Source: Fishing and Living – "The Vietnamese LonglineTuna Fishery"(2014)

- Khanh Hoa Province

In 2011, there were 8,941 fishing boats with about 30,000 fishers in Khanh Hoa province, in which, there were 352 tuna fishing boats, accounted for 3.9%. Longline, gillnet and pure seine are three main fishing gears for tuna fisherie in Khanh Hoa. In 2011, there were 99 tuna longline boats, 227 tuna gillnet boats and 26 tuna purse seine boats in Khanh Hoa province. Tuna longline and tuna gillnet boats are mainly in Nha Trang city. Tuna purse seine boats do not often operate in Khanh Hoa's sea waters. Some of the tuna purse seine boats have switched to purse seine with lights catching for small pelagic fishes. In 2011, the total tuna production for yellowfin and bigeye tuna (by longline) was about 1,950 mt, and total skipjack tuna production was about 11,000 mt (by purse seine and gillnet) in 2011.

IMPROVED CATCH VOLUME TO LIMIT TUNA IMPORTS

According to the Marine Institute, tuna stocks in Vietnam are estimated of 600,000 MT including 400,000 MT of skipjack tuna. The total allowable catches are 200,000 MT per year in order to protect the marine national ressources of tuna. This indicates that Vietnam has a huge potential of tuna stock and high potential in catching. And the utilization of this stock can be improved.

In Vietnam, tuna catch volumes are not suficient to provide the processing industry with enough raw materials. Therefore tuna is imported from other countries, low catch volumes (which begin to increase), are partially the result of the small size of most Vietnamese fishing vessels, and the fact that they do not fish in international waters. According to VASEP in 2014, Vietnam increases import on seafood products. In 2014, tuna was one of the main imported products (with finfish and shrimp) and represented 22, 9% of total seafood imported to Vietnam, representing 159, 796,151 US$. Althought it is likely that most imported tuna are Skipjack and Yellow Fin Tuna, no detailled information about the imported species is available. However, during an interview with an exporter in 2012, it was mentionned that Vietnam imported significant volumes of tuna from Taiwan.

Case study:
Japanese Support to Vietnam Tuna Fisheries Modernization

In 2014, 99 countries and regions in the world have imported and consumed Vietnamese tuna products for a total value of US$ 560 million. If Vietnamese tuna quality is improved in the next years, the total value of exports from Vietnam could reach US$ 1, 5 billion[22]. These quality improvements can be operated with technology's transfers.

Japan's projects in Vietnam aim to boost the modernization of the tuna fishery industry, mainly in the central provinces. Yanmar company project, coordinated with the University of Nha Trang Ship institute (UNINSHIP) aims to modernize the fishing boats in the provinces of Khánh Hòa, Phú Yên, and Bình Đinh located in the South Central Coast region, based on the japanese model of tuna fishers ("the Yanmar").According to Mr. Nguyen Manh Thanh (Tuna Department of VASEP), in order to improve the quality of Vietnamese Tuna products, it is necessary for local authorities to build modern vessels with new fisheries technology. The Yanmar has a boat structure of 18 meters, 50 tons, and 350 cc. Japanese Cooperation in Vietnam projects to built 180 boat for tuna fisheries industry, for 7,8 billion USD (65% payed by Yanmar Corporation and 35% by Fishery Directories). Today, 3,500 tuna boats are active in the 3 provinces with only 45 cc. A majority of 45 cc's power capacity is not enough to effectuate high-seas fishing with important captures.

During last years, Vietnamese tuna price increased from VND 50,000 (2, 3 US$) to VND 90,000 (4, 1 US$). With Japanese certification in Vietnamese products, the price can reached 9, 0 US$ per kilogram. Products certified with Japanese standards can be exported and accepted in all the countries in the world. Japanese Cooperation (JICA) is expecting to become the first international cooperator in agricultural sector in Vietnam.

TUNA PROCESSORS AND EXPORTERS

Number of tuna processing and export enterprises has increasingly gone up from 70 in 2008, to over 100 enterprises to 96 markets. Most of enterprises are located in the central region, especially Khanh Hoa (44 enterprises), Da Nang (15 enterprises), Binh

[22] Vietnam News, 05/08/2015. « Vietnamese Tuna Exports and New Technology », Japanese Experts.

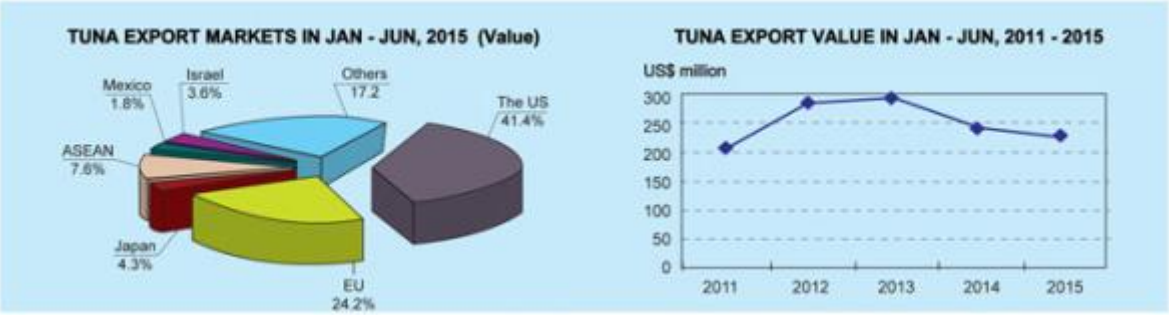
Dinh (6 enterprises) and Phu Yen (4 enterprises) that account for about 56% of the total national value. Tuna processing creates jobs for over 40,000 laborers (30,000 fishermen and over 10,000 workers in factories)[23].

All tuna processing enterprises involve in import and export. Many of them invest in infrasture and technology, strengthen training skills to workers, improve quality management, ensure food hygience and safety, implement advanced quality management programs (GMP, SSOP, HACCP, ISO, etc...), and meanwhile apply advanced technology and procedures of other countries to produce qualified tuna products that satisfy export requirements of the U.S, EU and Japan markets.

B/ TUNA EXPORTS

Vietnamese exports of tuna generally can be divided into canned tuna and frozen tuna products. The shares of tuna exports in 2014 composed 40% of frozen tuna, and 37% of canned tuna. In 2014, Vietnam exported tuna to 97 markets (compared with the same period last yerar where they were sent to 103 markets), earning US$ 484,2 million (8,1% less than 2013 with US$527 million). The US, EU, ASEAN, Japan, Israel, Canada, Tunisia and Mexico are the main markets, occupying 85% of total export value.

Figure: Market Structure in 2015



Source: VASEP, 2015

Reasons of the decrease of Tuna Exports in 2015, according to VASEP

1/ The development of the tuna industry is affected by market demand, instable price and low competitiveness.
2/ Unstable sources of raw tuna are the primary reason or falling tuna exports
3/ Vietnam also faces challenges in high demand in major import markets, related to the quality, origin and compliance with international standards in tuna exploitation.
4/ In addition Vietnam's tuna exports to the EU will encounter obstacles this year as its rivals, including Ecuador and the Philipines, have signed a trade agreement that entails a zero tax rate on tuna exports sent from these countries to the EU.

[23] Source : Vietnam Trade Promotion Agency, Vietnam Tuna Export Markets, June 2014

MARKET EXPORT STRUCTURE

- US Market

Vietnam is ranked the third in supplying tuna to the market in US behind Thailand and Indonesia. The TPP agreement will create more competitive advantage for VN tuna, because its regional competitors on the US market (Thailand, Indonesia, Philipines and China) are not part of the TPP.

Figure: Top 10 largest suppliers of tuna to the US, Jan-Jun 2014-2015 (USD thousand)

Top 10 largest suppliers of tuna to the US, Jan–Jun/2014–2015 (USD thousand)					
No.		2014	Jan–Jun/ 2014	Jan–Jun/ 2015	Variation (%)
	The world	1,552,066	694,923	715,205	3
1	Thailand	479,613	216,142	193,754	–10
2	Indonesia	150,001	62,408	86,518	39
3	Vietnam	134,996	57,911	65,728	13
4	Philippines	131,896	52,707	49,187	–7
5	Ecuador	126,247	54,908	60,305	10
6	China	123,644	55,180	64,282	16
7	Other Pacific Islands, NEC(*)	64,679	26,747	36,830	38
8	Mauritius	43,151	23,322	22,510	–3
9	Colombia	38,675	8,463	7,244	–14
10	Mexico	37,244	19,528	16,055	–18
11	Sri Lanka	30,909	17,744	18,783	6

Source: VASEP,2015

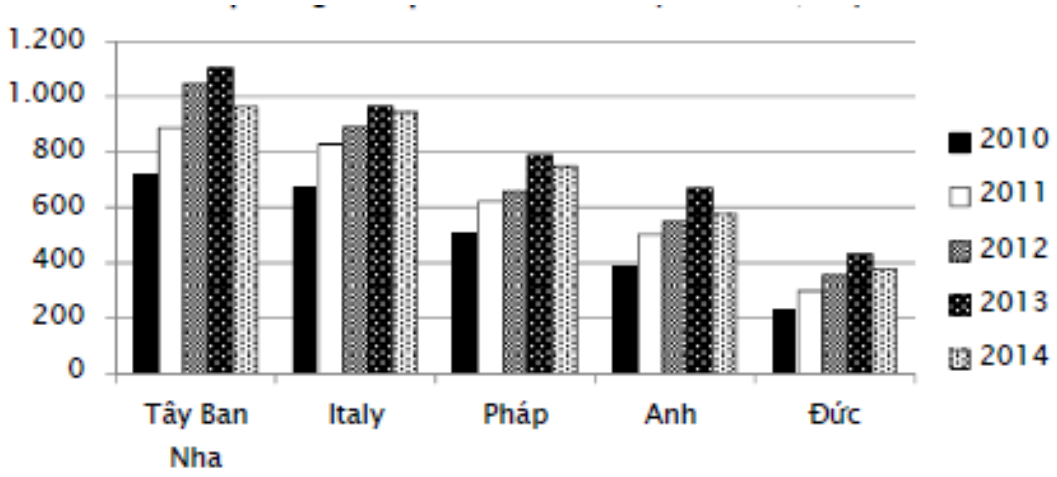
- EU Market

After the US, European market is second supplier of Vietnamese tuna. Vietnamese tuna import is rising in EU market, despite tuna imports from other exporters is declining. Moreover, VN tuna exporters to EU countries will soon benefit from EVFTA.

Among EU block, Germany was the largest importer of VN tuna but tuna sales to the market downed 17% in Jan-Jun 2015. Italy is the second destination for Vietnamese Tuna in European bloc, followed by France. Vietnamese tuna exports to Spain rose sharply 28, 2%.

According to VASEP, Spain is considered as a potential markets important among the EU countries. In 2014, Vietnam was ranked the 20th in supplying tuna to Spain. In 2015, Vietnam surpassed to the 9th position. Tuna loin was most exported to Spain, making up 80 percent of Vietnam's total tuna exports to the market.

Figure: Top 5 largest importer in EU block (value US$mil.)



Tây Ban Nha: Spain
Phap: France
Anh: the UK
Duc: Netherland

Case Study:
EVFTA and Outlook for Vietnam's Tuna industry

After over two years of negociation, Vietnam and EU reached agreement. The EU-Vietnam FTA will eliminate nearly all tariffs (over 99%) except for a small number of tariff lines for which the EU and Vietnam agreed on partial liberalization throught zero-duty Tariff Rate Quotas (TRQs). Accordingly, canned tuna from Vietnam will be completely tax-free when imported into the EU.
Statistics from Vietnam customs, Vietnam's tuna exported to the EU in H1/2015 reached 54,4 million, down nearly 22% ove the same period last year. According to Eurostate, in 2014, the EU imported 13,000 MT of canned tuna from Vietnam
When EVFTA takes effect, with the exception of canned tuna, all tuna products imported to the EU from Vietnam will be exempt from tax while canned tuna products need 7 more years to achieve this. In the short run, this would reduce the competitiveness of tuna from Vietnam, as products from Ecuador and the Philipines have already been exempted.

After all, in the long run, EVFTA will create advantage for tuna exports of Vietnam, especially raising quality. However, in the short run, difficulties are still there.

Source: VASEP, 18/08/2015

- Japanase Market :

Vietnam is the 20th suppliers of tuna for Japan. An important cooperation is being to develop between the two countries in seafood sector. During the year 2015, Japan supported Vietnam in tuna catching aiming to improve fresh tuna exports to the market. Tuna exports to Japan continuously dropped in first months of 2015. In June, exports recovered 2, 9% compared to June 2014. Japan is considered as the 4th biggest importers of Vietnam tuna.

- Potential Market : Mexico

In Jan-Jun 2015, Vietnam tuna sales to Mexico up 119% year on year. Vietnam is ranking the second in supplying tuna to Mexico. Frozen tuna (Hs code 03) is the major item exported to Mexico with US$ 4 million in H1. 2015. The signature of theTPP represents also an important opportunity for the Vietnamese producers and exporters of tuna. Mexico is an emerging country, and the tax benefits advantages for the Vietnamese tuna will aim to penetrate this potential market of the future.

- Potential Market : Russia

In 2014, Russia was a small market of Vietnamese tuna. In 2015, Russia ranked the 9th in importing tuna from Vietnam. In Jan-Jun 2015, tuna sales to Russia up to 165,7% year on year. Two main products are exported to the market: live/ fresh/ frozen tuna (3%) and frozen raw tuna (97%). The Eurasian Economic Union between Vietnam and Russia (plus Bielorussia, Azerbadjian, Kirdistan) signed on May 2015 represents a important opportunity for Vietnamese tuna, because committed to clear tax for seafood product imported into the EEU including Russia.

Egypt and others countries in the Middle East represent a new destination fro tuna from Southeast Asia. In the last 5 years, Vietnam's tuna exports to Egypt have increased constantly. In 2014, Vietnam's tuna exports to this nearly US$ 2, 5 million, reporting a rocket of nearly 63% compared to 2013. Canned tuna was of course the main export product (VASEP, 2015).

Canada represents also a new destination for Vietnam tuna exporters. In the past 5 years, Vietnam tuna exports to Canada are increasingly hight. Canada is one of 10 leading tuna consumers of Vietnam as well as the 14th largest consumer of the world. According to ITC, Canada imports tuna from 53 suppliers in the world in which Thailand, Philipines and Vietnam are leading ones. Thailand is the largest supplier to Canada with its market share of 84%, followed by Philipines and Vietnam, respectively 4% and 2, 6%. But in the last months of the year 2015 and during 2016, Vietnam tuna exports to Canada are expected to report a year-on-year growth. Morevoer, the TPP agreements, represent a huge opportunity for Vietnam tuna exporters to penetrate a market like Canada, and benefits of large tax privileges.

VASEP's recommendations for Tuna Exports

1/ The government's further consideration for developing offshore fishing sector to ensure high-quality and stable supply of raw for tuna processing and exporting (a/developing offshore fishing vessels in a sustainable manner; b/looking forward strict requirements from importing markets)
2/ Slashing import duty of raw material to 0% in order to boost exports amid the current difficult situation
3/ The state's further support for enterprises, when bilateral and multilateral agreements are coming into force (for example Thailand producers and exporters have advantage in the tuna production. Thailand is more flexible with the producers in term of policy for exporters).
4/ Build a Vietnam label for Tuna Product

TUNA FISHERIES MANAGEMENT: influencers and supporters of the sector

- Government authorities

National Level: Under the directorate of fisheries of the Ministry of Agriculture and Rural Development (MARD), DECAFIREP is in charge of the national management of the tuna sector. DECAFIREP is responsible for issues such as vessel registration, catch control, fishing area regulation, and traceability certificates. DECAFIREP is also supporting Vietnam to become full-number of the Western Central Pacific Fisheries Commission (WCPFC). NAFIQAD is responsible for the quality control of tuna. NAFIQAD is the only organisation that can certify vessels for food safety standards for foreign markets such as EU, US and Japan. An observed weakness is that there is no national standard for the quality of the tuna, so that the quality of the tuna can not be measured according specifiec standards (article "Courrier du Vietnam", Build a Vietnamese Label in the Tuna Industry, 07/05/2015). As part of the Ministry of Industry and Trade (MOIT), the Vietnam Chamber for Trade and Industry (VCCI) is responsible for granting the certificate of origin for the export of seafood product including tuna.

Provincial Level: Management responsibilities are delegated to local branches of MARD (Department of Agriculture and Rural Department (DARD)), and provincials units called sub-DECAFIREP. DARD is reponsible for implementing legal regulations enacted by central government and MARD and Sub-DECAFIREP are responsible for monitoring and controlling fisheries operations at the provincial level (e.g data collection, boat registration).

- Research Institutes:

The Research Institute for Marine Products (RIMF) operates under MARD, and is responsible for bio stock assessment for marine species including tuna. The latest stock assessement was conducted in 2011 and indicated the level of exploitation of Bigeye tuna and Yellow Fin tuna (Study Case: Longline and Handline fishing in Phu Yen

Province).The Institute of Marine Environment and Ressources (IMER) conducts research in several sectors in the marine environment and also provides scientific education and consultancy. IMER is part of the Vietnam Academy of Science and Technology. The WWF with its partners have been working to help build a steadily improving fishery that can ultimately achieve Marine Stewardship Council (MSC) certification. WWF is also involved on Vietnam yellowfin Tuna Fisheries Improvement Project.

- Producer and Exporters Associations:

The Vietnam Tuna Association was established in 2010, in the central province of Khanh Hoa in Nha Trang city. The association aims to connect and support members to develop and improve their fishing activities as well as protect rights relating to their protection, fishing; trading and processing in Vietnam. However, VINATUNA does not engage in catch control and export. At provincial leve, three provincial associations are established in Binh Dinh, Phu Yen and Khanh Hoan provinces. At a national level, VASEP supports exporters of fishery and aquaculture products, including tuna (Tuna department of VASEP).

MAIN BOTTLENECKS AND RECOMMENDATIONS

In 2012, a study[24] identified severals bottlenecks to be improved concerning the Vietnamese tuna fisheries:

- 1/ Lack of scientific data:

The report described a lack of scientific data focusses especially on the lack of information about tuna fishing grounds and stocks. Improved scientific data can result in more effective management plans for catching tuna and managing stocks. The last stock assesment for tuna was conducted in 2011 by the Vietnamese government and the one before was conducted in 2005.
As solutions and actions, the report proposed to invest more in research activities for stock asessments and monitoring programmes.
In 2015, according to the MARD, a plan gestion to preserve tuna species will be install for the period 2015-2020 to develop a long term exploitation. MARD declared three propositions: 1/ A satellite surveillance for the tuna fishing boats and to control fishing areas; 2/ Studies to control tuna stocks, every year (population, exploitation, overfishing, underfishing); 3/ creation of a consultative institution for fisheries management; moreover MARD declared the using of the MSC certification.

- 2/ Lack of cooperation within the value chain :

The report remarked a lack of cooperation between producers, middlement and procesors/exporters takes place at several stages on the value chain. Because of competition among the fishermen to catch good quality tuna, little information is shared

[24] The Vietnamese Seafood sector, A value chain analysis (2012), compiled for the Ministry of Foreign Affairs of the Netherlands.

about the fishing grounds. There are also limited contracts betweenn fishermen and processors/exporters.
In order to find a solution against this problem of cooperation, it is important to invest in mutual trust between different actors (especially between fishermen, middlemen, and processors/exporters) and show the benefits of cooperation within the value chain.
Especially in the tuna value chain, it is crucial to establish a strong partnership between all the actors working at the diferent stages of the industry. This partnership could participate to the sharing of informations, improve the quality of tuna fishing, and boost the exports.

- 3/ Lack of tracability:

Most of the Vietnamese tuna vessels are small vessels that do not have the financial capacity to document and measure their catches. Therefore is it difficult to trace their catches, what is for example required for exporting to the EU.
The element of tracability at the level of the fishermen and fish landing sites should be improved. To realise this, investment in small vessels are required as well as the training of fishermen to document catches.

- 4/ Lack of sustainability

According to the stakeholders, the level of sustainability of tuna fishery is insuficient. There is no management plan for the Vietnamese tuna fisheries. Also the fact that Vietnam is still no full member of the WCPFC (Western and central Pacific Fisheries Commission) is considered a bottleneck for the tuna subsector[25]. Finally, it is also mentionned that no tuna fishery in Vietnam is certified by an eco label as the Marine Stewardship Council (MSC)[26].

- 5/ Hight standards for food safety in export markets:

Althought the bottleneck of foreign trade is related to the bottleneck of lack of tracability, it was identified as a separate bottleneck. In particular, the strict standards regarding food safety (in the EU) are difficult to meet for both processing companies and fishermen.
To meet these standards most likely investments have to be made at the level of the fishing fleetn fish landing sites and the processors/ exporters. Also lobbying activities of the Vietnamese government may be a possible option.

[25] On may 2015, Vietnam is considered as a cooperating non-member of the WCPFC. WCPFC website updated on 25 may 2015.
[26] Vietnam Yellowfin Tuna Fisheries Improvement Project (FIP) , " *WWF and a number of partners have been working together since 2013, to help build a steadily improving fishery so that it can ultimately achieve the Marine Stewardship Council (MSC) certification*" – WWF, 2015.

Case Study:
Tuna Fishermen benefit from Cooperatives

The development of seafood cooperatives in northern Ninh Binh Province has helped local offshore fishermen access prferential State loans, duties and insurance policies. Co-operatives created more jobs for fishermen and supported long-term deep-sea seafood exploitation. Both the quantity and quality was improved. The cooperatives has registered total VND 100 billion (US$ 4,5 million) charter capital, of which minimum contribution from a member house hold is VND 300 million and maximum VND 20 billion. Being set up officialy on November 21, the cooperatives now owns fishing vessels (150-450 horse power) and a 90-horse power boat, at a cost of VND 1,5 billion.

Authorities in Quang Ngai central coastal provinces have built a 2015-2020 scheme for development of offshore seafood processing cooperatives. According to the scheme, the provincial government will pay for the cooperatives rent and the interest from their loan. Each cooperative has minimum of 20 member's households and 20 fishing vessels. All of the deep-sea fishing households volunteered to join the cooperatives. Sao Do, the first seafood cooperative in Danang city was set up on June 2015.

Source: Viet Nam News, Saturday November 28th, 2015

CONCLUSION

Most of the bottlenecks that are previously discussed occur at the stage of the fishing fleet, and the fish landing sites. Most of the small fishing vessels are depending on the middlemen. Another important issue, is that Vietnam exported in 2014, more canned tuna and frozen tuna than the numbers of tuna catched in the maritime area of Vietnam. Data from VASEP show that, Vietnam imported nearly 150,000,000 US$ of tuna in 2014 (representing 22, 9% of total seafood imported in Vietnam). Vietnamese processors/exporters seem to be more dependent on imported tuna than on the raw material supplied by the domestic fishing fleet.

Another issue for tuna industry in Vietnam is related to its price. Tuna caught by Vietnamese vessels has lower import tariffs than tuna caught by foreign vessels. In 2012, up to 50% of the catches cannot be sold to processors/exporters because the quality of the tuna has deteriorated du to insufficient cold storage facilities. It's important to precise that also processors should have an interest in improving the quality of catches.

4. BIVALVE MOLLUSC INDUSTRY

Clams, Oysters, Mussels and Scallops

Vietnam trails its Asian neighbors in bivalve production. Despite approximately 3,260 km of coastline an many native clams, mussels and oysters with excellent production potential, Vietnam exported in 2014 a total value of US$ 80 million (10,7% up than 2013), with only one third coming from aquaculture. And Vietnam is only sending its bivalve mollusc to 42 global markets[27]. Contrats with China, which produces more than ten times this quantity of molluscs per km of coastline with over 90% from aquaculture[28].
Nevertheless, clam farming in the coastal province of Vietnam has notably developed since last decade. It generated high income; improve socio-economic development for many local communities. However, many clam raising farms were facing many difficulties of farm management, disease control, markets and system of quality control.

Vietnam bivalve mollusc's value chain needs to improve some bottlenecks that we will try to identify. But Vietnam's bivalve mollusk has huge potential. Furthermore, in 2014, major markets including the US, Japan, South Korea, the EU, and Australia gradually increased the proportion of processed clam in import structure by 5-25% beside scallops, oysters and mussels. Vietnam exporters should promote exports of these products.

A/ BIVALVE MOLLUSC'S SPECIES IN VIETNAM

In Vietnam, 26 species of bivalve mollusks exist, 7 of while are considered as valuable, and were the focus of the Monitoring Program for Bivavle Mollusc production areas in 2014 redacted by NAFIQAD, under the Ministry of Agriculture and Rural Development[29] :

- Baby Clam (*Meretrix lyrata*)
- Yellow Clam (*Paphia sp.)*
- Blood Clam (*Tegillarca granosa*)
- Antique ark (*Anadara subcrenata, Anadara antiquata*)
- Scallop (*Chlamys nobilis*)
- Snout Otter Clam (*Lutraria philipinarum*)
- Pacific Oyster (*Crassostrea gigas*)

[27] VASEP website source, July 14, 2014.
[28] Building bivalve hatchery production capacity in Vietnam and Australia (2012), O'Connor, W.; Done, M.; O'Connor, S.; Luu, T.; Giang, T. FIS/2005/ 114 Final Report for ACIAR. 43pp.
[29] Report Sanitation Monitoring Program for Bivalve Mollusc Production Areas in 2014 and Plan for Program implementation in 2015, Ministry of Agriculture and Rural Development, National Agro-Forestry-Fisheries Quality Assurance Department (NAFIQAD), March 2015.
http://www.nafiqad.gov.vn/d-monitoring-program/Bivalve-mollusks/report-of-bm-14-15-en.pdf

B/ SCOPE AND PRODUCTION AREAS

In order to have an overview of the bivalve mollusk production areas in Vietnam, we refer to the Monitoring Program put in place by NAFIQAD and MARD on main bivalve mollusc production areas on the national teritory. In 2014, the Program was applied to 20 bivalve mollusc production areas located in following 12 provinces/ cities: Ho Chi Minh, Tien Giang, Ben Tre, Tra Vinh, Kien Giang, Binh Tuan, Ha Tinh, Thanh Hoa, ninh Binh, Thai Binh, Nam Dinh, and Quang Ninh (details on next Table)

Map: Location of Bivalve Mollusc Production areas in Vietnam

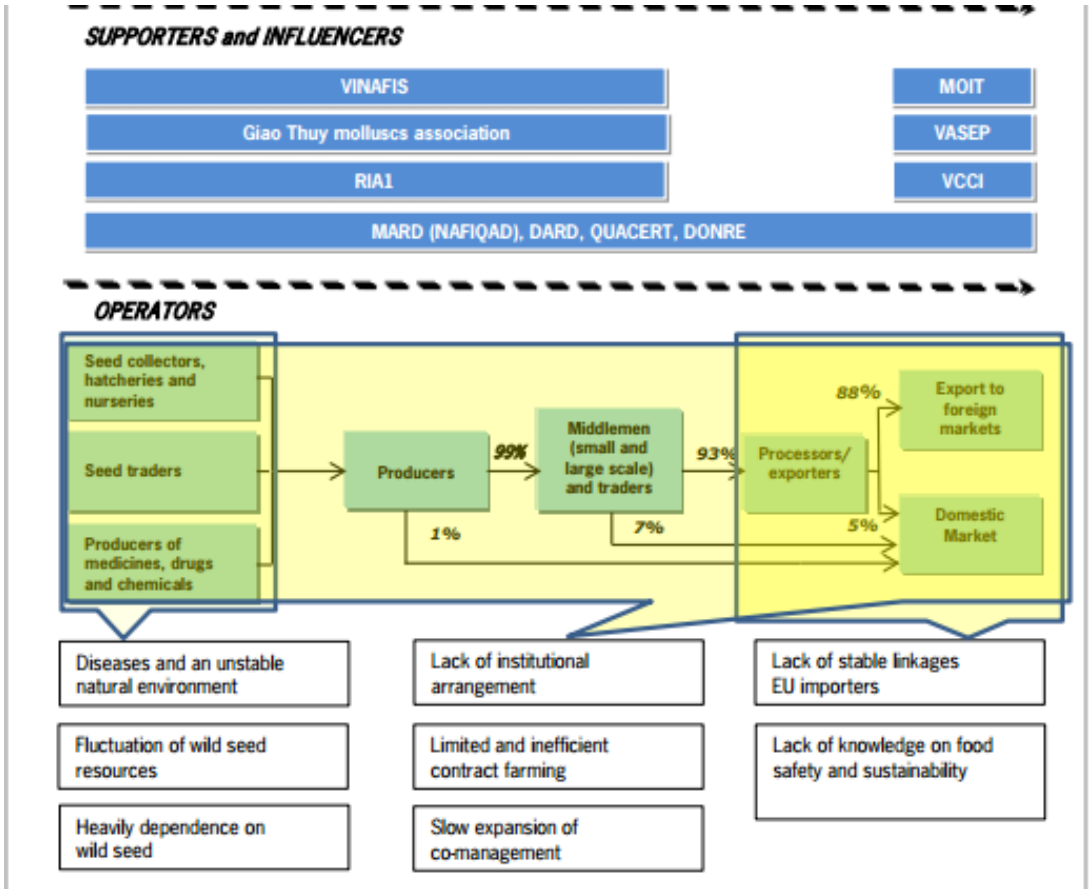
Source: NAFIQAD, 2015

Table 1: Species, Surfaces, Production under the Monitoring Program in 2014

No.	Production areas	Species	Surface (ha)	Production (tons)	Starting year
1.	Van Don	Snout Otter Clam (*Lutraria philippinarum*)	60	12	2009
		Pacific oyster (*Crassostrea gigas*)	100	280	2009
2.	Tien Hai	Baby clam (*Meretrix lyrata*)	1,580	11094	2004
3.	Thai Thuy		738	0	2011
4.	Giao Thuy		1,500	1650,2	2004
5.	Nghia Hung		500	8416,1	2004
6.	Kim Son		650	2003	2012
7.	Hau Loc		703	174,5	2011
8.	Loc Ha		230	1188,7	2011
9.	Tan Thanh	Baby clam (*Meretrix lyrata*)	2,150	567,2	1997
10.	Binh Dai	Baby clam (*Meretrix lyrata*)	2,160	2419,4	1997
		Blood clam (*Tegillarca granosa*)	750	29,5	
11.	Ba Tri	Baby clam (*Meretrix lyrata*)	1,195	1684,4	1997
		Blood clam (*Tegillarca granosa*)	150	36	
12.	Thanh Phu	Baby clam (*Meretrix lyrata*)	595	817	1997
		Blood clam (*Tegillarca granosa*)	150	3,3	
13.	Can Gio	Baby clam (*Meretrix lyrata*)	400	4544	1999
14.	Tuy Phong	Antique ark (*Anadara antiquata*)	16,500	831,3	2004
		Scallop (*Chlamys nobilis*)		2563,2	
15.	Ham Tan	Antique ark (*Anadara antiquata*)	1,330	856	2004
16.	Phan Thiet	Antique ark (*Anadara antiquata*)	16,050	2727,8	2004
		Scallop (*Chlamys nobilis*)		70570,5	
17.	Cau Ngang	Baby clam (*Meretrix lyrata*)	300	798	2001
18.	Hiep Thanh		60	190	2001
19.	Duyen Hai		140	160	2001
20.	Ba Lua	Yellow clam (*Paphia sp.*)	36,000	21966,4	2000
		Antique ark (*Anadara subcrenata*)		0	2006
	Tổng số			135,582,5	

C/ VIETNAMESE VALUE CHAIN FOR BIVALVE MOLLUSC

Figure 2: the Vietnamese value chain for hard clams and the main bottlenecks



Source : Lei, 2012

OPERATORS WITHIN THE VALUE CHAIN

The main inputs for farming hard clams, oysters, and mussels are seed, and medicines, drugs and chemicals[30]. Seed broostock is provided by seed collectors or hatcheries. Nurseries grow the seed for farming. Also seed traders play a role in the value chain by trading broostock with seed collectors, hactcheries, nurseries and farmers. Oysters and mussels are cultured, while clams are both cultured and captured.

