THE VALUE CHAIN OF WHITE LEG SHRIMP EXPORTED TO THE U.S MARKET IN KHANH HOA PROVINCE, VIETNAM

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Master Thesis in Fisheries and Aquaculture
Management and Economics
(30 ECTS)

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May 2011

ACKNOWLEDGEMENT

For Professor Skallerud Kare (Tromso University), I would like to express my heartfelt gratitude for his devotion in directing my study. His comments were useful in assisting me in the completion of my thesis. His supervision was essential in confidence building and enabled me to complete this study in a timely manner. I am fortunate to have him as my supervisor. Thank you very much, Professor Kare.

I am also grateful to Dr. Tram Anh Nguyen Thi (Nha Trang University), who supported and encouraged me during my coursework, especially during data collection. Thank you very much, Dr. Tram Anh.

My sincere appreciation goes to all farmers, middlemen as well as processors who were very cooperative during data collection.

I wish to express appreciation to NOMA program, NORAD project and Nha Trang University for giving me the opportunity to study Fisheries and Aquaculture Management and Economics.

Finally, I would like to express my sincere gratitude to my parents who provided me the best conditions to pursue my MSc studies. I am also grateful to Dr Curtis Jolly (Auburn University) for editing my thesis in a very careful manner. Last but not least, my appreciation also goes to my girlfriend, Huyen Trang, as well as my close friend, Xuan Huong, who encouraged and helped me during my coursework.

May God bless them all.

Nha Trang, May 2011

Bui Nguyen Phuc Thien Chuong

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ABSTRACT

The research aimed to explore the value chain of frozen white leg shrimp exported to the U.S market from Khanh Hoa province, Vietnam. Three objectives were set up, that is, (1) to identify the activities conducted by different actors in the value chain and the corresponding costs and earnings of those activities, (2) to evaluate the distributions of revenue, cost and profit along the chain, and (3) to determine factors preventing shrimp farmers from dealing directly with processing firms. Research findings showed that before exported to the U.S market, white leg shrimp has to undergo farming, procurement, and processing. Shrimp farming basically comprises of such steps as pond cleaning, seed release, and caring. When shrimp attain harvestable size, middlemen come to perform the procurement which includes harvesting, preserving, and transporting. At the processing plants, shrimp are transformed into final products, packed, labeled preserved and stored waiting to be exported. During shrimp farming, farmers incur several costs like seed, feed, labor, and other miscellaneous expenses. At the procurement stage, addition to purchasing shrimp from farmers, middlemen have to add some other costs like transport, labor, ice, and other inputs to transfer shrimp to the next stage. At the processing stage, direct material, direct labor, overhead, and other costs are added in accordance with the accounting format. Farmers, middlemen and processors experience positive profit in the 2008-2010 period. Based on costs and earnings data, some calculations were made which revealed the distributions of revenue (export price), cost and profit of 1 kg frozen shrimp exported to the U.S market. Costs and profits distributions were in sync with expectations. The surveys revealed 3 reasons why farmers depend on middlemen to sell their harvest, that is, lack of facilities, delayed payment policy and risk aversion.

CHAPTER 1
INTRODUCTION

1.1. INTRODUCTION

Vietnam owns a coastline of about 3,260 km and an exclusive economic zone (EEZ) extending over more than one million square kilometers (FAO, 2005). In Vietnam's marine waters there were about 3.1 million tones of the entire standing stock of marine fish with more than 2000 fish species and about 1.4 million tonnes of the sustainable potential yield (FAO, 2004). In addition, Vietnam also possesses an intricate system of rivers, streams, and channels as well as a favorable climate for aquatic animal culture. Such endowments have encouraged Vietnam to develop both capture fisheries and aquaculture. In 2010, Vietnam fisheries production reached 5,157.6 thousand tons, in which capture fisheries accounted for 2,450.8 thousand tons and aquaculture 2,706.8 thousand tons (Ministry of Agriculture and Rural Development). Vietnam's capture fisheries ranked 13th internationally in 2006 (FAO, 2009) and aquaculture ranked 3rd in 2008 (FAO, 2010). With a great capacity in fisheries production, fisheries export has always served as an important industry in Vietnam's economy. Actually, it always has its foot in top 4 leading exporting industries (including garment & textile, crude oil and footwear). Fisheries export contributed 4% in 2006 (FAO, 2009) and 5.44% in 2008 (ARGOINFO, 2009) to the GDP of the nation. Export values of fisheries in 2008, 2009 and 2010 were 4.5 US billion dollars, 4.2513 US billion dollars and 5.034 billion US dollars respectively (VASEP,2009,2010,2011)[1].

The development of fisheries export industry is attributed to the contribution of shrimp and pangasius. In 2009, shrimp and pangasius accounted for 39,4% and 31,6% of export value of fisheries respectfully (VASEP, 2010). In 2010, the figures were 41,9% for shrimp and 28,4% for pangasius (VASEP, 2011). Regarding shrimp export, black tiger

[1] VASEP is the acronym of Vietnam Association of Seafood Exporters and Producers. Available at http://www.vasep.com.vn/ VASEP is responsible for providing news and statistical data on commercial fisheries.

shrimp (Penaeus monodon) have always been the leading driver. It was responsible for about 95% of shrimp export value until the end of 2007.

The white leg shrimp (Penaeus vannamei) immigrated into Vietnam in 2003. They were, however, not permitted to be diffused widely due to the anxiety of disease invasion. Under the pressure of processing firms, who had to import white leg shrimp to process into exported products, the Ministry of Agriculture and Rural Development removed the prohibition on February, 2008. Since then, the white leg shrimp have grown dramatically, which forced the share of black tiger shrimp to fall from 95% to about 75% (VASEP). As a result of these changes, export value of shrimp still grew up in 2009 thanks to the contribution of white leg shrimp. The price of white leg shrimp is cheaper than that of black tiger shrimp. Therefore, during the economic crisis, white leg shrimp became the chosen product for consumers. The quantity of white leg shrimp exported in 2009 was 50,000 tonnes which generated 300 million US dollars (VASEP). In the turn of 2010, the exported quantity was 62,400 tonnes which produced 414.6 million US dollar (VASEP, 2011).

1.2. PROBLEM STATEMENT

Only three years after the prohibition was lifted in 2008, white leg shrimp have made remarkable progress. Although black tiger shrimp are still the pillar of shrimp exports, white leg shrimp has been claiming its position. Due to certain advantages over black tiger shrimp, white leg shrimp have became the chosen livestock of thousands of farmers as a way to improving their livelihoods.

The recent growth of white leg shrimp recently necessitates that its value chain should be studied for further development of the industry. Value chain is, however, a broad issue. This research, therefore, does not try to cover all dimensions of the value chain of white leg shrimp, but rather it focuses on specific objectives. The research attempt to identify actors participating in the value chain of white leg shrimp, their functions as well as costs

and earnings incurred. The research aims to reveal the distributions of revenue, costs and profit to different actors in the chain, as well as reasons for such distributions.

The dependence of farmers to market their shrimp is another issue that needs to be investigated. The question is what middlemen contribute to the flow of shrimp from farms to processing plants. Can farmers bypass middlemen to do transactions with processing firms?

1.3. RESEARCH OBJECTIVES

The research aims to explore the following issues of the value chain of white leg shrimp: (1) identify the activities conducted by different actors in the value chain, (2) calculate the corresponding costs and earnings of those activities, and evaluate the distribution of revenue, cost and profit along the chain, and (3) identify the factors that prevents shrimp farmers from dealing directly with processing firms.

Due to the limits of time and resources, the research is conducted within the area of Khanh Hoa province. The value chain is therefore of white leg shrimp in Khanh Hoa. Although white leg shrimp is exported to international markets, the data collection could not be conducted abroad. Since white leg shrimp are processed into different types of products and exported to many countries, it is crucial to choose a specific product and market. The research, therefore, selects frozen white leg shrimp exported to the USA as its focus.

CHAPTER 2
THEORY

2.1. THE CONCEPT OF VALUE CHAIN

Every enterprise is positioned in a value chain (United Nations International Labor Organization)[2] . The ***value chain*** describes the full range of activities which are required to bring a product or service from conception, through the different phases of production (involving a combination of physical transformation and the input of various producer services), delivery to final consumers, and final disposal after use (Kaplinsky and Morris, 2001). As opposed to the traditional exclusive focus on production, the concept stresses the importance of value addition at each stage, thereby treating production as just one of several value-adding components of the chain (United Nations Industrial Development Organization, 2009). Value chains can be restricted to local markets, but do also expand globally. This is just as true for small and medium-sized enterprises in developing countries as it is for enterprises in Europe and North America (United Nations International Labor Organization)[3].

The definition can be interpreted in a narrow or broad sense. In the ***narrow sense***, a value chain refers to all activities performed within a firm in order to transform raw materials into a desired product which later will be delivered to its customers. This narrow sense definition is attributed to Porter (1985). In his work "Competitive Advantage: Creating and Sustaining Superior Performance", Porter (1985) argued that a firm should be separated into activities in order to indentify source of competitiveness. And activities within a firm are categorized into primary and supporting activities. Primary activities fall into inbound logistics, production, outbound logistic, marketing & sales, and after sales services. On the other hand, supporting activities include firm infrastructure, human resource development, technology development and procurement. Porter's value chain has served as a tool assisting management decision and executive strategies.

[2] See at http://www.ilo.org/empent/Whatwedo/Publications/lang--en/docName--CMS_093982/index.htm

The broad approach in contrast does not look at activities conducted by a single firm. Rather, it pays attention to the participation of various members in the chain whose activities are meant to help bring the raw materials to the sale of the final product. Value chain system coined by Porter (1985), which comprises supplier's value chain, firm's value chain, distributor's value chain and buyer's value chain, resembles this broad sense definition. In the remaining part of the thesis, the term "value chain" will refer exclusively to this broad sense definition.

With the concept of value chain, enterprises are no more treated as a single entity but as a part of an integrated chain of economic functions and linkages across geographic boundaries (Gudmundsson, Asche, & Nielsen, 2006). In any value chain, one member is the buyer of the previous individual and the supplier for the later member. All members of the value chain share the same purpose: produce final products that satisfy final customers' needs and requirements. They are tied up to work altogether in order to attain such purpose, while maintaining their independence. They work in cooperation for a long time, discuss and solve problems together.

As passing through the chain, the product gains some value. The chain of activities as a whole gives the product more added value than the sum of independent activities. The value chain exists if and only if all members in the chain cooperate to deliver maximum value at the least possible total cost to the end customer. That is what value chain is about. It is important not to mix the value generated with the costs incurred by the activities. Diamond cutting can be employed to distinguish between costs and value. The cutting activity may incur a low cost, but such activity adds much value to the end product, since a rough diamond is significantly less valuable than a cut diamond.

One question could arise when the value chain is studied: Is the value chain and supply chain different? Physically they are the same because they both overlay the same network of members who are tied up with each other to provide goods or services to the final

customers. If we compare the definition of a supply chain with that of a value chain, we may realize that they cover the same things. The idea behind, however, is different. The supply chain, as the name implies, focuses mainly on the costs and efficiencies of supply. The supply chain is meant to bring materials into manufacturing operation and finished products to customers smoothly and economically. The primary objective of a supply chain is to fulfill customer needs and requirements through the most efficient use of resources, including distribution capacity, inventory and labor. A supply chain seeks to match demand with supply using the minimal inventory. Various aspects of optimizing the supply chain include liaising with suppliers to eliminate bottlenecks; sourcing strategically to strike a balance between lowest material cost and transportation, implementing Just In Time techniques to optimize manufacturing flow; maintaining the right mix and location of factories and warehouses to serve customer markets, and using location/allocation, vehicle routing analysis, dynamic programming and, of course, traditional logistic optimization to maximize the efficiency of the distribution side[3]. Whereas, the value chain lays its focus on value generation for customers. The objective of a value chain is, therefore, to maximize value at the least possible costs to customers. Thus, the primary difference between a supply chain and a value chain is a fundamental shift in focus from the supply base to the customer (Feller, Shunk, and Callarman, 2006).

Since the cost cutting and price-off strategy is not enough to guarantee for sustainable market advantage in the long run, it is necessary for the company to provide the value that will justify the price of the product. Therefore, the supply chain itself has evolved to synchronize supply and value. The evidence can be noticed in the definition of a supply chain from the Global Supply Chain Forum (1998): "the integration of key business processes from end user through original suppliers that provides products, services, and information that **add value** for customers and other stakeholders". The notion that a supply chain must "add value" is trying to blur the distinction between a supply chain and a value chain (Feller, Shunk, and Callarman, 2006).

[3] See at (http://en.wikipedia.org/wiki/Supply_chain)

2.2. THE VALUE CHAIN ANALYSIS MODEL

Considered in its general form, the value chain can take the shape as depicted in figure 1. It can be seen that the production per se is one of many value-added stage.

Figure 1: A generic value chain for seafood

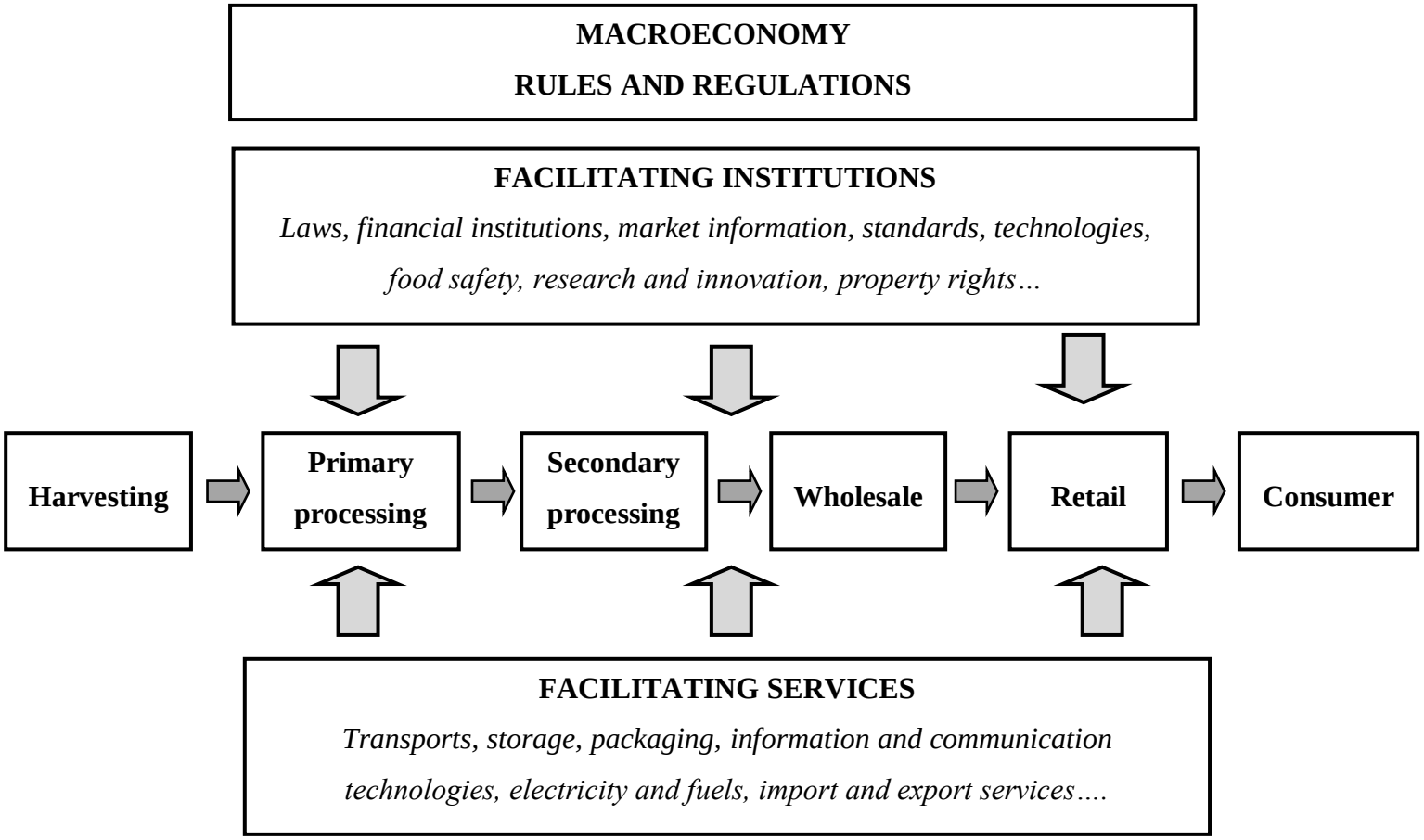
Source: Gudmundsson, Asche and Nielsen (2006): Revenue distribution through the seafood value chain

In the real world, the value chain tend to be more complex to involve numerous interlinked activities performed by multiple types of firms located in different regions of one country, or even located in various countries around the globe. The value chain could be even more sophisticated since intermediary producers in a particular chain can be members of a number of different value chains.