Seed collectors and suppliers:

Seed for the production of clams, oysters and mussels in nurseries is provided by seed collectors or hactcheries. About 70% of seed for hard clam production is supplied by seed collectors, while 30% is supplied by hatcheries. Hatcheries account for 80% of the seed production for oysters, while the remaining 20% is supplied by seed collectors. Mussel seed is supplied by seed collectors. 60% of the collected seed is sold to seed traders, while 20% is sold to nurseries. The remaining 20% is sold to farmers directly. Hatcheries produce seed for hard clams and oysters. Production of hard clam seed in particular has increased since last five years. It is said that demand for seed exceeds suply. Many hatcheries produce oyster seeds (mainly in Quang Ninh, Hai Phong, Khan Hoa and Ba Ria-Vung Tau). There are two main hatcheries for hard clams, one hatchery located in the Red River Delta and one in the Mekong River Delta. 50% of the seed that is supplied from hatcheries goes directly to producers, while 50% the other is sold to seed traders and nurseries. No distinctio between clams and oysters can be made.

Producers of medicines, drugs and chemicals for Bivalve Molusc in Vietnam

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

Producers of hard clams, oysters and mussels

Hard clams, oysters and mussels are supplied to middlemen and processors. For the production of hard clams, there are differences between the Mekong Delta and the Red River Delta. Most of the producers of hard clams in the Mekong River Delta belong to cooperatives, and focus on collecting wild hard clams (Tien Giang, Ben Tre), or the farming of hard clam (Tra Vinh). Most producers only focus on producing and harvesting clams. Large-scale producers (farms with more than ten hectares) in the Red River Delta also whiten and clean the hard clams and package and transport them to domestic markets in big cities or export to China. Producers of hard clams in the Red River Delta

[30] The Vietnamese Seafood Sector, A value chain analysis (2012), compiled for CBI by LEI, part of Wageningen UR, for the Ministry of Foreign Affairs of Netherland.

do not collect hard clams from the wild, but only farm hard clams. The most important reason that hard clam producers depend on seed traders is that they need seed of a reliable quality. In the Mekong River Delta hard clam producers are depending more on middlemen for marketing and selling hard clams. Also in general producers of hard clams have low operationnal costs. Very often, there are no written contracts between hard clam producers and middlemen.

On the Table, we can see that clam rising is one of the very risky activities. Farmers to face with many risky during the production process: unsecure quality of seed such as low growth rate, high death rate, late detection of disease, uncontroleld water source, natural disasters, such as flood, storms, sea level rise, etc. The most concern was the high death rate[31].

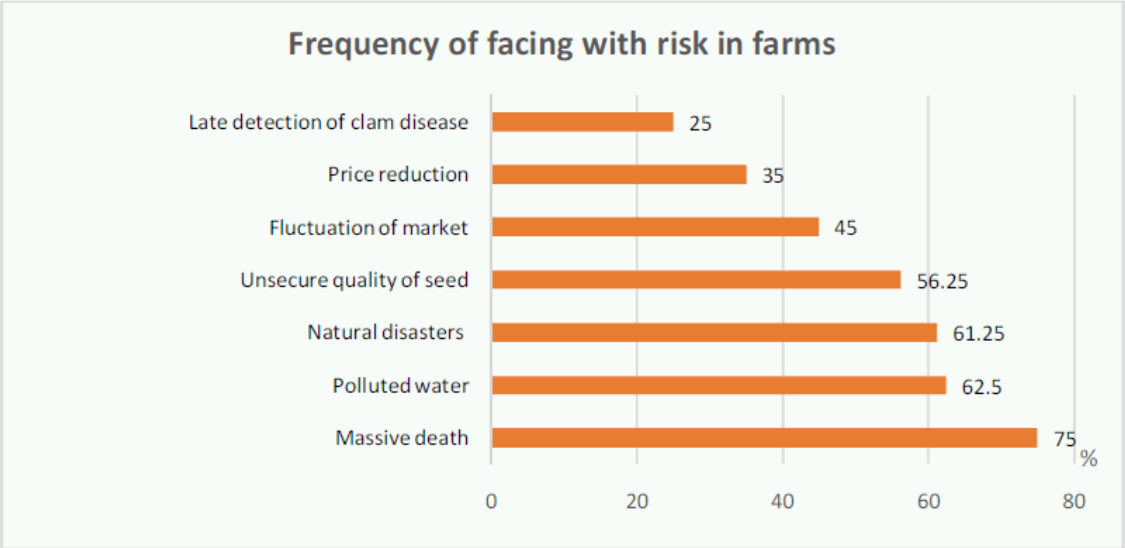


Figure 3. Frequency of facing with risk in farms

Case Study:

"December 2012: Water Pollution decimating Vietnam Oysters Fisheries"

About 1,000 tons of oysters cultivated in Man Quang Bay, located near Da Nang, died in december 2012, affecting more than 100 small farmers.

An oyster farmer who lost three tones of oysters told that polluted water can be the only factor. He said "Oysters rarely die of an illness. Water at the bay would likely have been polluted by waste from Tho Quang Seafood processing zone which is just 1km away".
The Sea and Islands General Administration of Vietnam estimates that various wastes originating on the mainland may contribute to about 70% of the nation's marine pollution. Researchers claim the coastal waters are now experiencing "significan environmental duress". The coast's pollution "hot spots" include northern Quang Ninh Province, Hai Phong City, central Da Nang City, Quang Nam province and southern Ba

[31] Research article: "Cost Monitoring for Clam raising farmers in the Northern Area of Vietnam ", Bui Thi Nga and Philippe Lebailly, 25/08/2014. This situation also reported in previous studies (Thuyet BD, and DzungTV, 2013; AD, 2011). There was 75% number of farms faced with situation of massive death. In which there were some farms that had been in massive death by 9 and 10 time during the production phase.

Ria Vung Tau Province. The current estimate of pollution (2013) is about 6,5 million tons of toxic chemicals, 1,6 million tons of oil, and 47,000 tons of heavy metal are fouling the oceans from the shore. Plus there are no landfill wastewater treatment facilities that could adress dangerous runoff. Rivers flowing into the sea contain pollution and sediment that compound the environmental challenges. The runoff and various discharges have degraded marine ecosystems and coastal fisheries.

Coastal Vitnaml has almost 44 million residents, plus hosts 5 million tourists annualy. There are also at 500 industrial parks and thousands of manufacturing facilities located on the coast. Fishing is an essential enterprise for Vietnam's economy. Oyster has been important for the nation since the 1960's according to the United Nations Regional Seafarming Resources Atlas. More than four million tons of oysters are consumed worldwide annualy. Althought molluscs have great export potential, current production is about 5,000 tons of fresh Pacific oysters produced annualy at a market price of between VND 30,000 and 50,000 per kilogram (in 2014).

Source: RWL Water, January 11, 2013

Middlemen:

On a 2012 study[32], middlemen on the value chain of bivalve mollusk in Vietnam are mentionned as a critical actor for clams. Middlement can conduct several activities such as harvesting, preserving, trasnporting and distributing of the products to the processors and domestic markets (restaurant, hotels, local market,etc). Middlemen do not provide seeds, loans or technical advice to producers of clams, oysters and mussels. In general, two kinds of middlement can be distinguised. Small middlemen are often located nearby the farming or fishing areas and limited financial capacity. Larger middlemen are often located in thee town centre or a city and have stronger financial power. Larger middlemen have closer relationships with processors.

Processors and exporters:

Hard clams are often processed and exported while oysters and mussels are only processed as they are only sold on the domestic. Nevertheless, its is important for Vietnam to divertify its seafood export products since, and oysters and scallop are beginning to be export, mainly on European market which is aiming of these products.

The processing of clams, oysters and mussels for the domestic market takes place at processors that also process other seafood products. Processors can also have other functions such as transporting, freezing, packing and preserving. In the domestic market, processors provide processed products only to the large traders and supermarkets. Processors of clams, oysters and mussels do not have contracts with producers or cooperatives, instead they have contracts with middlemen to trade a to act as their agent.

[32] The Vietnamese Seafood sector, A Value Chain Analysis (2012), compiled for CBI by LEI.

Although, processors have a very important role in the value chain for bivalve molluscs. In the Mekong River Delta, clams are auctioned before harvest. Often processors do not understand the specific harvest conditions and do not have suficient skills to compete with local middlemen. Nevertheless, depending on a few middlemen is considered to be risky compared to being dependent on many small producers. These also reduce the cost for the collection of raw material. Most of the exporting companies of hard clams are located in the Mekong River Delta. Hard clams are exporting to China without processing.

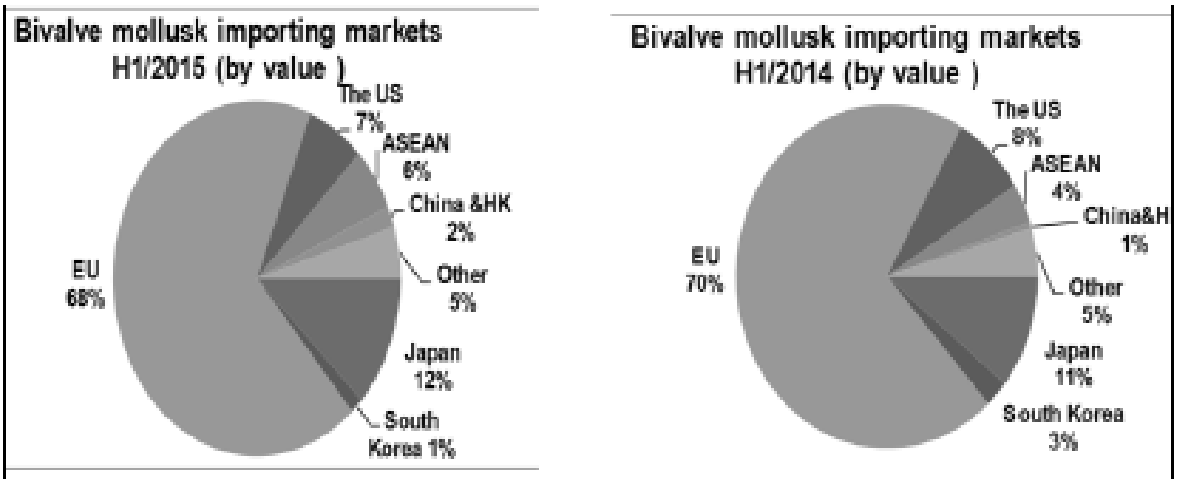
D/ FLOW OF PRODUCTS AND BIVALVE MOLLUSC EXPORTS

It is estimated that 88% of hard clams are exported to go to international markets and the remaining 12% goes to domestic markets. Hard clams that are exported are all processed first. Hard clams can be exported as various product types. About 60% is exported as whole shell product, while 30% is boiled without shell.

The domestic market is supplied by processors (4%), but also by traders (7%) and grows out farms (1%). Hard clams are captured or harvested from the farm and are transported by the middlemen to a trader before they are further traded to processors. Hard clams might have to pass several middlemen and traders before they reach the processing plants because of differences in the size, colour, subs species and quality levels.

In 2014, bivalve molluscs from Vietnam were exported in 42 global markets. Last year, top 9 markets of bivalve molluscs exports include the EU, Japan, the US, ASEAN, South Korea, China – HongKong, Australia, Taiwan and Canada accounted for 98,3% of the total export value. The EU, the US and Japan were top 3 owing 87% of the value.

Graph: Bivalve Mollusc Importing Markets



Source: VASEP, 2015

European Market:

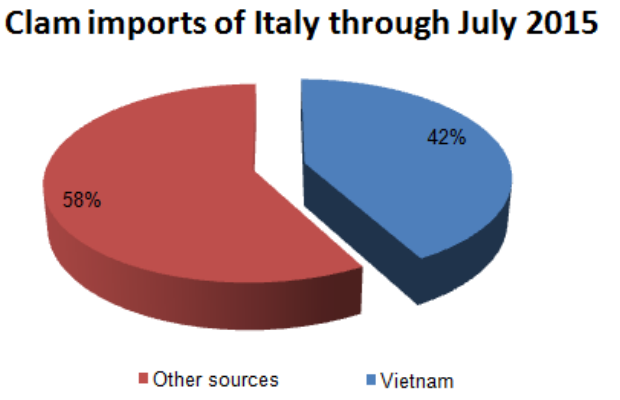
European Union is Vietnam's biggest importing market for bivalve mollusk with 68-70% of total export value. In 2014, total bivalve mollusc exports to the EU reached US$ 54, 4 million, up 8,8% year on year. In H1/2015, total bivalve mollusc exports to the EU reached US$ 27,2 million, up 1,1% year on year (VASEP, 2015). Portugal, Spain and Italy are the top 3 destinations in EU for bivalve mollusc from Vietnam.

Portugal:

Demand for clams (HS 030759) and processed clam (HS 160556) rose dramatically, clam occupying 65-75% of total import value. Accounting for 23,5% of total bivalve molusc exports from Vietnam, Portugal is a leading bivalve mollusk importing market in the EU. However, H1/2015 saw a fall in Vietnam clam exports to this market (-15,4% than last year same period).

Italy:

To Vietnam, Italy is the second biggest market for bivalve mollusk in the EU. According to Vietnam General Customs, through October 2015, bivalve mollusk exports to Italy reached US$ 10, 8 million, up 4% from the same period last year. All clam produts that Vietnam exported to Italy are processed. In Italy, processed clams were sourced from 7 countries. Vietnam is the second biggest source of processed clam, after Turkey. Italian spent US$ 13 million on processed clams. Import from Vietnam were worth US$ 5,5 million, equivalent to 42% of total imports.



France:

France, the world's largest scallop import market, had a record increase in scallop imports in the first half of the year. Vietnam faces stiff competition from Peru, which accounted for 25-30% of french scallop import this year.

Case Study:

On September 2014, Vietnam suspend export of some Molluscan bivalve products to EU following EU inspection

The European Union has asked on September 2014, to stop its export of bivalve mollusc products to the bloc, according to the NAFIQAD. This request was made by after an EU delegation detected two serious violations of food safety regulations for bivalve products during its fact-finding tour to Vietnam on 9-16 September. The mission concluded that Vietnam's blanched noble scallop (Mimaclamys nobilis) flesh had not been heat-treated in accordance with EU standards before being exported to Europe. A Number of seafood processed in Vietnam and exported to the EU were found to contain tracesof noble scallops and ark clams contamined with liphophilic toxins.

Source: Seafood News.com, 23/09/2014

Japan Market:

In 2014, total bivalve mollusc exports from Vietnam to Japan valued US$ 8,6 million, up 10,6%. Japan is the second biggest market bivalve mollusk of Vietnam. During H1/2015, bivalve mollusc exports to Japan reached US$ 4, 81 million, up 17, 4% year on year. China was the largest supplier to Japan, occupying 43-65% among Japan's total imports. Japan has other major sources include: Chile, Thailand, and New Zealand.

Among 85-90% of total imports are fresh live clam (HS 030771), frozen clam (HS 030779) and processed clam (HS 160556). Japan is a market with open opportunities for bivalve Vietnamese mollusc companies. In 2014, Vietnam was the 4th biggest source of processed clam to Japan but exports to the market dropped by nearly 32% more considerable than the top 3 clam exporting markets of Japan.

Table: Japan's top 10 sources of processed clams (H6 160556) (US$ thousands)

Origin	2012	2013	2014	Growth in 2015 compared to 2014 (%)
China	74,609	77,588	71,815	-7.44
South Korea	12,807	5,671	12,390	118.48
Thailand	2,382	2,341	3,560	52.07
Vietnam	**2,992**	**2,686**	**1,851**	**-31.09**
The US	2,421	2,708	1,717	-36.60
Myanmar	260	23	188	717.39
Mozambique	0	0	171	
Indonesia	476	364	160	-56.04
Italy	0	25	73	192.00
Canada	0	257	53	-79.38

US Market:

In 2014, bivalve mollusc exports to the US reached nearly US$ 7 million, up 31% year on year. The US was Vietnam's third favorite destination for bivalve mollusc. By the end of 2014, source from Vietnam accounted for 0, 8-2% total imports of the US, much smaller comparing to Canada, Japan, China, New Zealand and Chile. The two mains products, Scallop and processed clam correspond to 65-78% totals exports of bivalve mollusc. It is hard to compete with giants like China, New Zealand and Chile.

The US imported clams from 18 countries around the globe. For the US, Vietnam is the third biggest source of clams, after Canada and China. According to the NMFS, in the first month of 2015, the US imported 700 MT clams from Vietnam, valuing US$ 1, 81 million, down 15% by volume and down 17% by value year on year in value in 2014. Clam exports of Vietnam to the US deceased by both volume and value. Average clam export price from Vietnam to the US tends to increase, from US$ 2, 59/kg in the first 5 months of 2014 to US$ 2, 63/kg.

Total exports expectated for 2015:

The top nine export markets for bivalve molluscs are the EU, Japan, the US, ASEAN member-countries, South Korea, HongKong, Australia, Taiwan and Canada, which accounted for 92% of total exports. Despite the competition, Vietnamese export products are expected to reach US$ 85 million by the end of the year, a rise of 5% year-on-year, according to VASEP. Exports of bivalve molluscs totalled US$ 40,21 in the first part of the year, up 4,6% year-on-year. Last year, exports reached US$ 80 million for the entire year, an increase of 10, 7% over 2013. According to some VASEP experts[33], Vietnam should try to process more clams and other mollusc products for export on the next months, as demand has increased. Besides scallop, oysters and mussels, major markets including the US, Japan, South Korea, the EU and Australia had increased processed clam imports between 5% to 25% this last year.

E. SUPPORTERS AND INFLUENCERS WITHIN TUNA SECTOR

Government Autorities:

The Ministry of Agriculture and Rural Development (MARD) at the national level and the Department of Agriculture and Rural Development (DARD) at provincial level are the government agencies responsible for the state management of mollusc collection and farming including clams, oysters, and mussels. Within MARD, the National Agriculture Forestry Fisheries Quality Assurance Department (NAFIQAD) plays a relevant role (food safety, traceability and health certificates for export of molluscs) In 2012, NAFIQAD has implemented a traceability system for mollusc which will provide a "mollusc area" with a code for product traceability. The Ministry of Industry and Trade (MOIT) grants a ceritificate of origin for export of hard clams to the EU. Finally, the

[33] Le Hang, Deputy Director of VASEP, on August 2015

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

Producer and Exporters Associations:

At National level, there is no Vietnamese association that specifically represents the clams, oysters and mussels subsectors. The Vietnal Fisheries Society (VINAFIS) is reponsible for protection and supporting the interest of the operators within the value chain. In the province of Nam Dinh in the Red River Delta there is one mollusc association at the district level, namely the Giao Thuy molluscs association. The functions are to share the technical experience, market information and trade promotion. In 2012, the mollusc association has successfully registered the geographical indications of Giao Thuy clam to the ministry of Science and Technology (National Office of Intellectual Property of Vietnam).

In the Mekong River Delta, hard clams producers gather into cooperatives (Ben Tre province). The function of cooperative is to manage a large clam area and to share technical experience. In 2009, under the cooperative system, the Ben Tre clams have received the Marine Stewardship Council (MSC) certificate for the first sustainable fisheries in South East Asia.

Case Study:
Ben Tre Vietnam Han Raked Clam Fishery

In 2009, Ben Tre clam fishery received certification from the Marine Stewardship Council, becoming the first fishery in Southeast Asia to meet the organisation's sustainability and management standards.

The nationaly renowned Ben Tre hard clams (*Meretrix lyrata*) are hand picked using metal rakes and collected into mesh sacks. Once collected, the clams are sold to domestic markets and exported to Europe, the US, Japan, China and Taiwan. Ben Tre province covers a 65-kilometre coastal area and contains more than 4,800 hectares of protected mangroves. In this important region of tremendous biodiversity, the clam fishery plays a vital economic role.

The fishery is operated by a local cooperative that provides close management and surveillance of the broodstock and harvestable clams within their area. Ben Tre DARD and WWF co-sponsored the MSC certification process.

As the first MSC certified fishery in Southeast Asia, the Ben Tre clam fishery can play a key role in demonstrating how certification can conserve resources, preserve local comunities, and positively impact the bottom line for business. After certification, the prices of the clams rose by 30-50%. It is recommended that the Government improve management on fishing process, in order Vietnam keep its pionner role of sustainable fisheries in Southeast Asia.

Source: WWF Vietnam and Ben Tre's DARD

F. BOTTLENECKS AND SOLUTIONS WITHIN THE BIVALVE MOLLUSC VALUE CHAIN

1/ Diseases and an unstable natural environment

Diseaseas and unstable conditions of the natural environment are identified as the most crucial bottleneck. Natural fluctuations regarding water temperature of the level of salinity can have negative effects on the production on hard clams. Last years, some cases of bivalve died were caused by Climate change in Mekong River Delta.
A good warning and monitoring system that monitors the natural conditions in areas where clams are captured or farmed and can indicate possible changes in the environment or diseases might contribute to less fluctuations in production.

2/ Fluctuations of wild seed ressources

Wild seed ressources are the main source for the grow out of hard clams. Fluctuations in the availability of wild seed currently prevent clam producers from producing a stable volume of clams.
Improved protection of aquatic resources in Vietnam may result in less fluctuations and a better wider availability of hard clam seed. Also improvements in the artificial in the artificial reproduction of clams as an alternative for wild seed can be an option.

3/ Limited and ineficient contract farming

Currently, there are limited or ineficient contracts between clam farmers and cooperatives, with processors. This possibility has to do with the important position of middlement within the value chain.

The establishment and development of better linkages between producers and processors within the value chain should result in more and eficien contracts.

The Deutsche Gesselschaft für Internationale Zusammenarbeit (GIZ) has conducted a value chain analysis for clams in Tra Vinh. WWF is working to develop the Bivalve Aquaculture Standard/ASC and collect feedback for producers in Vietnam.

4/ Slow expansion of cooperatives

The cooperative co-management system in Ben Tre has proven to be succesful and to contribute to the sustainable development of the production of clams.
The introduction of policies and regulation that stimulate the development of co-management system can be a proposition as the main solution to overcome this bottleneck. A planning management system is necessary to build a strong and sustainable bivalve mollusc industry in Vietnam.

5/ Lack of stable linkages with importer (EU case)

European Union is Vietnam biggest importer market of bivalve mollusc products (70%) . Vietnamese exporters of hard clam have raised the issue that they are few long term

relationships with EU importer. Also the marketing effort should be improved and Vietnamese clams do not have a strong brand name.
More investments for the marketing and trade promotion should be carried out to improve the market position of Vietnamese clams. The government, VASEP and exporters of clams themselves should play an important role.

6/ Lack of knowledge on food safety and sustainability

Producers and exporters of hard clams are developing their knowledge on food safety and sustainability standards (MSC and Global GAP), but should be improve more. According to Ben Tre cooperative experience, production certification should be extending to other farms.
Better education and provision of information for exporters of clams about food safety standards and sustainability schemes is a straightforward solution to overcome the issue. Training program should be provide in order toreduce disease and increase the quality of the bivalve mollusc production

CONCLUSION

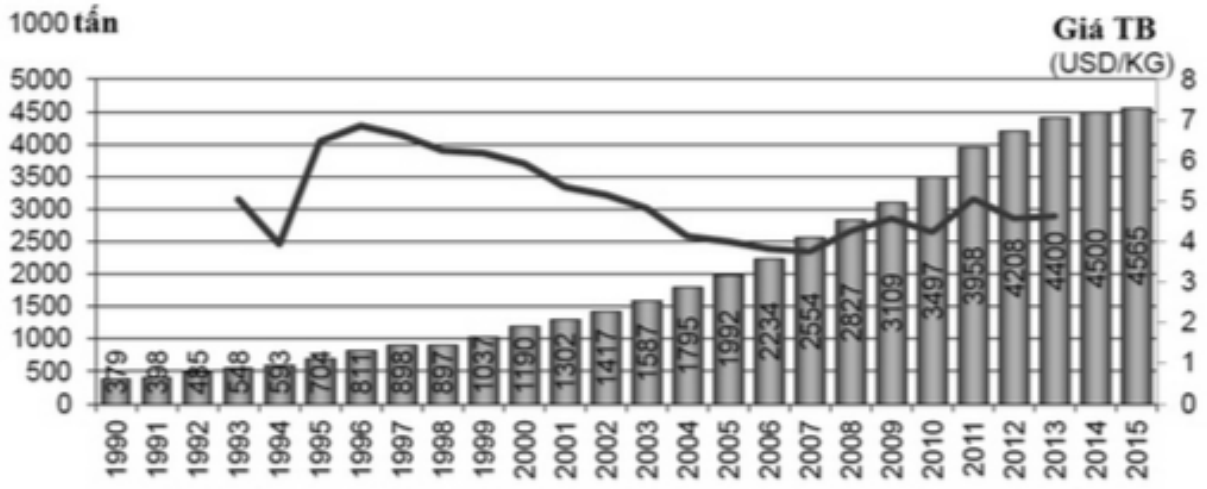
In order to promote the value added for bivalve mollusc farmers, major problems should be taken into consideration. The first and the most important is that the capacity of cost control of the farmers should be improved. Skill and technique for cost monitoringof the farmers had better to be enhanced through training and self-training activities. This will help them to improve their production and enhance their profit and benefit. The second important thing is to improve their ability to manage their farms. If the management capacity of farmers improves, they could be able to cope with risk situation. In these sens, it is necessary for the government and local authorities to support, create and maintain a stable market for bivalve mollusc farmers (ex: create a strong brand for Vietnam mollusc). Vietnam's bivalve mollusc sector has huge potential. In turn, we can stimulate production, create employment opportunities for rural labor, improve community income, and improve the farmers's livehood situations.

5 TILAPIA INDUSTRY: VIETNAM POTENTIAL

Tilapia is the second most popular farmed fished and tends to become the most important fish in this century. The demand of tilapia is large, its eating is not relating to culture or religion and its aquaculture does not affect environment. The supply of tilapia is international market is increasing, including supplies from Asian Countries (China, Indonesia, Philipines and Thailand). Vietnam is expecting to increase its production by 2015[34].

A/ OVERVIEW WORLD TILAPIA PRODUCTION AND EXPECTATIONS

Figure: Production of international Tilapia (1990-2015)



In the last decade, the production of tilapia constantly increases. The production increases from 830,000 tons in 1990, to 1,6 million tons in 1999, to 4,5 million tons in 2013. Tilapia is now farmed in 140 countries. China is the main producer with yield ranging from 1,1-1,5 million tons per year in 2008. It is noted that the strongest growth comes from the Asia region, except for China. In this region, the farmed tilapia production increased from 340,000 tons in 2000 to 1 million tons in 2013.

The following table shows that frozen fish makes up majority of transaction, nearly 62-74% of total value. Fresh or frozen fillets are the most expensive processed producted of tilapia production, with a value between 6,9 and 7,2 US$ per kg. Frozen fish is less expensive with a value of 1, 8-2,1 US$ per kg.

[34] According to MARD and VASEP declarations.

Table: World Tilapia production in 2014

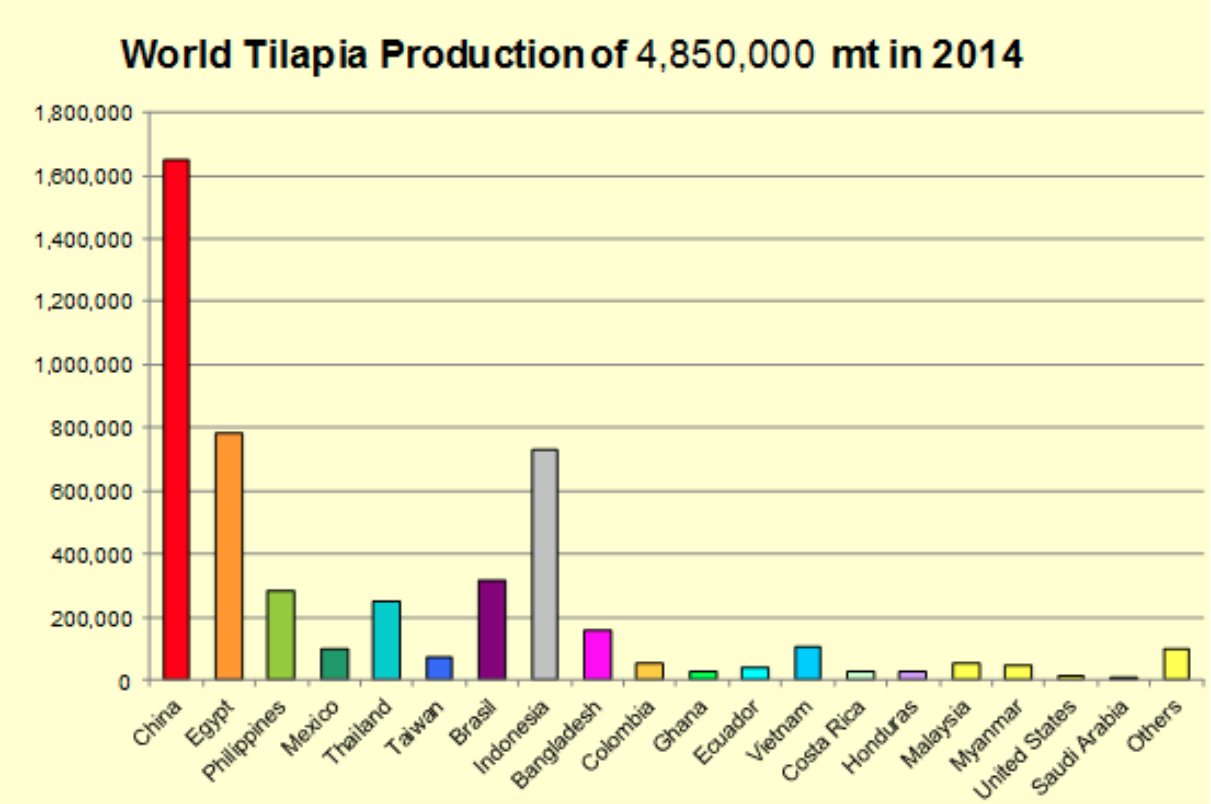


Table: International Trading of Tilapia

Quantity of imported tilapia in the world in 2012 – 2014 (quantity: tons, value : USD 1,000)							
HS Code	Production	2012		2013		2014	
		Quantity	Value	Quantity	Value	Quantity	Value
	Total tilapia	106.731	357.012	170.671	534.422	201.383	614.829
030323	Frozen tilapia	72.342	127.191	121.294	224.752	158.854	324.569
030431	Fresh or Frozen fish Fillets	26.812	207.041	35.069	274.104	33.591	261.795
030271	Fresh or Frozen fish	7.577	22.780	14.308	35.566	8.938	28.465

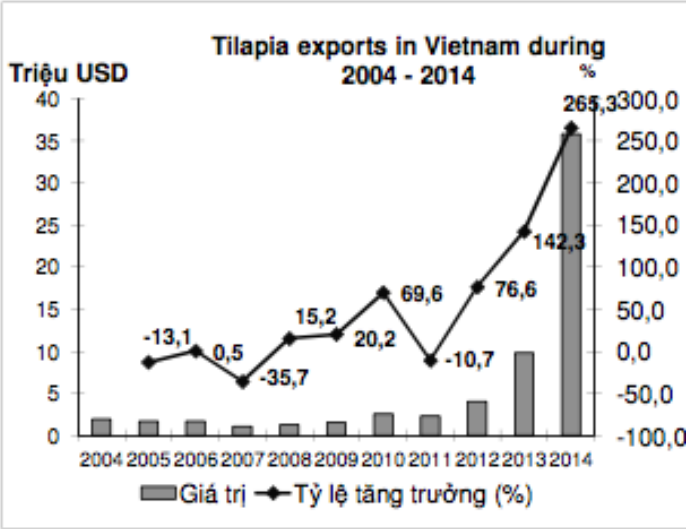
B/ VIETNAM POTENTIAL ON TILAPIA EXPORTS

Vietnam's tilapia exports to foreign markets have enjoyed strong growth last decade, steadily increasing from export volume of US$ 1,95 in 2004, to more than US$ 32,2 in 2014. It has been exported in the form of frozen whole fish, skin-on filet and skinless filets to more than 60 countries, with the US, Spain, Colombia, the Netherlands, Belgium, Mecixo, Germany, the UK, The Czech Republic, and Italy being the top importers.