Any value chain operates in an environment which is formed by the macroeconomic landscape, policies and regulations, institutional elements and facilitating services. These elements of the environment, although not directly involving in the production and distribution, do influence the performance of the value chain. Rules and regulations govern activities of members of the value chain. Rules and regulations can be set up by actors within the chain as in the case a buyer requires its suppliers to provide high quality materials. Or they can be established by external actors like governments, NGOs, and other organizations. Institutional elements may fall into laws, finance, technologies, human development, standards, property rights, research and development… Such elements influence the performance of the value chain. For instance, research and development (R&D) institutions are important in coming up with innovations in product development, packaging and other processes that will allow better handling, storage and transport while financial institutions are conduits for capital loans and investments. Finally, facilitating services includes transport, packing, storage, communications, import

and export services…. As its name implies, supporting services facilitate the operation of the value chain. For instance, transportation is an important key to the fast and on time delivery of goods which is vital in preserving product quality and value. An efficient transport system can translate to savings in delivery cost, inventory, quality deterioration and wastage. Information and communications technology is important in attaining cost efficiency, responsiveness to consumer's requirements and reliability in delivering the right kind of product and volume of product required by the market. All activities performed by members of the value chain as well as its environment together constitute the value chain analysis model. Figure 2 illustrates a generic value chain analysis model.

Figure 2: The value chain analysis model



Source: Adapted from United Nations Industrial Development Organization (2009): Argo-value chain analysis and development

Contrary to other business development tools that focus on the internal performance of businesses (e.g. management), value chain analysis is about understanding the external networks in which businesses are embedded (United Nations International Labor Organization, 2009). Value chain analysis is the process of breaking a chain into its constituent parts in order to better understand its structure and functioning (United Nations Industrial Development Organization, 2009). It helps to understand how and where enterprises are positioned in economic processes. It also helps to identify new business opportunities and possible leverage points for upgrading solutions (United Nations International Labor Organization)[4]. The analysis consists of identifying chain actors at each stage and discerning their functions and relationships; determining the chain governance, or leadership, to facilitate chain formation and strengthening; and identifying value adding activities in the chain and assigning costs and added value to each of those activities. The flows of goods, information and finance through the various stages of the chain are evaluated in order to detect problems or identify opportunities to improve the contribution of specific actors and the overall performance of the chain (United Nations Industrial Development Organization, 2009).

Regarding relationships between members, it is important to be mindful that relationships between members are not only characterized by transactions through which a product/service is transferred from one member to another in return for payment; relationships in value chains are also characterized by a vast exchange of information, knowledge, skills and various embedded services (e.g. loans provided by input suppliers to small producers, training sessions conducted by lead firms, quality control mechanisms, leasing arrangements, provision of equipment and manuals, marketing support, etc.) (United Nations International Labor Organization, 2009). Understanding relationships between members are crucial to understanding how entry barriers are created, and how gain and risks are distributed.

[4] See at http://www.ilo.org/empent/Whatwedo/Publications/lang--en/docName--CMS_093982/index.htm

2.3. MAPPING THE VALUE CHAIN

The value chain analysis starts with the process of mapping out the value chain. Mapping a chain means creating a visual representation of the connections between businesses in value chains as well as other market players (United Nations International Labor Organization, 2009). Making a value chain map is a way of making what is seen and encountered more easily understood: "A picture is worth a thousand words" (Making value chains work better for the poor, 2008). It is, however, important not to confuse value chain mapping with value chain analysis. Value chain mapping is meant to provide a broad picture of the value chain to be studied. Value chain map is a way to illustrate (or perhaps simplify) the complexity of the value chain in the real world. Value chain analysis needs to go beyond the process of drawing a value chain map.

Constructing a value chain map is not a quick job. Rather, the exercise evolves during the value chain analysis (United Nations International Labor Organization, 2009). It is started with a rough map. Then during the value chain analysis, more information will be gathered and added to the map to make it more detailed. "There are many potential dimensions of a value chain which could be included in the mapping exercise. Therefore it is crucial to choose which dimensions are to be mapped, based on available resources, the scope and objectives of the value chain analysis and the mandate of the organization" (Making value chains work better for the poor, 2008). Regardless of what choices are made, the following dimensions are of necessity and therefore should be mapped to provide an overview of the studied value chain.

First of all is what core processes are in the value chain. In order words, what are processes through which the product has to pass in order to reach the final customers? It is important to limit the value chain analysis to a certain number of core processes. Otherwise it will be too complex, and therefore consume too much time and resources. The identification of core processes should not stop at listing the names of processes. Rather, core processes should be broken into specific activities. The extent to which the

core processes are broken down is up to researchers. One more thing is if the value chain geographically spread out over locations (i.e. actors in the chain are located in different areas), it would be useful to assign locations to processes. Particular in the case that of global value chain in which developed and developing countries participate, the geographical map will bring a notion of how benefits are shared between two groups of countries.

Along with the identification of core processes on the value chain, actors who are directly involved in such processes are uncovered. How to distinguish between actors is dependent on the level of complexity which the exercise of mapping is trying to reach. The most straightforward distinction is to categorize actors according to their main occupation (Making value chains work better for the poor, 2008). For example, collectors are those who perform the collection, while producers are those involved in production. This type of categorization is simple but does not provide much information. Other classification criteria could be: ownership (government-owned, private-owned, households, cooperative, etc.), scale (large, medium or small-scale, national or international, etc.), poverty ranking, location, etc (Making value chains work better for the poor, 2008). For example, shrimp farmers can be classified into large, medium and small scale. Or they can be grouped into intensive, extensive, integrated mangrove-shrimp, and integrated rice-shrimp models.

After the core processes, actors and specific activities in the value chain have been mapped out, the product flow is going to be identified. The product flow will tell the story of the product's life: the transformation of the product from raw materials to final product which is ready for sale to the final customers. After the map of the product flow is accomplished, the volume of the product is then mapped out. The volume of the product when identified will provide a notion of the sizes of different channels within the value chain (Making value chains work better for the poor, 2008).

According to the value chain analysis model, in addition to internal actors directly involved in the core processes, there exists external, although indirectly involved, do have effects on the performance of the chain in one way or another. Such external actors, therefore, deserve at least a glance from the researcher. It is risky if doing a value chain analysis without any consideration on the world surrounding the value chain (Making value chains work better for the poor, 2008). When mapping services feeding into the value chain, it is worthwhile to keep in mind that services could be classified into transactional services and embedded services. Transactional services, from the surrounding environment, are provided by specialized services providers on the fee-for-service basis. On the other hand, embedded services are provided as part of transactions between buyers and suppliers in the chain. For example, in order to offer clean shrimp for customers in EU, processing firms could provide farmers with quality standards required by EU market, as well as technically and/or financially assist them to culture shrimp free of chemical and anti-biotic residues.

Last but not least, the value chain map includes the initial identification of difficulties faced by different actors in the value chain while they are performing their functions. During the value chain analysis, other constraints could be indentified and added. It is important to bear in mind that only difficulties are listed. Root causes of these difficulties and solutions to get rid of them are saved for further analysis.

2.4. GOVERNANCE OF THE VALUE CHAIN

Of the three elements of the surrounding environment of a value chain is rules and regulations. Rules and regulations are the product of value chain governance. Governance ensures that interactions between actors along a value chain exhibit some reflection of organization rather than being simply random (Kaplinsky and Morris, 2001). It also implies that transactions between actors in the value chain are organized in a system that allows firms to meet specific requirements in terms of products, processes, and logistics in serving their markets. As such, it recognizes that power is not evenly distributed”

(Making value chains work better for the poor, 2008). Governance refers to both "official" rules that address output and the commercial imperatives of competition that influence how production is structured (Making value chains work better for the poor, 2008). Humphrey (2006) further described it as the definition and enforcement of instructions relating to what products are to be produced (product design), how they are to be produced (process controls) and when (timing).

Because the term "governance" sounds like "government", it is often interpreted as rules and regulation set up by the government. In fact, governance refers to rules and regulations which are set up by actors within the chains or by those who lie outside the chain like governments, NGOs, and ISO organization. "These may be as simple as the requirement imposed by wholesalers that agricultural products be correctly harvested to prevent damage and degradation. Conversely, they may be as complex as a foreign government's enforcement of international standards regarding permissible levels of pesticide residues on imported products. Another example is the procedure imposed by a multinational firm as a condition of participation for a subcontractor in its global value chain" (Making value chains work better for the poor, 2008). Kaplinsky and Morris, in their "A handbook for value chain research" (2001), proposed how rules and regulation should be categorized. The hand book stated "there are two sets of factors which can be used to categorize different types of rules. The first is the extent to which they are codified. The standards may be set in legal codes, and subject to fines if transgressed. They may also be internationally recognized, and widely used, even though they have no legal basis. This recognition may be less than global, but cover a number of product markets, or they may be firm specific. The second axis is whether the rules cover products or processes".

According to Kaplinsky and Morris (2001), there are three forms of value chain governance namely legislative governance, executive governance, and judicial governance. Legislative governance, as its name implies, refers to the issues of setting rules and regulations governing the operation of the value chain. Once rules and

regulations are born, it is of necessity to monitoring the performance to ensure the compliance with the rules. This is the function of judicial governance. Sanctions both negative and positive are the key of judicial governance. However, in order to meet those rules and regulations, actors in value chain may need assistance. Executive governance is about assisting participants in the value chain to fulfill required rules and regulations. The three forms of governance can be exercised by both external and internal actors. Much of the existing discussion of governance fails to recognize this distinction of the threefold governance, partly because in some cases the same party is believed to covers all three sets of powers, like the case of Toyota. However, this is seldom the case (Kaplinsky and Morris, 2001).

2.5. ANALYSIS ON COSTS AND EARNINGS

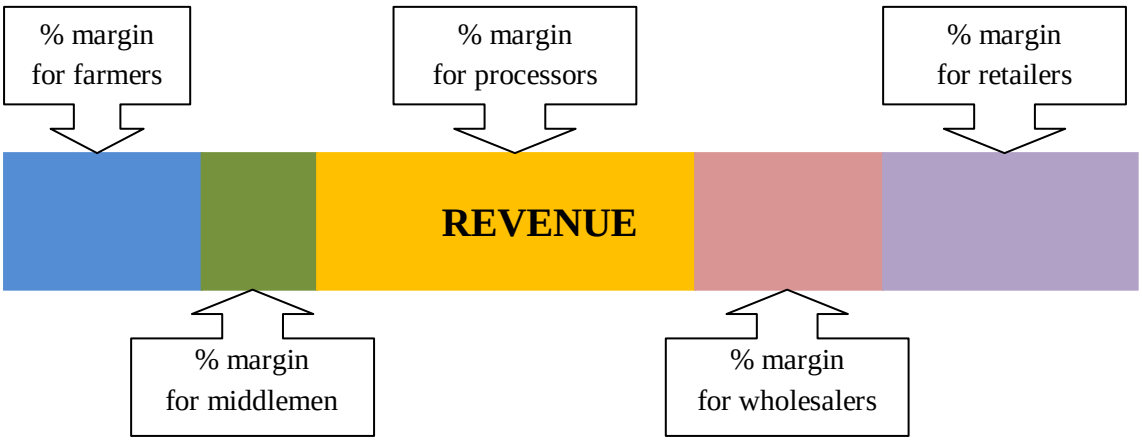
After the value chain is mapped, certain aspects of the value chain could be put into analysis for better insights. Among them is the analysis on costs and earnings. The analysis on costs and earnings aims to provide a notion on costs incurred by different actors as well as revenues and profits they earn in return.

Costs are classified into variable or fixed costs. Variable costs are costs that vary in proportion with level of output. On the other hand, fixed costs are costs that are independent on the level of output. Not all costs are easily to categorize into fixed or variable costs. Assumptions in some cases are therefore needed. However, regardless of which choice is made, consistency throughout the analysis is required. In the analysis, shares of cost components are exhibited, by which activities causing exceptionally high cost could be singled out. In addition, the analysis also presents fluctuations in cost components as well as the total cost. As switching the focus to benefits, the analysis describes changes in revenues over years as well as underlying causes. And by comparing revenues with costs, the analysis reveals how much different actors earn from their businesses.

2.6. DISTRIBUTIONS OF REVENUE, COST AND PROFIT

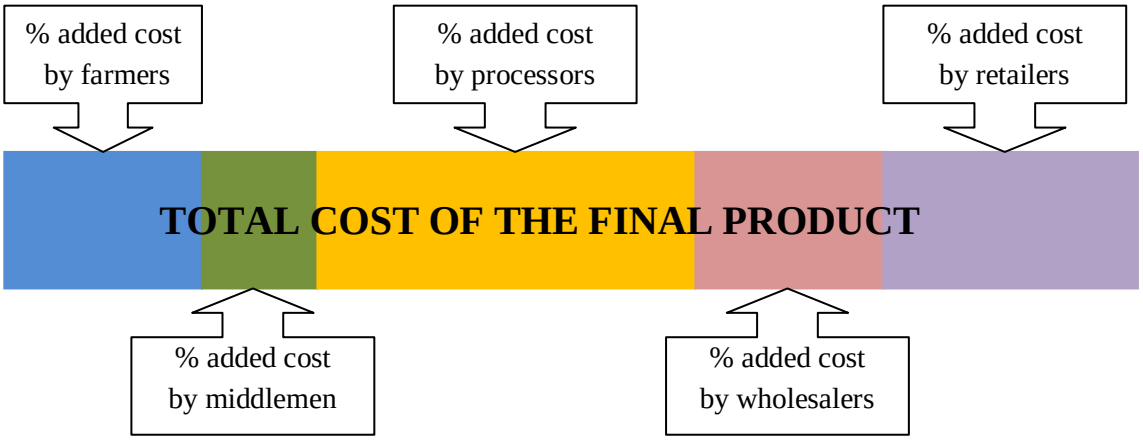
The revenue (or retail price) is made up of marketing margins belonging to different actors in the value chain. Therefore, the marketing margin, showed in percentage, reflects the distribution of revenue to different chain actors (figure 3). Marketing margin is the difference between selling price paid by the next stage and purchasing price paid to the previous stage. Marketing margin must cover all costs needed to transfer the product from one stage to the next and a reasonable return to those perform the job (Shepherd, 2007).

Figure 3: The distribution of revenue



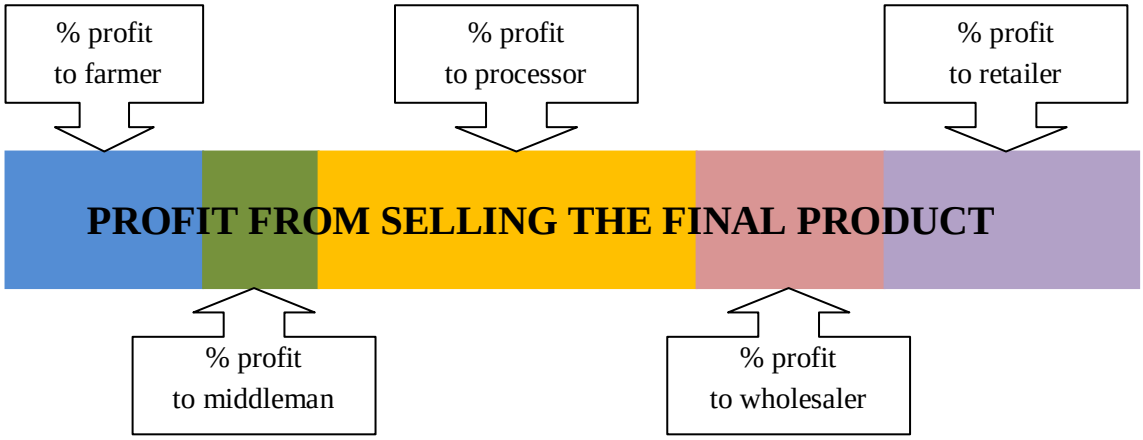
Total cost of the final product sold to the final customer is constituted of added costs incurred by different chain actors (figure 4). Added costs computed by extracting from the total cost the purchasing price paid from the previous level in the value chain. Added costs reflect efforts of different chain actors in adding values to the final product.

Figure 4: The distribution of cost



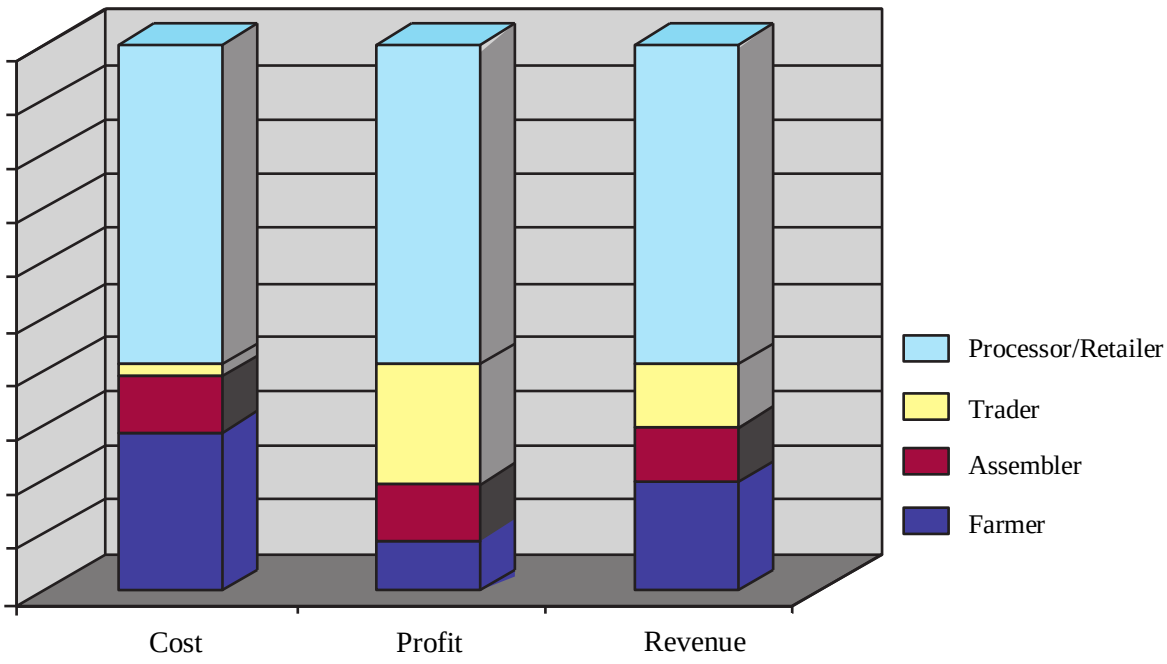
Finally, profit from selling the final product to the final customer comprises of profits accruing to different chain actors (figure 5).

Figure 5: The distribution of profit



The distributions of retail price, profit and added cost are drawn in the same graph with the hope that it can reveal certain information. Figure 6 below serves as an example.

Figure 6: An example of the distributions of revenue, profit, and added cost

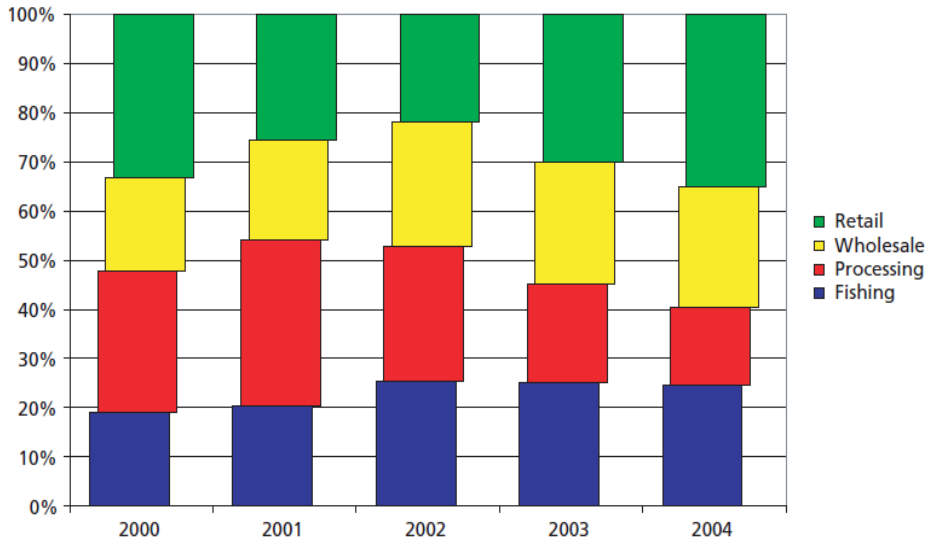


Source: National Economic and Social Development Board of Thailand (2004): Training course on integrating value chain analysis and methodologies into policy analysis

As in the example, traders, although incurring smallest cost, obtain the second highest share of profit. As compared to assemblers, farmers' share of cost is much higher while their share of profit is more or less the same. For these reasons, the graph suggests that there could be unequal distributions of cost, revenue and profit.

If data are collected over time, changes in the distribution can be observed. It is important to use time series when monitoring the distribution of value throughout the value chain (Gudmundsson, Asche and Nielsen, 2006). It is even more important to explore reasons for such changes. A good example comes from the value chain of Icelandic cod fillets exported to the United States (figure 7). In the value chain of Icelandic cod fillets exported to the U.S, fishing and processing are performed by fishermen and processing firms located in Iceland. Whereas, wholesale and retail are the responsibilities of U.S firms (Gudmundsson, Asche and Nielsen, 2006).

Figure 7: Example - Changes in the distribution of revenue



Source: Gudmundsson, Asche and Nielsen (2006): Revenue distribution through the seafood value chain

"This figure shows the impact of the depreciation and then appreciation of the Icelandic króna. As prices in Icelandic krónur became higher the fishing companies and processing companies received a higher share in the total value chain assuming the retail and

wholesale levels could not increase their price in US dollars and hence they received a smaller share of the total value, measured in Icelandic krónur. As the Icelandic krónur appreciated in 2004, the retail and wholesale firms received a higher portion of the value chain" (Gudmundsson, Asche and Nielsen, 2006).

CHAPTER 3
METHOD AND DATA COLLECTION

3.1. METHODS

The value chain theory is the foundation on which the research is conducted. The research starts with the exercise of value chain mapping to provide a glance at the value chain of white leg shrimp. The exercise includes (1) mapping core processes, (2) mapping direct actors, (3) mapping the product transformation, (4) mapping the volume of the product, (5) mapping institutions and services feeding into the chain, and (6) mapping difficulties faced by actors in the chain. In order to identify core processes, the end product is identified. Then, the question "what happen to the product before it gets here?" was asked to trace the product downstream. The question was repeated until all possible core processes are captured. Core processes were then broken down into specific activities. After the identification of core processes, each process were assigned to its corresponding actor. Mapping the product transformation was done by identifying the outcome of each stage in the value chain. The next information to be included was the volume of the product. Through interviews, interviewees at each stage were asked "Who are your buyers?" and "What percent do you sell to each type of buyer?" The exercise then continued with mapping institutions and services feeding into the value chain. The interviewees were asked "What services are you using/buying/receiving… while doing your job?" "Do you receive any technical or financial support?"… The word "institution" was not used because it does not have an equivalent Vietnamese word. The exercise ended up with mapping difficulties experienced by different actors in the value chain. This was done by asking interviewees to list difficulties they encounter while doing their job.

When the map of the value chain of white leg shrimp was finished, the research continued with the identification of existing rules and regulations in the value chain. The

interviewees were requested to (1) list rules and regulations that they have to abide by, (2) to list rules and regulations that they require their suppliers to comply with, and (3) in case of non-compliance, what are sanctions to be applied?

In order to reveal the distributions of revenue, cost and profit, data on costs and selling prices are required. To collect costs incurred at the farming stage, a farmer chose one of his ponds and then listed all corresponding costs he incurred from the beginning of the cropping season until harvest, as well as the quantity of shrimp harvested from the chosen pond. However, for those farmers who do not keep separate records for separate ponds, they presented on the summed up values. Regarding middlemen, they were requested to offer all incurred costs for 1 kg shrimp. If they find it difficult to average costs for 1 kg shrimp, they averaged costs for one month. In this case, they are also requested to reveal the amount of shrimp transacted in 1 month on average. Considering processing firms, cost data were collected from the accounting departments.

Selling prices were then gathered. Farmers sell all shrimp at the same price to middlemen, but at procurement stage, shrimp could be sold to processing firms at different prices based on sizes. Therefore, middlemen were requested to specify selling prices and the corresponding quantity sold. If, however, they do not like to provide detailed selling prices, they offered average values. Regarding processing firms, the export price of frozen shrimp was given by the accountant.

Profit, added costs and marketing margins were then calculated. Afterward, the distributions of revenue (export price), cost and profit to different actors in the value chain were graphed. The research results were interpreted. Processing firms have to use more than 1kg raw shrimp to produce 1kg frozen shrimp, that is, 1.5kg raw shrimp. Thus, export price for 1 kg frozen shrimp is that of 1.5 raw shrimp. Therefore, cost per kg and selling price received by farmers and middlemen have to be re-scaled into cost and price per 1.5kg.

Finally, in order to understand what was preventing shrimp farmers to do transactions directly with processing firms, farmers were asked "why don't you sell your shrimp directly to processing firms?"

3.2. DATA COLLECTION

Data were gathered through interviews with shrimp farmers, middlemen, and processing firms for three year 2008, 2009, and 2010. Semi-structured questionnaires were designed. Thanks to the help of processing firms, addresses of middlemen were obtained. Similarly, middlemen helped to reveal locations of shrimp farmers. Twenty-five farmers were involved in the interview. However, four farmers somehow refused to mention about costs and earnings. Another five farmers provided data in only 1 or 2 years. Fifteen middlemen were surveyed but only ten of them were willing to provide costs and earnings. Regarding processing firms, there are five processors who process and export white leg shrimp products. Three processors were interviewed. However, two of them refused to provide costs for 3 years. The only processor who offered data for three years is the Nha Trang Seafood Joint Stock Company. It is the largest processor in Khanh Hoa province and the 11th largest in the whole Vietnam. This processor consumes more than 75% of harvested white leg shrimp in the province[5]. Data collected from farmers, middlemen and processors are presented below.

3.2.1. Data collected from shrimp farmers

[5] The information was given by Nha Trang Seafood Joint Stock Company (www.nhatrangseafoods.com.vn).
The other 2 firms who were involved in the interview are Cam Ranh Seafood (www.camranhseafoods.com) and Cafico Vietnam Corporation (www.cafico.vn)

Table 1: Relevant information revealed by farmers

ITEM	DESCRIPTION	NUMBER	PERCENT
Scales (25 surveys)	**Small (< 1 ha)**	**4**	**16%**
	Medium (1-5ha)	**15**	**60%**
	Large (> 5 ha)	**6**	**24%**
Shrimp buyers (25 surveys)	Middlemen	[6]20	80%
	Processors	5	20%
Seed suppliers (25 surveys)	**Prestigious hatcheries**	**5**	**20%**
	Less prestigious hatcheries	**20**	**80%**
Waste treatment (25 surveys)	Yes	7	28%
	No	18	72%
Contract types (25 surveys)	**Legal contract**	**0**	**0%**
	Verbal contract	**25**	**100%**
Difficulties (25 surveys)	Expensive feed	19	76%
	Seed quality	16	64%
	Lack of capital	14	56%
	Weather fluctuations	25	100%
	Diseases	25	100%
	Complex procedure for a loan from bank	[7]8	42%
	Electricity shortfall	8	32%
Services and institutions (25 surveys)	**Loans from bank**	**19**	**76%**
	Culture techniques, disease prevention	**25**	**100%**
	Researches on culture techniques and seeds	**9**	**36%**
	Market information	**25**	**100%**
Why depend on middlemen? (20 surveys)	Lack of facilities	13	65%
	Immediate payment	15	75%
	Afraid of risks	20	100%
	Lack of experience Middlemen do better Not familiar with the job	12	60%
	Dislike to do the job	8	40%

Source: Surveys from farmers

[6] Including 4 small scale, 13 medium scale, and 3 large scale. Those 20 farmers account for 70% of total harvested shrimp from 25 farmers.

[7] 8 out of 19 farmers who requested for loans from bank

Shrimp farming is classified into small, medium and large scale. Of twenty-five surveyed farmers, fifteen are culturing under medium scale, six under larger scale and four under small scale. In order to purchase shrimp seed, farmers could buy either from prestigious hatcheries which provide stable quality seed at high prices or from less prestigious hatcheries which offer lower prices for lower seed quality. Shrimp farming do generate wastes which are harmful to the environment. Farmers are therefore required to employ waste treatment measures before the used water is emitted to the surrounding environment. The survey, however, shows that most of the farmers do not comply with the regulations. This irresponsible practice leads to a polluted environment, which in turn encourages diseases to occur. Middlemen and processors are two options to which famers could sell their harvested shrimp. According to the survey, most of the farmers prefer to have transactions with middlemen. Farmers were requested to list difficulties faced as performing their job. As revealed, they are most afraid of *diseases* and *weather fluctuations*. *Expensive feed*, *seed quality* and *lack of capital* were also mentioned. The survey also shows that all farmers are aware of *culturing techniques and disease prevention* before they start shrimp farming. They obtain the knowledge from training courses or guidelines as well as from other experienced farmers. All farmers do pay attention to *market information* related to shrimp where shrimp prices are collected. Research *on culturing techniques and seed* receive the lowest number of responses from farmers. There could be two possible causes, that is, lack of research or lack of farmers' concerns for research information. Regarding the dependence on middlemen, all farmers stated that they use the middleman option because of risk aversion. *Immediate payment* and *lack of facilities* also serve as catalysts for the dependence of farmers on middlemen. Descriptive statistics related to costs, farm-gate prices and profits for three years, 2008 to 2010, are presented in the appendix B (Table B1 and B2)

3.2.2. Data collected from middlemen

Table 2: Relevant information revealed by middlemen level 1

ITEM	DESCRIPTION	NUMBER	PERCENT
Shrimp buyers (15 surveys)	Middlemen level 2	[8]13	87%
	Processors	2	13%
Difficulties (15 surveys)	**Lack of knowledge on preserving techniques**	**9**	**60%**
	Lack of knowledge on food safety and sanitation	**11**	**73%**
	Insufficient supply of clean ice	**5**	**33%**
	High competition between middlemen	**6**	**40%**
Services and institutions (15 surveys)	Loans from bank	6	40%
	Transportation services	9	60%
	Market information	15	100%

Source: Surveys from middlemen

During procurement, middlemen encounter certain difficulties. *Lack of knowledge on food safety and sanitation* receive the most mention, followed by *lack of knowledge on preserving techniques*. *Insufficient supply of clean ice*, and *high competition between middlemen* were also mentioned but received less responses. Regarding services and institutions, the survey shows that all middlemen pay attention to market information. More than half of middlemen have to outsource transportation services, and less than half need loans from bank. Descriptive statistics on costs, selling prices and profits are presented in the appendix B (Table B3).

3.2.3. Data collected from processors

[8] Those 13 middlemen account for approximately 90% of total shrimp from 15 middlemen.

Table 3: Relevant information revealed by processors

Respondents / Questions	Processor A	Processor B	Processor C
Who are your suppliers of shrimp?	75% from middlemen 25% from farmers	70% from middlemen 30% from farmers	70% from middlemen 30% from farmers
Why do you buy more shrimp from middlemen than from farmers?	Most of farmers do not have enough facilities to do the harvesting and preserving.	It is simply because most of farmers opt to sell their harvest to middlemen.	Because most of farmers prefer to sell their harvest to middlemen for their own "safety".
Regarding middlemen as suppliers, do you buy shrimp from middlemen level 1 or level 2?	Although mid. level 1 transport shrimp to the firm'gate, 90% of shrimp legally belong to mid. level 2.	90% from mid. level 2	90% from mid. level 2
To whom do you sell your shrimp products?	Frozen shrimp is exported. Instant products are sold to restaurants, local people and supermarkets.	Frozen shrimp is exported.	Frozen shrimp is exported.
Do you manage export affair or outsource?	Self manage:85-90% Outsource: 10-15%	Self manage:90% Outsource: 10%	Self manage:85-90% Outsource: 10-15%
Do you encounter any difficulties during your operation?	The concentrations of *chloramphenicol* and *trifluralin* in shrimp. Traceability from EU markets. Other standards related to environment, labor.	Food safety standards. Traceability from EU markets	Food safety standards. Traceability from EU markets
What services do you use during your operation?	Banking services. Quality tests by NAFIQAD[9]. ISO, HACCP, AAC, BRC, and IFF certifications Shipment services. Market information.	Banking services. Quality tests by NAFIQAD. HACCP and BRC certifications Shipment services. Market information.	Banking services. Quality tests by NAFIQAD. HACCP certification Shipment services. Market information.

Source: Surveys from processors

[9] NAFIQAD is the acronym for National Agro Forestry Fisheries Quality Assurance Department

The survey showed that 70% of shrimp employed for processing is bought from middlemen while only 30% is supplied by farmers. It is, however, not the preference of processors to purchase shrimp from middlemen than from farmers. Rather, it is simply because most farmers opt to sell their harvest to middlemen. Raw shrimp after processed are sold ether international or domestically. Frozen shrimp are sold on the international market while instant products like *spring rolls, green rice-wrapped shrimp, floured shrimp,* etc., are sold at domestic level to restaurants, supermarkets, and local people who purchase for home cooking. As in the survey, 85% to 90% of shrimp products are exported by processors themselves while 10% to 15% are done by outsourced exporters. During their operations, processors face certain difficulties like food safety, and traceability. In favor of quality assurance, processors have no choice but to implement quality management systems like ISO, HACCP. In addition, they also have their raw shrimp as well as final products tested at NAFIQAD. Banking, transportation and market information are other services employed by processors. Costs and earnings provided by Nha Trang Seafood Joint Stock Company are presented in the empirical chapter.