In 2014, the country has 236 tilapia breed establishments including 44 raising parent tilapias with 940,000 tilapia parents with 455 million breeds (according VASEP). Up to November 2014, the tilapia farming area in ponds is 16,000 ha, in raft 410,732 m^2, and a yield of 118,000 tons. It is estimated the farmed tilapia in 2014 in the country is 125,000 tons, which is an increase of 25% compared to 2013.

Figure: Vietnam Tilapia Export (2004- 2014)

Tilapia exports in Vietnam (2004 – 2014)			
Year	Tons	USD	Growth rate (%)
2004	974	1.946.196	
2005	827	1.691.555	-13,1
2006	812	1.699.994	0,5
2007	412	1.092.550	-35,7
2008	480	1.258.179	15,2
2009	536	1.511.940	20,2
2010	848	2.563.928	69,6
2011		2.289.512	-10,7
2012		4.043.158	76,6
2013		9.794.643	142,3
2014		35.784.642	265,3



Source: VASEP, 2015

Vietnam Tilapia production has many advantages. First, with available infrastructure, knowledge, technologies, market linkages to process a large quantity of tilapia based on catfish aquaculture industry. Secondly, with the popular method relating to the treatment of waste has been well developed. Catfish production will be beneficial to that of tilapia. Tilapia sector in the country will also faces some challenges, as fish diseases and pond water quality. Vietnam does not have standard farming procedures; product quality and quality are not stable. And at least, Vietnam's breed production capacity is not good and cannot produce high quality breeds.

Table: Vietnam Tilapia Export (2014)

Vietnam Tilapia exports 2014	
Country	**Value (USD)**
America	8.911.672
Belgium	4.450.093
Netherland	3.718.744
Germany	2.974.238
Italy	1.717.745
French	1.614.374
Other countries	12.397.777
Total	**35.784.642**

Concerning Vietnam Tilapia export, Vietnam mainly exports frozen tilapia products. in 2014, the largest import market was America with 25% of total export value, followed by Belgium (12,4%). Tilapia of Vietnam is having export potential to America as imports from China and Taiwan are being reduced. Furthermore, in America, tilapia of Vietnam is averagely sold at 2,7 USD/kg, which is higher than in China (2,3 USD) and in Taiwan (2,5 USD) thanks to higher quality. The Directorate of Fisheries plan in 2015 that farming area of tilapia is 21,000 ha with a production of 150,000 tons (50,000 tons export). By 2020, according to the Directorate, the national tilapia farming area will occupy 30,000 ha with a total quantity between 300,000 and 500,000 tons. Tilapia exports are expected to reach US$ 130-150 million by 2020[35].

Under the Tilapia Breedgin Master Plan to 2020, the Ministry of Agriculture and Rural Development encourages institutes, univesities, and enterprises to import fry for research and breeding more fry. The MARD also wants localities to establish links, better cooperation between tilapia farmers, processors and exporters. Developed partnership between a fishery sectors as tilapia in Vietnam can be very useful for all the communities, for sharing informations, and be more competitive. In addition, provincial agriculture departments are required to strengthen quality management and regularly check breeding activities to ensure farming follows zoning plans and does not cause pollution or obstruct waterway transport.

The demand for tilapia in the global market is hight, but Vietnamese exporters have faced difficulties in finding export markets (especialy with the hight regional competition of China, Malaysia, Indonesia, and Philipines). It is suggested for the companies to invest and develop high-grade fries , and also focus on building brands for vietnamese tilapia and developing unique products to compete with experienced global rivals.

[35] "Tilapia fish exports seen rising by 2020", MARD-06/10/2015

6 CEPHALOPODS INDUSTRY

Squid and Octopus

The total value of cephalopod trade flows was nearly USD 6 billion in 2013. In terms of volume, China is both the biggest importer and the biggest exporter in the cephalpods market (squid and octopus). Exports from China are worth more than USD 1,5 billion and mainly go to Japan, the EU, the Korea and the US. Other major exporters in the octopus, quid and cuttlefish markets are Peru, India, the US and Morocco, which is the EU's most important trade partner. In therm of values, the EU es the largest importer, with more than USD 1,2 billion annualy[36].

Vietnam was predicting growth in its exports of cephalopods in 2015, particularly squid. In 2014, the country exported cephalopods worth USD 438 million, an 8,5 increase compared with the same period in 2013. The Vietnam Association of Seafood Exporters and Producers (VASEP) were expected in 2015, an increase of 15-20% of cephalopod exports. But this expectation was taking into account the decrease of economy in main import markets, as Japan and European countries.

Table: Vietnam Cephalopod Export Markets in Jan – Jun 2015

Markets	June 2015 (Value)	Proportion (%)	Variation (%)	Jan - Jun 2015 (Value)	Proportion (%)	Variation (%)
South Korea	**11.206**	**28.6**	**-23.6**	**74.994**	**37.8**	**-3.6**
Japan	**10.704**	**27.3**	**+7.8**	**48.584**	**24.5**	**-9.4**
ASEAN	**6.614**	**16.9**	**+29.7**	**27.067**	**13.6**	**-5.5**
Thailand	*5.590*	*14.3*	*+40.1*	*22.074*	*11.1*	*-4.5*
EU	**6.188**	**15.8**	**-13.1**	**26.065**	**13.1**	**-28.5**
Italy	*3.784*	*9.7*	*-16.0*	*15.711*	*7.9*	*-35.1*
Germany	*0.387*	*1.0*	*+38.0*	*2.222*	*1.1*	*+9.9*
Spain	*0.478*	*1.2*	*-34.1*	*1.815*	*0.9*	*-13.5*
China&Hong Kong	**1.978**	**5.1**	**+77.3**	**11.133**	**5.6**	**+7.6**
Hong Kong	*0.910*	*2.3*	*+125.1*	*2.653*	*1.3*	*-3.5*
The U.S	**0.438**	**1.1**	**-0.6**	**2.374**	**1.2**	**+15.1**
Taiwan	**0.459**	**1.2**	**+15.8**	**2.368**	**1.2**	**+12.7**
Australia	**0.554**	**1.4**	**+114.6**	**1.639**	**0.8**	**+0.7**
Israel	**0.322**	**0.8**	**-32.3**	**1.287**	**0.6**	**-28.4**
Others	**0.689**	**1.8**	**-21.2**	**3.062**	**1.5**	**-37.3**
Total	**39.152**	**100**	**-3.1**	**198.573**	**100**	**-9.5**

According to the following table, South Korea, Japan, ASEAN and the EU are the main markets for Vietnam cephalopod exports, representing 89% of total export value between January and June 2015. Since 2013, South Korea is the most important market for vietnam cephalopod exports, accounting for about 37,8% of total exports and

[36] Rabobank World Seafood Trade Map, March 2015

representing USD 110,3 million between January and June 2015 (down 3,5% than 2014 at same period). The recently signed Free Trade Agreement (on May 2015) between Vietnam and Republic of Korea has boost trade between these two countries. Japan is the second biggest market in 2015, representing a share of 24,5% between January and June 2015. Nevertheless, Vietnamese cephalopod import to Republic of Korea decreased of 9,4% compared with 2014 same period. ASEAN countries members represent in the first part of 2015 the third destination for Vietnamese cephalopod exports (13,6%). European Union, the largest importer of cephalopod in the world, is the fourth destination for Vietnam cephalopod exports representing 13,6% of total export value in the first part of 2015. Italy, Germany and Spain are the major markets of EU for cephalopod products, but Italy and Spain decreased their export of Vietnamese cephalopod of –35,1% and –13,5% respectively. This decrease caused an important collpase for EU import, nearly –28% less than same periods in 2014. Despite this decreases, European Union will stay an important market for Vietnam cephalopod exports. Because Morocco and Mavinas are region sources of EU and the market share of Morocco reduced with the influence of the Asian economies in the market (China, India and Vietnam). Furthermore, the Free Trade Agreement represents an excellent opportunity for Vietnam processors and exporters to swamp the cephalopod market in EU.

Table: Cephalopod Exports by products in Jan – Jun 2015

CEPHALOPOD EXPORTS BY PRODUCTS JAN - JUN 2015		
Products	**Value (US$)**	**Proportion (%)**
Squid (1)	**110,028,476**	**55.4**
- Other processed squid (HS code 16)	8,847,681	
- Dried/grilled squid (HS code 03)	48,319,905	
- Live/fresh/frozen squid (HS code 03)	52,860,891	
Octopus (2)	**88,544,459**	**44.6**
- Processed octopus (HS code 16)	15,972,636	
- Dried/salted/live/fresh/frozen octopus (HS code 03)	72,571,823	
Total (1 + 2)	**198,572,935**	**100.0**

Concerning emerging markets for Vietnam cephalopod export (squid and octopus), China increased more than 7,5% its exports during the first part of 2015, representing USD 11, 13 million. The first product imported on China market is frozen squid. China sourced frozen squid from 27 countries, and US products represent USD 25 million, South Korea products USD 16,5 million and thir, India is at USD 16 million. US market also increased its vietnam's cephalopod exports more than 33% between January and September 2015, comapred to same period last year, representing USD 3,9 million. US sourced squid from 25 countries for a total value of USD 139,89 million (40,334 million of tons). The TTP reached between 12 countries including US and Vietnam represents an important opportunity for Vietnamese exporters of cephalopods to meet the American demand.

7. LOBSTER INDUSTRY

Well know for high value in economics, art and nutrition, lobsters are exported for high income, and are popularly cultured in open ecosystem of the central provinces of Vietnam, including Khanh Hoa Province and Phu Yen. Developing from 1990s, lobster farming generates super profit and high internal rate of return in investment. Moreover, Vietnam is known worldwide for producing high quality lobster.

Map: Location of Lobster Production in Vietnam

In Vietnam, there is two species cultured, the main one, *Panulirus Ornatus*, which represents 60 to 75% of the production; and Panulirus Homarus, from 25 to 40% of the national production. The country now breeds more than 53,000 lobster cages with a total output of 1,600 tonnes a year (Directorate of Fisheries, 2015). Of the 53,000 lobster cages, Phu Yen accounts for more than 23,600 and Khan Hoa more than 28,400. Lobster farming in these two provinces used to create a number of jobs for not only farmers, but

also fishers and other locals related to this farming. In recent years, after the disease outbreak occurred in 2007-2008 and the typhoon happened in 2009, there is a phenomenon that farmers limit cages for lobster culturing and transform gradually to culture marine finfish (Nha Trang). Threats from disease outbreaks and natural disaster, pressures from over increase and devaluation from middlemen are unbearable to farmers.

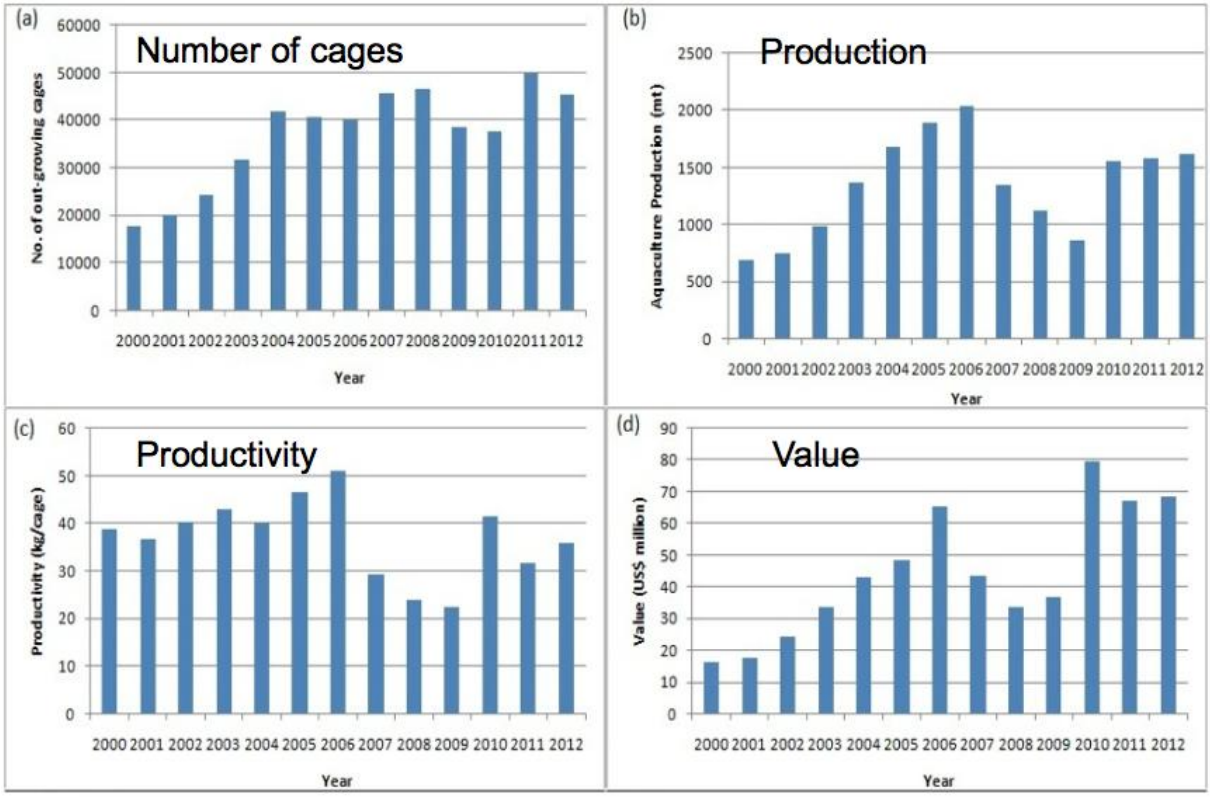
In 2015, the country accounts for 53,000 cages (23,600 in Phu Yen and 28,400 in Khoan Hoa) with a total input of 1,600 tons a year. According to the Research Institute for Aquaculture, in 2005, the country lobster outpu was 1,500 tons a year for 45, 000 cages in the country (25,000 in Khoan Hoa and about 19,000 in Phu Yen). The output has only increased slightly compared to 10 years ago. Also the production cost for lobster fishing is 10 times higher than a decade ago, but the selling price is sometimes lower than 10 years ago (Research Institute for Aquaculture). On october 2015, in Phu Yen, lobsters caught weighed between 0, 7-1,7 kilo, were sold at a price of VND 1,3-1,5 million (US$61-71) per kilo.

Lobster production was estimated to be 1,900 tons in 2006 (record of lobster production in Vietnam), with a high value of more than US$ 65 million. But in 2007, there was a significant decline in production to about 1,400 tons (Hung and Tuan, 2008) because of milky disease, and the production continued to fall in the following years. In 2014, about 25-30% of cultivated lobsters had been infected with hemolymph disease, causing several losses for farmers. This desease has not been treated thoroughly (Pham Khanh Ly, deputy head of Aquaculture department, 2015). Furthermore, environmental problems are particularly serious within seawater exchange. With this kind of farming in environmental "open-access" culture conditions, it is necessary to plan careful site selection and adopt improved management in order to minimize farmer losses[37].

Indeed, to develop lobster-farming sustainability, "lobster cultivation areas should be zoned" (Head of the Khoan Hoa Aquaculture Sub-department). The Directorate of Fisheries and other agencies were assigned in 2015, to resolve the problem of lobster cultivation by the deputy Minister of Agriculture and Rural Development. Besides, research on advanced techniques, institutes and other agencies should research the consumption markets for Vietnam's lobsters in order to alert farmers about suitable cultivation. Many projects were conducting on research for lobster cultivation during last years, but only small-scale projects and it was not used to raise lobsters.

[37] "Opportunities and Challenges in lobster marine aquaculture in Vietnam: the case of Nha Trang Bay" (2012), Nguyen Thi Khieu Thao, Master Thesis in Fisheries and Aquaculture Management and Economics with the Norwegian College of Fishery Science University, University or Tromso, Norway; and Nha Trang University, Vietnam.

Schems: Industry Lobster Statistics



Source: VASEP, 2015

CONCLUSION AND RECOMMANDATIONS

Vietnamese lobster aquaculture industry has developed for nearly two decades, a annual production of about 1,600 tones and a value of USD 85 million. The lobster industry in Vietnam is faced major constraints, as disease (milky disease), mortality of wild caugh puerulus, trash fish feeding issues and also the availability of sea cage sites. But this sector of the seafood industry in Vietnam represents also opportunities in term of land-based production systems, the expansion of the two main species (P. Panulirus, P. Homarus), the availability of the hatchery supply of juveniles. As high value product, Vietnam lobster farmers and exporters will benefit to the internationalization of the seafood sector. Vietnam lobster exports are expecting to growth in import markets as EU and the US.

Specialists concerning lobster industry in Vietnam and especially for Phu Yen and Khoan Hoa Provinces make some suggestions[38]. In term of management and environment, we propose more educating farmers to understand the benefit of protect sea environment (a guideline for fishermens can be an option). It coul be also useful to impose environment standard of seawater quality. Concerning the society of the lobster sector,

[38] Some of the following suggestions were made by Nguyen Thi Khieu Thao on his memor thesis"Opportunities and Challenges in lobster marine aquaculture in Vietnam: the case of Nha Trang Bay" (2012).

the idea to build a co-management organization for lobster's farmers to connect all farmers together can be a proposition to implement between the Provinces of Phu Yen and Khoan Hoa. Experience from others farmers is always most trusted. This clustering of companies' suggestion could aslo represent the opportunity for the lobster farmers of Phu Yen and Khoan Hoa provinces (whose represent the major lobster farmers of the all country) to create a strong brand together. Create a strong brand will increase the quality of the products, contribute to share more informations and respect more quality standards.
At national level, the Government should support market informations for local farmers concerning the export opportunities and requirements.

8. CRAB INDUSTRY

Crustacean

A/ OVERVIEW OF CRAB AQUACULTURE PRODUCTION

Mud crab farming is very popular in some Asian countries like Bangladesh, India, Thailand, Vietnam, etc. Mud crab has hige demand and price in international market. Crab is very tasty and many countries of the world import huge amount of crabs for consumption every year. As a result, there are huge possibilities by exporting crabs. The main benefits of crab farming are, labor cost is very low, production cost is comparatively low and they grow very fast.
Mud crab can be found on estuaries, backwaters and coastal areas. They are member of Scylla genus. They are two species of crabs available that are suitable for commercial production (Red Claw "S.olivacea" and Green Mud Crab "S. Paramamosain"). The most common species of mud crab in Vietnam, and also China is S. Paramamosain[39].
Mud crab aquaculture is curently undertaken at relatively low densities compared with other types of pon-or penèbased aquaculture. In Vietnam, mud crab is just one species of many being used in integrated mangrove-aquaculture farming systems, which are focused on productive and sustainable use of mangrove ecosystems[40]. In Viet Nam, most coastal areas with access to brackish and marine waters are suitable for farming S. paramamosain, the most common mud crab in the country, particularly those around the Mekong River Delta, where salinity is from 5 to 30 ppt[41].

[39] C. Shelley, A. Lovatelli. 2011, Mud Crab Aquaculture. FAO – Fisheries and Aquaculture Technical Paper N° 567
[40] Anon. 2006, Guidelines for environmental management of aquaculture investments in Vietnam. World Bank Technical Note 37564. 230 pp.
[41] Minh, T.H., Yakupitiyage, A. & Macintosh, D.J. 2001. Management of the integrated mangrove-aquaculture farming systems in the Mekong Delta of Vietnam. ITCZM monograph series No. 1. 24 pp.

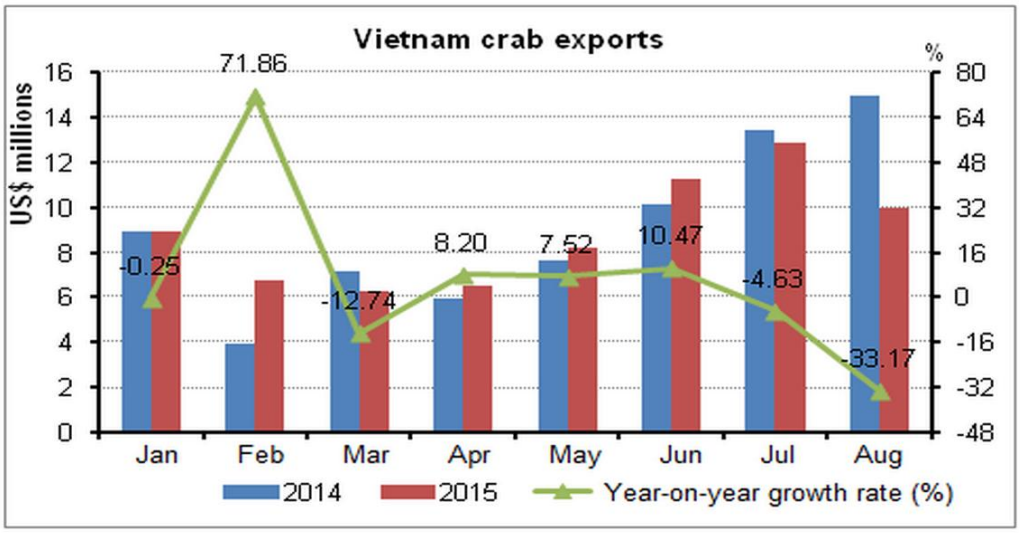
Map: Province of Ken Giang in Mekong Delta River

In 2012, Ken Giang Province farmers have stocked mud-crab on the total area of 28,000 ha, mostly in An Minh district (21,845 ha) and An Bien (5,592 ha) and some in Ha Tien and Kien Luong (Province Sub department of Fisheries). Crab was farmed in rotation with shrimp in the paddy field, using extensive method. The grow-out crab is fetching high price, i.e VND 400,000/kg for egg bearing crab, VND 200,000/kg for others.

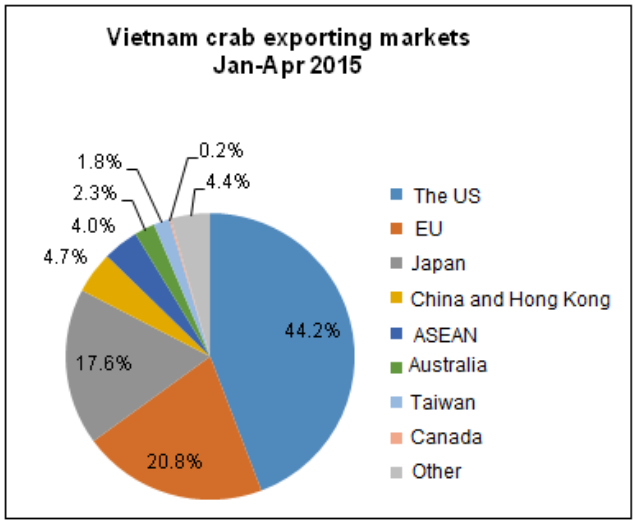
B/ VIETNAM CRAB EXPORTS

In August 2015, crab exports from Vietnam declined. The total export value in August was just over 10 million. Cumulative crab export value for first 8 months of this year is nearly 71 million, downs by 2% comapred same period last year. Vietnam crab export products are sended to 28 different global markets. Major markets are the US, Japan and EU.

Figure: Vietnam Crab exports (January – August in 2014-2015)

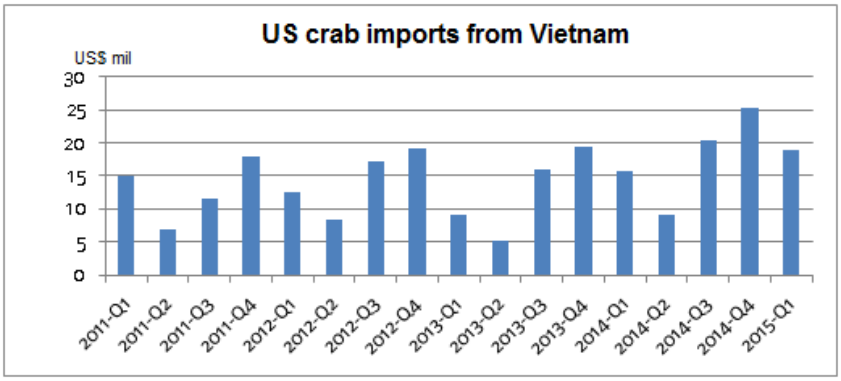


Source: VASEP, 2015



Concerning exports to the US, we are notifying an important fluctuation and a quite decline. In 2015, after strong growth in February, crabs exports from Vietnam to the US fluctuated and in August, the value was just over US$ 4, 3 million. Through August, crba exports to the US valued more than US$ 34, 4 million, down 13% over the same period.

Figure: US carb imports from Vietnam (2011-Q1 to 2015-Q1)



Source: VASEP, 2015

Figure concerning US crab imports from Vietnam shows that since 2011, Q3 and Q4 are the best period of the year for Vietnam crab exports to US. Last months of the year (Oct/Nov/Dec) are the highest points for crab export to US. 2015 is expecting to represent an important for crab export to US according to VASEP.

With steady growth, Japan continues to be second most popular destination for Vietnam crab. August only, Vietnamese companies earned nearly US$ 2 million from crab export to this market. This represent a 34% year on year increases. Though the yen appreciated, crab export through August suprassed US$ 12,7 million, up nearly 42%.

Crabs exports from Vietnam to EU decreased continiously since March 2015. In August, crab exports from Vietnam reduced to just over 2 million. Through August, crab export value was over US$ 12,5 milion, was down more than 13% over the same period. France, Netherlands, UK and Belgium continued to be top 4 crab importing markets. Belgium experienced a 3-digit rise of more than 120%. Crab exports to France and Britain remained low while exports to Netherlands solwed down.

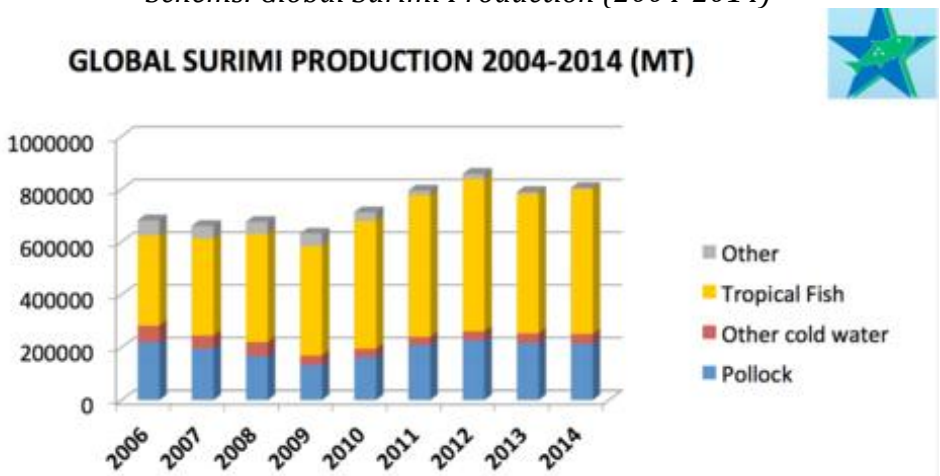
Crabs export to China and Hong Kong in August 2015 surged to US$ 580 thousand, up 131% year on year, bringing the total export value of 8 initial months of 2015 to US$ 3,7 million, up 31% compared same period last year. According to VASEP, in 2013, China reduced its crab imports from other countries, while Vietnam remained the key crab exporter to the Chinese market.

9. SURIMI PRODUCTION & EXPORTS

In recent years, Vietnam's surimi – a uniquely functional food ingredient made of fish protein – has been exported to many nations in the world (VASEP, 2015). Currently, the surimi and surimi products of Vietnam are competing well in the market. Surimi from Vietnam is mainly tropical surimi, know as "Itoyori".

A/ VIETNAM SURIMI PRODUCTION

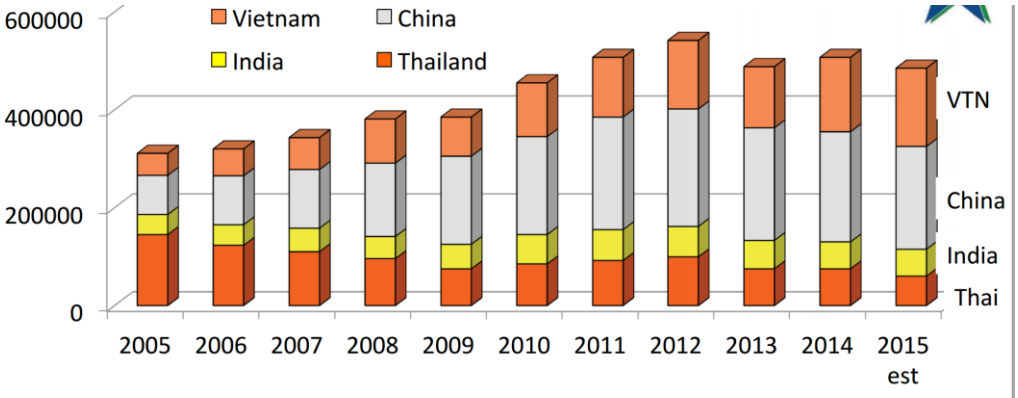
Schems: Global Surimi Production (2004-2014)



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Pollock	247000	219000	196000	168000	132150	160900	208800	227100	216000	213000
Cold water	54000	63000	49000	52000	37000	34000	30700	34100	37000	37500
Tropical Fish	329000	342000	368000	411000	415000	485000	537000	576600	528000	550000
Other	58000	58000	48000	45000	48000	33000	19000	20500	8500	4500
Total	688000	682000	661000	676000	632150	712900	795500	858300	789500	805000

In 2014, the world surimi production was dominated by the tropical fish (or Itoyoki), represented 550,000 MT for a total of 805,000 MT. Among Tropical Surimi producer, the first world producer is China with a total production of 225,000 Mt in 2014 and an estimation of 210,000 MT in 2015. Vietnam since 2004 has increased a lot its surimi production, and the country is now ranked as the second largest producer of Tropical surimi in the world (160,000 MT in 2015 estimations).

Global Tropical Surimi Production 2004-2015



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015 est
Thailand	145000	123000	110000	96000	75000	85000	92000	99600	75000	75000	60000
India	41000	42000	48000	45000	50000	60000	63000	62000	58000	55000	55000
China	80000	100000	120000	150000	180000	200000	230000	240000	230000	225000	210000
Vietnam	45000	55000	65000	90000	80000	110000	122000	140000	125000	152000	160000
Other SE Asia	18000	22000	25000	30000	30000	30000	30000	35000	40000	45000	45000
Total	329000	342000	368000	411000	415000	485000	537000	576600	528000	552000	530000

B/ VIETNAM SURIMI EXPORTS

Between January and April of this year, Vietnam exported nearly US$ 86 million of surimi products. The main destination for this product are principaly in Asia, with South Korea (31,6%), ASEAN countries (28,4%), Japan (11,9%) and China (10,9%).

South Korea

Maintaining its proportion of over 30% in surimi exports from Vietnam, South Korea has been Vietnam's biggest market for the begin of 2015 and potentials are still seen for the next years. Vietnam surimi exports to South Korea in the first 4 months of the year reachec US$ 27,15 million, up 8,7% from the same period in 2014. Exports to South Korea accounted for 31,6% of total exports. Statistics from the International Trade Centre 5ITC) shows that in the first quarter of 2015, Korea imported surimi from 10 countries, 5 of which are ASEAN countries. Vietnam and South Korea has officially signed this year Free Trade Agreement. This will also motivate surimi exports of Vietnam to this market in the future.

ASEAN

This year surimi imports of ASEAN countries (except for Vietnam) tend to increase compared to the same period last year. ASEN is currently impoting these items from more than 35 countries inside and outside the block. In particular, Vietnam and Indonesia are two countries most exported products to ASEAN countries. Between, January and April of this year, ASEAN countries imported for nearly US$ 24 million of surimi products, an increase of 9% compared to last period in 2014. Among ASEAN

countries, Thailand is the biggest surimi import market, ans is also known as the biggest importer of surimi from Vietnam (18% of total Vietnam surimi exports).

Japan and Russia represent excellent perspectives for Vietnam surimi export, and the trade agreement signed with this two important seafood importer in the last months are expected to boost the surimi exports.

Table: Surimi Exports from Vietnam (US$ millions)

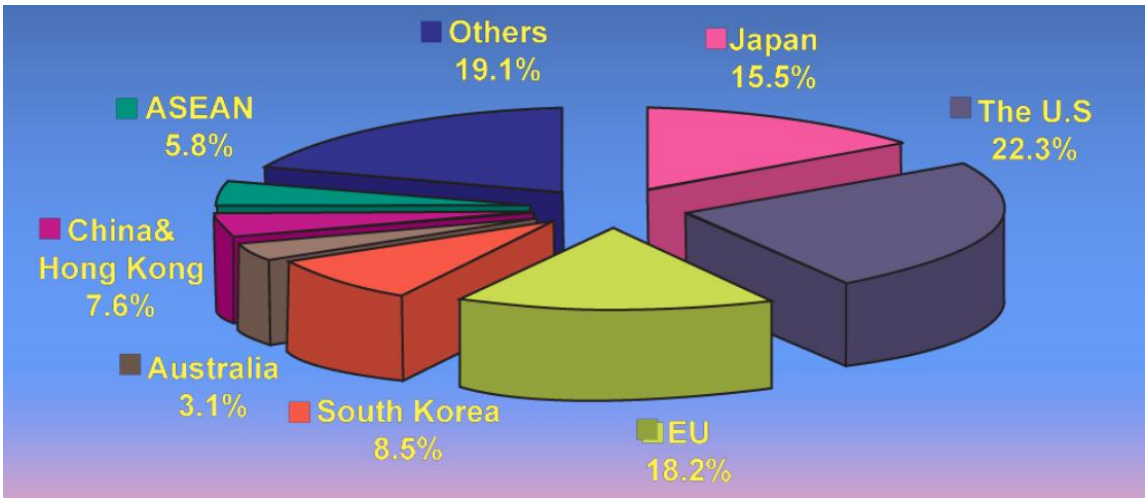
Surimi exports from Vietnam (Unit: US$ millions)							
Market	Jan 2015	Feb 2015	Mar 2015	Apr 2015	Jan-Apr 2015	Percentage in total exports (%)	Variation (%)
South Korea	**9.379**	**3.961**	**4.767**	**9.041**	**27.148**	**31.6**	**8.7**
ASEAN	**7.090**	**3.749**	**5.837**	**7.735**	**24.41**	**28.4**	**9.1**
Thailand	5.177	2.416	4.388	6.351	18.333	21.3	20.4
Singapore	1.151	0.887	0.865	0.954	3.857	4.5	-14.9
Malaysia	0.692	0.446	0.562	0.401	2.101	2.4	-19.4
Japan	**2.687**	**2.183**	**1.717**	**3.655**	**10.241**	**11.9**	**7**
China	**3.162**	**0.888**	**1.242**	**4.035**	**9.326**	**10.9**	**1.9**
Hong Kong	0.150	0.063	0.03	0.141	0.383	0.4	-16
EU	**1.164**	**0.976**	**1.166**	**1.897**	**5.203**	**6.1**	**-31.7**
France	0.643	0.576	0.265	1.619	3.104	3.6	-13.1
Lithuania	0.206	0.196	0.515		0.917	1.1	-42.7
Italy	0.063	0.156	0.155	0.063	0.436	0.5	12.1
Russia	**1.042**	**1.287**	**2.133**	**0.189**	**4.651**	**5.4**	**47.5**
Taiwan	**1.085**	**0.678**	**0.876**	**0.755**	**3.395**	**3.9**	**-4.9**
The US	**0.095**	**0.164**	**0.09**	**0.139**	**0.488**	**0.6**	**8.3**
Other	**0.263**	**0.313**	**0.353**	**0.157**	**1.087**	**1.3**	**-40.8**
Total	**25.966**	**14.199**	**18.182**	**27.602**	**85.949**	**100**	**3.9**

Source: VASEP, 2015

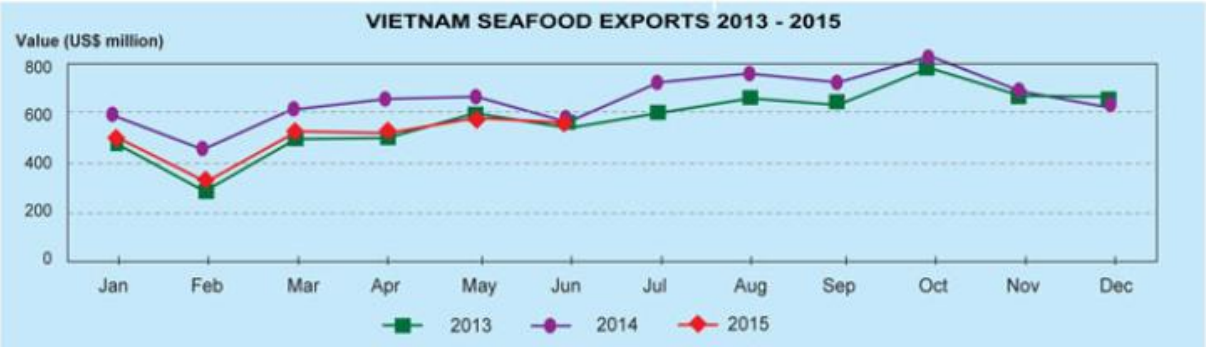
V. VIETNAM INTERNATIONAL TRADE RELATIONS: OPPORTUNITIES FOR VIETNAM SEAFOOD INDUSTRY

Fishery industry is one of the major exports items of the country. Currently, more than 95% of Vietnam seafood products are consumed in foreign market (Vietinbanksc, 2013). Vietnam currently exports seafood to more than 166 countries and territories over the world. In 2014, export turnover reached US$ 7,8 billion, a 16,4% increase compared to 2013. The country is currently ranks fourth in the world for seafood exports. Last year, the main import markets for Vietnam seafood products were the US (22,3%), the EU (18,2%) and Japan (15,5%). These three markets represent by themself 56% of the total export value of seafood products from Vietnam. Following by South Korea representing 8,5%, China and Hong-Kong with 7,6% and ASEAN countries with 5,8% of the total export value.

Graph: Export Market structure 2014



In 2015, Vietnam was targeted to export seafood products for a turnover of US$ 8 billion. In reality, Vietnam will miss its export target, because seafood exports are expected to reach US$ 6,6 billion (lowest than US$1,2 billion than 2014 (VASEP, 2015). Nevertheless, 2015 was an important year for the country related to the internationalization of its economy and its seafood product exports opportunities. Of course, this decrease of exports has many internal reasons (high production costs, inadequate quality, unhealthy competition, etc), but external reasons need also to take into account in this analysis. During the first months of this year, some of the main seafood importers in the world (EU, Japan) had seen their money devalued, and their imports reduced. Indeed, it is crucial that Vietnam continue to internationalize its economy, to multiplicate its trade agreements and bilateral free trade agreements; but the agricultural sector in developing country, like Vietnam, are dependante of the economic context in import markets.



Since 1986, Vietnam has chosen to internationalize its economy with the beginning of the Doi Moi Process. Over the last 20 years, Vietnam has constantly made efforts to foster its bilateral and multilateral relationships with other countries. The recent multiplication of trade agreements and bilateral free trade agreement demonstrate the willingness of the Government of Vietnam to integrate Vietnam's economy to the rest of the world. Trade and economic integration has provided a momentum for economic development while at the same time, drove an overhaul and restructuring of the economy as well as governance, to cope with the challenges of economic integration. In fact, liberalization is considered a key factor in securing poverty reduction (World Bank, 2012).

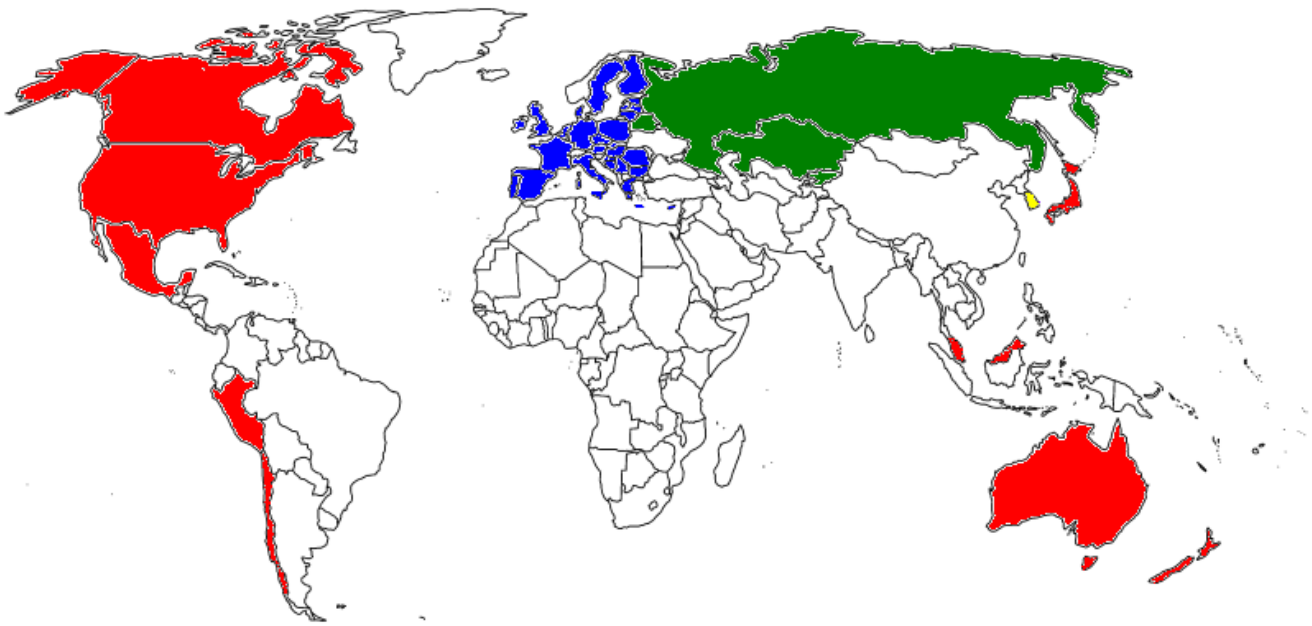
Table: Vietnam's participation in FTA's

Year	FTA's
1995	ASEAN (FAFTA)
2001	Vietnam – US Bilateral Trade Agreements
2004	ASEAN – People Republic nof China FTA (ASEAN –PRC FTA)
2006	ASEAN – Korea FTA (ASEAN – KOR FTA)
2007	*Vietnam joining WTO*
2008	ASEAN -Japan
2008	Vietnam – Japan
2009	ASEAN – Australia/ New-Zealand (AANZFTA)
2009	ASEAN – India (AIFTA)
2012	Vietnam – Chile FDTA (VCFTA)
2014	Vietnam – Customs Union of Russia – Belarus - Kazakhstan
2015	Vietnam – Korea FTA (VKFTA)
2015	Vietnam – Eurasian Economic Union[42] (EAEU) FTA
2015 (Dec)	Vietnam – European Free Trade Agreement (EVFTA)
2015 (Oct)	Trans Pacific Partnership[43] (TPP)
2016 (1st Jan)	ASEAN Economic Community

[42] Russia, Armenia, Bielorussia, Kirdistan, Kazakstan
[43] Australia, Canada, Japan, Malaysia, Mexico, Peru, United States, Vietnam, Chile, Brunei, Singapore, New Zealand.

By the end of 2015, Vietnam has signed and participated in 11 trade agreements, 6 of which are regionally agreed between ASEAN and other countries and 3 of which are bilateral agreements with the US, Chile, Japan. Furthermore, the country has been recognized as a full market economy by India, Australia and New Zealand.

Map: Countries that have signed FTAs with Vietnam in 2015



TPP: US, Canada, Peru, Mexico, New Zealand, Australia, Singapore, Malaysia, Brunei, Japan and Vietnam

EUFTA: 27 EU members and Vietnam

Eurasian Economic Union: Rusia, Belarus, Albania, Kazakhstan, Kyrgyztan and Vietnam

EKFTA – South Korea and Vietnam

Case Study:

Vietnam, as a "Nonmarket Economy" under WTO rules. But until when?

The multilateral Trading System was created in the 1940's with the GATT, containing clear objectives to liberalize and promote trade instrument of economic development. Aiming to become universal, the Multilateral Trading System gave support and incentives to both market and non-market economies (NME's) to participate in its activities[44].

The use of antidumping measures to protect certain domestic industries may be the most widely abused trade policy instrument. Nevertheless, when Vietnam joined World Trade Organization in 2007, afte five years of negotiation, the governement agreed to be considering as a Nonmarket Economy. According to WTO, nonmarket economy's definition is *"the situation where the government has a complete or substantially complete monopoly of its trade and where all domestic prices are fixed by the State, GATT 1994 and the Agreement recognize that a strict comparison with home market prices may not be appropriate. Importing countries have thus exercised significant discretion in the calculation of normal value of products exported from non-market economies".*

Current WTO rules permit Countries to maintain this discriminatory approach, which Vietnam (as China) agreed to as a condition of its accession to the WTO in 2007. So When, the United States decided imposing antidumping duties on imports from Vietnam, the US uses what's know as Nonmarket Economy (NME) methodology. That is, instead comparing a product's US price with the price for the same or similar product in Vietnam, US authorities compare it with a fictitious price constructred using surrogate values from third countries. In this situation, United States authorities decided to apply to a value constructed on the products from Indonesia as the third country of reference. This value choosen by the US to calculate antidumping duties on Vietnamese product is non-rational one because Indonesia does not have the same level of economy than Vietnam.

Countries currently designed, as NMEs are China and Vietnam, as well as nine former Soviet States: Armenia, Azerbaijan, Belarus, Georgia, Kyrgyzstan, Moldova, Taijikistan, and Turkemistan, Uzbekistan.

The most important thing to know about NME provision in Vietnam's accession protocol is that it expires in December 2018[45]. After that date, the United States will not be allowed to treat Vietnam as an NME regardless of wheter Commerce thinsl its economy, industries, or manufacturers meet the condition of any test.

But some countries, as Australia and New Zealand decided to classify Vietnamese economy as a full market one since 2009. Moreover, this year, Vietnam participated to the negotiation and the signature to the Trans-Pacific Partnership. On March 2015, Vietnam's ambassador to the US implied that Vietnam was seeking to have its NME

[44]V. Thorstensen; D. Ramos; C. Muller; F. Bertolaccini. WTO – Market and Non-Market Economies: the hybrid case of China (2013). Published as Latin America of International Trade, V.1, issue 2, 2013, p 765-798.

[45] "Report of the Working Party on the Accession of Viet Nam," ¶255, WT/ACC/VNM/38 (October 27, 2006)

status revoked as part of those negotiations. But the problem is NME status is very much a political decision. And second, the NME designation is merely an excuse for lawless protectionism. Now TPP agreement was reached by the parties, Vietnam is right to demand an end to abusive treatments by the US. If US negotiators are serious about making an "ambitious 21st century agreement", they should welcome that demand without objection.

Source: How wills the TPP Impacts Vietnam's "Nonmarket Economy" designation? Cato Institute, by William Watson, on March 2015

Recently, in May 2015, Vietnam has successfully concluded negotiation rounds with Korea and officially signed the Vietnam – Korea FTA in June, the Vietnam – Eurasian Economic Union (EAEU) FTA. On August 2015, Vietnam and European Union after 3 years reached agreement on free trade deal and was officialy signed on December 2015. Furthermore, in 2015 Vietnam participated to the TPP negotiation and concluded a free trade partnership with 12 other countries on October. This last year was a very important step for the internationalization of the Vietnamese economy. Vietnam will also begin next year with the signature of the ASEAN Economic Community (AEC) on January 2016.

The benefits from joining these FTA's include lower of zero tariff barriers for a number of exported products and services. To conform to the rules and regulations of the WTO, since January 1, 2007, Vietnam has been proactively reducing all import tariffs in line with its commitments (including 10,689 tariff lines) to an average of 13,4% (from 17,4%) over a 5 to 7 years time frame. Therefore, exporters in Vietnam have enjoyed a larger export market and favorable conditions to enter foreign markets than ever before.

A. FTA with EAEU *(Russia, Armenia, Kirdistan, Kazakhstan, Bielorussia)*

With the newly signed FTA with EAU, Vietnam has advantageous access to a market of 182 million people with an estimated GPD of USD 1,500 billion. Following this, bilateral trade is forecoasted to increase by 18-20% per year, reaching USD 10-12 billion by 2020 compared to the USD 4 billion in 2014 (1,34% of total import-export total value).

The Russian market, as all BRICS markets represent an important opportunity for Vietname exporters of seafood products. During this last year, economic relations between Vietnam and Russia were difficult, marked by a decrease of the national Russian money (rubles). Because of crisis with the European Union during the first months of the year, the Russian buying power decreased. But the FTA signed, and the good mutual relations between Vietnam and Russia represent as an opportunity for Vietnam exporters, as challenges for the Ministry of Industry and Trade. Indeed, Vietnam export products need to respect some complex rules to enter in the rusian territory. Furthermore, Vietnam exporters with the national support of the government will need to establish a solid distribution network. Trade relations between Russia and

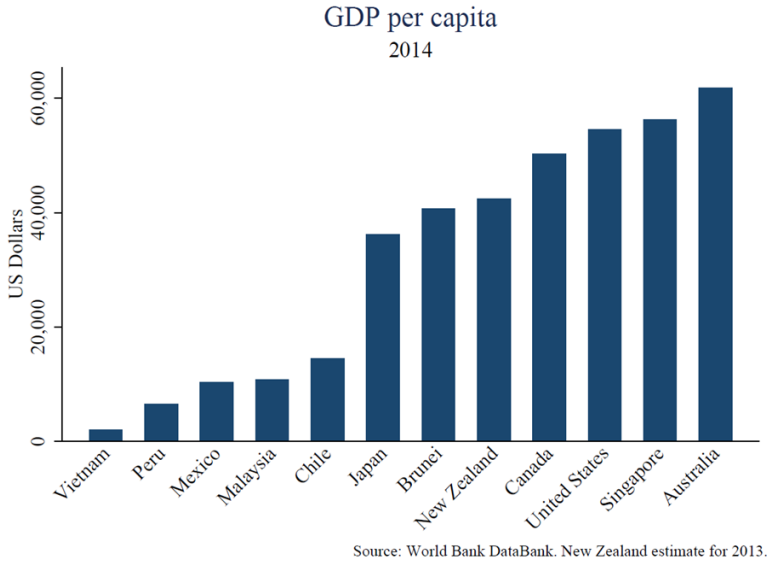
Vietnam are suffering to territory access. It's relevant to study roads to facilitate the maritime transport[46].

B. Opportunities for Vietnam in Trans-Pacific-Patnership (TPP)

On the 6th October, the Agreement on Trans-Pacific-Partnership (TPP Agreement) has been concluded after more than five years of negotiation. It is a large free trade agreement with 12 participating countries, accounting 40% of the global economy and 25% of the world trade. TPP is considered a comprehensive agreement, aiming to establish a code of conduct for high standard trade, thus promoting sustainable growth and employment of the countries in Asia and Pacific Rim. For agriculture, TPP agreement brings about both opportunities and challenges. The TPP agreement up a large export market for many key agricultural commodities of Vietnam, as seafood product, with 0% tariff rate[47].

According to World Bank experts, TPP Agreement would give Vietnam significant benefices and help increase its economy ouput by 8-10% or even higher by 2030. Trade pact will be a "catapult" for Vietnamese economy. If the domestic manufaturing sector is able to overcome technical barriers from other TPP members, the Vietnam GDP could increase by Us 35,7 billion in 2025.

Table: GDP per capita in TPP members (2014)



Vietnam seafood opportunities with TPP members:

Nearly half of Vietnamese seafood exports are going to the 11 other countries that are set in the TPP agreement. Vietnamese seafood businesses can look forward to the

[46] According to the Directorate of Fisheries in Vietnam, Vietnam News, August 2015.
[47] The agriculture product import turnover among TPP membersin 2009-2012 periods has reached US$ 279 billion, accounting for over 51% of trade among these countries. ISG Plenary Meeting 2015, "Vietnam's accession to TPP agreement: prospects and solutions for agriculture, 06/11/2015 Hanoi.

TPP. Indeed, seafood exports would benefit to the reduction or elimination of 90% of import taxes.

- US Market (19,3% of seafood exports in 2015) : immediately remove tariffs on 92,68% of export turnover. After 3 years, tarrifs will be removed on 92% of export turnover, and in 10 years, 100% of tariff will be removed.

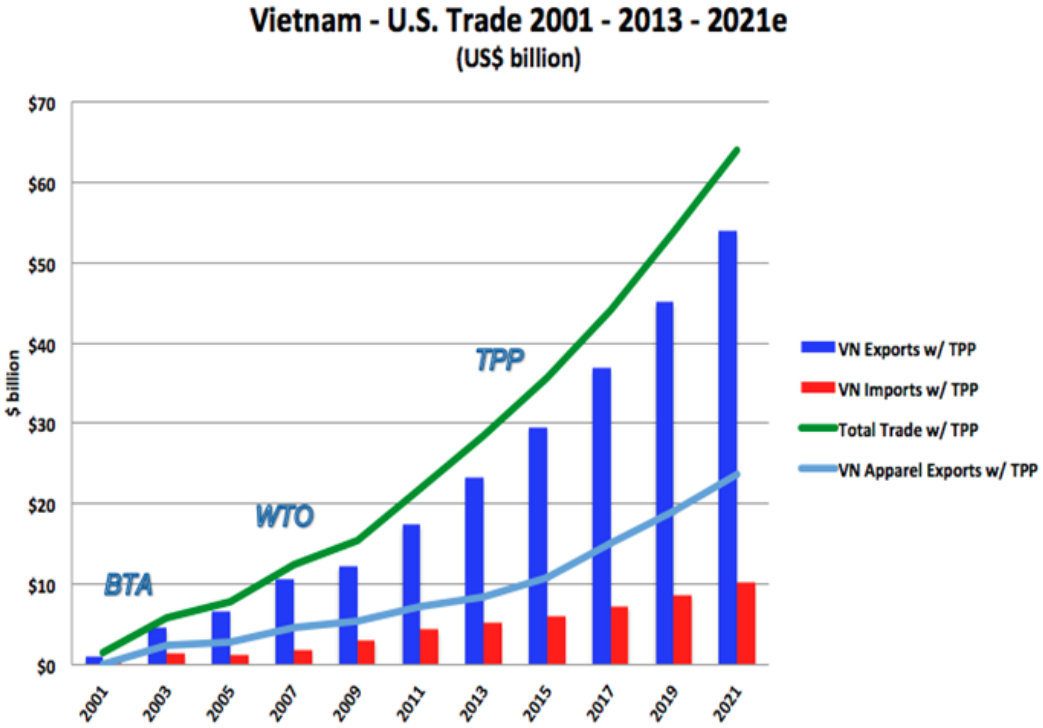


Figure: Vietnam –US trade 2001-2013-2021 (expectations)

On the figure, we can notice that trade between US and Vietnam has increased importantly since the beginning of the century; and the import-export between the two pacific countries is expected to increase more again.

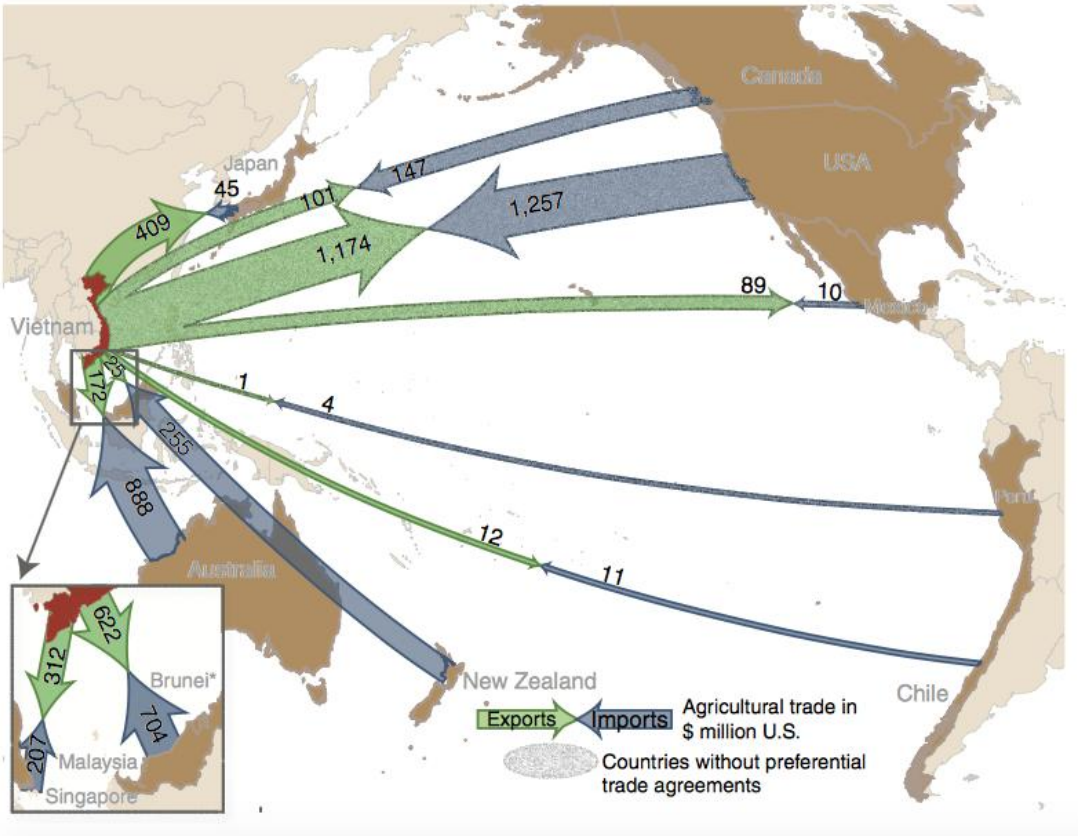
- Japan Market (15,2% of seafood exports in 2015: Immediately remove tariffs on 91% of export turnove, including surimi, yellowfin tuna and striped fish. After 5-7 years, remove tariffs on 98, 34 % of export turnover. Afrter 15 years, remove tariffs on 98, 34% of export turnover. And after 15 years, 100% of the products will be removed. Compared with VJ-EPA: 64, 8% of fishery lines is improved.
  Japan is the second largest importer of Vietnamese tuna after the US, and has for long time imposed higer taxes on Vietnamese products than other ASEAN countries.

- Mexico Market: Immediately remove tariffs and remove tariffs after 3-5 years: 60% of the lines, accounting for 99, 33% of export turnover. In which, cat fishh will be removed after 2 years. After 10-16 years, remove tariffs on 40% of the remaining lines, accounting for 0, 67% turnover.

- Canadian Market: a 100% removed tariff.

For fishery sector, tariffs and few lines will immediately be removed after 2-3 years with the most semi- processed seafood products in Chapter 03 including: catfish, tuna (yellowfin, stripe), shrimp, crab, other mollusks. For processing products, tariffs will be removed after 5-10-15 years.

Map: Vietnamese agricultural trade with potential TPP partners in 2012



Source: FAO, 2012

According to the Institute of Policy and Strategy for Agriculture and Rural development, vietnamese implications to be able to transform the TPP agreement to an real ooportunity are: to supervise chemical using in aquaculture production closely, to promote seafood processing and manufacturing industries. And develop distribution chains and brands for Vietnamese products.

But Vietnam is also expecting to TPP to buy cheap raw materials from Malaysia, Mexico and Peru. The FTA signed between 12 countries represent for Vietnam an important way to attract FDI on agricultural sector, in term of improving agricultural infrasctructure, and developing production chain.

The Free trade agreements reached with Vietnam and 11 other countries represents a real motivation for domestic enterprises. Vietnam needs to take into account that TPP is considered a comprehensive agreement, aiming to establish a code of conduct for high

standard trade, thus promoting sustainable growth and employment of the countries in Asia and Pacific Rim.

The TPP might be good news for sustainable fisheries

Since the Trans-Pacific Partnership (TPP) text was signed, comentators have sought to assess its impact on the environment. They have expressed concerns about the enhanced rights it provides for investors, and criticised the absence of climate change mitigation in its provisions. Howevern the TPP does contain clauses that can enable countries to combat another global environmental crisis: overfishing.

Many of world's most significant producers and consumers of fish are parties to the TPP. Japan and the United States, Vietnam, Chile, Canada and Peru are some of the biggest exporters. If the TPP comes into force, it will apply to a significant proportion of the global fish trade and its environmental impacts.

Certain features of the trade are particularly worrying. For example, international and domestic laws that limit catches, promote effective management, and protect certain species are often ignored. Illegal, Unregulared or Unreported (IUU) fishing accounts for between 13% and 31% of catches and more than 50% in some regions. The United States, Japan and other countries that are now in the TPP have not been as proactive as the European Union in terms of using trade measures.

The Trans-Pacific Partnership attemps to adress these problems, at least for the trade between TPP countries. In the separate Environment Chapter, the agreement recognises that participating nations may use fish measures to prevent trade in fish products that result from IUU fishing. Theses measures may include catch documentation schemes and port access restrictions.

Methods that allow countries to restrict access t ports of certain fish products are also important. The Agreement on Port State Measures to Prevent, Deter and Eliminate Illegal, Unreported, and Unregulated fishing wads concluded by members of the Food and Agriculture Organisation (FAO) in 2009 and ratified by Australia this year. But it does not yet have enough ratification to come into force.

Seven of the twelve parties of the TPP are yet ratify this FAO agreement (including Canada and Japan). So the TPP's explicit obligation for parties to implement port state measures to combat IUU practices is a positive development.

Recommandation for Vietnam to ratify the Agreement on Port State Measures to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing

Illegal, Unreported and Unregulated (IUU) fishing is a global threat to sustainable fisheries and to the management and conservation of fisheries resources and marine biodiversity (FAO Fisheries and Aquaculture Department, 2009). As a tool to combat IUU fishing, the importance of enhanced port state control has increasingly gained ground throughout the last decennium. The *Agreement on Port State Measures to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing* was approved by the FAO

Conference at its Thirty-sixth Session on 22 November 2009. The Agreement aims to prevent illegally caught fish from entering international markets through ports. Under the terms of the threaty, foreign vessels will provide advance notide and request permission for port entry and country will conduct regular inspections.

Among TPP's countries, five of them are parts of the FAO's agreement. In 2015, Vietnam is still not part of the FAO agreement signed in 2009. It is expected that TPP might be a good opportunity to combat IUU practices. But it can be also strongly recommended to Vietnam to be part of this FAO agreement.

What are the current conditions for country to be part of the Agreement on Port State Measures? And does Vietnam have requirements to be part of the FAO's agreement?

There are two requirements to respect if a country wants to be part of the FAO's agreement:

- To be member of the Western and Central Pacific Fisheries Commission (WCPFC)
- To ratify the UNFCA

Moreover, according to the *Article 21, Requirements of developing States, Part 6* of the Agreement on Port State Measures: *"parties shall (…): enhance their ability to develop a legal basis and capacity for the implementation of effective port state measures (…); facilitate their participation in any international organizations that promote the effective development and implementation of Port State measures (…); facilitate technical assistance to strengthen the development and implementation of port State measures (…)".*

Regarding the following requirements, Vietnam asked to be part of the Western and Central Pacific Fisheries Commission (WCPFC) but its demand was rejected. And Vietnam has not yet ratidy the UNFCA Agreement

C. EU – Vietnam: Free Trade Agreement

In 2014, EU constituted one of the most importantoverseas market for Vietnam (after the US). Vietnamese exports to the EU concentrated on labour intensive products including assembly of electronics items/telephone, footwear, garments and textiles, coffe and seafood. The EU has purchased as much as 18,2% of the total seafood exports last year, following the US market (22,3%). The total value of fishery products imported into EU from Vietnam was nearly USD 912 million[48]. The expansion of Vietnamese exports to the EU market benefit considerably from the EU's Generalised System of Preferences (GSP), which facilitates exports of goods from developing countries into the EU.