CHAPTER 4
EMPIRICAL FINDINGS

4.1. GENERAL INFORMATION

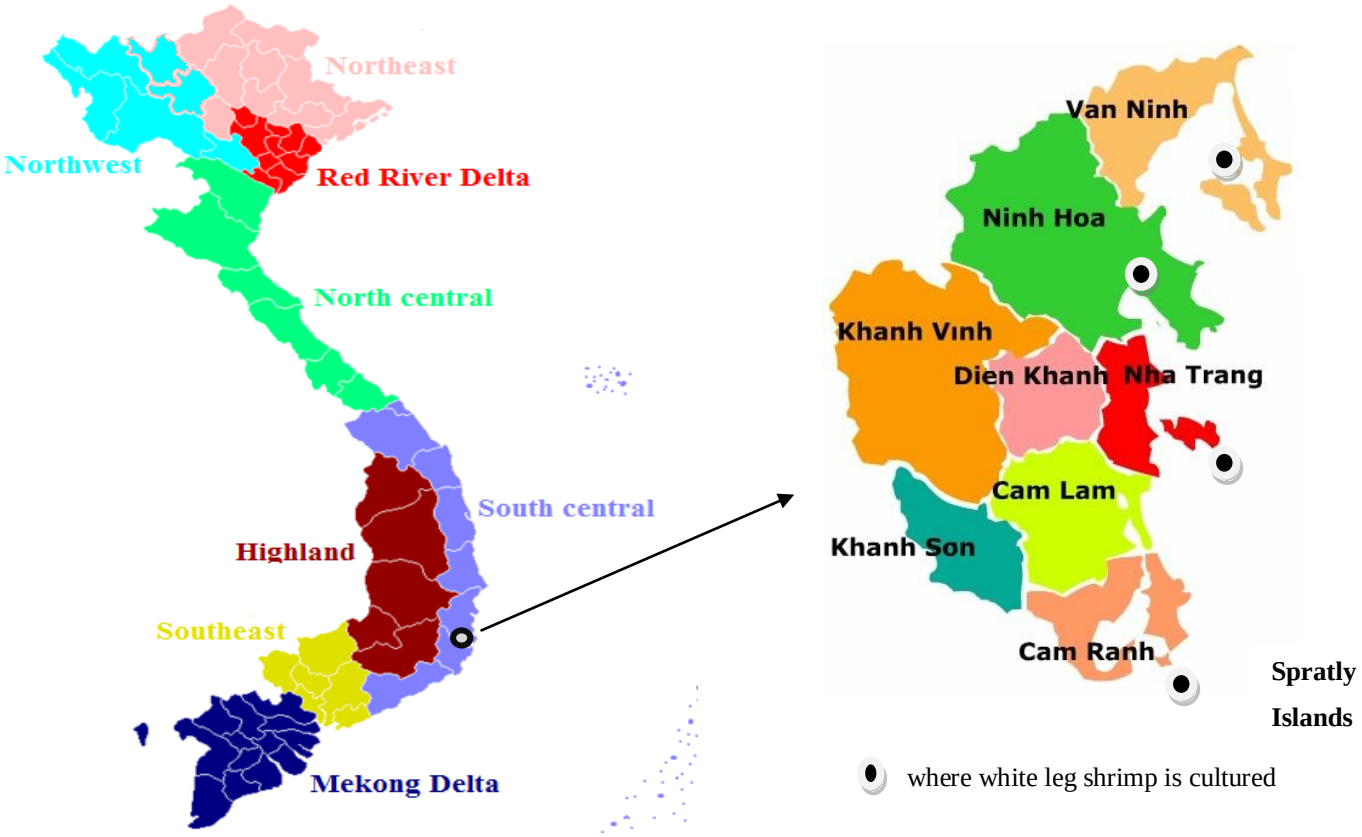
White leg shrimp, which are native to South America, made their first appearance in Vietnam in 2001. During the period 2001 to 2007, they suffered the prohibition imposed by the Ministry of Agriculture. This was because white leg shrimp could infect black tiger shrimp with certain diseases. At that time, black tiger shrimp were the main livestock, accounted for 95% of export value from shrimp. The ban was lifted coincidentally right at the time farmers were suffering great financial losses due to the spread of diseases on black tiger shrimp. Thanks to certain advantages over black tiger shrimp, white leg shrimp were sighted as solutions to debts. White leg shrimp can grow well in salty, fresh, or brackish waters. As compared to black tiger shrimp, white leg shrimp can be cultured in much higher density (100 individuals/m^2 compared to 30 individuals/m^2). White leg shrimp can be cultured twice a year (January to March, and June to August), while black tiger is raised once a year (January to April). White leg shrimp also exhibit a higher growth rate than black tiger. As a result, culturing length of black tiger shrimp is 4 months while it takes white leg shrimp only 3 months. Longer farming length is associate to higher production and financial risks. Although white leg shrimp are cheaper (due to lower cost per kg), thanks to higher yield, return from a unit area of white leg shrimp could be higher.

In addition to technical advantages over black tiger, white leg shrimp were also the preferred choice of international customers during the economic crisis because of an average lower price. For these reasons, white leg shrimp have become the chosen livestock of numerous farmers, who have never cultured shrimp before and who were culturing black tiger. As a consequence, areas employed for white leg shrimp farming has increased remarkably. In 2010, the area for shrimp farming nationwide was 25,000

hectares, increasing 30% as compared to 2009. The corresponding yield was 135,000 tons while it was 89,500 tons in 2009 (VASEP).

White leg shrimp farming concentrates mainly in Mekong Delta and the South Central of Vietnam. South Central consists of eight provinces located along the coast, including Khanh Hoa. In 2008, total area employed for white leg shrimp farming in the South Central Coast was 4,227 hectares. The figure dramatically amounted to 9,131 hectares by September, 2009 (Ministry of Agriculture and Rural Development).

Figure 8: The map of Khanh Hoa province



Khanh Hoa is a coastal province in the South Central Vietnam. The province covers an area of 5,197 km^2. It is also endowed with a coast line of 385 km^2 which consists of territorial waters and 200 islands of many sizes. Tourism, capture fisheries and aquaculture are key industry in the economy of the province. Fisheries production in 2009 was over 93,000 tons, of which capture fisheries accounted for 72,301 tons (Khanh

Hoa's People Committee, 2010). Annual fisheries export value is more than 300 million USD (Directorate of Fisheries, 2011).

Khanh Hoa province is made up of two cities (Nha Trang, Cam Ranh), six inland districts and one islandish district (Spratly Islands). White leg shrimp is cultured in Cam Ranh, Ninh Hoa, Van Ninh, and Nha Trang which are listed in culturing capacity order. Total area for white leg shrimp farming rocketed from 900 hectares in 2008 to 3,100 hectares in 2009 (Ministry of Agriculture and Rural Development).

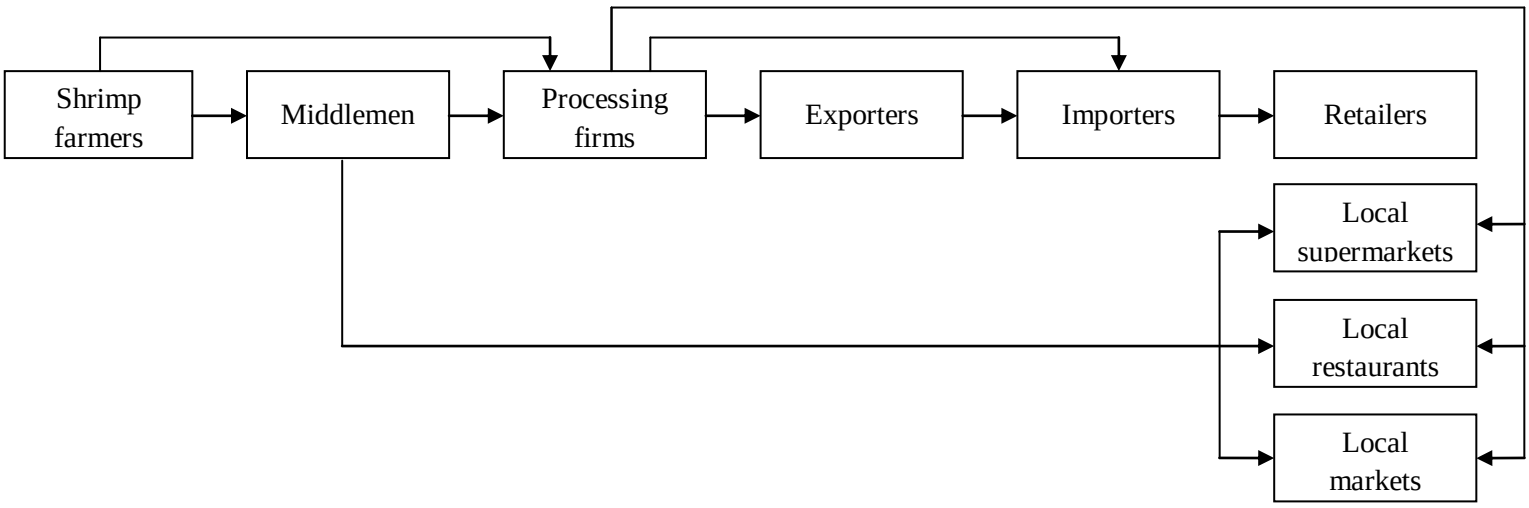
Table 4: Culturing area and harvest of white leg shrimp in 2010 in Khanh Hoa

Locations	**Cam Ranh**	**Nha Trang**	**Ninh Hoa**	**Van Ninh**	**Total**
Area (hectares)	3,435	156	1,381	470	5,789
Harvest (tons)	1,683.5	764.5	6,051.5	2,038.5	[10]12,238

Source: Khanh Hoa Derpartment of Argricuture and Rural Development, 2010

4.2. THE VALUE CHAIN OF WHITE LEG SHRIMP IN KHANH HOA

Figure 9: The value chain of white leg shrimp in Khanh Hoa



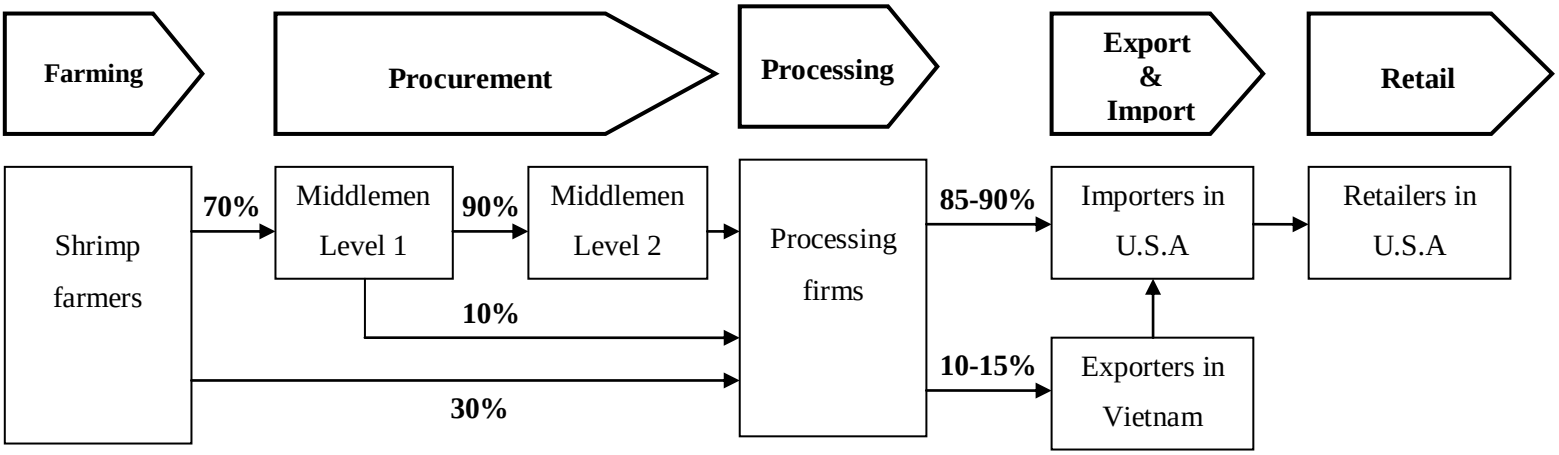
[10] Of which, Nha Trang Seafood Joint Stock Company consumed 9,350 tons, which equals to 76%

It can be seen from the figure that there are two underlying value chains in the production of white leg shrimp products. One serves domestic demands and the other serves global customers. Farmers produce white leg shrimp and sell them to middlemen or processors. Middlemen then sell them to local markets, supermarkets and restaurants to meet domestic demands. In the other branch, middlemen sell shrimp to processors who then process shrimp for the international export trade. Japan, EU and the USA are the three biggest markets. In addition, processors also produce certain products to serve domestic customers. Processors can choose to their own exporting or they can go through specialist exporters. Importers are usually wholesalers to distribute imported shrimp to retailers.

4.3. THE VALUE CHAIN OF FROZEN WHITE LEG SHRIMP EXPORTED TO THE US MARKET

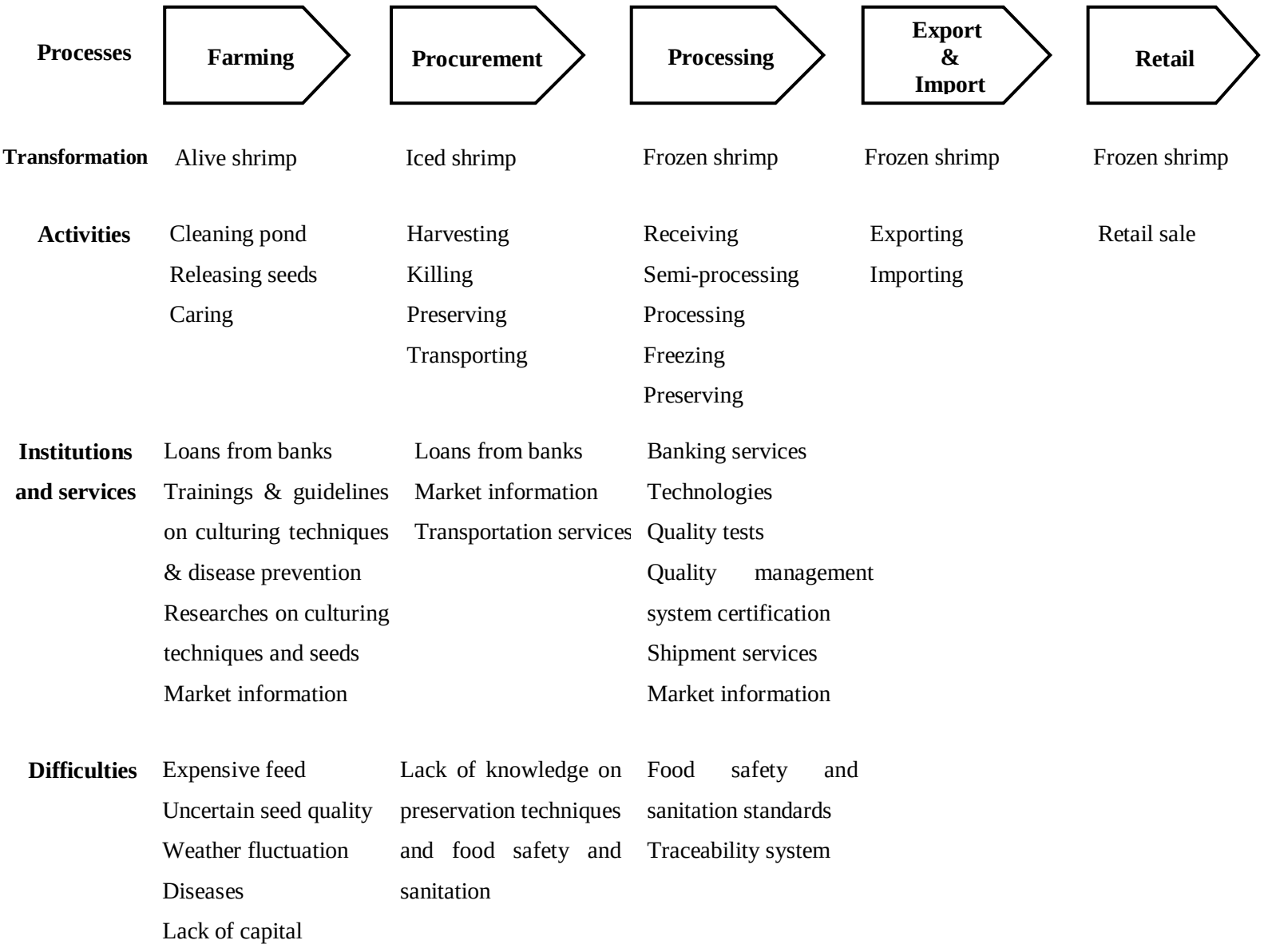
The value chain for frozen white leg shrimp sold on the US market has five segments: farming, procurement, processing, import and export, and retail. Shrimp farmers can be categorized into small scale (< 1hectare), medium scale (1-4 hectares), and large scale (> 5hectares). Middlemen are divided into two levels which handle different jobs. Processors perform both primary and secondary processing. Shrimp is exported by ship and it takes at least 7 days to arrive in the USA. US customers can buy shrimp via retailers like supermarkets or at restaurants. Figure 10 depicts a schematic presentation for frozen white leg shrimp exported from Khanh Hoa to the US market.

Figure 10: The value chain of frozen white leg shrimp sold on the U.S market



The percentages refer to the volume of shrimp belonging to each branch.

Figure 11: Other information on the value chain of frozen white leg shrimp sold on the U.S



4.3.1. Farming stage

Farmers do shrimp farming twice a year to take advantage of favorable weather. One crop starts in January and ends at the end of March. The other lasts from April or May to July or August. Shrimp are cultured under intensive mode. Culturing techniques are mixed up with experiences. Farmers learn culturing techniques from training courses, guidelines issued by the local authority, as well as from neighbors. Shrimp farming

requires large amounts investment. Therefore, loans are of necessity. Farmers prefer to request for loans from relatives or friends rather than from banks. This is because banks require assets as collateral and interests on loans may be high. Technically, shrimp farming follow the steps below.

Cleaning pond: Water from the previous crop is drained away. Mud and wastes are then removed from the bottom of the pond. Lime is mixed with soil for neutralization purpose. The pond is then exposed to the sun. After the exposure, the pond is filled with water, enabling eggs of unwanted fish and crustacean to turn into larvae. Then, such larvae are killed with a substance called *saponin*. Afterward, new water is pumped in. *Chlorine* is commonly used to sterilize the water. After that, water is colored by fertilizers. Finally, shrimp seed could be released. Although all farmers do clean ponds before releasing seeds, only do professional famers perform the job properly.

Releasing shrimp seeds: Before seed release, water is tested to ensure such conditions as oxygen concentration, salinity, pH, clarity and temperature are appropriate. Shrimp seeds are then released. In south central provinces of Vietnam, density is 100-120 individuals/m^2. Regarding shrimp seeds, farmers have two options. They can buy seeds from prestigious or less prestigious hatcheries. Only do 20% of farmers take option 1 as their choice, while 80% prefer option 2. This can be easily explained since seeds from prestigious hatcheries are more expensive than those from less prestigious hatcheries to assure a better quality seed.

Caring: Caring includes practices of feeding, maintaining water conditions, and testing shrimp health. During the process of caring, farmers are required to respect regulations on permitted chemicals and medicines for shrimp farming issued by the Ministry of Agriculture. However, some shrimp farmers do break the regulations for their own benefits.

After 3 months, shrimp can be harvested. Seventy percent of harvested shrimp are sold to middlemen and 30% are directly bought by processing firms. Before selling shrimp, a farmer can obtain information on price from other farmers, mass media, and Market News published by VASEP. Since shrimp products are exported, demand and supply conditions on the world marker will determine export price, and therefore affect how much farmers gain from selling their shrimp. Price received by farmers also determined by the domestic supply and demand for raw shrimp.

Farmers face some difficulties in doing their jobs. Feed used for shrimp farming is expensive and its prices vary. Since feed cost accounts for a large percent in total cost, an increase in feed price may affect probability. Another difficulty comes from seed quality. Although all farmers know that seed quality is crucial to the success of the crop, they still purchase uncertain quality seed from less prestigious hatcheries because of its lower prices as compared to those of prestigious hatcheries. Lack of capital is also considered as a drawback. If farmers want to expand their production, they have to request for loans from commercial banks. Unless they have assets to deposit as collateral, they cannot receive loans. Finally, diseases and weather fluctuations are the worst to farmers. Farmers jump to shrimp farming with the hope for a change in their livelihoods. However, if diseases or weather fluctuations occur, famers could go into debts rather than making a positive net return.

Farmers are required to abide by regulations issued by the Ministry of Agriculture during shrimp farming. These include regulations on pond systems, waste treatment, specialized equipment, culturing techniques, labors, handling infected shrimp, and keeping records. In addition, the ministry also issued a list of banned chemicals, medicines and biological products which require the compliance from farmers. Local departments of agriculture are responsible for monitoring the compliance and applying sanctions on regulation breakers. For some reasons, violations still occurs, especially against regulations on waste treatment and the list of banned substances.

4.3.2. Procurement stage

After receiving messages from farmers that they want to sell their shrimp, middlemen come to check shrimp size. Unless shrimp attain their harvestable size, the harvesting will be postponed until shrimp are sufficiently big. No legal contracts are made between middlemen and farmers. Only "verbal contracts" are utilized. Middlemen are responsible for harvesting, preserving and transporting shrimp to processing firms.

Harvesting: Before harvesting, water in ponds is drained off, leaving just enough water for shrimp to survive. It is therefore easy to catch shrimp. Shrimp is still alive after harvesting. Shrimp after harvested are placed onto a canvas container. It is then watered so that mud, soil and wastes are removed. After the shower, shrimp are placed neatly into baskets to be weighed.

Killing shrimp: Shrimp are put into containers where ice and water are waiting. Two kg shrimp require one kg ice and one kg water. When soaked in water, shrimp gain weight. Therefore, middlemen intentionally expand the length of soaking to earn more profit. Some middlemen even add certain substances to increase shrimp weight. This causes shrimp to be impure.

Preserving: Shrimp are preserved with ice. One layer of shrimp is accompanied by one layer of ice. The proportion of shrimp to ice is subject to the distance from harvesting places to processing firms. If it takes twelve hours to arrive at processing firms, the proportion is 2/1 which means ten kg shrimp require five kg ice. If travel length falls between 12-24 hours, the proportion is 1/1.

Transporting: Containers after filled with shrimp and ice are sealed carefully. Then, they are loaded into trucks to be transported to processing plants as fast as possible. It is crucial to arrive within the schedule time. If, for some reasons, travel length is longer

than expected, shrimp quality could reduce and therefore could be rejected by processing firms.

As a matter of fact, middlemen are divided into 2 levels. Level 1 are responsible for all activities mentioned above, while level 2 perform a much simpler job. Level 2 are those who own a large amount of cash. When level 1 signal that farmers want to sell shrimp, level 2 contact processing firms to receive price. After that, level 2 provide cash for level 1 to pay to farmers. Profit for level 2 is the price difference: 500 VND per kg. Level 1 therefore receive a fixed amount of cash. How much profit they earn depends on the price paid to shrimp farmers. In case that level 1 have enough cash to pay to shrimp farmers, they can make transactions directly with processing firms, bypassing level 2. However, of all transactions between middlemen and processing firms, about 10% are between middlemen level 1 and firms.

The difficulty faced by middlemen is the lack of knowledge on preservation techniques. Preservation is no doubt important, and affects the earnings of middlemen. Middlemen however base preservation mainly on their own experience. In addition, middlemen also lack knowledge to ensure food safety and sanitation, which is required by processing firms. According to the agreement with processors, shrimp will be rejected if middlemen do not respect the commitment on food safety and sanitation.

4.3.3. Processing stage

Processing firms are responsible for transforming raw shrimp into frozen shrimp ready to be exported**.** Processing which is the most complex stage in the value chain consists of various steps. Frozen shrimp includes two types: frozen semi-processed and frozen processed.

Receiving raw shrimp: Shrimp are transported to firms by middlemen level 1. After unloaded, shrimp undergoes sensory evaluation performed by firms' employees who are

responsible for quality control. If shrimp have issues, they will be rejected. In case that shrimp pass the sensory evaluation, samples of shrimp are tested for microorganisms and antibiotic concentrations right at the firms and then at NAFIQAD[8] for quality certifications. Shrimp cannot wait until the tests are completed. They has to move on to the next phase.

Semi-processing: At the beginning of the semi-processing, shrimp are given a shower. After that, shrimp are moved to tanks placed near the production line. Tanks are filled with ice in order to keep the temperature between 0^0C and 10^0C. The semi-process generally falls into removing head, peeling shell (*exoskeleton*), removing vein (*posterior aorta*), and removing tail (*telson* and *uropods*). Shrimp are semi-processed somewhat differently for different products. For example, if the product is *headless-shell on*, head is removed while shell is kept. Or if the product is *peeled-deveined*, shrimp are peeled off (including head, shell and tail) and the vein is removed.

Processing: After the semi-processing phase, shrimp are separated based on quality and weigh for different products. They then undergo the processing phase to transform into the processed products.

Freezing, packing, preserving: There are two types of freezing, technically termed *block* and *IQF* (Individual Quick Freezing). In block technique, a certain number of shrimp are frozen into a block. Meanwhile, IQF enables shrimp to be frozen individually, and ensure that shrimp are kept separated after the process, as compared to block technique. The freezing length is 6-8 hours for block technique and 5-10 minutes for IQF. As the freezing practice finishes, shrimp products are packaged, labeled, and kept at -20^0C for preservation purpose.

On the day of exporting, frozen shrimp are tested for quality assurance. All legal documents are prepared for the shipment. Processed shrimp are transported to ports in

trucks where temperature is kept at -18 to -20^{0}C. It then travels to importing countries by ships. If frozen shrimp pass all quality tests conducted by importing countries, they will be permitted to immigrate. Transactions end when shrimp are accepted and payment is made. Processors can perform exporting affairs on their own, or they can employ specialized exporters. Obviously, indirect export takes away some benefits from processors. Eighty-five to ninety percent of frozen shrimp travel abroad through direct export, while ten to fifteen percent are left for indirect export.

The biggest challenge to processing firms is food safety and sanitation standards imposed by import countries. During the past few years, shrimp exported to Japan and the USA have been rejected due to the presence of *chloramphenicol.* Recently, the concentration of *trifluralin* in shrimp exported to Japan is identified to be higher than permitted. This issue has its roots at the farming stage because farmers intentionally or unintentionally make use of products which contain *chloramphenicol* and *trifluralin.* Moreover, by increasing shrimp weight illegally and immorally, middlemen account for the impurity of shrimp. With respect to the EU market, traceability is the challenge. One of drawbacks against the implementation of traceability is that farmers are not familiar with international standards in keeping records of their farming practices. Furthermore, most farmers do not keep separated records for separated ponds. In addition the traceability, EU also demands for the fulfillment of environmental standards and labor standards.

As a processor and exporter, firms have to comply with standards on food safety and sanitation as well as other regulations required by importing countries. Domestically, firms are regulated by rules issued by NAFIQAD on quality control. Furthermore, firms have to maintain the compliance with requirements of quality management systems like ISO, HACCP, AAC (Aquaculture Certification Council), BRC (Bristish Retail Consortium), and IFS (International Food standard).

4.4. ANALYSIS ON COSTS AND EARNINGS

4.4.1. Farming stage

Table 5: Costs per unit of raw white leg shrimp in the period of 2008-2010

Unit: VND

Cost components	2008		2009		2010	
Seed	2,489	*7.66%*	2,723	*7.81%*	2,956	*7.88%*
Feed	21,902	***67.40%***	23,605	***67.69%***	25,717	***68.52%***
Labor cost	1,559	*4.80%*	1,666	*4.78%*	1,761	*4.69%*
Depreciation	1,026	*3.16%*	1,026	*2.94%*	1,026	*2.73%*
Electricity and fuel	1,320	*4.06%*	1,450	*4.16%*	1,546	*4.12%*
Canvas	904	*2.78%*	919	*2.64%*	937	*2.50%*
Land rental	1,140	*3.51%*	1,140	*3.27%*	1,140	*3.04%*
Chlorine	712	*2.19%*	733	*2.10%*	771	*2.06%*
Lime	838	*2.58%*	967	*2.77%*	991	*2.64%*
Microbiotics and medicines	310	*0.95%*	330	*0.95%*	352	*0.94%*
Others	295	*0.91%*	312	*0.90%*	332	*0.89%*
Cost per kg	**32,495**	*100%*	**34,871**	*100%*	**37,530**	*100.%*
Equivalent to US$ [11]	**1.97**		**1.88**		**1.92**	

Source: Average numbers from surveys from farmers

The table mentions all cost items incurred by farmers during white leg shrimp farming. Variable costs include expenses on seed, feed, electricity & fuel, and microbiotics & medicines. On the other hand, fixed costs comprise of labor wage, depreciation, canvas, land rental, chlorine, lime and other expenses. Expenses on inputs increased over three years (figure 13). Land rental however stayed the same since contracts for land rent are valid for 3 to 5 years. Cost/kg steadily rose up from 32,495 VND (1.97 US$) to 37,530 (1.92 US$). The table (and figure 12) demonstrates that feed expense accounts for the largest share, overwhelming other cost components. Therefore, a good use of feed would help reduce cost. Technically, expense on feed is determined by what is called *food change ratio* (FCR). FCR 1:1.1, for example, means that in order to harvest 1kg shrimp,

[11] The exchange rate in 2008 was 16,500VND/USD; in 2009 18,500VND/USD; in 2010 19,500VND/USD

1.1 kg feed is required. Normally, FCR fall into the range of 1.0 to 1.4. Good management of food enables FCR to be between 1.0 and 1.2.

Figure 12: Shares of cost components

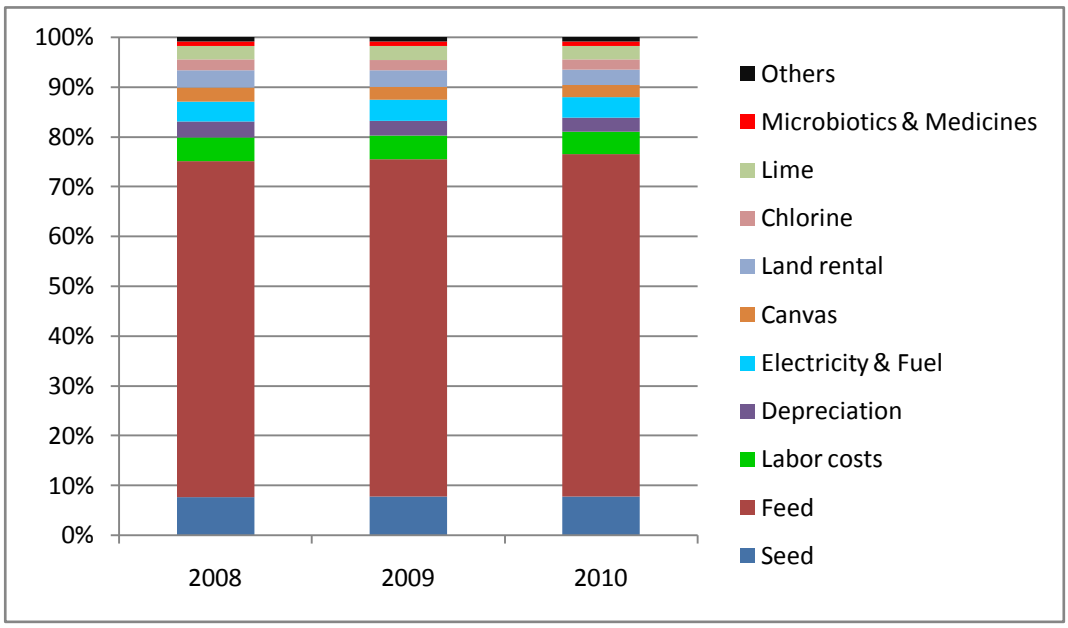


Figure 13: Increases in input expenses

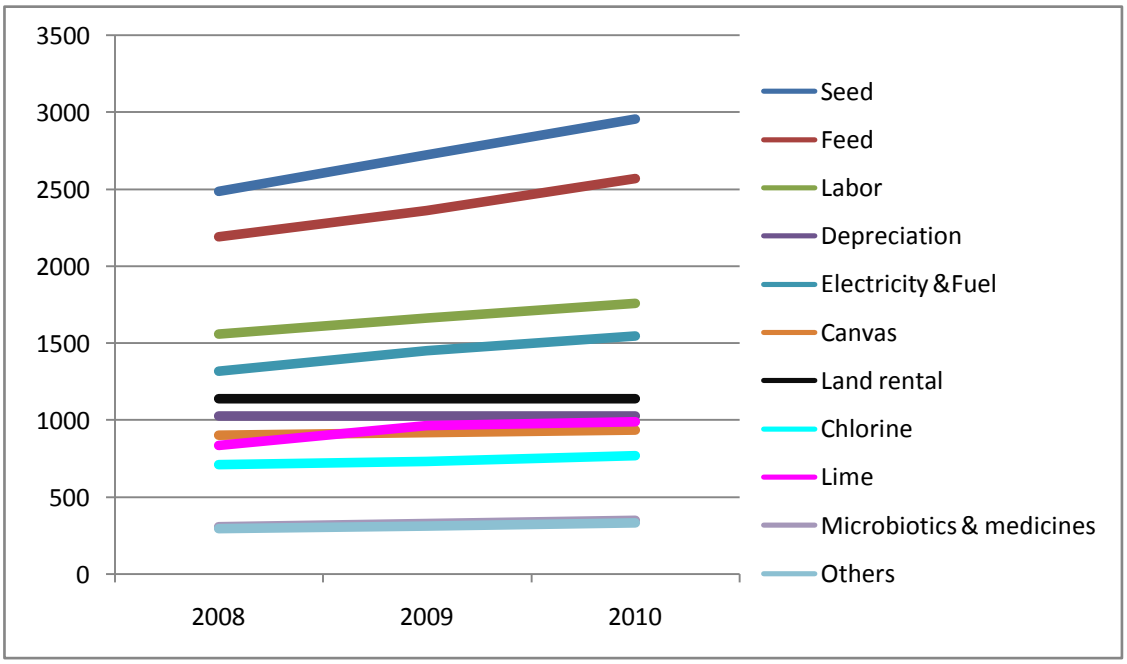


Figure 13 shows that feed and seed exhibited the largest rates of increase, followed by, electricity & fuel, and labor. Land rental, as mentioned before, and depreciation stayed the same.