The Vietnam and the EU officialy launched negotiations for Free Trade Agreement (FTA) in June 2012. In mid July-August, Vietnamese ministry of Industry and Trade and the EU Trade Commissioner announced the Agreement in principle of the EU and Vietnam FTA negotiations in 4th august 2015, and concluded on December 2, 2015. This agreement

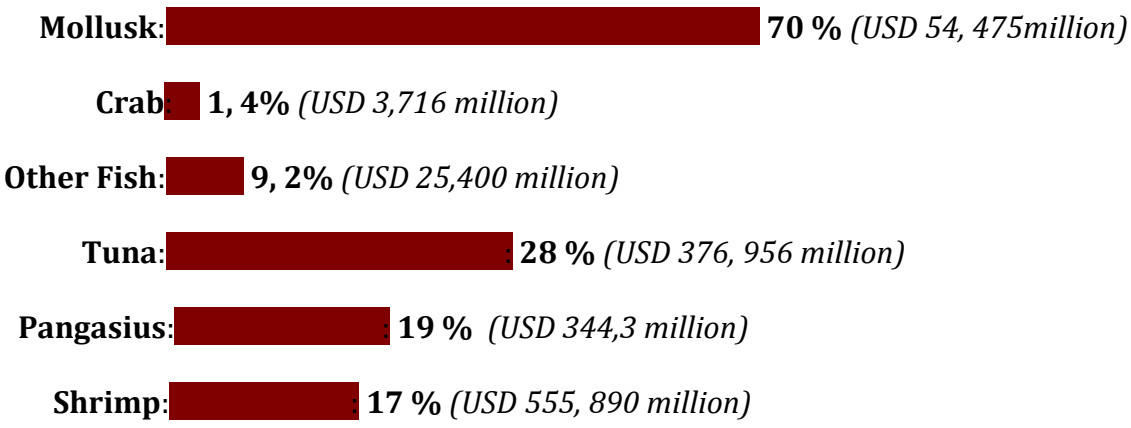
[48] European Commission, 2015. Total Exports from Vietnam

will remove all tariffs on goods traded between the two economies, with a transition period to allow Vietnam to adapt. The agreemenbt will also improve the protection in Vietnam of Geographical Indications (Gis) representing EU flagship agricultural product. Vietnamese Gis too will be recognised as such in the EU, providing the adequat framework for further promoting imports of quality products such as Moc Chau Tea and Buon Ma Thuot Coffee.

The Free Trade Agreement between European Union and Vietnam is expected to push Vietnam's export into the demanding EU market. The single European market is composed by 560 million of consumers in 27 diferent countries, with a median GDP of 21,000 thousand USD per year, per habitant.

When the deal takes effect, the EU will remove import duties on 85,6 % of goods, equivalent to 70,3 % of Vietnam export revenue to the EU. After seven years the EU will eliminate 99,2 % of import tariffs, accounting 99,7% of Vietnm's exports. The bloc vows to lift all import tariffs on Vietnamese key export like aquatic products (except for tunna canned and fish balls), within 7 years of the pact's effective date.

VIETNAM SEAFOOD EXPORTS TO EU, 2014.



% of Vietnam Total Exports by Products

The technical standards of the European Commission (EC) market will remain unchanged (C. Dordi, 2015), suggesting that Vietnamese businesses need to be proactive in getting their operations up to snuff and in compliance with the regulations. Despite the fact, non-tariff barriers (NTB) will be add after the FTA, exist some risk of private initiatives in order to block imports of seafood products from Vietnam (J.J Boufflet, Oct 2015). Indeed, some Vietnamese seafood products into single market of the EU are siffering of bad reputation with consumers, especially pangasius filets.

Fish and seafood products are considered as top products in the EU, however the number of warnings issued and flat out rejections of products by costums have been steadily inching up. In 2012, 64 seafood shipments were returned, a sharp rise from 2002's figure of 26. From 2010 to May of this year, 183 seafood shipments were issued warnings, and there were 41 shipments rejected in last year income (EU Delegation to

Vietnam, 2015). According to Vietnam Sanitary and Phytosanitary Notification Authority and Enquiry Point (SPS Vietnam), most batches subjects to warning failed to meet the physical, chemical or biological standards.

The EU requires compliance with the Global (Good Agricultural Practice) standards for all imported products, while Vietnamese utilizes a lower VietGAP standard. According to NAFIQAD director, it is necessary for Vietnamese products to comply with Global GAP requirements, and this compliance represents the next challenge for Vietnam producers and exporters.

There are a large number of complexe requirements for products to enter the EU (Seafood development Committee at the Vietnam Fisheries Association, 2015). Vietnam businesses will need to get up to speed on the regulations related to materials, chemical compositions and labels if they want to take full advantage of the opportunities prsented by the FTA. Businnesses need to innovate and modify their operations to improve the added value of their products. It is also recommanded to businesses in the industry to pay more attention to labelling with a view to raising added value and promoting the "Made in Vietnam" brand (C. Dordi, 2015). To gain access to EU bloc, fish and seafood businesses need to perform theur dutie diligence investigations of the markets with care to insure they meet all of the prerequisite regulations.

Case Study:

Shrimps – What are the requirements for shrimps to be exporting to Europe ?

Shrimps can oly be exported to the EU if they:

- **Come from an authorised country**: the country of origin must appear on the list of the countries, which can export fishery products to the EU. The EU Food and Veterinary Office of compliance with European standards for fishery products base this list on an assessment.
- **Are caught by approved vessels (wild shrimps) or were produced in registered farms (aquaculture)**: Shrimps can only be imported to the EU if they have been dispatched from, obtained or prepared in approved establishments (cold store, processing plant[49], factory or freezer vessels), so these facilities must be inspected and approved your government (ministry of Agriculture, Health, Commerce, etc).
- **Are accompagned by the proper health certificates**: shrimps need a health certificate confirming they meet the standards for export to the EU. This certificate is delivered by the government following a harmonised template.

Concerning the contaminants, specific limits exist for heavy metal or dioxins. For aquaculture shrimps, there are controls on veterinary medicine residues. Countries must submit an annual residue-monitoring plan to the EU and have it approved to export aquaculture products to the EU market.
Concerning, illegal fishing, marine fishery products entering the EU require a catch certificate proving that international conservation and management were respected. Certificates must be:
- 1/submitted to European authorities several days before the exported product reach the EU.
- 2/ validated by the fishing vessel's national authority.
Fish-exporting countries must carry out regular's checks to ensure their fishing vessels comply with conservation laws. Non-european fishing vessels carry out landing or transhipment operations at designated ports in Europe.
Concerning labelling, label msut be visible, indelible and clearly worded in a language easily understood by consumers. Usually this means in the official language(s) of the European country where the product is marketed. You may use foreign terms or expressions if consumers will easily understand them.

All food labels must display: 1/ name under whiwh the product is sold; 2/ list of ingredients, including additives; 3/ net quantity; 4/ minimum durability date; 5/ special condition for storage or use; 6/ name of business name and adress; 7/ place of origin or provenance; 8/lot marking.

Source: European Commission, July 2015

[49] In 2015, in Vietnam, there are 567 processing plants , and 450 of them qualfified for the EU market, 35 more than 2013.

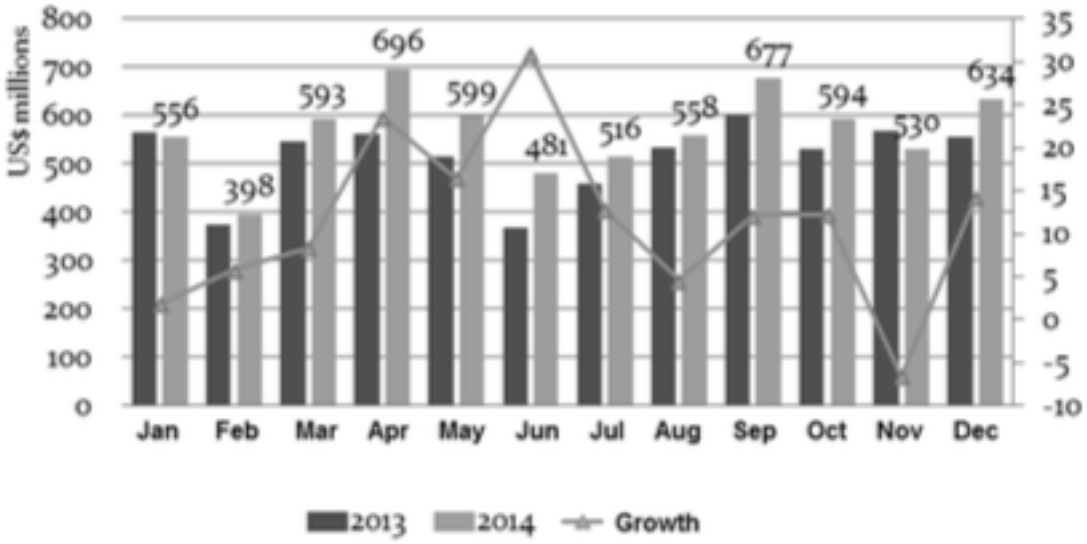
D. Seafood exports to China: potential and trends

Glance on China seafood

- 30 % of Global Seafood Production
- 35% of Global Seafood Consumption
- 64'5 million MT (up 4,5 year on year) of seafood production
- 47 million MT of aquaculture fish production
- US$ 20,8 billion of seafood export value (up 7% year on year)
- US$ 6,8 billion of seafood import value (up 11% year on year)
- Sources: 115 countries

China seafood imports

Figure: china seafood imports 2013-2014



The fresh seafood consumption in China increases by 4,6% year on year (2008 – 2013), and accounting in 2013: 36,6 million MT. It forecast to grow by 5,9% to 48,8 million MT in 2018. The consumption per capita is also expected to grow from 33,1 kg (in 2010) to 35,9 kg in 2020. The Chinese middle class becomes news customer's high value species (scallops, lobsters, and salmon) and represent a good opportunity for providers from Western and Asian countries.

Vietnam Seafood Exports to China

China is Vietnam's 4th biggest seafood importing markets, representing 8% of total exports of Vietnam in 2014. The share of shrimp in seafood exports from Vietnam to China increased:

- 13% (in 2013)
- 64% (in 2011)
- 60% (in 2012)
- 66% (in 2013)
- 70% (in 2014)

Table: Vietnam seafood export to china 2004-2014

Vietnam seafood exports to China, 2004 – 2014		
Year	Value (million US$)	Growth (%)
2005	134.401	2.4
2006	145.573	8.3
2007	152.710	4.9
2008	157.139	2.9
2009	201.723	28.4
2010	247.252	22.6
2011	347.905	40.7
2012	419.177	20.5
2013	572.717	36.6
2014	597.136	4.3

Seafood Exports in 2015

In 2014, seafood exports to China reached US$ 597 million, up 4,3% than 2013. Shrimp exports accounted for over 70% of total export representing a value of 414,065 million US$. Nearly 95 % of frozen raw shrimp and 5% of processed shrimp composes shrimp exported to china. Last year, exports of tuna, shrimp and pangasius climb, and exports of cephalopod and crab were on declin.

This year, during the first part export to China reached 269 million US$, down of 0,8% compared last year, because shrimp exports down 28%.

Table: Vietnam seafood exports to china, 2014-2015

Fresh seafood consumption in China (thousand MT)							
Species	2013	2014	2015	2016	2017	2018	Average growth 2013-2018
Fish	22,993	24,326	25,786	27,384	29,000	30,653	5.9%
Molluscs	9,609	10,080	10,584	11,135	11,669	12,206	4.9%
Crustacean	4,011	4,332	4,687	5,076	5,482	5,899	8.0%
Total	36,613	38,738	41,057	43,595	46,151	48,758	5.9%

Nevertheless, pangasius exports to China have grown significantly in the first five months of this year (21-31%). Between January and May, pangasius exports to china reached US$ 70 million, an increase of 50, 7% compared last year at the same period.

Table: Pangasius export to china and Hong Kong by month 2014-2015

Pangasius exports to China				
Year	Volume (MT)	Value (million US$)	Value growth (%)	Average price (US$ /kg)
2005	16,353	32,379		1.98
2006	17,678	37,377	15.4	2.11
2007	18,214	38,803	3.8	2.13
2008	18,519	35,975	-7.3	1.94
2009	19,481	35,338	-1.8	1.81
2010	23,752	42,941	21.5	1.81
2011		55,488	29.2	
2012		72,967	31.5	
2013		91,114	24.9	
2014		113,152	24.2	

A potential, but a sustainable market?

According to VASEP, there are three reasons for growth in export to China in 2015. Firstly, as demand in major importing market such as the US, EU, ASEAN, Meixco and Brazil reduce, market diversity is a must and China is a new and potential one. Second, beside the purpose of the consumption, China is also imported pangasius to process and export to the US. And to sustainably develop seafood domestic industry, Chinese government offered a new credit package of 20 billion Yuan beside other policies to encourage imports.

Despite behing a potential for pangasius from Vietnam most trading activities are cross-border. Just over 10% of the imported products were for restaurants, mostly for other domestic consumption and processing for exports. Quality is not highly required, which is not good for reputation of exported pangasius and other seafood. There is a potential risk of price and payment, what is a sign of an unstable market. But still, it is a potential alternative market while demande major markets decline.

Advantages and Challenging exporting Seafood to China

Concerning the advantage of the Chinese market, the first element to mention is relative to the market itself. It is a huge market, ful of potentials for seafood exports from Vietnam. There is a high economic growth and the demand for seafood is increasing. The

second element concerns the geographical advantage for Vietnam. China is a neighbor country: short transport by road and sea-saving time. Also a long history of trade relations exists between the two countries, and Vietnam understands needs of Chinese customers. At least, requirements on quality and technical standards are not as high as other major markets.

Nevertheless, China has regulations on protecting fisheries ressources, but the legal system for foreign trade of seafood is not complete. Bargaining represents the biggest obstacle for Vietnamese exporters and processors. Also, there are higher risks and tariffs on imported seafood products are generally higher comparing to the US, Japan and other Asian countries.

Furthermore, since 2012, China requires seafood from other countries to register with Chinese authorities. Vietnam seafood businesses have to register with Certification and Accreditation Administration of China (CNCA). For Vietnamese businesses, it is relevant that there is a lack of information on trends of the market. These informations are crucial for Vietnamese exporters because there are several quality problems, especially with antibiotics and contaminants in shrimp, which affected reputation of Vietnamese product.

In conclusion, shrimp export to China will continue to decline as Chinese stock market crash impacts on the middle class, driving demand for high priced products to decrease (VASEP, 2015). There are opportunities to exports of frozen pangasius and other marine fish (Tilapia) are still open. In 2015, seafood exports to china will be US$ 580 million, down nearly 5,3%. Seafood exports to China are expected to push up when demand in this market gets higher. According to some experts advises, if the share of vietnam seafood exports increases in direction to China, vietnamese exporters should be carefull with this market because it is not a sustainable one and it is a a fluctuate market.

E. VIETNAM – SOUTH KOREA FTA

Free Trade Agreement between Vietnam and South Korea, known as VKFTA, was signed in the 5th May of 2015. The trade is expected to bring tons of opportunities for Vietnamese companies when their shrimp export to South Korea will be free from tax.

This is considered as a significant competitive advantage for Vietnamese exporters. It is confirmed by the South Korea that each year, 10,000 MT of Vietnamese shrimp will be tax exempt, against the current quota of 2,500 MT/year. In the next 5 years, this will be graudually raised to 15,000 MT/year. With 97,2% of tax exempted on Vietnamese seafood products imported to the Asian country, Vietnam products will benefit from an important advantage on China, Indonesia, Thailand and Malaysia, which do not benefit of the same privilege for seafood products.

In 2016, South Korea will also remove tariffs from prawn imported from Vietnam, currently at 10%, raising hopes of expanding exportsof the product to the market. Korea

is Vietnm's fifth biggest importer while in 2014; Vietnam surpassed China to become the biggest importer to Korea.

Top 10 shrimp suppliers to South Korea in Jan-Jul/2013-2014 by value (Unit: US$ thousands) Source: ITC

No	Supplier	Jan-Jul/2013	Jan-Jul/2014	2014/2013 (%)
	World	204,163	305,795	49.8
1	Vietnam	76,203	152,390	100.0
2	China	50,884	39,592	-22.2
3	Thailand	32,184	27,686	-14.0
4	Malaysia	12,994	22,239	71.1
5	Ecuador	17,649	20,531	16.3
6	India	4,377	13,689	212.7
7	Philippines	1,574	6,807	332.5
8	Indonesia	1,306	5,012	283.8
9	Argentina	736	4,618	527.4
10	Iran	122	2,731	2,138.5

Besides, compared to the US, EU and Japan, South Korea is a smaller garment market, with buyers often making small orders of just 3,000 or 5,000 pieces[50]. According some Vietnamese seafood industrials, Vietnam exports to South Korea are not expecting so much benefit from the trade. Moreover, South Korea market is a very strict market. The country may impose non-tax barriers, such as quarantine regulations, to limit the entry of imported products. In the past many local companies have failed to increase their exports because of such barriers.

But South Korea is the biggest investor in Vietnam, with US$ 38 billion in more than 4,200 projects. In the first quarter of 2015, South Korea invested in 89 new projects in Vietnam with 33 others increasing their project capital, totaling $491 million. The country currently stands in first place among foreign investors in Vietnam.

South Korean investors are involved in all sectors of Vietnam's economy. The majority of its investors focus on the manufacturing and processing industries. The Vietnamese seafood sector can expect to attract more and more South Korean investments in order to industrial and modernize the seafood value chain in Vietnam. South Korea will remain a traditionnal and trusted partner of Vietnam.

[50] According to an industrial experience. Thanh Nien News "Vietnamese firms unenthusiastic about Fta with South Korea" Friday, June 26, 2015.

F. ASEAN ECONOMIC COMMUNITY: opportunities for Vietnamese seafood enterprises

In Malaysia in November 22nd 2015, ASEAN leaders signed the Kuala Lumpur declaration to officially establish the ASEAN Economic Community (AEC) from December 31st 2015.

In the short term, the establishment of AEC will create a common market and remove barriers in services and capital for goods trading. ASEAN members enjoying the same preferential tax will compete with each other by quality and value added in products. It is expected that Vietnam will be experience a relatively high GDP growth rates.

Vietnam seafood exports to ASEAN, 2011-2015 (US$)

No.	Products	2011	2014	↑↓%	Jan-Oct 2015
1	Other finfish (HS code from 0301 to 0305 and 1604, ext tuna, pangasius)	80,076,456	150,519,713	+87.96	169,906,792
2	Tuna (HS code 03 & 16)	20,246,472	34,984,752	+72.8	31,763,566
3	Pangasius (HS code 03 & 16)	110,851,730	136,569,821	+23.2	112,064,391
4	Crab and other crustacean (HS code 03 & 16)	4,222,721	3,438,816	-18.56	3,028,505
5	Mollusk	45,260,170	65,235,169	+44.1	49,213,255
6	Shrimp in all varieties (HS code 03 & 16)	48,184,211	62,144,321	+28.9	46,811,395
Total		**308,841,761**	**452,892,592**	**+46.6**	**412,787,902**

Source: VASEP

Through October 2015, ASEAN has been Vietnam's 6th largest seafood importing market, behind the US, EU, Japan, China-Hong Kong and South Korea. It is also the 7th largest seafood source to Vietnam. Vietnam's seafood export to ASEAN reported the annual growth of 5-10%. In Jan-Oct 2015, total seafood export increased by 33.6% from those of 5 years ago: Exports of other finfish (HS code from 0301 to 0305 and 1604, except for tuna and pangasius) reported the largest revenue of US$170 million, up 11% from that of 2011 while exports of tuna reached US$31.7 million, up 57% and exports of mollusk (squid, octopus and bivalve mollusk) up 8.7%.

In Jan-Sep 2015, total seafood imports into Vietnam from ASEAN reached US$87.7 million, down 0.5% year on year. Vietnam has also imported shrimp, tuna, squid and octopus from India, Taiwan, and Peru.

Seafood imports into Vietnam from ASEAN, Jan-Sep 2014-2015			
Products	**Jan-Sep 2014**	**Jan-Sep 2015**	**↑↓%**
Other finfish (HS code from 0301 to 0305 and 1604, ext tuna, pangasius)	8,683.876.72	12,119,479.58	+39.56
Tuna (HS code 03 & 16)	15,551,274.48	14,577,186.63	-6.26
Pangasius (HS code 03 & 16)	3,165,597.04	6,861,852.10	+116.76
Crab and other crustacean (HS code 03 & 16)	1,352,721.30	783,292.00	-42.1
Cephalopod (HS code 0307 & 16)	8,260,170.67	6,453,603.98	-21.87
Bivalve mollusk (HS code 0307 & 16)	1,470,338.25	515,225.85	-64.96
Shrimp in all varieties (HS code 03 & 16)	49,717,689.08	46,465,837.34	-6.54
Total	**88,201,667.55**	**87.776,477.49**	**-0.48**

Source: VASEP

Among ASEAN markets, Thai is one of the Vietnam's most important seafood markets. In Jan-Oct 2015, seafood export to Thailand accounted for 44.2% of Vietnam's total export value to ASEAN. It was followed by Singapore, Malaysia and Philippines. Among ASEAN nations, Thailand and Vietnam are two leading seafood suppliers.

Setting up ACE is a milestone in the regional economic integration in the ASEAN community. Seafood companies will have better competitive advantage because they enjoy the same economic environment and favorable and fair trade. This is a great opportunity for seafood enterprises to raise seafood imports and promote seafood exports inside and beyond the region.

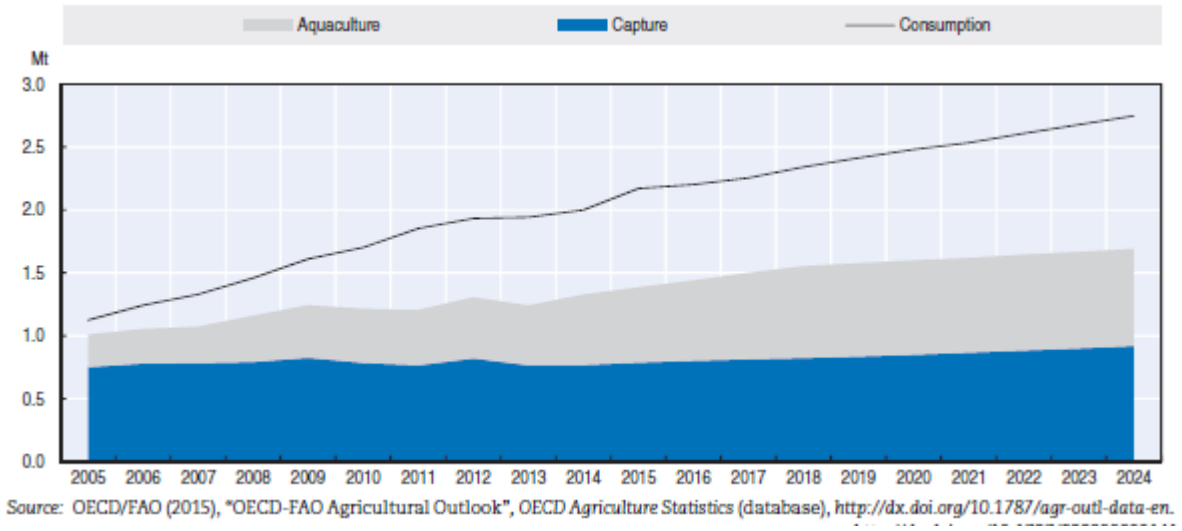
G. BRAZIL: FUTURE MARKET FOR VIETNAM?

On March, 2015, Brazil's Ministry of Agriculture, Livestock and Supply (MAPA), issued notice on allowing granting import licence of seafood products from Vietnam after a pause[51]. On October 2014, Brazil authorities suspend imports of Vietnamese Pangasius over sanitary reasons. MAPA had requested Vietnam to draw out an urgent plan for preventing diseases on tra fish. Immediately after that, DHA sent a letter to MAPA, stating that the requirement was contrary to regulations of the World Organisation for Animal Health (OIE), the World Trade Organisation and those in the sanitary and phytosanitary systems (SPS).

[51] VASEP, October 2015

Brazil is considered as an increasingly important market for Vietnamese seafood products as the export of frozen tra fish fillets. For several years, Brazil has been a net importer of fish and fishery products and the largest importer of fish in Latin America and Caribbean. The sharp increase in demand with the strengthening of the Brazilian real against the US dollar led to an impressive increase in imports of fish for human consumption (from USD 297 million in 2005 to USD 1.5 billion in 2014) and a decrease in exports (from USD 405 million to USD 207 million in the same period). Even with the projected depreciation of the Brazilian real against the US dollar, prospects are for imports to increase by 46% (in volume terms) during next decade (FAO-OECD, 2015) .

Figure: Fishery Production and Consumption in Brazil (2005-2024)



During the past decade, domestic consumption of fish and fishery products has increased steadily thanks to growing fishery production and imports. Apparent per capita fish consumption grew from 6.0 kg/p in 2005 to 9.9 kg/p in 2014. This growth is also a result of massive campaigns within the country to promote fish consumption.

CONLUSION

The recent multiplication of trade agreements and bilateral free trade agreements (15 trade agreements since 2001) demonstrate the willingness of the Government of Vietnam to integrate Vietnam economy with the rest of the world. This last year represents an important step for the internationalization of the Vietnamese economy, with the the signature of TTP, of the EVFTA, plus the Euroasiatic Agreement and the FTA with Korea.

The internationalization of Vietnam represents firstly opportunities for Vietnam seafood exports. With the reachment of all these FTAs, Vietnam's exports will benefit a lot of tax privileges on the main import markets of seafood products in the World (EU, the US and Japan). But this strategy of internationalization represents also for Vietnam Seafood sector an occasion to attract more Foreign Direct Investment in order to industrialize and modernize the Vietnamese seafood sector. Currently, the main FDIs in Vietnam come from South Korea and Japan.

The internationalization of Vietnam economy and tax privileges for Vietnam seafood products represents as opportunities as challenges for Vietnamese producers, processors and exporters. The major importers of seafood products, which signed Free Trade Agreements with Vietnam, are strict markets. In order to fulfill and take complete advantage of its internationalization, Vietnam products need to respect international requirements.

VI. IMPORTANCE OF THE INTERNATIONAL STANDARDS: "MEETING STANDARDS, WINNING MARKETS"

The latest wave of globalization has been characterized by a remarkable process or market liberalization. With the multiplication of comercial trade negotiations, the world economy has seen a significant overall decline in tariff levels during the past couple of decades. However, despite the overall reduction in tariff levels, many developing countries have not been able to substantially increase their participation in global trade. Potential gains from tariff reductions have not been realized and in some cases even eroded due to an increased us of non-tariff barriers to trade. Among such non-tariff barriers one typically finds technical regulations and (public) standards. In addition, in recent years private standards have gained in importance and grown in number and are increasingly affecting and shapin international trade flows (UNIDO, 2015[52]). During the last few years, import markets have imposed increasingly complicated safety standards related to chemical, drug residues and certification, barriers of anti-dumping duties of DOC. If the Vietnam seafood businesses can not meet these standards and regulations, their revenus and reputation in the global market are seriously affected, even the worst case is that they are forced to stop their operation (VietinBank, 2013).

With market liberalisation in the 1990's, Vietnam expanded its export volumes and was ranked as the fouth largest exporter of seafood in the world in 2014 (FA0, 2015). Vietnam exports to as many as 166 countries, including very high-end markets in developing countries (VASEP, 2015). Among Vietnam's seafood exports, pangasius and shrimp play important roles. Yet, in recent years some seafood exports from Vietnam have faced difficulties meeting the regulations of importing countries. For example, Vietnam seafood imports have been the major target of intensive inspection in recent years in Japanese ports. In May 2012, one shipment of Vietnamese shrimp to a Japanese port was found to contain etoxyquin and this triggered more scrutiny of shrimp imports from Vietnam by Japanese authorities.

A/ TRADE STANDARDS HISTORY

Technical standards for products and also for production processes are not new; they have been in existence for well over 100 years. Long before globalized trade took off, countries developed technical standards to guarantee consumer safety, increase transparency in markets, facilitate product compatibility, and ensure that products met consumer needs. In many cases, the compliance requirements placed on imported products are, in fact, simply the same as the requirements placed on domestic products. howevern in recent past, standards have been applied in International trade with growing intensity. On the one hand, this trend towards stardardization and application of standards is driven by legitimate motives including consumers becoming more demanding regarding the safety and quality of products, managerial and technological

[52] UNIDO, NORAD, Institute of Development Studies, Meeting Standards, Winning Markets, Trade Standards Compliace 2015.

innovations, as well as increased awareness and concern for social and environmental sustainability issues among many governments, consumers, non-governamental organizations (NGOs) and civil society organizations (CSOs). On the other hand, however standards can be used in way that hampers trade and, indeed, act as disguised protectionist measures. In a world of low tariff levels and far-reaching multilateral trade disciplines under the WTO, the ability of governments to arbitrarily impose or increase tariffs or quantitative restrictions on trade is limited so that they are sometimes tempted to resort to other means to restrict imports, including through the application of standards that have discriminatory consequences for trade partners (WTO, 2005).

B/ DEFINITION OF TERMS

Trade standards refers to all technical regulations, requirements and standards (ald all measures based on them) related to quality and safety aspects of products which are used and applied in cross-border commercial transactions and which, thus, affect and shape international trade flows. The first two types are also known to and defined in the WTO Agreements on Technical Barriers to Trade (TBT) and on the Application of Sanitary and Phytosanitary (SPS) Measures.

According to Annex 1 of the WTO Agreement on Technical Barriers to Trade (TBT), a technical regulation is a "document which lays down product characteristics of their related processes and production methods (…) with which compliance is mandatory. It may also include or deal exclusively with terminology, symbols, packaging, marking or labelling requirements as they apply to a product, process or production method". A standard, by contrats, is defind by the WTO TBT Agreement to be " a document approved by a recognized body that provides, for common and repeated use, rules, guidelines or characteristics for products or related processes and production methods, with which complican is not mandatory".

C/ FISH AND FISH PRODUCTS – VIETNAMESE REJECTIONS

On the study made by UNIDO, NORAD and Institute of Development Studies, fish and fish products, following by fruits and vegetables accounted for a further 21 per cent of rejections in main import markets (EU, the US, Japan and Australia). Fish and Fish products are the second product most rejected in European Union; the first product most rejected in Japanese and American boundaries and the third products most rejected for Australia.