Table 6: Cost, farm-gate price and profit per kg in the period of 2008-

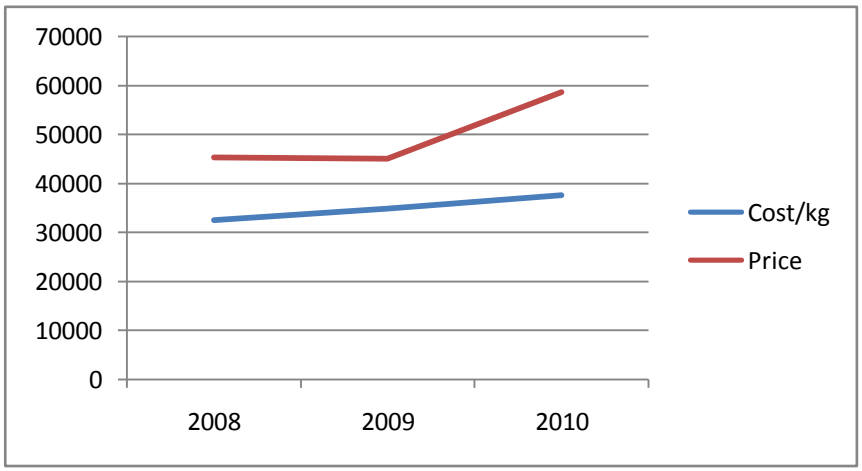
Unit: VND

Items	**2008**	**2009**	**2010**
Cost per kg	32,495 (1.97 US$)	34,871 (1.88US$)	37,530 (1.92 US$)
Farm-gate price	45,344 (2.74 US$)	45,044 (2.43 US$)	58,625 (3.00 US$)
Profit per kg	12,849 (0.79 US$)	10,173 (0.55 US$)	21,095 (1.08 US$)

Source: Average numbers from surveys from farmers

Farm-gate prices of white leg shrimp were 45,344 VND, 45,044 VND and 58,625 VND in 2008, 2009 and 2010 respectively. As mentioned before, areas employed for white leg shrimp farming significantly increased in 2009, which in turn made the supply of raw shrimp augment. Farm-gate price in 2009 was therefore lower than that in 2008. In the turn of 2010, farm-gate price then increased. This was because of the augment in the export price. The increase of the export price in 2010 was attributed to the fall in the supply of shrimp caused by the oil spill incident in the Gulf of Mexico (VASEP). In addition, the recovery of the global economy started in 2010 helped raise the demands for shrimp products (VASEP).

Figure 14: Changes in profit per kg in 3 years



As in figure 14, due to the drop in farm-gate price and the increase in cost/kg, farmers did not earn as much profit/kg as did they in 2008. In the year of 2010, cost/kg extended its upward increase. Such an increase was, however, compensated by the significant increased farm-gate price as compared to those in 2008 and 2009. Profit in 2010 was, therefore, the largest.

Table 7: Cost and profit per ha in the period of 2008-

Unit: VND

Items	2008	2009	2010
Total cost per ha	310,755,763 (18,883 US$)	333,377,919 (18,020 US$)	358,698,265 (18,394 US$)
Total profit per ha	122,437,987 (7,420 US$)	96,965,831 (5,241 US$)	200,676,735 (10,291 US$)

Source: Average numbers from surveys from farmers

It can be seen from table 7 that total cost for 1 ha of white leg shrimp is a large amount of money. If, for some reasons, shrimp are infected and die, farmers could probably run into debts. Moreover, the table also explains why shrimp farming is "attractive". Profit per ha is quite large, but large profits are associated with high risks

4.4.2. Procurement stage

Table 8: Added costs at the procurement stage in the period of 2008-2010

Unit: VND

Added costs	2008		2009		2010	
Transport	282	*15.3%*	287	*14.8%*	302	*14.4%*
Labor cost	467	*25.4%*	481	*24.7%*	508	*24.2%*
Ice	268	*14.5%*	327	*16.8%*	395	*18.9%*
Depreciation	320	*17.4%*	320	*16.5%*	320	*15.3%*
Others costs	502	*27.3%*	530	*27.2%*	570	*27.2%*
Total per kg	**1,839**	*100%*	**1,945**	*100%*	**2,095**	*100%*
Equivalent to US$	**0.111**		**0.105**		**0.107**	

Source: Average numbers from surveys from middlemen level 1

At the procurement stage, in addition to the cost of purchasing shrimp, middlemen have to add some other costs in order to transfer it to the next stage. Variable costs comprise of expenses on transport, labor and ice, leaving the rest to fixed costs. Added costs at the procurement stage stayed around 2,000 VND in three years, of which labor cost individually accounted for the largest share. Other costs, although occupied larger share than that of labor cost, are composed of several components (figure 15).

Figure 15: Shares of added cost components

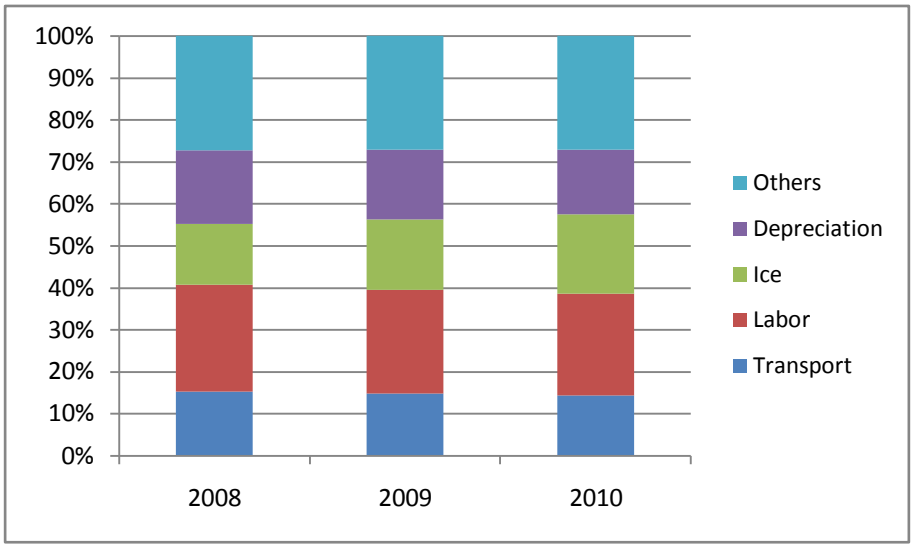


Figure 16: Increases in added cost components

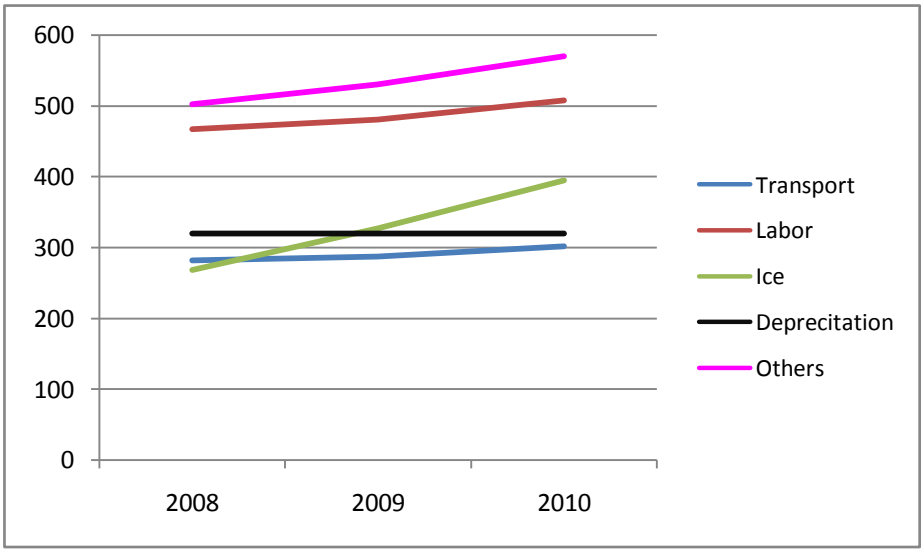


Figure 16 shows that as at the farming stage, added costs exhibited an upward trend. This led to an increase from 1,839 VND in 2008 to 2,095 VND in 2010. Of all components, ice expenses demonstrated the most remarkable rate of increase. The increase in ice prices was explained by the increase in electricity prices in 2009 and 2010 since ice production is an electricity-consuming practice. Transport cost moved up slowest while depreciation, of course, stayed unchanged.

Table 9: Costs, selling prices and profits at the procurement

Unit: VND

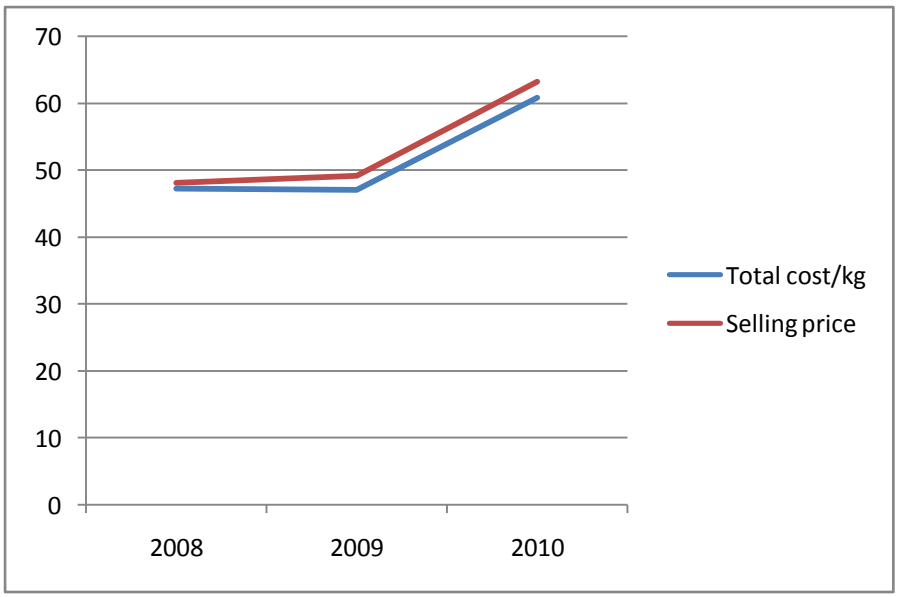
Items	2008	2009	2010
Purchasing price of shrimp	45,370	45,100	58,700
Added costs from Mid. level 1	1,839	1,945	2,095
Total cost per kg	(2.86 US$) 47,209	(2.54 US$) 47,045	(3.11US$) 60,795
Selling price to processors	(2.92 US$) 48,160	(2.66 US$) 49,140	(3.24 US$) 63,180
Profit for Mid. level 2	200	400	500
Profit for Mid. level 1	(0.04 US$) 709	(0.09 US$) 1,659	(0.095 US$)1,857

Source: Average numbers from surveys from middlemen level 1

As in table 9, total cost of 1kg shrimp at the procurement stage consists of purchasing price of shrimp and added costs. Level 1 middlemen are responsible for added costs while level 2 middlemen provide cash to purchase shrimp. As both levels are involved in the procurement process, profit is shared between them in accordance to the complexity of the job. Therefore, level 1 middlemen earn higher profit than level 2 middlemen do. It is interesting to notice that as compared to 2009, purchasing price in 2008 was higher while selling price was lower. This reflects the role of the law of supply and demand of raw shrimp in determining prices. In 2008, middlemen had to accept the lowest profit in 3 years to purchase shrimp from farmers. By contrast, due to the boom of culturing areas in 2009 which led to the augmentation in the supply of shrimp, farmers suffered from a reduction in profit while middlemen earned double what they did in 2008. In the turn of

2010, both farmers and middlemen earned larger profits. Nevertheless, farmers' profit doubled while middlemen's profit simply increased. This indicated a rise in (domestic) demand for raw shrimp. The oil spill incident in Mexico Bay and the recovery of the global economy were the reasons. The oil spill led to a reduction in the supply of shrimp while the latter helped raise the demand for shrimp products. The two events together promoted shrimp export from Vietnam, therefore raised the demand for raw shrimp.

Figure 17: Changes in profit per kg in 3 years



That two curves stay closely to each other reflects small profit per kg. Moreover, the expanding distance between two curves indicates increasing profits over three years. Although middlemen earn small profits per kg, their monthly earnings are not correspondingly small. In fact, their earnings depend on their operational capacity. The higher the capacity is, the higher the earnings become. In the table below, 3 middlemen who operate with high capacity are cited as the evidence.

Table 10: Earnings/month of middlemen

Unit: VND

	2008			2009			2010		
	Quantity[12]	*Profit/kg*	*Earnings/month*[13]	*Quantity*	*Profit/kg*	*Earnings/month*	*Quantity*	*Profit/kg*	*Earnings/month*
Mid. A	1,450,860	726	87,777,030	5,527,350	1,501	691,379,363	2,836,530	1,855	438,480,263
Mid. B	673,180	892	50,039,713	452,080	1,666	62,763,773	1,427,761	2,020	240,339,768
Mid. C	1,340,550	684	76,411,350	2,045,720	1,675	285,548,417	3,672,593	2,030	621,280,316

Source: From surveys from middlemen level 1

Unit: USD

	2008	*2009*	*2010*
Middleman A	5,320	37,372	22,486
Middleman B	3,033	3,393	12,325
Middleman C	4,631	15,435	31,861

Table 11: Farm-gate prices given by farmers and purchasing prices provided by

Unit: VND

Farm-gate price	45,344	45,044	58,625
Purchasing price	45,370	45,100	58,700

Source: Average numbers from the surveys

Purchasing prices of shrimp revealed by middlemen are slightly different from farm-gate prices given by farmers. It is however not a surprise. The survey interviewed 16 farmers while only 10 middlemen were involved. The average numbers are therefore impossibly identical. Even if the number of farmers and middlemen surveyed were the same, the average prices could not be 100% the same since information given by farmers and middlemen are not exactly the same.

4.4.3. Processing stage

Costs and benefits at the processing stage are presented in the same form as the accounting format (table12). Costs are separated into direct material, direct labor, manufacturing overhead, marketing, interests and administrative costs. And profit means profit before tax. Since shrimp products are exported, export prices were measured in US$ which were then converted into VND at the corresponding exchange rates. One

[12] Quantity refers to operational capacity. It is on year basis.

[13] Earning/month = (Quantity x profit)/12

important thing to notice is that raw shrimp cost which belongs to direct material costs is equal to the expense on 1kg shrimp multiplied by 1.5. This is because 1.5 kg raw shrimp are required to produce 1 kg frozen shrimp.