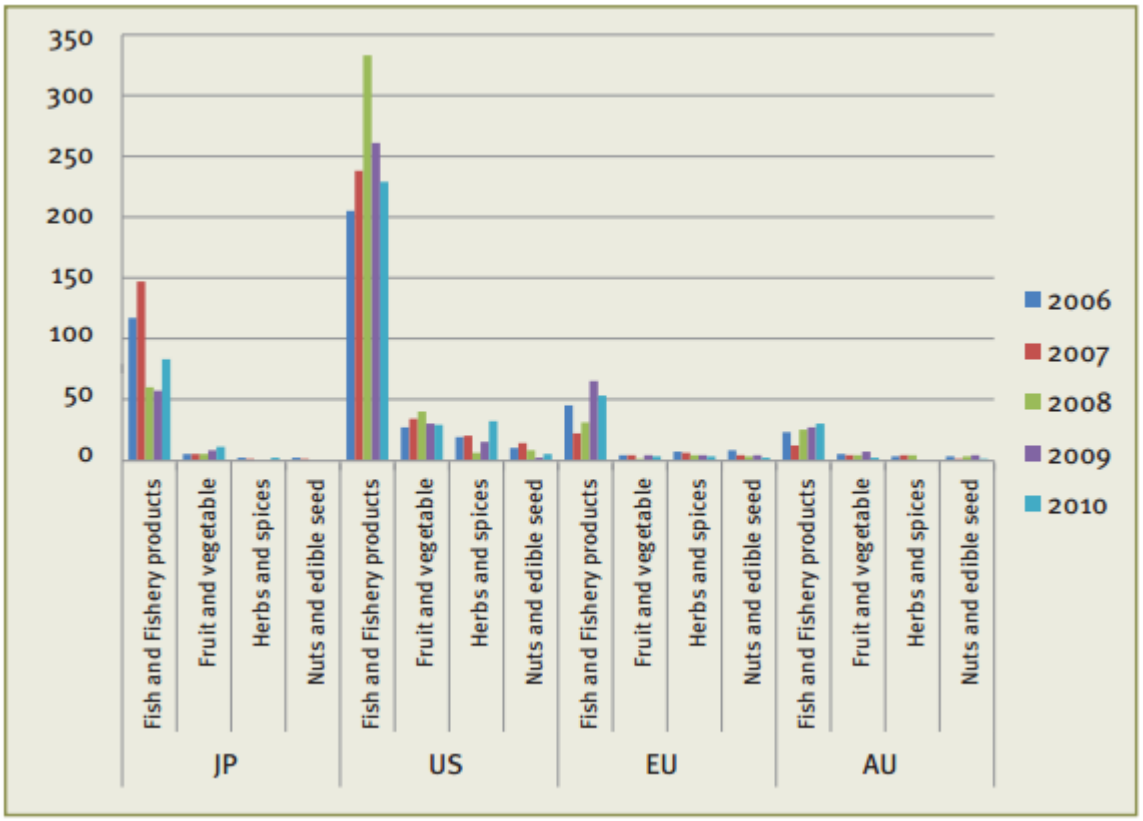
Table: Rejections of Vietnamese agri-food exports at major markets

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

Source: UNIDO dataset and analysis, based on EU RASFF,
UF OASIS, AQIS and Japanse MHLW data

In 2014, Vietnam seafood products were exported more than 166 countries and regions in the world, but four major markets shared 64,4% of the total exports: the US, EU, Japan and South Korea. Australia is ranked as the seventh destination for vietnam seafood destination. According to data provided by UNIDO, the four main market for the study will be the EU, the US, Japan and Australia.

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

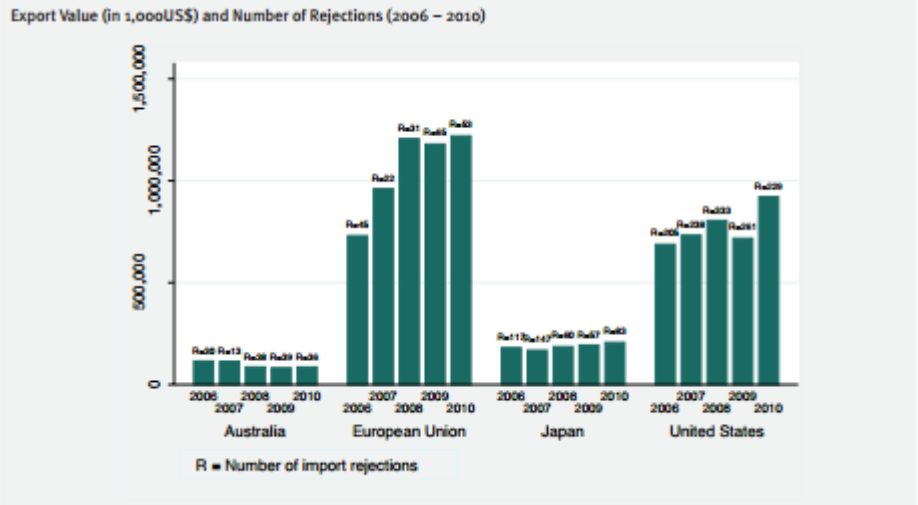


Source: UNIDO dataset and analysis, based on EU RASFF, US OASIS, AQSIS and Japanese MHLW data

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

Among various agriculture commodities, fish and fishery products from Vietnam seem to face rather high rejection rates when looking at the overall number of rejections (see Figure). According to the report, from 2002 to 2010, rejections of fish and fishery products from Vietnam were valued at US$ 73 million, representing more than 1% of the value of the imports in the US market. Vietnam has significant rejections for fish and fish products over 2006 and 2010 in Japan.

Figure: Rejections Analysis: Fish and Fishery Products



Source: UNIDO, Trade Stanards Compliance Footprint -2012

A closer look at the reasons for rejections across these four markets reveals that fish and fishery imports from Vietnam are rejected for various reasons. In the Japanese market, veterinary drugs residues and bacterial contamination seem to be a major problem (see next table). In the EU market, veterinary drug residues, bacterial contamination, and heavy metals seem to be the problem. In the Inuted States market, hygienic conditions, bacterial contamination, and labelling seem to pose difficulties for imports from Vietnam. In the Asutralian market, the problem arises from bacterial contamination, labelling and veterinary drig residues.

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

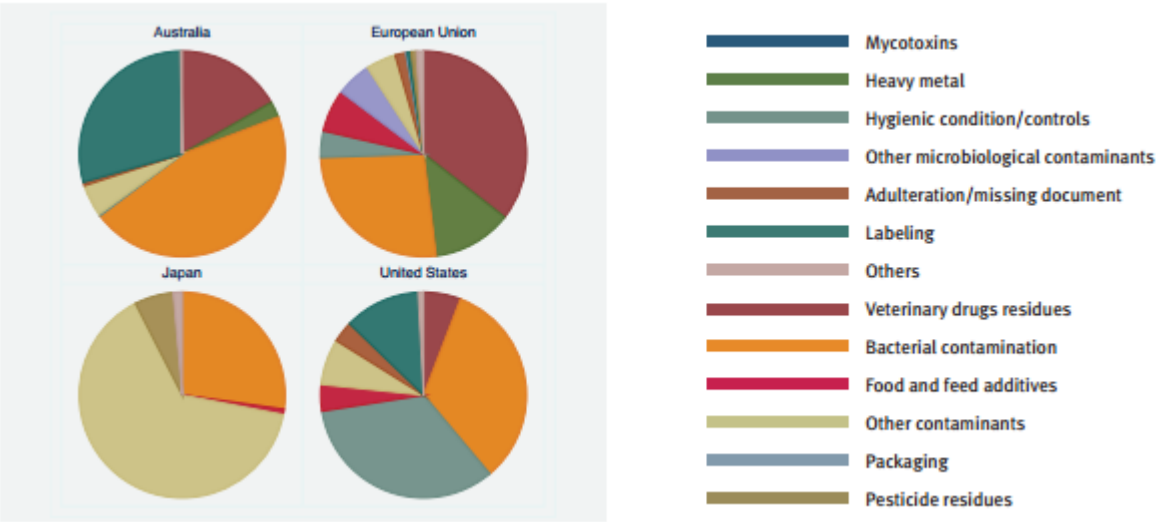
Table: Reasons for import rejections of Vietnamese fish and fish products in selected markets

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

Source: UNIDO dataset and analysis

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

Graph: Reasons for Rejections by Export Market and Product Group 2002 - 2010



Source: UNIDO – TSC Foot print 2012: Import rejections analysis

What is unclear is why this is the case. With 37 years of export experience, Vietnam is no longer an amateur in this field. Import rejections are costly, not only because og the actual costs of unsold products and shipments back to the exporting country, but also

because it hurts the reputation of the country as an exporter. With increasing global competition and high standards, maintaining a good reputation is critical to attract consumer demand.

Another unclear aspect is that with increasingly stringent international standards and a growing number of certifications, who hurt the most along the value chain? Complying with standards required improvement in quality management systems. Who is the bear those cost? What are the effects on various stakeholders along the value chain?

D/ VIETNAMESE SHRIMP CONTAMINED REJECTIONS

Among Vietnam's seafood exports, pangasius and shrimp play important roles. Yet in recent years, some seafood exports from Vietnam have faced difficulties meeting the regulations of importing countries, particularly Vietnamese shrimp.

Japan, 2012

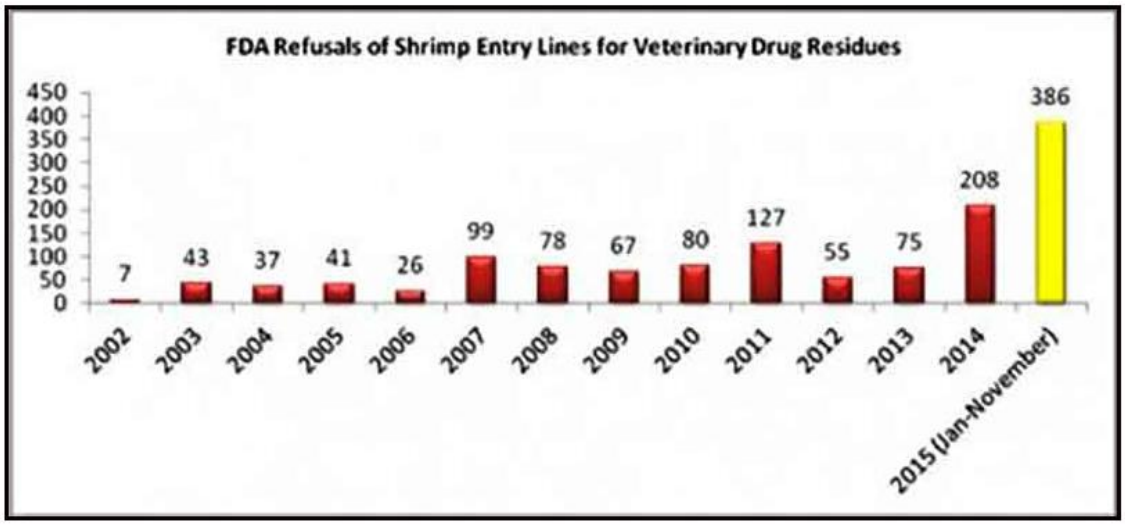
At Japanese ports, Vietnam seafood imports have been the major target of intensive inspection in recent years. In May 2012, one shipment of Vietnamese Shrimp to a Japanese port was found to contain ethoxyquin and this triggered more scrutiny of shrimp imports from Vietnam by Japanese authorities. This incident was preceded by detections of trifluralin in 2010 and enrofloxacin in 2011. Both ar banned substances in shrimp according to Japanese regulations. Now, shrimps exporters are concerned about this issue and some of the exporters are now refraining from exporting to Japan for fear of being rejected once again. This could jeopardise future growth in shrimp (UNIDO, Regional Trade Standards Compliance, 2013).

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

United States, Canada, Japan, European Union, Australia, 2015

On December 4, 2015, the USA Food and Drug Administration (FDA) reported 129 seafood entry line refusals for the month of November 2015. Nine (7.0%) were for banned antibiotics in shrimp. With one month left in 2015, FDA has now refused a record 386 entry lines of shrimp for reasons related to ban antibiotics.

Figure: Food Drug Administration refusals entry lines for veterinary drug residues (2002-2015)



Source: FDA, 2015

The nine entry refusals in November principally involved shrimp manufactured by one Vietnamese company. The refusals were reported from our different FDA District Offices spread across the country:

Bac Lieu Fisheries (Vietnam), a company listed on Import Alert 16-214 for sulfadoxine on June 19, 2015, but not currently listed on Import Alert 16-129, had five entry lines refused for shrimp contamined with veterinary drug residues in the Los Angeles District, two entry lines refused for shrimp contamined with veterinary drug residues in the Atlanta District, and one entry line refused for shrimp contaminated with veterinary drug residues in the New York District.

The eight entry lines refusals of shrimp shipped from Vietnam, by three different FDA district Offices, are the first refusals of Vietnamese shrimp for reasons related to ban antibiotics since May 2015. In total, the FDA has reported refusing 38 entry lines of Vietnamese shrimp for banned antibiotics in 2015, the second most since 2002, when 48 entry lines of Vietnamese shrimp were refused.

The FDA's findings are similar to those in other major seafood-importing markets, for example:

- The Canadian Food Inspection Agency currently includes 6 Vietnamese companies on its Mandatory Inspection List (MIL) for antibiotics that were added in 2015:
    - **Nha Trang Seaproduct Company (Approval DL 17),** on February 12, 2015 for both sulfonamides and fluoroquinolones;
    - **Global Blue Ocean Import Export Joint Stock Company (EU Code DL 745),** was placed on the MIL on March 4, 2015 for sulfonamides;

- **Trang Thuy Private Enterprises (Plant Reg. No. HK337)**, was placed on the MIL on June 2015 for amphenicols;
- **Bien Dong Seafoods Co. Ltd (EU#DL45)** was placed on the MIL on September 2015, for fluoroquinolones;
- **Quoc Viet Seaproducts Processing Trading and Import-Export Co. Ltd. (DL 200)** was placed on the MIL on November 30, 2015 for tetracyclines, and
- **Vietnam Clean Seafood Corporation (VINA CLEANFOOD) (DL 707)** was placed on the MIL on November 30, 2015 for amphenicols.

- The Import Food Inspection Services (IFIS) of Japan's Ministry of Health, Welfare and Labour has reported finding antibiotics in 23 shipments of shrimp from Vietnam in 2015, with rejections in every month of this year for a varried array of antibiotics:
  - **On January 21, 2015**, IFIS published notice that a shipment of shrimp (frozen ebi fry) from Vietnam by **New Wind Seafood Co. Ltd** was found to have traces of enrofloxacin;
  - **On February 10, 2015** IFIS published notice that a shipment of Nobashi Ebi With STPP from Vietnam by **Seaprimexco** was found to have traces of enrofloxacin;
  - **On March 5, 2015**, IFIS published notice that a shipment of Frozen Block Raw PDTO Vannamei Shrimp from Vietnam by **Ngo Bross Seaproducts Import Export One member Co. Ltd**. Was found to have traces of enrofloxacin;
  - **On March 30, 2015** IFIS published notice that a shipment of Frozen Raw Sushi Ebi (Vannamei) from Vietnam by **Vietnam Clean Seafood Corporation** xas found to have traces of enrofloxacin;
  - **On April 2015** (enrofloxacin); **May 2015** (chloramphenicol); **June 2015** (furazodoline, enrofloxacin, sulfadiazine), etc until **November 2015**.

- The European Union's Rapid Alert System for Food and Feed (RASFF) includes six notificatio issued in 2015 for Vietnamese shrimp contamined with a variety of banned antibiotics:
  - **On January 14, 2015,** a notification was issued from Germany regarding frozen shrimps from Vietnam found to have residued of chloramphenicol;
  - **On January 22, 2015** a notification was issued from Belgium regarding frozen sushi shrimps from Vietnam found to have residued of oxytetracycline;
  - **On January 30, 2015,** a notification as issued from Germany regarding frozen prawns from Vietnam found to have residues of tetracycline.
  - **On July 14, 2015,** a notification was issued from Germany regarding frozen king prawns from Vietnam to have residues of nitrofurans.
  - **On August 26, 2015** a notification was issued from Germany regarding frozen whiteleg shrimp from Vietnam found to have residues of oxytetracycline; and
  - **On September 1, 2015** a notification was issued from Sweden regarding frozen shrimps from Vietnam found to have residues of doxycycline.

- Even Australia has reported issues with imports of Vietnamese shrimp this year. Australia's Departement of Agriculture and Water Resources publishes monthly "Failling Food" reports of results from its Imported Food Inspection Scheme including a report that a shipment of marinated garlic prawns from Trang Khanh Seafood Co Ltd. (DL343) tested on May 22, 2015 was found to have ciprofloxacin.

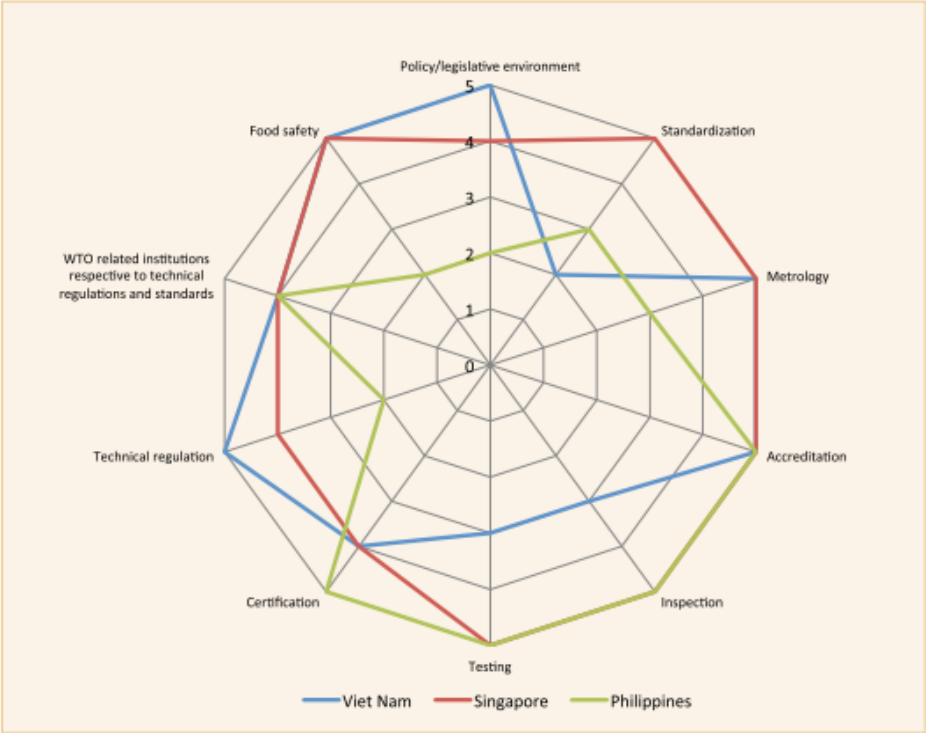
During the year 2015, Vietnamese seafood exporters met difficulties meeting the regulations of importing countries. Between January and September of this year, Vietnamese exporters received 181 warming on seafood safety (compared to 7 in 2013 and 51 in 2014) from main import markets (Japan, South Korea, EU, US, Australia, Canada, Euroasian Economic Union) according to the Department of Health in Vietnam. During the last two years, 32,000 metric tons of seafood were rejectd for import to contain residues of banned antibiotics.

Import rejections have an important cost, not only the cost of the way to come back, but also the cost of the reputation for the Vietnamese products. These difficulties to meet the regulation of importing countries participated this last year to the uncompetitivity of the Vietnamese seafood sector to reach USD 8 billion of total export value. Other explications are the high production cost, the inadequate quality and the unhealty competition. A more expensive prive than its competitors (+20% for shrimp products) participate to the uncompetitivity. Vietnamese exporters should limit antibiotic residues on seafood on seafood to find new market and consolidate the current main import markets.

E/ WEAKNESS OF VIETNAMESE COMPLIANCE CAPACITY

On the last UNIDO study about "Trade standards Compliance 2015", Vietnam is classified as a country that has only some specific areas of weakness. The next figure for example presents the rankings for the Vietnam, Philippines and Singapore, all of which are in Southeast Asia. The results reported suggest that all three of these countries have relativelly strong trade compliance capacity, broadly speaking. However it is evident that these countries do have some areas of weakness. For example, Vietnam is placed in the fifth quintile for quality policy/ legislative environment, metrology, accreditation, technical regulations and food safety, its standardization capacity is in only the second quintile, and its testing and inspection capacity in quintile 3.

Figure: Array of Compliance capacity in Vietnam, Philipines and Singapore



Source: UNIDO Trade Standards Compliance, 2015

F/ SEAFOOD CERTIFICATION IN VIETNAM

BAP

To promote responsible practice across the aquaculture industry, the Global Aquaculture Alliance coordinates the development of Best Aquaculture Practices (BAP) certification standards for hatcheries, farms, processing facilities and feed mills.
The BAP program drives continued improvements via high standards that deliver significant benefits industrywide. The BAP standards cover aquaculture facilities for a variety of fish and crustacean species, as well as musels.

Vietnam get total of 120 BAP certified facilities including 5 certified 4 stars, 12 certified 3 stars, 21 certified 2 stars, 82 certified 1 star. Vietnam has 5 shrimp companies certified 4-star BAP standard in total 10 companies' certified 4 stars BAP stndards in over the world.

ASC

The ASC's mission is to transform aquaculture towards environmental sustainability and social responsibility using efficient market mechanismes that creat value across the chain. ASC aims to be the world's leading certification and labelling programme for responsibility farmed seafood. The ASC's primary role is to manage the global standards for responsible aquaculture, which were developed by the WWF

Aquaculture Dialogues in 2010. The Aquaculture Dialogues was the creation of eight global stndards that define how the responsible farming for 12 diferent types of fish and shellfish (salmon, shrimp, tilapia, trout, pangasius, abalone, musles, clams, oysters, scallops, cobia and seriola).

Currently, there 47 farms certified ASC pangasius in Mekong Delta region. ASC Pangasius standard is a solution to critical aspects of pangasius farming, adressing: pollution of the Mekong-river, uncontrolled catch of wild fish for feed production, misus of antibiotics and high density in ponds.

There are 5 ASC certified farms for shrimp in Vietnam. Other ASC certified shrimp farms are in Belize, Ecuador and Indonesia. The ASC shrimp standard requires that the construction of farms is not destructive to the environment. Nutrient and chemical loading must be limited to science-based thresholds. Feed ingredients need to be traceable to sustainable sources. Farms are also required to commission a Biodiersity Environmental Impact Assesment (EIA).

Global GAP

Global GAP's roots began in 1997 as EurepGAP, an initiative by retailers belonging to the EuroRetailers Produce Working Group. British retailers working together with supermarkets in continental Europe become aware of consumers' growing concerns regarding product safety, environmental impact and the health, safety and welfare of workers and animals. Global GAP is today the world's leading farm assurance program, translating consumer requirements into Good Agricultural Practice in a rapidly growing list of countries- currently more than 100.

In August 2014, in Vietnam a small-scare Vietnamese pangasius farms earn group Global GAP certification, in Tra Vinh Province by Provincial Seafood Association. Currently, there are 26 Vietnamese pangasius farms certifiec by Global GAP, located in Ben Tre Province, Dong Thap, and Tien Giang (Global GAP website, December 2015).

Viet GAP

To contribute to promoting aquaculture seafood products and food safety in general and fruit and vegetable for consumption in the country in particular to exports, the Ministry of Agriculture and Rural Development issued the criterai VietGAP on 01/28/2008.

Viet GAP (Vietnamese Good Agriculture Practices): practices good agrictulure production in vietnam is basd on 04 criteria, such as Standard on production techniques; Food Safety including measures to ensure no chemical contamination or physical contamination during harvesting; working environment aims to prevent abuse of the labor of farmers; product traceability.

Under Decree No.36/2014/ND-CP dated 29/04/2014 about farming, processing, and export of pangasius products, on December 31, all commercial fish farms must apply and be certified by Viet GAP or other international certifications. But on November 2015, the Ministry of Agriculture extended the deadilne for tra fish farms obtain VietGAP or other

certification to December 31 in 2016, to giver them more time to make preparations[53]. The reasons for the delay is some provinces have not yet tom complete zoning plans for tra fish farms and processing faciltied, thus affecting the deployment of VietGAP certification. The Government has approved this first Decree so that the origin of products can be easily tracked and the credibility of Vietnamese tra fish on Global market boosted. Over 90% of domesticaly-processed tra fish fillets are exported; however, some export shipments have reported failed to meet food safety criteria in recent time. Tofay, only 50% of the total tra fish farming area has been certified as GAP standard and the numbr of Viet GAP is still low.

G/ ALIGNMENT of VIET GAP on GLOBAL GAP

2006: ASEAN anounced GAP Process for its members.
2008: Vietnam launched its own standards with VietGAP.

The development of VietGAP was one of the approaches to support small farmers in gaining international market access. However, Viet GAP has not yet been benchmarked to Global GAP (UNIDO, 2015). The exporters see the GlobalGAP certification as visa to conduct business with European supermarkets.

However, there is a constant discouragement for "the serious" global GAP certification Vietnamese exporters in that they see theur non-certified GlobalGAP fellow exporters continuing to ship to the EU without certification. The Established supermarkets in the EU only take to Global GAP certified suppliers but in times of short supply of certain products these supermarkets sometimes also buy from the wholesale markets[54].

Viet GAP should be recognized as a strict standard into main import markets. For the while, on international trade, Viet GAP is not recognised as equivalent as Global GAP. By contrast, Thai GAP standards are now officialy recognized as equivalent as the Global GAP standard.

During a conference organised in Ho Chi Minh on November 24, 2015 (focused on Viet GAP certification), Mr Tien, Head Office of the Agricultural And Rural Development Office of Ho Chi Minh explained the difficulties to extend the VietGAP model certification in rural areas. May be it is relevant to revised VietGAP standards, to have a better utilisation and application of this national standard, and in order to recognised Viet GAP as a strict standard in the world.

The certification will increasingly mediate the ability of Vietnamese producers of Pangasius and shrimp (and other seafood products) to access Northern markets in coming years. Price increases are also a consequence of certification for export products. Concerning bivalve mollucs certified in Vietnam, the prices increased more than 30-50% on main import markts. FTAs reached this last year for Vietnam represent a great opportunity for national producers and exporters but also an important challenge in term of meeting international standards. The role of the Government is to inform and to form farmers/processors/exporters to the importance of certification and traceability.

[53] Breaking Vietnam News, "VietGAP for tra fish delayed until end 2016", November 20, 2015.
[54] UNIDO, Trade Standards Compliance Report , 2015

H/ WEAKNESS OF INSPECTION AND TESTING: NAFIQAD ROLE

The National Agro-Forestry-Fisheries Quality Assurance Department (NAFIQAD) is an institution assisting the Minister to carry out the state governing of quality and safety of agricultural, forestry, fishery products and salt nation-wide.

According to the Decision No. 29/2008/QD-BNN dated on January 28, 2008, NAFIQAD has the responsibility and power to "Examinating and Testing" (al.8) national fish and fishery products. Role of NAFIQAD is to:

- *a/ Synthesize and propagate Vietnam and international, regional and importing countries' requirements on testing criteria, limit of detection, testing and examinating methods in the assigned fields;*
- *b/ Guide and supervise the testing activities of quality and safety of agro-forestry-fishery products and salt;*
- *c/ Build-up nationalr eference laboratories for fishery quality and safety criteria, recognize national and international reference laboratories for quality and safety criteria of agro-forestry-fishery products and salt;*
- *d/ Supervise the implementation of national standards and technical regulations on the quality assurance system for laboratories of agro-forestry-fishery products and salt.*

NAFIQAD effectuates control of products. It is an important agency bu every inspection and testing on the value chain depend of NAFIQAD. Private Sector has a limited role in the inspection and testing phases.

CONCLUSION and RECOMMANDATIONS

In this part, we examined the situation of of standard compliance for Vietnam seafood export sector. In recent years, seafood exports from Vietnam have faced some difficulties meeting regulations of importing countries.Between 2002 and 2010, rejections of fish and fishery products from Vietnam were valued at US$ 73 millions. Between January and September of this year, Vietnamese exporters received 181 warming on seafood safety (compared to 7 in 2013 and 51 in 2014) from main import markets (Japan, South Korea, EU, US, Australia, Canada, Euroasian Economic Union). During the last two years, 32,000 metric tons of seafood were rejectd for import to contain residues of banned antibiotics. All these rejections represent an important cost for the revenue and the reputation of the Vietnamese products all over the world. In terms of Trade Standards Compliance, Vietnam has specific areas of weakness (standardization, testing, inspection and certification). Some farms in the country are certified by international standards (ASC, BAP, and Global GAP) but the number is still low. The intensifying trade standards are adding costs for the stakeholders for Vietnam without increasing the prices. The great difficulty lies in the compliance of standards at the level of small-scare farmers.

Also the decision of the Government that, all commercial fish farms must apply and be certified by Viet GAP or other international certification is a good one, but the deadline is still delays until end of 2016. Moreover, VietGAP is not recognized as a equivalent as Global GAP (by contrast to the ThaiGAP). The alignement of VietGAP on GlobalGAP represent an important challenge for the future.

A more strict mechanism is needed to ensure standard compliance. A lot of farmers are now aware of the existence of this standards and certifications; they are not willing to obtain these certifications because there is no effective system mechanism. Also, in addition to intensifying the monitoring by local authorities, offering access to public labs for farmers may also bring positive results by educating farmers about the situation of their fish. If they can check the status of their fish by themselves before sales, that will also give them more incentives to frow safer fish. Here development agencies seem have important role to play.

VII. FISHERY INDUSTRY AND ENVIRONMENTAL ISSUES

More than 70% of our planet's surface is covered by water, creating a vaste habitat for thousand of species. Many of these species however are endangered because of the the climate change and the increasing fishing activities of humans (WWF, 2015). In order to reduce this impact it's important to promote a sustainable fishery sector.

The fishing sector is vital to Vietnamese prosperity and important to all nations bordering the South China Sea. China, Thailand and Vietnam accounted for 80% percent of world fishery production in 2012 and 50 per cent of fishery export value[55]. In 2014, Vietnamese fisheries accounted for nearly 4,5% of gross domestic profit . In 2010, 7,4 percent of economically active people were engaged in fishing, the second highest percentage worldwide after Fidji[56]. Vietnam rose to the position of fourth largest exporter of fish and related products between 1998 and 2014, when the catch was value at nearly US$ 7, 84 billion. A flourishing aquaculture industry rather than increases in offshore capture fisheries explains much or its rise. In 2007, aquaculture production surpassed capture fisheries for the first time[57]. Last year, the aquaculture production in Vietnam reached 3,413 million tons, and fishing capture at 2,919 million tons.

Environmental risks for fishery sector in VN [58]:

Directly related to climate change:

- Increase frequency of typhoons and cyclones
- Increased Flooding and Sea level rise
- Ocean Acidification and migration of fish species
- Increase in temperature

Not directly related to climate change:

- increased upstream damming and reduced river flows through damming
- increased use of pesticides and environmental pollution
- aquaculture development (habitat loss)
- overfishing control

[55] United Nations Food and Agriculture Organization (FAO), The State of the World Fisheries and Aquaculture 2014, Fisheries and Aquaculture Department, 2014.

[56] Edward H. Allison, et al, « Vulnerability of National Economies to the Impacts of climate change on fisheries », Fish and Fisheries, 10. 2009.

[57] Cao Le Quyen : »Country Report Vietnam : National policies and actions to militigate and adapt to climate change in the aquaculture sector », paper presented at the Asian Pacific Fisheries Commission, May 31, 2011.

[58] FAO, "Climate change vulnerability in fisheries and aquaculture: a synthesis of six regional studies", (2013).

A/ ENVIRONMENTAL RISKS FOR FISHERY INDUSTRY IN VIETNAM: DIRECTLY RELATED TO CLIMATE CHANGE

Vietnam is one of the developing countries most exposed to climate change by nature of its geography. Twenty four percent of Vietnam's population lives in coastal districts[59]. Storms and related damage from floods and tidal surges are among the most significant impacts. Coastal mangroves, salt marshes and coral reefs – critical to breeding marine life – are all endangered. Warming ocean temperatures associated with climate change will also change migratory patterns of fish in the open sea[60]. So many fisheries will be seriously affected, due to new ecosystems, abnormal weather phenomena.

Table: Major Physical effects on climate change on Vietnamese fisheries

Cyclones Typhoons	Based on a range of models, it is likely that future tropical cylones will become more intense, with with heavier precipitation, and increases of sea surface temperatures.
Flooding	Coastal areas, including the populated Mekong Delta region, will be at greatest risk due to tidal surges and Sea-level rise and consequence saline water intrusion[7] (17 cm by 2030 and 33 cm by 2050). Increased flooding and water availability in the dry season (Halls and Johns, 2013).
Ocean Acidification Migration of fish species	Progresive acidification of ocean waters destroys corals and their dependant species. Vietnam has a limited reef system but fish species migrate northward from the fragile Coral Triangle reef system.
Rising Temperature	Shifts in ranges and changes in algal, plankton and fish abundance are associated with rising water tempratures, as well as related changes in salinity, oxyegn levels and circulation. Temperature are expected to increase by 1° in 2050 and 1,5° in 2070.

7/ Thuan (2011) estimated that sea-level rise could submerge 19-38 per cent of Vietnam's Mekong Delta, which currently produces 25 per cent of the country's GDP.

Sources: IPCC (2014) (2007), T. Daw, et al. (2009), I-Ching Chen et al. (2011)

[59] Tran Duc thanh et al. « Regimes of human and climate impacts on coastal changes in Vietnam, Regional Environmental change », Volume 4, Issue 1, (2004).

[60] Intergovernamental Panel on Climate Change (IPCC) : ML. Parry et al. eds. "Summary for Polcymakers, Contribution of Working Group II to the fourth Assesment Report of the Intergovernamental Panel on climate Change", (2007) Cambridge, United Kingdom and New York, Cambridge University Press.

Physical Impacts on marine capture fishery:

Worldwide, climate change driven- changes in the distribution of sea life ar expected in every marine eco-system but the exact magnitude and extend of effects are largely unknown due to the immaturity of scientific analytical approaches[61]. However, evidence from an analysis of studies on range shifts of aquactic species published in 2011 in the Journal *Science* by I.Ching et al. has significiant implications for Vietnam. Northern migration of fish stocks into waters claimed by China is the most concerning trend. It finds that as ocean temperatures are increasing, species in the South China Sea (Oriental Sea) are migrating to colder waters in higher latitudes at a rate of approximately 17 kilometers per decade[62]. A newer study from the Journal *Nature* confirms theses results[63]. All of these findings have significant negative implications for Vietnam. Northern migrations are economically vital fish stocks into waters clameid by China.

The map below illustrates each littoral country of the South china Seas claim to an Exclusive Economic Zone under the UN Convention on the Law of the Sea (UNCLOS). The Convention grants nations the right to declare an EEZ of 200 nautical miles from an established coastal.

Map: Chinese territorial claims relative to UNCLOS

Source: BBC News

[61] MacNeil, M.A, N.A.J. Graham, J.E, Cinner, S. Jennings, N.V.C.Plumin and T.R. McClanahan, 2010; Transitional States in marine fisheries: adapting to predicted global change. Philosophical Transactions of the Royal SocietyB, 365 (1558), 3763.

[62] I-Ching, Chen et al. « Rapid shifts of species Associated with high levels of climate warming » , Science, Vol 333 (2011).

[63] William L Cheung et al. « Signature of Ocean Warming in Global Fisheries Catch », Nature 497, (2013).

A comprehensive study by Malone et al. of the importance of fisheries to national economic and food security ranks Vietnam as 24th in the world in terms of relative national economic vulnerability specifically to climate change-driven impacts on capture fisheries[64]. These findings should send a resounding warning to Vietnamese policymakers about the need to rapidly develop adaptive measures to maintain the viability of fisheries.

Physical Impacts of environmental issues on Aquaculture Production:

Climate change will also deplete aquaculture yields. Global aquaculture is concentrated in the world's tropical and sub-tropical regions, with Asia's inland freshwaters, accounting for 65% of total production. In Vietnam, freshwater, coastal and offshore open waters are all suitable environments for aquaculture. However, aquaculture production is concentrated in the Mekong River where sea-level rise and associated surges are causing harmful saline intrusion into brackish and fresh water hatcheries[65]. The global warming greatly influences aquaculture, especially the aquaculture of shrimp which is very sensitive to the changes of living environment.

Mekong Delta, the main aquaculture production area in Vietnam but also…

The Mekong Delta River delta, which is a flat wide plain located in southern Vietnam, is the main aquaculture production area. The delta lies along the last part of the lower selection of the Mekong River, which is the world's second richest river bassin in term of biodiversity. Before pouring into the East Sea, the Mekong River reaches the delta through nine estuaries and a dense canal network.

Aquaculture area in Vietnam has increased from 864,5 ha in 2003 to 1,038,9 ha in 2012. The most important region is in the Mekong Delta with a total aquaculture production of 727,200 hectares (in 2012). The southern region account for nearly 70% of total aquaculture production area in the whole country (followed by the inland areas representing 17,2% of the national aquaculture area. This area contributes more than 41% of the total export value of seafood products in the whole country in 2012. Aquaculture in this area has diverse activities: fresh water, brackfish water, and marine water. It includes breeding, rearing, and sale of shrimp, prawan, mollusk and fig fry and fingerlings. Earea for fresh water aquaculture is more than 400,000 hectares.

Especially Delta is suitable for raising shrimp due to characteristic of geological structure with salinity area accounting for 46,15% area of the whole region. The culture of shrimp is a typical production of this region and in 2014, the total area of shrimp culture was arround 530,000 ha for a production of 248,000 MT. Last year, 70 % of the

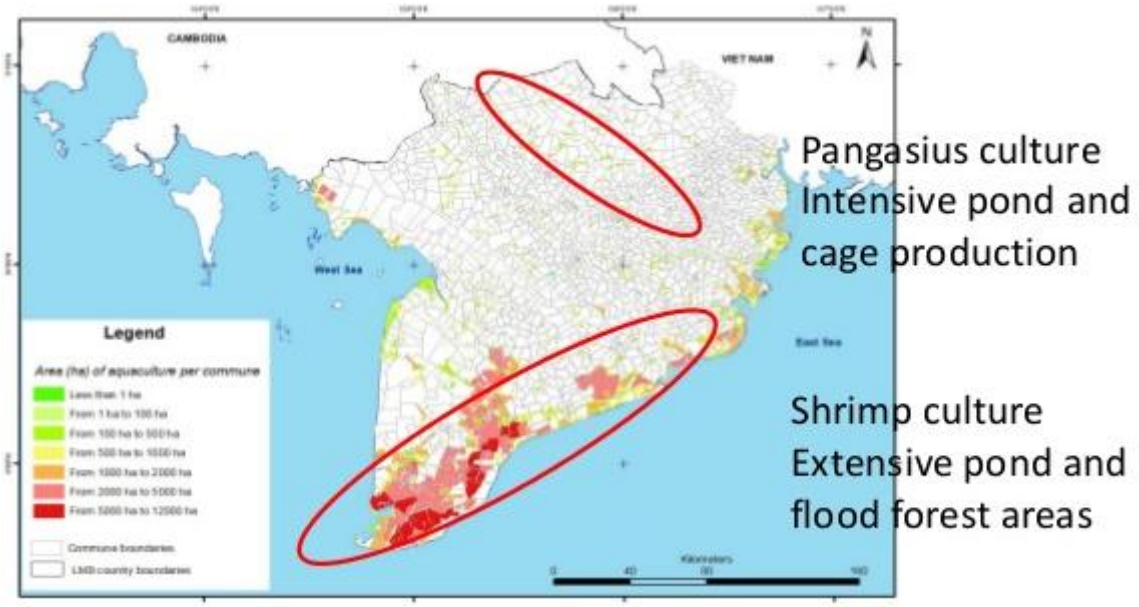
[64] Edwards H. Allison et al, « Vulnerability of National Economies to the Impacts of climate change on fisheries", Fish and Fisheries, Blackwell, 2009. Vulnerability is defined a sexposure to climate change, systemic natural resource resilience, degree of dependance of the national economy upon social or economic returns from fisheries and the extent to which adaptive capacity offsets.

[65] Tim Daw, et al. « Climate change and Capture fisheries : potential impacts, adaptation and mitigation », FAO, Fisheries and Aquaculture Technical Paper, No 530. Rome, Italy.

total national shrimp production was represented by the Mekong Delta region (the Province of Cau Mau representes 25 of the national's shrimp production).

Concerning the culture of pangasius, this product have been raising and developing mostly in 10 Mekong Delta River Provinces, including: An Giang, Dong Thap, Tien Giang, Can Tho, Vinh Long, Ben Tre, Hau Giang, Soc Trang, tra Vinh, Kien Giang, and two privinces (Tay Ninh and Quang Nam) with total farming area of 5,509 hectares (in 2011) and up to 13,000 hectares in 2020 (VASEP, 2012). Provinces of Can Tho, An Giang and Dong Thap are the leading region culture of Pangasius in the Mekong Delta, account for over 75% of the total national pangasius production.

Map: distribution of aquaculture production in the Mekong Delta.



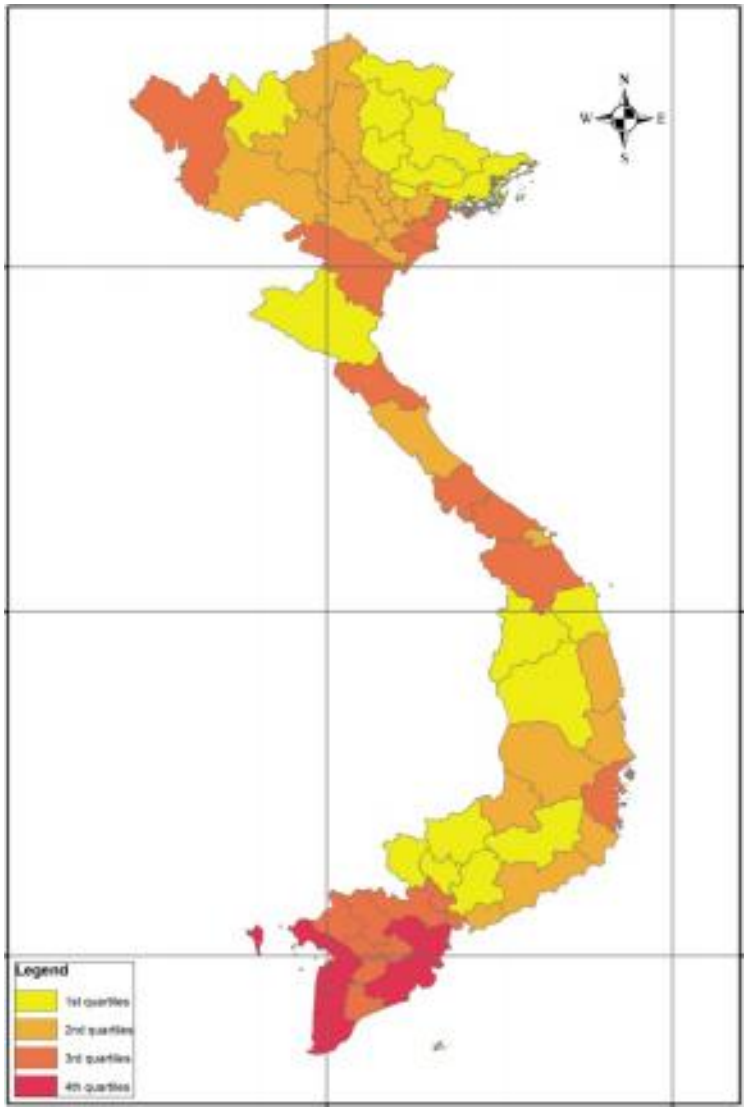
Source: Study of the Impacts of Mainstream Hydropower on the Mekong River by DHI, HDR, VNMC

The Vietnam's fishery industry is concentrated in the Mekong Delta. The region accounts for nearly 70% of the national pangasius production. Between January and June, exports of pangasius products represented 24,8% of the seafood exports. Moreover, nearly 75% of shrimp national production is located in the region. But this region, is significantly vulnerable to climate change and its impacts on aquaculture production.

- *… <u>A vulnerable Region front of climate change:</u>*

On the "State of World Fisheries and Aquaculture 2014", FAO experts recognize that the Mekong Delta is "significantly vulnerable" to sea level rise and flooding. Its fisheries and "aquaculture activities are likely to be impacted, albeit to varying degrees" by these two particular facets of climate change. Another vulnerability analysis confirmed that "aquaculture would be more vulnerable to climate change scenarios than capture fisheries", climate change affecting equally both intensive and extension production system (FAO, 2014).

Map: Provinces most vulnerable to climate-induced changes in the aquaculture sector



Source: World Bank Stud, 2010

In Vietnam and especially in Mekong Delta provinces, sea level rise and flooding will have important consequences industry sector[66]. A recent study suggests that if Viet Nam experiences a 1 m rise in sea level, manufacturing enterprises in 20 provinces would be inundated. Most provinces with large numbers of firms affected are in the Mekong River Delta and southeast regions, which contribute 56% of national industrial production by value and 40 % of total seafood exports in 2014. In Long An Province, decades of enterprises would be inundated. Close to 500 large and medium-sized enterprises would be affected in Ho Chi Minh City. Many of the 24,000 small manufacturing enterprises operating in the city would also be affected; most are located in areas that

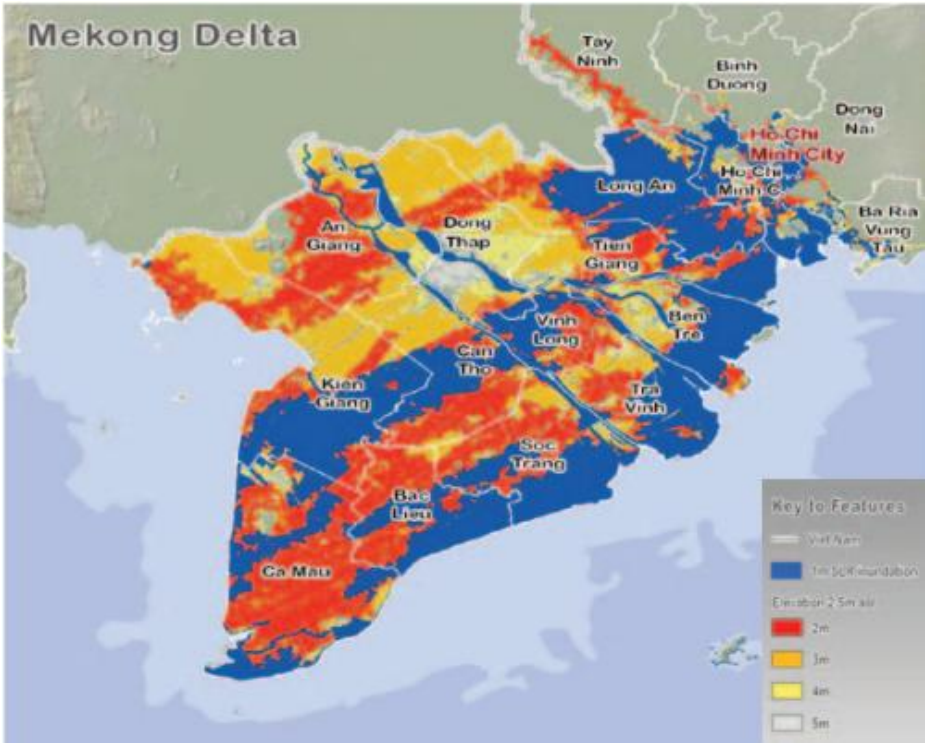
[66] Asian Development Bank, 2013. Vietnam Environment and Climate Change Assesment

are already vulnerable to inundation. Ho Chi Minh City has 16 industrial estates that would be affected; 9 of them would be inundated and the others would be within reach of storm surges. In the southeast region overall, 55 industrial estates would either be inundated or at high risk of disruption due to storm surges and other impacts related to sea-level rise (Carew-Reid 2007). The consequences of sea-level rise and fishery industry in Mekong Delta Region and for the national economy could be very important. According to a Malone Study, Vietnam is ranked 24th in the world in term of relative national economic vulnerability.

"The sea level rise is bringing up water so fast
That our defences against it have failed"

Quang Vinh, Director of the Climate Change Coordination Office in Can Tho

Figure: Areas under inundation in the Mekong Delta Region of Vietnam in 2100 under an Assumed 1,0 meter Sea Level Rise



Source: J. Carew Reid. 2007. Rapid Assesment of the Extend and Impact of Sea Level Rise in Vietnam

Scientists at the Mekong River Commision (MRC)[67], an intergovernamental body, warm that if the sea level continues to rise at its projected rate of around one metre by the end of the century, nearly 40% of the Delta will be wiped out.

[67] The MRC covers four country in the Delta region: Thailand, Cambodia, Laos and Vietnam.

B/ ENVIRONMENTAL RISKS FOR FISHERY INDUSTRY IN VIETNAM: NOT DIRECTLY RELATED TO CLIMATE CHANGE

Climate change is not the only one actor affected environment in Vietnam. In 2014, Vietnam was ranked fourth biggest exporter of seafood product in the world, with 3,413 MT of aquaculture products (shrimp, pangasius, tilapia, etc) and more than 2,919 MT of products from marine fisheries. The faster flourishment of the aquaculture sector with uses of antibiotic and destruction of natural areas (mangroves), add with marine capture methods, as overfishing or illegal fishing, participate to the impacts of the fishery sector on the climate change and the environment in Vietnam and South East Asia.

Impacts of aquaculture in the mangrove system in Vietnam

Mangrove systems are among the most productive and biologically important ecosystems in the world. They form a crucial component of the livelihoods of coastal communitiesin developing countries (Joffre and Schmitt, 2010[68]), providing fish, crustaceans, and other sea life for food income. However, mangrove systems have experienced rapid change in the form of degradation and loss due to increase human activity, particularly intensive and extensive commercial aquaculture.

The rapid rise of large scale, intensive aquaculture in Vietnam has been facilitated by the transition from a centrally planned to a socialist-orientated market economy (Adger, 2000[69]). Subsequently, Vietnam has lost 69% of its 269,000 ha of mangrove forests held in 1980, with an estimated 77% of this loss due to aquaculture (Hamilton, 2013[70]).

The Mekong Delta River and Waters Pollution :

According to Vietnam's Environmenta Agency[71], the waters of Mekong Delta are seriously polluted. Many factors are responsible of the Mekong Delta waters' pollution. Firstly, the Mekong crosses six countries, from China to Vietnam, and see a lot of hydroelectric sites in construction or ever working. Another important factor is the aquaculture production of Pangasius and Shrimp products in Vietnam. Aquaculture was developed in order to find an alternative solution to the overfishing issue and to assume the increased need for food. But aquaculture farms contribute to an important pollution of the Mekong Delta waters.

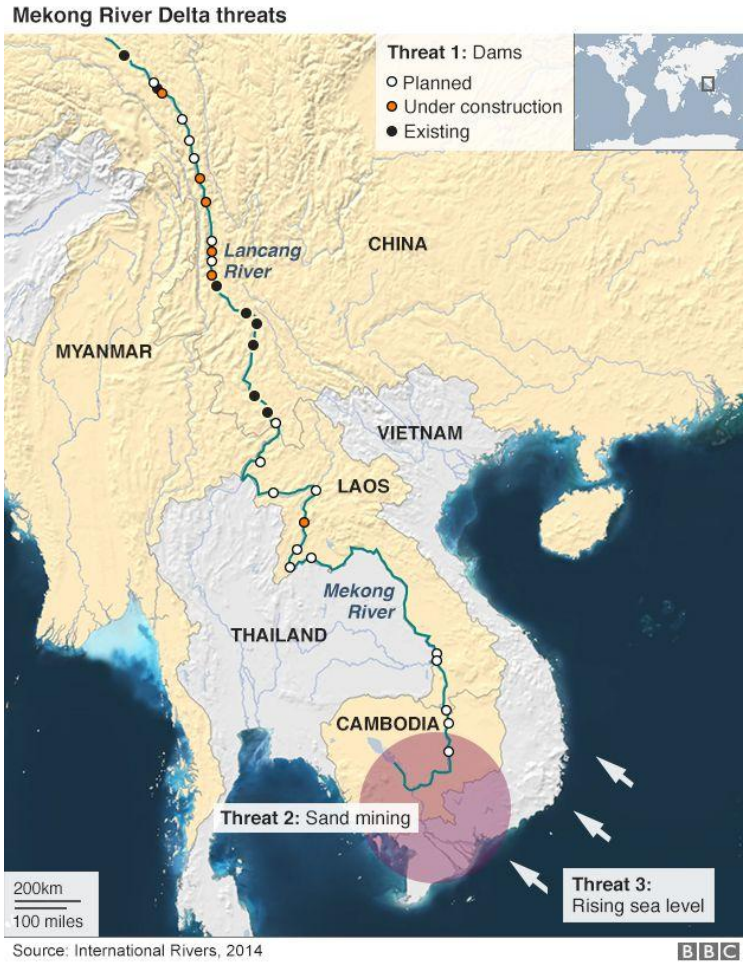
[68] O.M, Joffre and K. Schmitt. Community livelihood and patterns of natural ressources uses in the shrimp farms impacted Mekogn Delta, Aqua Ressources, 2010, vol 41.
[69] W.N. Adger. Institutional adaptation to environmental risk under the transition in Vietnam Ann. Assoc. Am. Geogr., 90 (2000), pp. 738–758
[70] S. Hamilton. Assessing the role of commercial aquaculture in displacing mangrove forest. Bull. Mar. Sci. , 2013, pp 585-601.
[71] Under the Ministry of <natural Resourcesand the Environment.

Will dams killed the Mekong Delta environment?

From China to Vietnam, crossing Myanmar, Laos, Thailand and Cambodia, The Mekong River sees the development of a lot of dams and major hydroelectric development sites. Countries of the Mekong River Region are hungry for energy and electricity. But this flousishment of hydroelectric sites is it dangerous for the Megong River waters, the population and the fishes? For Vietnam, the situation is preocupated beacuse the Mekong Delta is one of the most endangered area of the region.

In the north of the region, there is a dam expansion. Several dams upstream are already accused of disturbing the ecology of the river, which streches nearly 5,000 km from Tibet in China to the sea. According to International Rivers (IR), an organisation working on trans-boundary Rivers, China has built six "mega dams" on the river and is planning another 14 over the next 10 years. According to the organization, "China's dam construction on the Upper Mekong has already had an impact downstream, especially alog the Thai-Lao border where communities have suffered declining fisheries and changing water levels that are seriously affecting their livelihoods". In fact, by changing the river's hydrology, blocking fish migration and affecting the river's ecology, the construction of dams on the Lower Mekong will have repercussions throughout the basin.

Map: Mekong River Delta Threats



Laos, Cambodia, Thailand and Vietnam are planning to follow China's lead by building a dozen more dams on the lower Mekong. In Laos, the Don Sahong hydro dam project is especially controversal in Cambodia and Vietnam, the two countries at the basin's southernmost tip.

The Intergovernmental Panel of Climate Change (IPCC) has long that the Mekong Delta will feel the effects of climate change. Its latest assesment report says: "National climate change adaptation plans have been formulated in all four Lower Mekogn Basin countries but trans-boundary adaptation planning across theses countries does not exist. Today, a gap is opening between the need of electricity in the region, and the need for food with livelihoods of fishermens, agricultors, who depend to the free circulation of Mekong waters.

Water pollution by Pangasius production in the Mekong Delta [72]

According to a report on Vietnam Bridge, the content of E. coli bacteria in the delta's river and canal is two to five times the level permitted. The pollution is due in part to the expansion of rice fields and the increased use of fertilizers and pesticides. Another reason is pond expansion to grow pangasius (basa and tra).

The study analyse water pollution caused by farming and processing Pangasius in the Mekong Delta in Vietnam. The results shows that 1 tonne of frozen filets releases 740kg BOD, 1020 kg COD, 2050 kg TSS, 106 kg of nitrogen and 27 kg oh phosphorus, of whiwh wastewater from fish ponds contributes 60-90% and sludge from fish ponds and wastewater from processing facilitiescontributes 3-27% of the total emissions. Overall, the combined waste emissions from Pangasius production and processing acount for <1% of the total TSS, nitrogen and phosphorus load in the Mekong Delta. Despite the relatively low contribution to water pollution, further reductions are possible through more efficient use of inputs and low-cost treatment and re-use of effluent streams.The use of cleaner production technologies and the development of wastewater treatment plants could be applied to large farms and processing facilities to reduce water pollution in Pangasius processing. Low cost options for small-scale farms include the optimization of the discharge design for the re-use of wastewater.

Various claims have been made by consultants, NGOs and multilateral organizations alike about the impact of water pollution (WWF 2009), drug and chemical use (Sarter, Nguyen, Hung, Lazard & Montet 2007), adverse e¡ects of high feed conversion atios (APFIC 2005), farm health management and disease control and the carrying capacities of terrestrial and aquatic environments In response, the industry and Vietnamese government have invested in a range of state and private safetyand qualitystandard and certification systems in the hope of improving production and processing practices, and allaying the concerns of consumers in international markets. One of the most commonly voiced environmental concerns of Pangasius farming is the discharge of wastewater from ponds (which now make up 98% of the production). In addition, the Pangasius processing industry, concentrated in the Mekong Delta close to Pangasius farming areas,

[72] Pham Thi Anh, C. Kroeze, Simon Bush, Arthur Mol, "Water pollution by pangasius production in the Mekong Delta, Vietnam: causes and option for control". Aquaculture Research, 42 (2010)

is also widely regarded as a major source of wastewater with high organic matter content.

Antibiotic contaminants in Mekong waters from Vietnamese shrimp farms

The areas and production levels of Vietnamese shrimp farms have been increasing dramatically in recent years. This has contributed greatly to the national economy, poverty alleviation and job creation[73]. Farmed shrimp production in the Mekong River Delta has also played a key role in the shrimp industry of Vietnam. Despites the obvious strength of the industry, aquaculture production is an important source of pollution of veterinary medicines into the environment. One of the critical issues is the excessive application of antiobiotics including human medicines. These chemicals could be released from shrimp ponds and then accumulated and contamined of the ecosystem[74].

A large number of aquaculture farms in Vietnam are highly intensive in order to increase the yield per unit area. In attend to salvage their farms and improve yields, farmers resort to using a variety of antibiotics. A study conducted on antibiotic contamination in northern Vietnam indicates the presence of three major antibiotic classes in aquatic environment: sulfonamides, diaminopyrimidine (trimethoprim) and macrolides)[75]. Research by Le and Munekage on shrimp farms in mangrove areas in Vietnam indicates the presence of similar antibiotics in both northern and southern Vietnam[76].

The uses of antibiotics in aquaculture systems can creat serious economic and health problems. Antibiotics residues have been found in several aquatic products from Vietnam and other Asian countries(UNIDO, 2012 [77]). Because of stringent regulations from the US and European Union, the issue of antibiotic residues in aquatic products for export has been mostly resolved; however, there are no such well-enforced regulations for Vietnam's domestic markets. Since fish and other aquatic products represent a very large portion of their diet, Vietnamese people are potentially being exposed on a daily basis to antibiotic residues.

The main danger of antibiotic use is the development and selection of antibiotic resistant pathogens. Since many of the antibiotics used are non-biodegradable, industrial antibiotics used in aquaculture farms can place intense selective pressure on aquatic microbila populations. The situation in Vietnam is amplified by the integrated agriculture-aquaculture (IAA) farming system encouraged by the Government, which often involves an aquaculture system that is sustained through the addition of human

[73] Estelles, P. Jens, H. & Sanchez, L, Sustainable Development in the Mekong Delta. Centre for Environmental studies, University of Aarhus, 2002.
[74] Hoang Thi Thanh Thuy, Antiobiotic contaminants in coastal wetlands from Vietnamese shrimp farming, Environmental Science and pollution reasearch, 18, 835-841. Institute for Environmenta and Ressources, Ho Chi Minh City, Vietnam.
[75] Hoa PT, Managaki S, Nakada N, Takada H, Shimuzu A et al. (2011) Antibiotic contamination and occurrence of antibiotic-resistant bacteria in aquatic environments of northern Vietnam. The Science of the total Environment 409:2894-2901.
[76] Le TX, Munekage Y (2005) Antibiotic resistance in bacteria from shrimp farming in mangrove areas . The science of the Total Environment 349:95-105.
[77] UNIDO- Trade Standards Compliance Footprint 2012: Import rejection Analysis.

livestock waste. This creates an environmental that greatly increases the ease through which antibiotic resistance genes present in livestock[78].

Due to the lack of regulation, there is very little information about antibiotics used in aquaculture for the domestic markets of Vietnam ad whether there is any antibiotic residue present. In 2015, the study about "Monitoring Antibiotic Use and Residue in Fresh Water Aquaculture for Domestic Use in Vietnam" [79], found that fish and shrimp bought at a regional market were antibiotic residue screening test positive in about 25%. Also a considerable number of farms (23,4%) used antibiotics up to harvest time. Thses fish or shrimp were often suffering from illness; therefore antibiotics were used to maintain an appearance of health in order to minimize losses and gain back the capital. The decision to use antibiotics is a matter of economic practically rather than health, safety or environement protection. It is important for the future to resolve the farmer's lack of knowledge.

Overfishing and Illegal Fishing

Overfishing: situation in South China Sea:

It is important first to give the basic definition of the biological overfishing, according to the FAO: *"Overfishing corresponds to a situation where the fishing mortality is such that fish are caught before they have a chance to reach their growth potential. Fishing less or with a better exploitation pattern would result in higher total catches. The low catch rates corresponding to this situation may not be profitable in economical terms (unless when these fishes are sold at a very high price)."*

In its report about the "World State of Fisheries and Aquaculture, 2012", FAO explained that eighty percent of the world's fish stocks are overfished or at maximum capacity. This situation is especially evident in the South China Sea where coastal fishing grounds have been depleted to 5-30 percent of their unexploited stocks[80]. Consistent with this trend, unsustainable fishing practices have been confirmed in local areas within the Vietnamese EEZ[81]. A large amount of the over withdrawal can be attributed to the incursion of foreign fishing vessels. Furthermore, the lack of cooperation between the countries involved in this maritime conflit is not favorable for the establishment of a Regional Management Plan for the fish species preservation.

For the larger China East Sea, some 300 million people currently live in coastal areas, and this population expected to double in the next three decades. According to the University of Britisj Columbia Fisheries Centre, the average annual haul of fish caught in this region tops nearly six million tons per year. Furthemore, China and Vietnam are

[78] Hoa et al. 2011.
[79] Dang Kim Pham, Jacqueline Chu, Nga Thy Do, François Brose, Guy Degand, Philippe Delahaut, Edwin De Pauw, et al. Monitoring Antibiotic Use and Residue in Freshwater Aquaculture for Domestic Use in Vietnam (2015).
[80] Alain Dupont, Christopher G. Baker, East Asia's Maritime disputes : Fishing in Troubled Waters, The Washington Quarterly, Vol. 37, Iss. 1, 2014, 81.
[81] Dr. MarcusDuBois, Climate Change and Vietnamese Fisheries : opportunities for conflict prevention, N. 26, june 29, 2015.

among the world's top five shrimp producers. The US is one of the largest markets for frozen yellow tuna caucght by Vietnamese fishermen. There are more than 500,000 full time Vietnamese fishermen in the coastal areas and 130,000 commercial wooden trawlers. Because of this population there is perhaps nowhere else in the world – considering the rich biodiversity and dependance on the once abundant and available fish species – where fisheries face greater overexploitation than in the area of the South China Sea.

While policy shapers and governments continue to argue about territorial sovereignty, an increasing number of environmentalists believe that fishermen from Vietnamn China, Cambodia, the Philippines and Japan are overexploiting the sea. According to Dr. Nguyen Long, Deputy Director of the Research Institute for Marine Fisheries (RIMF), the overexploitation of coastal resources us demonstrated by a decline in fish catches with specific declines in lobsters, abalone, scallops and squid. Since the 1960s, the number of fish species in the South China Sea has markedly declined from 487 to 238. A study made by Fisheries Economics Research Unit of University of British Columbia explains that some species population 's are down 5% of what they were in 1950's in South china Sea area. A solution could be placing quota on fishing and delineating maritime boundaries, but the regional actors should find a compromise before.

Illegal Fishing:

Vietnam needs to be careful about the illegal fishing issue. The EU condamned Thailand to prohibit Thai products to be imported in European Union because of illegal fishing methods.

In April 2015, the European Commission put Thailand on formal notice for not taking sufficient measures to tackle illegal, unreported and unregulated (IUU) fishing. The EU is using its market (first import seafood market of the world). The EU in the past banned fish imports from Belize, Guinea, Cambodia and Sri Lanka for faillingto take action on IUU[82]. Imports from Belize are however, not allowed again after reform efforts.