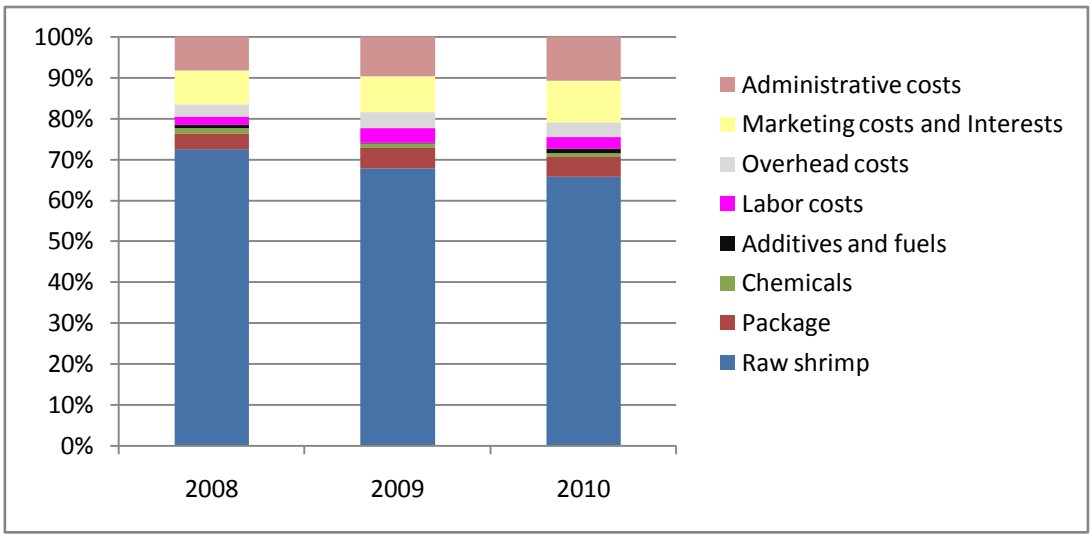
Table 12: Costs, export prices and profits at the processing stage

Unit: VND

Items	2008	2009	2010
1. **Direct material costs**	77,833	80,339	104,286
Raw shrimp[14]	72,000	73,500	94,500
Package	3,675	5,364	7,012
Chemicals	1,308	1,185	1,398
Additives and fuels	850	290	1,376
2. **Direct labor costs**	1,981	3,754	4,112
3. **Direct manufacturing overhead costs**	2,950	4,338	5,115
4. **Marketing costs and Interests**	8,250	9,562	14,625
5. **Administrative costs**	8,250	10,449	15,600
6. **Total cost per kg**	**99,264** (6.02 US$)	**108,442 (**5.86 US$)	**143,748** (7.37 US$)
7. **Export price**	6.4 US$ (**105,600**)	6.7 US$ (**123,950**)	8.76 US$ (**170,820**)
8. **Profit before tax**	**6,336** (0.38 US$)	**15,508** (0.84 US$)	**27,072** (1.39 US$)

Source: Nha Trang Seafood Joint Stock Company

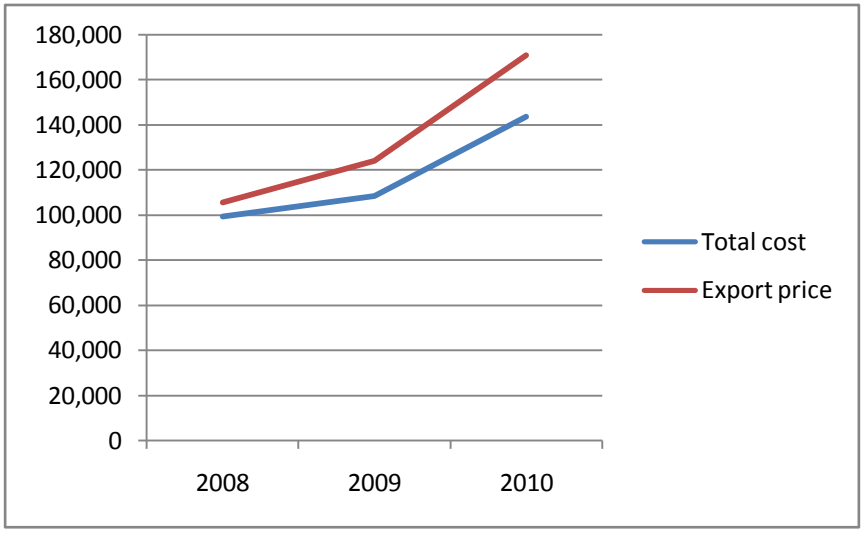
Figure 18: Shares of cost components at the processing



[14] 72,000 / 1.5 = 48,000; 73,500 / 1.5 = 49,000; 94,500 / 1.5 = 63,000. It can be seen that purchasing prices of 1 kg raw shrimp given by the processor are slightly different from those given by middlemen.

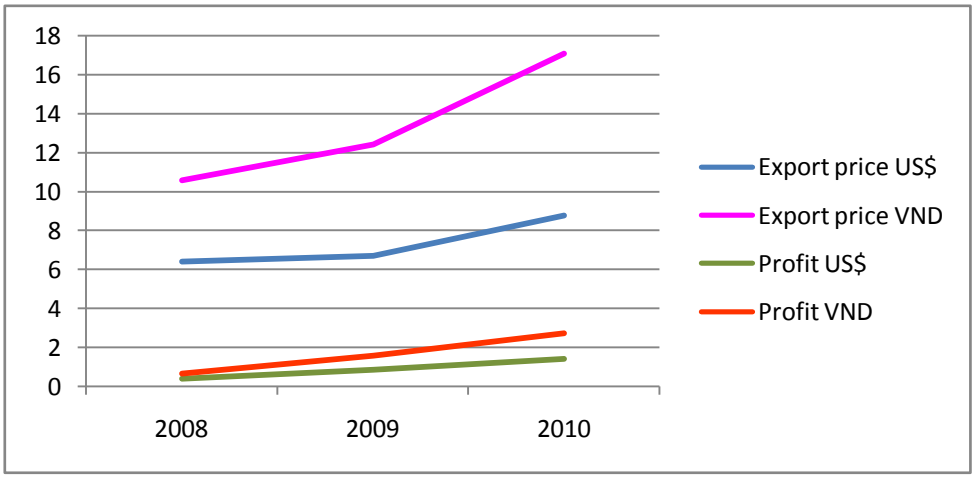
As figure 18 can tell, raw shrimp cost made up the largest share in total cost per kg frozen shrimp. In absolute term, all cost components increased over 3 years. In relative term, raw shrimp cost however exhibited a decline.

Figure 19: Changes in profit per kg in 3



Total cost and export price exhibited a remarkable rise in 2010 (figure 19). The increases in total cost over 3 years were compensated by the faster-increasing export prices. Profit was, therefore, larger year after year. It is of importance to notice that the increases in export prices were partly due to the increased exchanged rates. The effect of exchange rates can be seen from figure 20.

Figure 20: Effect of increased exchange rates



Measured in US dollar, the export price demonstrated an upward trend. In VND, the increasing exchange rates made it rise even more quickly. Profit in VND was therefore promoted to increase faster than that in US$.

4.5. THE DISTRIBUTIONS OF REVENUE, COST AND PROFIT

In the previous section, analyses have been carried out to provide insights on the businesses of farmers, middlemen and processors. Such analyses have demonstrated that all actors were rewarded with positive profit for their efforts across 3 years. It might be, however, of interest to question: "Were they rewarded equally?"

Table 13: Profit, added cost, and margin[15]

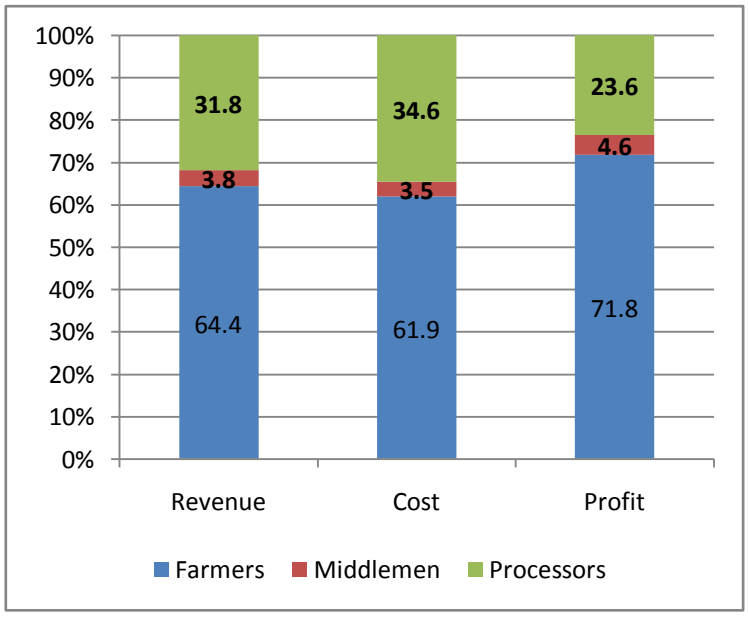
Unit: VND

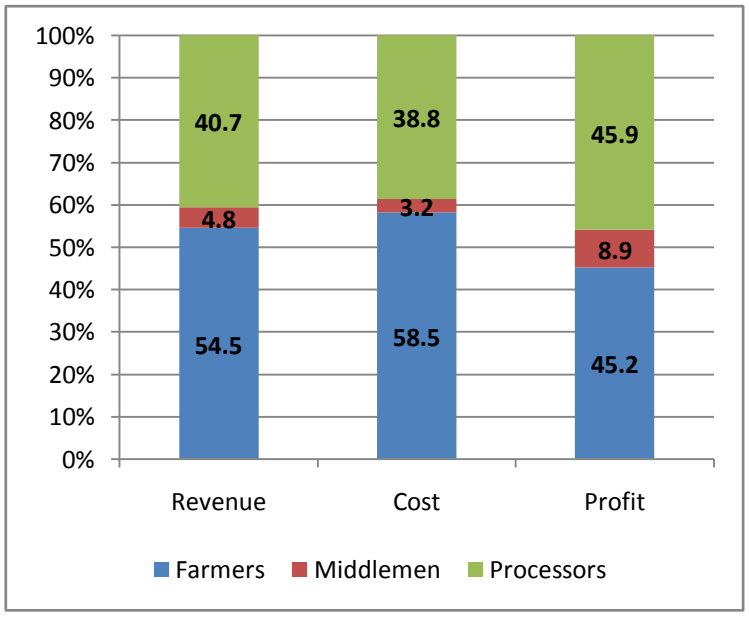
Chain actor	Purchasing price	Total cost	Selling price	Profit		Added cost		Margin	
				Abs. value	%	Abs. value	%	Abs. value	%
2008									
Farmer	-	48,743	68,016	19,273	71.8	48,743	61.9	68,016	64.4
Middleman	68,016	70,775	72,000	1,225	4.6	2,759	3.5	3,984	3.8
Processor	72,000	99,264	105,600	6,336	23.6	27,264	34.6	33,600	31.8
Total				**26,834**	**100**	**78,766**	**100**	**105,600**	**100**
2009									
Farmer	-	52,307	67,566	15,259	45.2	52,307	58.0	67,566	54.5
Middleman	67,566	70,484	73,500	3,016	8.9	2,918	3.2	5,934	4.8
Processor	73,500	108,442	123,950	15,508	45.9	34,942	38.8	50,450	40.7
Total				**33,783**	**100**	**90,167**	**100**	**123,950**	**100**
2010									
Farmer	-	56,295	87,939	31,644	50.9	56,295	51.8	87,939	51.5
Middleman	87,939	91,082	94,500	3,418	5.5	3,143	2.9	6,561	3.8
Processor	94,500	143,748	170,820	27,072	43.6	49,248	45.3	76,320	44.7
Total				**62,134**	**100**	**108,686**	**100**	**170,820**	**100**

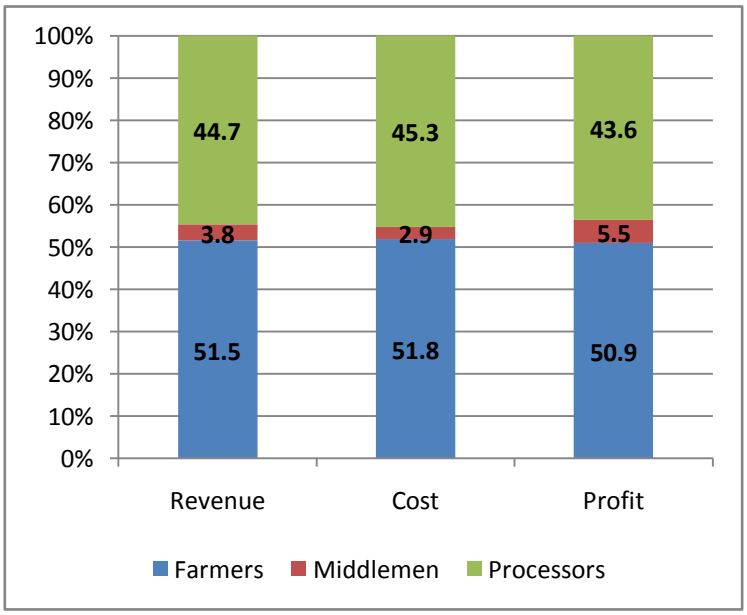
Source: Own calculations

[15] The calculations are for 1kg frozen shrimp which is equal to 1.5kg raw shrimp

Figure 21: The distribution of revenue, cost, and profit of 1kg exported frozen shrimp







In 2008, farmers overwhelmed the other 2 actors with the absorption of 64.4% of the revenue and 71.8% of profit from 1kg frozen shrimp exported to the U.S market. They also correspondingly contributed to 61.9% of total cost. The reasons for the exceptionally high shares of revenue and profit are that the demand for raw white leg shrimp from processors was high, and 2008 was the first year for officially cultured white leg shrimp.

Before 2008, processors had to import raw white leg shrimp for their production. The year of 2008 seemed beautiful to famers. Processors, on the other hand, obtained 23.6% of profit although they contributed 34.6% to total cost.

In the turn of 2009, a sad scenario happened to farmers. The boom in culturing areas led to an increase in the supply of white leg shrimp, which in turn forced the farmgate price of shrimp to reduce. Farmers' share of revenue therefore dropped from 64.4% to 54.5%. Their share of cost, however, reduced slightly from 61.9% to 58.0%, causing their share of profit to dramatically fall from 71.8% to 45.2%. Middlemen and processors were the beneficiaries. Middlemen's share of cost decreased from 3.5% to 3.2%, but their share revenue increased from 3.8% to 4.8%, leading to an approximate double in their share of profit (from 4.6% to 8.9%). Similarly, processors' share of profit almost doubled since their share of cost experienced a lighter increase than their share of revenue.

The year of 2010 continued to witness fluctuations in the distributions. Farmers suffered from a slight decline in their share of revenue from 54.5% to 51.5%. Their share of cost, however, reduced greater from 58% to 51.8%, leading to a slight increase in their share of profit. Processors, on the other hand, enjoyed an increase the share of revenue from 40.7% to 44.7%. However, such an increase was not enough to compensate for the rise in the share of cost. The share of profit therefore mildly dropped from 45.9% to 43.6%. It was noticeable that what happened in 2010 was a reverse scenario to that in 2009. It was because the (domestic) demand for raw white leg shrimp increased in 2010, as mentioned above.

Despite of fluctuations, farmers always retained the largest shares of revenue and profit in accordance with their highest contribution to total cost. The increase in shares of revenue and profit belonging to processors was always accompanied by the rise in shares of cost. Middlemen absorbed smallest shares of revenue and profit which were appropriate for their smallest contribution to total cost. It is, therefore, possible to state that revenue and

profit were distributed in relation to cost shares. In other words, it could be said that actors were “rewarded” equally for their corresponding efforts.

4.6. REASONS FOR THE DEPENDENCE OF FARMERS ON MIDDLEMEN

As depicted in the value chain map, only 30% of farmers are dealing directly with processors. The rest of them sell their harvested shrimp via middlemen. The contribution of middlemen is undeniable. Nevertheless, it is interesting to figure out why farmers have to rely on middlemen to sell their harvest.

If farmers choose to surpass middlemen, they have to perform all tasks used to be conducted by middlemen, that is, harvesting, preserving and transporting. However, it is a challenge to farmers if they perform such tasks on their own. First of all, farmers must purchase equipment dedicated to harvesting and preserving shrimp. They then have to look for workers, ice and transporters and ensure their presence on the harvesting day. For middlemen, this is not a problem because they have already established close relationships with workers, ice producers and transporters. But it is not that easy for farmers. For example, during the harvesting period, the supply of ice could be insufficient to meet the demand. In such a case, ice producers might prioritize middlemen’s needs rather than those of farmers. The absence of ice can cause delays in the harvesting, which result in additional feed expenses. In case farmers can ensure the presence of workers, ice and transporters, there is no certainty that farmers can perform the harvesting and especially preserving as properly and efficiently as middlemen can. Farmers, therefore, prefer to leave the tasks to middlemen who are more professional.

The delayed payment policy also helps prevent farmers from selling their harvest to the processor. Most farmers prefer immediate payment because they need cash to clear their loans, including feed expenses. As mentioned before, since level 2 middlemen possess a very large amount of cash, they can satisfy the immediate payment condition. Farmers who prefer immediate payment has no choice but to sell their shrimp to middlemen.

The most important reason is farmers are afraid of risk. Shrimp farming itself is a high-risky business. Most farmers, therefore, do not like to take on more risks coming from the procurement job. If they do transactions with middlemen, there is guarantee that 100% of harvested shrimp will be purchased. On the other hand, if processors are chosen, it is uncertain that the same transactions will take place. It is a financial burden to farmers if part of harvested shrimp are rejected.

For those reasons above, most farmers prefer to do transactions with middlemen rather than with processors. The existence of middlemen enables farmers to fully concentrate on shrimp farming at which they are good, and leave the procurement to those who can perform the task better. The presence of middlemen also takes away from farmers certain risks arising during the procurement process. The relation between farmers and middlemen somehow looks like a symbiosis in which both parties benefit. Most farmers are therefore not interested in bypassing middlemen.