The EU's IUU regulation enterred into for in 2010, putting in place a system to identify countries where illegal marine activity is rife, with the ability to resort to trade bans to prevent illegally caught products from enterring its market. The regulation also put in place a system of catch certification whereby fish imports are accompanied by a document indicating that it was caught in accordance with applicable laws, regulations, and international ressources.

On June 2015, Indonesian Water Police have seized two Vietnamese vessels for allegedly conducting illegale fishing activities in Indonesian waters[83]. On last September, Indonesian authorities captured a Vietnamese vessel illegaly fishing in Indonesian waters. The area the vessel was operating in is part of Indonesia's Exclusive Economic Zone.

[82] International Center for Trade And Sustainable Development, EU warns Thailand on illegal fishing, may 2015.
[83] The Jakarta Poost « Two Vietnamese vessels seized for illegal fishing ».

- *Sustainable Marine Fishing:*

One of the major exported seafood products of Vietnam is tuna. Sea turtles are common by catch-species in tuna fisheries and their populations have become critically endangered over the past few decades (WWF,
One assement of WWF in 2007 has identified that more than 1,000 sea turtles are affected by fishing activities annualy. To mitigate those impacts, WWF has raised awareness for fishers on turtle protection, trained them to rescue encountered turtles during fishing, sent observers on board fishing boats to observe the impact on turtles and helped fishers rescue turtles. For the tuna long line fishery, WWF promoted with fishers the circle hook to replace the normal J-hook in order to reduce the impact on sea turtles while maintaining the effectiveness of tuna fishing.

Picture: Tuna Hook recommended by WWF for sustainable fisheries

Source: WWF website

By 2014, about 90% of tuna fishers from Binh Dinh and 50% of tuna fishers in Phu Yen and Khanh Hoa used circle hooks. This effort is still ongoing, but it is important to maintain these objectives. This work is not only helping to consrve turtles but also supporting Vietnam to comply with regional and international regulations on tuna fishing, and from that, ensure the market for Vietnam's tuna.

In the followed case study, we will understand why it is important for Vietnam to promote sustainable marine fishing, in term of international trade, with the famous WTO case of "Shrimp and Turtles" between the US and India.

Case Study:
India versus US "Shrimp- Turtles"

"…We have not decided that the sovereign nations that are members of the WTO cannot adopt effective measures to protect endangered species, such as sea turtles. Clearly, they can and should…"

In early 1997, India, Malaysia, Pakistan and Thailand brought a joint complaint against a ban imposed by the US on the importation of certain shrimp and shrimp products. The protection of sea turtles was at the heart of the ban.

The appelate body made clear that under WTO rules, countries have the right to take trade action to protect the environment (in particular human, animal or plant life and health) and endangered species and exhaustible resources). The Appellate Body also said measures to protect sea turtles would be legitimate under GATT Article XX, which deals with various exceptions to the WTO's trade rules, provided certain criterai such as non-discrimination were met. The US lost the case, not because it sought to protect the environment but because it discriminated between WTO members. It provided countries in the western hemisphere, technical and financial assistance and longer transition periods for their fishermen to start using turtle-excluder devices.

Source: WTO

Establish a sustainable marine fishing is not only important in order to protect the environment, but it is also a way to protect Vietnam export products in the world trade. According the example of the WTO case between the US and India, we take conscience that sea turtle protection was in the heart of a very famous WTO's case. Vietnam need to be careful about the environment protection because some countries as the US can use the WTO rules or other world trade's rules in order to control imports and use environmental reasons in order to do protectionism.

- <u>Ressources protection/ Costal Surveillance :</u>

In Vietnam, there are two fishing seasons, the *North* season (November-April) and the *South* season (May- October). During the last season of the North between November 2014 and April 2015, 1,297 millions tons of fish were captured in the sea (an increase of 2, 85% compared to last year). During the season of the south, 1,327 MT of fish were captured in sea between May 2015 and October 2015.

A high pressure of fishing on coastal sea areas lead to serious reduction in fishery ressources. In order to control maritime areas, the Government established under the Ministry of Agriculture and Rural Development, a non governamental agency: Vietnam Fisheries Ressources Surveillance. Formally established on 25 January 2013, it is a non-military special task force responsible for patrolling, checking, controlling, detecting and handing law violations. But the number of inspections realised by this agency is stil not enough. Before, it was the Office of Aquatic Ressources Protection in each Province. But since 2014, this surveillance was delegated to the Provincial Service for Agriculture.

Concerning the tuna species protection, the Government by the MARD projected to developp a Master Plan for the Protection of tuna species and the the long term ressources protection[84]. This Plan will be effective between 2015 and 2020. The plan respects the Aquatic Products' Law in Vietnam and is confomed with the International Agreements of Vietnam. The first action will consist to the creation of a Maritime Surveillance by Satelite (boats and marine areas). Every year, should have study informing about the tuna species stock (population, exploitation capacity). And the Master Plan will create a consultative agency for fisheries management. This council could deliverate MSC label. With a sustainable vision, the plan would like to control the illegal fishing activities and a strict tuna exploitation stock in order to maintain a durable tuna sector in Vietnam.

CONCLUSION

The Fishery sector is vital in the national economy of Vietnam. By nature of its geography, Vietnam is one of the countries the most exposed to the climate change consequences (sea-level rise, salinity, rising temperature, typhoons, cyclones). With 25% of its population living on costal areas the Vietnamese population is vulnerable to cliamte change. The National economy is also faces to several climate change issues. The Mekong Delta concentrates the essential of the seafood industry in whole the country, with 70% of total seafood production and 40% of total seafood exports. But the Mekong delta is also a region vulnerable face to the climate change and the sea-level rise. But in Vietnam, seafood sector is not just a victim of climate change, but the seafood industryhas also its part of responsibility. Aquaculture production has impacts on the environment, especially with the destruction of the mangrove and the non-water treatment at the primary chain of the production (pollution of water with antibiotics used in farms). Overfishing and illegal fishing are also responsible to the destruction of the biodiversity. All these elements represent the present and next challenges for Vietnam if the country wants to build a sustainable fishery management.

[84] Le Courrier du Vietnam, « Vietnam : effective plan for Tuna protection, 20 September, 2015

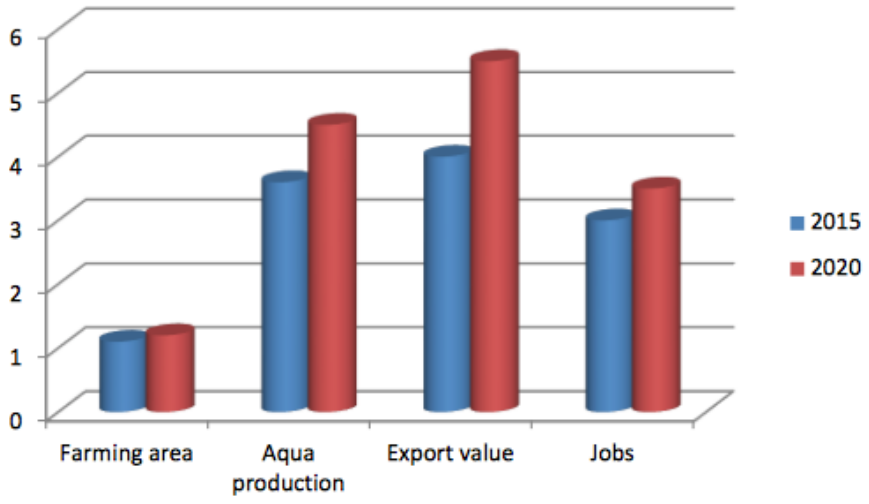
VIII. OUTLOOKS AND PLANNING FOR THE VIETNAM SEAFOOD INDUSTRY

Global seafood consumption is forecoasted to rise over the long-term. According to the FAO, by 2015, the consumption demand would reach 165 million tons, which increase by 2,1%/year on average, and consumption per capital would reach 14,3 kg (the current level of about 14 kg). The UN predicts that the world population would increase by 2 billion people in the next 20 years. Therefore, the consumption in developing countries is expected to grow up. It is obvious that pressure on seafood ressources will increase, but it's also opportunities for the global fishery industry in general and Vietnm's fishery industry in particular.

In Vietnam local demand for food and other seafood products is also expected to increase rapidly over time due to growth of population, from 90,73 million[85] (annualized rate of 0,8% in the 2013-2022 period) and increase of real incomes (GDP per capita is forecoasted to increase by 11,8% per year in the same period).

The seafood industry currently is faced with many difficulties and challenges. Howver, with the advantages and reputations which have been built during the past years, the long-term growth potential of the industry is considered rather good. On 3 Marc 2011, the Prime Minister issued Decision No. 332/QD-Ttg, which aims to develop long-term growth for the period of 2015-2020 for the Vietnam Fisheries as Follow:

Graphic: Objectives for Vietnam Seafood Industry



[85] Official data in 2014 according to the World Bank Vietnam

Especially the aquaculture production to 2020, as follow:

Table: Aquaculture production to 2020 by products

Products	Production (million tonnes)	Average growth rate/ year to 2020 (%)
Pangasius	1.5 – 2.0	4.80
Shrimp	700.000	5.76
Mollusk	400.000	16.0
Marine fish	200.000	14.9
Tilapia	150.000	7.9
Seaweed	150.000	7.2
Prawn	60.000	11.6

The Vietnamese Government aims to guide the seafood sector to become a global-leading posiiton as seafood exporter. This ambition has been set out in the fisheries development strategy to 2020 and vision to 2030, with the viewpoints of the Plan, development of objectives, possible orientations and several key solutions:

1/ Development Viewpoints:

- Master Plan on Fisheries Development must be in line with socio-economic development strategy of the whole country, towards increasing added value and sustainable development, fishery continus to become a sector with high competitiveness.
- Fisheries development plan bases on effective exploitation and implement restructuring of fisheries sector along with modernization of fishery.
- To combine fishery development in accordance with cliamte change and environmental protection and natural ressources.
- To associate fisheries development with developing production relations, focusing on forms of association or cooperation.
- Continuing to train and retrain human ressources to meet requirements with increasing skills and technology level.

2/ Overall objectives:

- Fisheries will be industrialized by 2020, and modernizated in 2030.
- Special targets by 2020:
    - Total fisheries output is about 7 millions tons.
    - Export value of fishery reaches USD 11 million (+7-8% /year in 2015-20)
    - Proportion of export value added products exports posts 50%.
    - Approximatelly 50% of fisheries laborers will be trained.
    - Income per capita of employees will be 3 times higher than at present.
    - Reducing post harvest losses products from 20% at present to fewer than 10%.

- Orientations to 2030:
    - Total fisheries outpu reaches 9 million tons.

- Export value of fishery is about USD 20 billion (+6-7% / year in 2020-30)
- Proportion of export value added products reaches 60%
- Approximately 80% of fisheries labour will be trained.

3/ Orientations of fisheries development plan:

- Fisheries exploitation: Reorganize fisheries exploitation to be suitable. By 2020, to stabilize exploitation fisheries output 2,4 million tons. By 2020, total numbers of fisheries boats drops to 110,000, by 2030 failling to 95,000 (decreasing by 1,5 per year).

- Fisheries cultivation: prioritize development of model of industrial farming for key exports products, which are suitable with potential; and linking closely between production, processing and consumption. By 2020, fisheries cultivation areas will reach 1,2 million ha. By 2020, fisheries cultivation output hits 4,5 million tons:
  - Red River delta: 637,640 tons.
  - Northern montainous areas: 118,640 tons.
  - North and central coast: 553,000 tons.
  - Highlands: 42,000 tons
  - Southeast regions: 171,900 tons
  - Mekong Delta Region: 2,976,000 tons.

- Fisheries processing and training: Associate processing, consumption with production of raw materials, prioritize developments of value added products, building and developing trademarks, improving quality, food safety and protecting environment. To maintain and develop traditional markets, at the same time expanding and devleoping other potential markets.

  By 2020, subject's suh as frozen shrimps, tra fish and cephalopods remains an important product group, accounting for over 70% of total export value:
  - Frozen fish: output of 1,320 thousand tons, accounting for 45,9% of export value. Key markets are: EU, US, Japan, the Middle East, Brazil, and the rest of Europe.
  - Frozen shrimps: 330 thousand tons, accounting 32,3% of total export value. Key markets are Japan, the US and EU, expanding other Asian markets, including Korea and China.
  - Frozen squid and octopus: production of 120 thousand tons, accounting for 6% of total export value. Key markets are Japan, EU ands South Korea.
  - Other frozen fisheries: production of 150 thousand tons, accounting for 12% of total export value. Key markets are EU, Japan, other Asian countries and Australia.

- Development of domestic fisheries processing: Forming distribution channels. Innitially implementing traceability and building trademarks of domestic fisheries products. By 2020, output of domestic fisheries processing reaches 950 thousand tons.

- Fisheries infrastructure and logistics: Associating with supporting industries, in order to promote the growth , improve production efficiency of exploitation

    - Forming 6 key fishing Centers:
        - Hai Phong Fisheries center, connecting closely to fishing ground of Gulf of Tonkin.
        - Da Nang Fisheries center, connecting fishing ground of East sea and the Paracels.
        - Khanh Hoa Fisheries Center, conencting fishing ground of south central region.
        - Ba Ria – Vung Tau fisheries center, southeast region.
        - Kien Giang fisheries center, southwest region.
        - Can Tho fisheries center, cultivation are of Mekong River delta.

    - For fisheries exploitation, to upgrade and complete mechanical service facilitiesof ship building and repairing toward; to continue to develop fishing ports, and storm shelters for fishing boats.

    - For fisheries cultivation, to form concentrated fisheries cultivation areas with many key fisheries species; to complete and gradually industrialize and modernize system of fisheries seed production; and to complete system of monitoring, environment and testing to serve management of fisheries cultivation focusing Mekong Delta Region and Red River delta Region).

4/ Several key solutions:

A. Market:

Concerning export market, associatiosn and enterprises, are direct subjects to build and implement trade promotion programs in accordance with strategy of export market development, national trade promotion programs. Enterprises gradually need to build a network of fisheries distribution of Vietnam in international markets, direectly signing contracts with organizations, which supply food to distribution centers, supermarkets, in major markets. To form distribution centers, dealers and representatives offices, in association with promotion and introduction of Vietnam fisheries products in major markets, in order to link and reducing intermediaries, giving correct informations of Vietnam seafood products to consumers. To build trademark of Vietnam fisheries products, products with reputable geographical indications (national brand name), meeting tastes of consumers all around the world.

Concerning domestic market, establish distribution channels to sell fisheries to traditionnal market, supermarkets systems in urban centers, industrialareas, and large city in the country. To analyse domestic market deman, implement trade promotion, building domestic trademark of fishery products, connecting producers with consumers. To construct center of researching, analyzing, forecasting export and domestic markets.

B/ Science, Technology and Fishery encouragement

Fishing exploration, it is relevant to invest and evaluate fisheries resources, build standards ang regulations, as a basis for planning and organizing production and management of fisheries exploration. Also to research and apply advansced fishing methods, equipment and modern technology of preserving post-harvested products, especially for offshore fishing fleet to improve efficiency. And concentrate on researching and designing fishing boats, researching new materials to replace wood hull for current ishing fleet.

Fisheries cultivation: Government recommands to complete research development and process of production of fisheries variety without disease. And continue to invest and concentrate variety production areas to ensure variety production condition in accordance with law and controlling quality. And at least, to promote international cooperation in researching production of fisheries variety, breeding new fisheries varieties, special and rare fisheries having high value added, with ability to adapt climate change and sea farming development.

Fisheries processing: The Master Plan encourage to continue to apply technology, advanced manufacturing processes, and upgrade processing facilities to ensure to satisfy with national standards, national technical regulations and meet requirements of import markets on food safety and environmental protection. Also, to promote application of advanced technology, to investing and renovating modern production lines, modern processing equipments, design, packaging, etc. To develop new products in line with consumers' tastes and demand in each import market, especillay product with high value added (for example, scallop products in EU market). And to research and develop technologies of preserving fishery products on offshore fishing boats.

C/ Protection of environment and fisheries ressources:

The Master plan has several key solutions, as implement plans annual fisheries resources survey on sea waters; continue to implement schemes and projects of protection, restoration and development of fisheries resources for sustainable fishing. Concerning fisheries cultivation, promulgate regulations on conditions or production (water ressources, reduce environemt pollution). A solution is also to review and adjust existing plan on concentrated fishing cultivation areas. The government recomands also to promote application Good Aquaculture Practice (VietGAP) to protect ecological environment, prevent disease and improve product quality[86].

D/ Organizing and Managing Production

To implement restructuring of fisheries sector, especially reorganizing production of fisheries cultivation. Diversifying production models, encouraging joint venture model between producers of raw materials with processing enterprises, traders, investors and bank... under value chain of products with management of community, association.

[86] Concerning the fact to promote the application of Viet GAP standards, others experts on fisheries mangement, recomand a better application of Global GAP standards for Vietnam seafood products. The application of Viet GAP standards is currently an important question and it is more recommanded to focus on the application of Global standards because Viet GAP needs some improvements.

- *For offshore fishing*: organizing production on basis of type of cooperative economic: cooperatives, model of linking between fishermen and businesses and other economic sectors. For inshore fishing, development of community-based management model.
- *For domestic fisheries*: processing, key production organization models are households, cooperatives, and enterprises associating with traditional villages.
- *For export fisheries processing*: organizing production models of associating fisheries processing with raw material production, linking production with consumption markets.

To build and implement model of public - private partnership (PPP) in investment. In short term, focus on investment in developing and putting into operation huge fishing centers, creating attraction and motivation for fisheries field to develop effectively and sustainably towards industrialization – modernization.

To organize to manage fishery plan, closely linking to plans of agricultural sector and other sectors, especially water resources plan, land use plan, tourism plan, plan of urban zones, plan of industrial parks... to ensure sustainable development, harmonize interests of fields and sectors of the economy.

E/ Mechanisms and Policies

- *Investment and credit*: prioritize projects of fisheries, increase investment on researching, promulgate incentive policies to attract more foreing direct investments, develop mechanism of preferential credits.
- *Policies of using fisheries cultivation land, water*: continue implement policies; encourage investments, promoting decentralization of coastal sea water management to all level of local governments in accordance with law on fisheries.
- *Protection of environment and capture ressources*: have policies to attract and encourage participation of fisheries actors, have policies to support and encourage studies, encourage fisheries processing enterprises to apply technology.
- *Training, Development of Human Ressources*: continue to prioritize to train scientific personnel of specialitiesand high technology application, continue to upgrade materials facilities of school, raising capacities of teachers, researchers improving capacities.

6/ International Cooperation

According to the Master Plan, for the government it is essential to strengthen and expand international cooperation in fisheries field, especially with countries in ASEAN and other countries in the East sea (regional competitors: Thailand, Indonesia, Philipinnes, India).
Also encourage enterprises, universities, scientific research institutions to cooperate and link with foreign scientific researsh organizations and investors.

CONCLUSION

Objectives, orientations and key solutions we mentionned previously are relating to the "Master Plan for fisheries development to 2020, vision to 2030". Ministry of Agriculture and Rural Development, according this plan is focusing on large-scale production with appropriate and efficient production models that could bring high yield and high-quality products. Target sets for developing the fisheries sector to 2020 with a global vision for 2030, focuses on the four areas: 1/ Fishing and fisheries ressources protection; 2/ Aquaculture; 3/ Seafood processing and trading; 4/ Shipbuilding and fisheries logistic services. These targets show positive signs for the long-term development of the whole industry.

IX. LIST OF PLAYERS IN THE INDUSTRY

1. LIST OF PRODUCERS / MANUFACTURERS

Top 10 Vietnam Seafood Exporters in Jan-Jun, 2015

Enterprises	Value (US$ Mil.)
MINH PHU SEAFOOD CORP	142,893
VINH HOAN CORP	113,785
CASES	86,528
STAPIMEX	82,624
MINH PHU – HAU GIANG SEAFOOD CORP	69,266
QUOC VIET Co. LTD	64,401
FIMEX VN	52,876
TRANG KHANH SEAFOOD CO. LTD	50,538
HUNG VUONG CORP	48,745
BIEN DONG SEAFOOD	47,506
Total	**759, 163**

Source: VASEP

1.1 MINH PHU SEAFOOD CORPORATION

Address: Industrial Zone, Ward 8, Ca Mau City, Vietnam
Tel: 84 780 3820 044
Fax: 84 780 3668 795
Email: minhphu@minhphu.com
Website: www.minhphu.com

HCMC Branch:
Address: 6 th Floor, No.21 Le Quy Don Street, District 3, HCMC
Tel: 84 8 3930 9631
Fax: 84 8 3930 9624
Email: minhphu@hcm.vnn.vn
Website: www.minhphu.com

Contact 1: Mr Le Van Quang
Job title: Chairman and General Director

Contact 2: Ms Chu Thi Binh
Job title: Deputy General Director

Minh Phu Corp is the largest shrimp exporter in Vietnam. The company was established as a private enterprise in 1992 and then turned itself into a joint stock company in 2006. The company is listed on Vietnam's stock exchange and has successfully formed a full

circle process from producing feeding shrimps to biological products, commercial shrimps and processing for export. The company currently has 9 member companies including three seafood processing companies.
Minh Phu Corp has the largest shrimp farming area countrywide with a total of 900 hectares of industrial shrimp farm in the company's ownership and 12,000 hectares of shrimp ecofarms in corporation with farmers. Minh Phu Corp has also got the highest processing capacity in Vietnam, of about 76.000 tonnes/ year. Between January and June 2015, the company succesfully exported US$ 142,893 million in value, ranked largest seafood exporter in Vietnam.

1.2 VINH HOAN CORPORATION

Address: National Road 30, Ward 11, Cao Lanh City, Dong Thap Province, Vietnam
Tel: 84 67 3891 166
Fax: 84 67 3891 062
Website: www.vinhhoan.com.vn

HCMC Branch
Address: 8 h Floor, TKT Building, 569-571-573 Tran Hung Dao Street Cau Kho Ward, District 1, HCMC
Tel: 84 8 3836 4849
Fax: 84 8 3836 5090
Email: vh@vinhhoan.com.vn
Website: vinhhoan.com.vn

Contact: Ms Truong Thi Le Khanh
Job title: Chairman and General Director

Established in 1997. Vinh Hoan Corp has continuously grown to become the largest pangasius processor and exporter in Vietnam with five subsidiaries creating a completed circle of process from breeding to farming and processing. The company owns the largest pangasius breeding farm in the country of 43.5 hectares which can meet 50% the company's demand and a feed factory that can satisfy 100% of the company's demand. Vinh Hoan Corp's processing factory has the capacity of 500 tonnes of raw material/ day. The US and EU are the company's two main export market which accounts for 49% and 28% respectively. During the first part of the year 2015, Vinh Hoan Corporation exported for a total value of US$ 113,785 million, ranked as second largest seafood exporter in Vietnam.

1.3 QUOC VIET SEAPRODUCTS PROCESSING TRADING AND IMPORT – EXPORT CO. LTD

Address: 444 Ly Thuong Kiet St., Ward 6, Ca Mau City, Ca Mau Province
Tel: 84 7803 836 454/ 830 561
Fax: 84 7803 832021
Email: quocviet@quocvietseafood.com.vn
Website: www.quocviet.vn

Contact: Mr Ngo Van Nga

Job title: General Director

Contact: Mr Ngo Quoc Viet
Job title: Vice General Director
Email: quocviet@quocvietseafood.com.vn

Contact: Mr Ngo Quoc Tuan
Job title: Vice General Director
Mobile: 84 (0) 986 037 979
Email: tuan.ngo@quocvietseafood.com.vn

Mr. Ngo Van Nga has been working in shrimp farming, processing and trading business in Vietnam for 35 years and founded Quoc Viet Co., Ltd in 1996 with his sons and daughter. The family company has been one of the leading shrimp processors. Its export markets include US, Japan, EU, Australia, Canada, Korea and others. Quoc Viet produces quality shrimp products that are from ethical and responsible practices and it uses the highest standards of quality control in a modern processing plant and farming system. Between January and June 2015, the company was part of the Top 10 largest seafood exporter in Vietnam with a total value of US$ 64, 401 million.

1.4 HUNG VUONG CORPORATION

Address: Lot 44, My Tho Industrial Park, Tien Giang Province
Tel: 84 73 3854 245
Fax: 84 733 854 248
Email: info@hungvuongpanga.com
Website: www.hungvuongpanga.com

Contact 1: Mr Duong Ngoc Minh,
Job title: Chairman cum General Director
Address: 144 Chau Van Liem, Ward 11, District 5, Ho Chi Minh City
Tel: 84 8 3853 6052
Fax: 84 8 3853 6051

Ho Chi Minh City Branch 1:
Address: Resco Building, 94-96 Nguyen Du Street, District 1, Ho Chi Minh City
Tel: 84 8 3914 2668
Fax: 84 8 3914 2668

Hung Vuong Corporation is also among the top pangasius exporters. The company was incorporated in 2003 and soon took a leading position in the country's seafood industry with eleven subsidiaries. The company has currently got a total farming area of 345 hectares with the average annual production of 78,300 tonnes. The company can provide 70% of its needed raw material to its processing subsidiary. Hung Vuong Corp. also owns two subsidiaries specializing in manufacturing fishery feed. These two subsidiaries can supply 1,700 tonnes of fishery feed/ day which not only meet 100% of the demand of the company's farm but can also sell part of the volume to the market. Over the years, Hung Vuong Corp has developed a good number of export markets stretching from the US, EU, Eastern Europe to South America and Asia Pacific. The

company's exports to its three main markets US, Russia, and Spain account for 19%, 16% and 15% respectively in its export structure. The company's export value between January and June 2015 was ranked in the Top 10 largest seafood exporter with US$ 48,745 million.

1.5 CAU MAU SEAFOOD PROCESSING AND SERVICE JOINT STOCK COMPANY (CASES)

Address: 4 Nguyen Cong Tru Street, Ward 8, Ca Mau City, Ca Mau Province
Tel: 84 780 383 5805
Fax: 84 780 383 0298
Email: sales@cases.com.vn/ salesmanager@cases.com.vn
Website: www.cases.com.vn

Contact: Mr Truong Hoang Kiet
Job title: Vice Director
Mobile: 84 (0) 913 933 143

Established in 1996, Ca Mau Seafood Processing & Service Joint Stock Corporation (Cases) specialises in processing and supplying a variety seafood products such as: Black Tiger, White, Pink, Cattiger (HOSO, HLSO, RPTO, CPTO, RPD, CPD, EZP, Nobashi…),Squid, Octopus (Whole cleaned baby octopus and Cut), Cuttlefish, Cut poul Squid and Surimi (Mix Surimi (GS: 100-200; 200-300; 300-500; 500-700; 700-900; 900-UP, Guchi Surimi (100%), Kintokidai Surimi (100%), Itoyori Surimi (100%), Basa Surimi and Eso Surimi), etc. The company capacity is 2,000-4,000 tons of finished products /month and the main export 25 market are includes Japan, USA, EU, Australia, Korea, Hong Kong, Singapore, China and Thailand.

1.6 THUAN HUNG FISHERIES COMPANY LTD

Address: Lot 17D, Street 05, Tra Noc Industrial Zone, Can Tho City Can Tho Province
Tel: 84 7103 911 624/ 911 888
Fax: 84 7103 911 623
Email: thuanhungct@hcm.vnn.vn/ thufico@vnn.vn
Website: www.thufico.com

Thuan Hung Fisheries Company Ltd (THUFICO) is private owned with more than 4 years experience in the seafood business. The company is one of the leading processor and exporter of fishery products in Vietnam, with annual exports of over 4,000 tons of fishery products per year.

Sanitation Standard Operating Procedures (SSOP), Good Manufacturing Practices (GMP), Hazard Analysis and Critical Control Point (HACCP) systems have been developed and implemented throughout al stages of production at Thuan Hung Fisheries' processing plants to ensure safe, wholesome and good quality fishery products supplied for human consumption.

The company products are sold in all major markets and are consistent in both quality and price. This is achieved through efficient processing systems, quality control

procedures and product acquisition guidelines, combined with special management techniques designed by the company.

1.7 DONG NAM SEAFOOD CORPORATION

Address: Lot 27, Tra Noc 1 Industrial Zone, Tra Noc, Binh Thuy, Can Tho Province
Tel: 84 7103 844 666
Fax: 84 7103 885 999
Email: info@dongnamvn.com
Website: www.dongnamvn.com

DongNam Seafood Corporation (DONGNAM) specialises in processing and trading highquality shrimps, fish and frozen seafood products for export. Owning two processing plants, which apply HACCP regulations for quality management, which have been equipped with the most advanced technology and most modern processing lines as IQF lines, contact freezers, chlling rooms, mental detectors, laboratories, air blast, etc. Since its launch, DONGNAM has grown to be one of the leading seafood manufacturers and exporters in Vietnam. They now manufacture many kinds of products such as Shrimps, White River Cobbler, Barramundi and other seafood products which are exported to the US, EU, Australia, Japan and Korea markets.

2. LIST OF RELEVANT INSTITUTIONS

2.1 DIRECTORATE OF FISHERIES VIETNAM

Address: 10 Nguyen Cong Hoan Street, Ba Dinh District, Hanoi, Vietnam
Tel: 84 4 6680 5011
Fax: 84 4 3724 5411
Email: ttam.bts@hn.vnn.vn
Website: www.fistenet.gov.vn

Contact: Mr Duong Long Tri
Job title: Director of Fisheries Information Center
Email: ttam.bts@hn.vnn.vn

2.2 NATIONAL FISHERIES QUALITY ASSURANCE AND VETRINARY DIRECTORATE (NAFIQAVED)

Address: 10 Nguyen Cong Hoan Street, Ba Dinh District, Hanoi, Vietnam
Tel: 84 4 3831 0983
Fax: 84 4 3831 7221
Email: Nafiqacen@hn.vnn.vn

Contact: Mr Tran Van Vy
Job title: Senior Adviser

2.3 FISHERIES PROGRAMME SUPPORT (FSPS)

Address: 10 Nguyen Cong Hoan Street, Ba Dinh District, Hanoi, Vietnam
Tel: 84 4 3771 7001
Fax: 84 4 3771 6522
Email: vannt.stofa@fsps.com.vn

2.4 VIETNAM ASSOCIATION OF SEAFOOD EXPORTERS PRODUCERS (VASEP)

Address: 10 Nguyen Cong Hoan Street, Ba Dinh District, Hanoi, Vietnam
Tel: 84 4 3835 4496
Fax: 84 4 3771 9015

Contact: Mr Nguyen Hoai Nam
Job title: Deputy General Secretary
Email: namnh@vasep.com.vn
Mobile: 84 (0) 983 609 228

2.5 RESEARCH INSTITUTE OF AQUACULTURE NO.1 (RIA1)

Address: Dinh Bang, Tu Son, Bac Ninh, Vietnam
Tel: 84 4 3827 3069
Fax: 84 4 3827 307
Email: vanphong@ria1.org; ria1@hn.vnn.vn; qlkh@ria1.org

Contact: Ms Phan Thi Van
Job title: Director

2.6 RESEARCH INSTITUTE OF AQUACULTURE NO.2 (RIA2)

Address: 116 Nguyen Dinh Chieu Street, District 1, Ho Chi Minh City
Tel: 84 8 3829 9592
Fax: 84 8 3822 6807

Contact: Mr Nguyen Van Hao
Job title: Director
Email: haoria2@hcm.vnn.vn

Contact: Mr Nguyen Van Trong
Job title: Vice Director
Mobile: 84 (0) 909 374 716

2.7 RESEARCH INSTITUTE OF AQUACULTURE NO.3 (RIA3)

Address: 33 Dang Tat, Nha Trang, Khanh Hoa Province
Tel: 84 583 831 138
Fax: 84 583 831 846

2.8 VIETNAM ACADEM OF SCIENCE AND TECHNOLOGY INSTITUTE OF OCEANOGRAPHY

Address: 1 Cau Da, Nha Trang, Khanh Hoa Province
Tel: 84 583 590 036
Fax: 84 583 590 034
Email: haiduong@dng.vnn.vn
Website: www.vnio.org.vn

Contact: Mr Vo Si Tuan
Job title: Director

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