CHAPTER 5
DISCUSSION AND CONCLUSION

5.1. DISCUSSION

The growth of white leg shrimp in recent years makes it interesting to explore its value chain. The research was conducted within the area of Khanh Hoa, one of the first provinces to culture white leg shrimp in Vietnam. The value chain studied was the value chain of frozen white leg shrimp exported to the U.S market. The first objective of the research is to identify activities conducted by different actors in the value chain and the corresponding costs and earnings. Research's findings showed that before exported to the U.S market, white leg shrimp have to undergo farming, procurement, and processing. Shrimp farming basically comprises of such steps as cleaning pond, releasing seeds, and caring. Shrimp farming is a high risky business since it is greatly affected by weather conditions which are out of men's control. However, farmers are still attracted to it because of high earnings. Shrimp farming somehow seems like gambling which requires not only knowledge and experience but also good fortune. When shrimp attain its harvestable size, middlemen come to perform the procurement including harvesting, preserving, and transporting. The job of middlemen is far simpler than that of farmers. In addition, as compared to shrimp farming, the business of middlemen is less risky. The risk comes from the possibility that shrimp could be rejected by processors in case of any violations of food safety and sanitation regulations. In the processing plants, shrimp are transformed into final products, packed, labeled, preserved and stored, waiting to be exported. Processors can manage export affairs on their own or they can outsource specialized exporters.

Doing shrimp farming, farmers incur several costs like seed, feed, labor, and other miscellaneous expenses. The survey showed that total cost exhibited an upward trend in 3 years. The continuous increase of total cost posed a risk to farmers because at the

beginning of the cropping season they are not sure if farm-gate prices were large enough to cover all costs. Fortunately, farm-gate prices in 3 years 2008 to 2010 were sufficient to compensate for costs and resulted in positive profits to farmers.

Of all cost components, feed expense alone accounts for almost 70% of total cost. Therefore, the increase in feed price did affect farmers' profit. The majority of ingredients used for feed production like soybean, wheat, corn, vitamins, minerals, and other ingredients are imported. The increasing feed price in recent years has been, therefore, attributed to the increasing prices of imported ingredients, as explained by feed producers. Statistics from FAO and the International Trade Center show that Vietnam imported 50 thousand tons of corn in 2001, and 670 thousand tons in 2008. This volume soared to almost 1.5 million tons in 2009. For wheat import, the corresponding figures are 742 thousand tons in 2001 and 2.2 million tons in 2010[16]. While importing wheat is the only way to meet domestic demand, the importing of corn is ironic since Vietnam is an agricultural country with great potential to grow corn. FAO has declared a warning on a food price crisis in which corn and wheat are the "culprits". This is a bad news to the feed industry which is heavily dependent on imports, and the shrimp farming as the consequence.

In addition to feed, it is seed quality which is of most concern to farmers. Although farmers are aware of high quality of seeds provided by prestigious hatcheries, most of them could not afford the high price. They purchased from less prestigious hatcheries and accepted the risk. Prices for uncertain quality seeds range from 20 to 25 VND/seed while those for high quality seeds vary between 30 and 35 VND/seed. Given the density of 100 individuals per m^2 and the culturing area of 1 ha, difference between cost spent on high quality and on uncertain quality seeds is 100 x 10,000 x 10 = 10.000.000 VND. In order to produce high quality seeds, parent seeds have to be imported exactly from Hawaii. However, high price is the barrier which prevents most hatcheries from importing parent seeds from Hawaii. Instead, they import parent seeds from Thailand and China instead.

[16] See at http://english.thesaigontimes.vn/Home/business/other/16070/

According to the vice president of the Research Institute for Aquaculture III, 80% of parent seeds in Vietnam are imported from Thailand or China, only 20% from Hawaii. Although parents imported from Thailand or China are still native to Hawaii, they do not produce as fine seeds as those imported from Hawaii. A pair of parent seeds imported from Hawaii costs 32-36 US$ while that from Thailand or China is worth only 22-26 US$. Actually, the main culprits in reducing seed quality are unlicensed hatcheries (illegally established). Such hatcheries smuggle seeds which have unknown origins and sell them to farmers. As compared to seeds bred by parents imported from Thailand or China, the quality of smuggled seeds is far below. It is, however, impossible for farmers to assess the quality of seeds with their naked eyes. Moreover, they even cannot be sure if the hatcheries from which they are purchasing seeds are licensed or not.

At the procurement stage, addition to purchasing shrimp from farmers, middlemen have to add some other costs like transport, labor, and other inputs to transfer shrimp to the next stage. As compared to farmers, middlemen earned only a small profit per kg. This, however, does mean the job is less attractive. Middlemen's earnings depend on their operating capacity. The higher the capacity, the larger are the earnings.

At the processing stage, costs were present in accordance with the accounting format, Despite of the rise in total costs, processors enjoyed increasing profit in 3 years. Since export prices are measured in US dollar, earnings of the processor were affected from the increasing exchange rates. Although the business has been going on well, processors have not been able to set their mind in peace due to the concentrations of *chloramphenicol* and *trifluralin* in exported shrimp products. The presence of the two banned substances in shrimp products is rooted in the farming stage. Besides, the existence of middlemen has so far separated farmers and processors from each other. For these reasons, the problem of banned substance use has stayed out of processors' control.

Based on the data on costs and earnings, some calculations were done to reveal the distributions of revenue (export price), cost and profit of 1 kg frozen shrimp exported to the U.S market, as demanded by the second objective of the research. The distributions exhibited changes in 3 years governed by the law of supply and demand for raw shrimp. Despite of those changes, farmers, middlemen and processors could all be pleased since their earnings were in sync with their costs incurred.

The last objective of the research is to understand why farmers have to depend on middlemen to sell their harvest. The survey revealed that farmers find it uneasy to perform the procurement job due to the lack of facilities as well as professionalism. More importantly, if farmers sold their harvest to processors, they would have to accept the delayed payment policy. Most farmers, however, are in need on money to pay for their expenses after harvest. The most important reason leading to the dependence of farmers on middlemen is that middlemen commit to purchase 100% of harvested shrimp while processors do not offer the same promise. When farmers sell to processors, they could sell their harvest at a higher farm-gate price. However, such an attraction is blurred by the risk. For all those reasons, most farmers prefer to remain in a symbiotic relationship with middlemen.

5.2. CONCLUSIONS

White leg shrimp experienced an expansion in production due to a removal of the ban in 2008 under the permission of the Ministry of Agriculture. Coincidentally, at this time farmers who cultured black tiger shrimp went into debts because of mortality of shrimp from diseases. Thanks to some advantages over black tiger shrimp, white leg shrimp soon won the hearts of a large number of farmers. Furthermore, it was in 2008 when the world started to experience an economic crisis which caused international buyers to switch to lower price white leg shrimp. Domestic demand for white leg shrimp dedicated to export has increased as a consequence. Three years after the day the ban on the production of

white leg shrimp was lifted, white leg shrimp have established a firm position in the export of shrimp products.

Khanh Hoa, one of the first provinces to culture white leg shrimp in Vietnam, was chosen as the principal research area for this species. The value chain studied was the value chain of frozen white leg shrimp exported to the U.S market. The research surveyed twenty-five shrimp farmers, of which sixteen were willing to offer data on costs and earnings for three year, 2008 -2010. Fifteen middlemen were involved in the survey but only ten provided data on costs and earnings. Finally, only one out of three processors surveyed offered costs and export prices.

Literature on value chain was presented briefly to serve as a foundation. In addition, the research defined the distributions of revenue, cost and profit by employing the concepts of margin and added cost.

The value chain of frozen white leg shrimp was broken into stages of farming, procurement, processing, export, import, and retail sale. The first four functions are performed in Vietnam, leaving the last two functions to partners in the U.S. During shrimp farming, farmers incur several costs like seed, feed, labor, and other miscellaneous expenses. All input expenses increased in three years, 2008 to 2010. Fortunately, the farm-gate prices were sufficient to cover all costs and resulted in positive net return to farmers. At the procurement stage, the business requires that middlemen make use of some inputs like labor, ice, transport and others. At the processing stage, direct material, direct labor, overhead, and other costs are added in accordance with the accounting format. Like farmers, middlemen and processors enjoyed positive profits. The research also examined the distribution of costs, revenue and profit along the chain. Results showed that the distribution was in sync with expectations. Finally, the research revealed three reasons underlying the dependence of farmers on middlemen to market their harvest that is, lack of facilities, delayed payment policy and risk aversion.

5.2.1. Practical implications

In order for the white leg shrimp industry to develop in a sustainable manner, the following issues should be addressed, that is, feed price variation, seed quality consistency and the compliance in the use of banned substances in shrimp farming.

Regarding feed price, there should be some type of program for import substitution. That is there should be in place long-run plans for the establishment of agricultural zones dedicated to local feed production to reduce the dependence on imported ingredients which exhibit immense international price fluctuations. In addition, preserving techniques have to be disseminated to farmers to ensure their grain harvest is suitable to meet the standards of the feed industry. While waiting for the establishment of agricultural zones in the future, at present time feed price can be reduced by increasing feed marketing efficiency. For instance, instead of purchasing feed from retail stores, farmers could contract directly with feed producers for the delivery of feed right at farm-gates which in turn will help reduce marketing costs, therefore reducing price.

Considering seed quality, there must be in place drastic measures as well as severe sanctions to prevent the smuggling of seeds of unknown origin seeds. Besides, the list of licensed hatcheries has to be published widely to farmers. In the long-run, it is important to create “made in Vietnam” parent seeds which can well replace imports in terms of quality and cost. If this principle is established, hatcheries could save much expenses related to importing parent seeds. Then farmers could purchase high quality seeds at a more affordable price.

With respect to the presence of banned substances in shrimp, the problem can be worked out by establishing a bond between farmers and processors. As revealed, it is diseases that worry farmers the most. Technically, the occurrence of diseases is attributed weather fluctuations, seed quality and performance of farming techniques. While weather fluctuations are God’s will, seed quality and best performance of farming techniques are

within men's control. As entering into the bond, processors can offer credits so that farmers can purchase high quality seeds as well as feed. Processors also provide technical support to ensure farmers adopt best management farming practices. In addition, farmers will be advised on methods of disease treatment. In exchange for those assistances, farmers are required to seriously comply with technical recommended practices of shrimp farming, improve record keeping in favor of traceability requirement, and most importantly resist the use of banned chemicals and antibiotics. It is obvious that the bond benefit both parties involved. Processors can feel secure about the quality of raw shrimp. Thanks to the help of processors, the probability that diseases occur is reduced. Farmers to some extent could set their mind at rest. The bond between farmers and processors must be guarded by legal contracts to ensure the fulfillment of the responsibilities from both parties.

Thanks to the establishment of the bond, Global G.A.P could be practiced at the farming stage. Global G.A.P is a set of voluntary standards for the certification of production processes of agricultural (including aquaculture) products around the globe. Global G.A.P standard are primarily designed to reassure consumers about how food is produced on the farm by minimizing detrimental environmental impacts of farming operations, reducing the use of chemical inputs and ensuring a responsible approach to worker health and safety as well as animal welfare[17]. However, it is the high cost which prevents farmers from implementing Global G.A.P at their shrimp farms. Now, through the bond with farmers, processors can offer technical and financial aids to enable the practice of Global G.A.P. The implementation of Global G.A.P does benefit processors since it serves as the visa for shrimp products to travel to E.U markets where food safety and sanitation standards are enforced in a strict manner.

5.2.2. Limitations and future research

The value chain of white leg shrimp exported to the U.S.A does not stop at the exporting stage. It rather includes importers which serve as wholesalers, and retailers. The current

[17] See at http://www.globalgap.org

research however could not be conducted in the U.S.A. Therefore, future research should perform data collection in the U.S.A to provide the full story of the value chain. It is interesting to see what happens to Vietnamese shrimp products after it reaches the U.S.A. Do the wholesalers and/or retailers add values to the products? And if so, how much cost do they incur and how much do they sell their products? Are shrimp products sold under Vietnamese brands or under brands of wholesalers or retailers? More importantly, if costs and earnings of wholesalers as well as retailers could be collected, the distribution of revenue between the exporting country and the importing country will be uncovered. In the current research, the sample size was pretty small. It therefore should be increased in future research.

In the research, export price and the supply and demand for raw shrimp were referred to as farm-gate price determinants. However, the author believes that there remains other factors which can affect farm-gate price. A future quantitative research could assist in determining factors influencing farm-gate prices.

In favor of the sustainable development of the white leg shrimp industry, it demands not only an understanding of the value chain but also an assessment on the competitive advantages of the industry since Vietnam is not the only place from which white leg shrimp is exported. Such an issue, therefore, could serve as a potential research in the future.

REFERENCES

ARGOINFO, 2009. Report on "Vietnam fishery sector in the first quarter, 2009" (In Vietnamese). Release date: June 25th, 2009. Published by Information Center for Agriculture and Rural Development (ARGOINFO). Institute of Policy and Strategy for Agriculture and Rural Development. Ministry of Agriculture and Rural Development, Vietnam.

Directorate of Fisheries, 2011. Khanh Hoa: Benefits Offered by the Sea (In Vietnamese). Available at http://www.fistenet.gov.vn/Portal/NewsDetail.aspx?newsid=8585&lang=vi-VN.

FAO, 2004. Report of the national conference on responsible fisheries in Vietnam. FAO/FishCode Review No.9, FAO, Rome, Italy.

FAO, 2005. Report of the conference on the national strategy for marine fisheries management and development in Vietnam. FAO/FishCode Review No. 16, FAO, Rome, Italy.

FAO, 2009. The State of World Fisheries and Aquaculture 2008. FAO, Rome, Italy. Available at http://www.fao.org/docrep/011/i0250e/i0250e00.htm

FAO, 2010. The State of World Fisheries and Aquaculture 2010. FAO, Rome, Italy. Available at http://www.fao.org/docrep/013/i1820e/i1820e00.htm

Feller A., Shunk D., and Callarman T., 2006. Value Chains versus Supply Chains. Available at http://www.ceibs.edu/knowledge/papers/images/20060317/2847.pdf

Gudmundsson E., Asche F., and Nielsen M., 2006. Revenue distribution through the seafood value chain. FAO, Rome, Italy. Availble at http://www.fao.org/docrep/009/a0564e/a0564e00.HTM

Humphrey J. (2006). Global Value Chains in the Agrifood Sector. Strategic Research and Economics Branch, UNIDO, Vienna, Italy.

Kaplinsky R., & Morris M., 2001. A Handbook for Value Chain Research. Prepared for IDRC. Available at http://www.inti.gob.ar/cadenasdevalor/manualparainvestigacion.pdf

Khanh Hoa's DARD, 2011. Report on white leg shrimp production 2010. Released by Khanh Hoa's Department of Agriculture and Rural Development.

Khanh Hoa's People Committee, 2010. Report on Khanh Hoa Social-Economy 2009 (In Vietnamese). Available at http://www.khanhhoa.gov.vn/?ArticleId=df641634-9c7a-4527-93eb-7121ce8aee58#

NESDB, 2004. Training course on integrating value chain analysis and methodologies into policy analysis: Value Chain Development Training project. Prepared by Agrifood Consulting International for the Northeastern Region Economic and Social Development Office, National Economic and Social Development Board (NESDB), Thailand.

Porter M. E., 1985. Competitive Advantage: Creating and Sustaining Superior Performance. New York, The Free Press.

Shepherd A.W., 2007. A Guide to Marketing Costs and How to Calculate Them. FAO, Rome, Italy. Available at http://www.fao.org/docrep/010/u8770e/u8770e00.htm

United Nations Industrial Development Organization (UNIDO). 2009. Argo-value chain analysis and development. Vienna, Italy.

United Nations International Labor Organization (UNILO). 2009. Guide for Value Chain Analysis and Upgrading. Available at http://www.value-chains.org/dyn/bds/docs/detail/545/6

VASEP, 2009. Commercial Fisheries News (In Vietnamese). Release date: January 23rd, 2009. Published by Vietnam Association of Seafood Exporters and Producers (VASEP).

VASEP, 2010. Commercial Fisheries News (In Vietnamese). Release date: January 29th, 2010. Published by Vietnam Association of Seafood Exporters and Producers (VASEP).

VASEP, 2011. Commercial Fisheries News (In Vietnamese). Release date: January 28th, 2011. Published by Vietnam Association of Seafood Exporters and Producers (VASEP).

Websites

http://www.globalgap.org

http://www.vasep.com.vn

http://www.ilo.org

http://english.thesaigontimes.vn

http://en.wikipedia.org

APPENDICES

Appendix A: Questionnaires

QUESTIONNAIRES FOR SHRIMP FARMERS IN KHANH HOA PROVINCE

1. How many hectares are you operating? ……
2. Are you culturing under

   ☐ intensive mode ☐ semi-intensive mode ☐ extensive mode ☐ Other modes
3. How long does a crop last from the beginning to the harvesting day? ……
4. How many crops do you operate per year?

   ☐ 1 per year ☐ 2 per year ☐ 3 per year
5. When does it start and end?

   1st crop starts on …….. and ends on …….

   2st crop starts on …….. and ends on …….

   3st crop starts on …….. and ends on …….
6. What is the technical process of shrimp farming?

	Technical steps	**Activities**
1		
2		
3		

7. Where do you buy your seeds? ……

☐ Prestigious hatcheries ☐ Less prestigious hatcheries ☐ Self made

8. Why do you choose the seed supplier from which you are buying?

☐ Lower price ☐ Higher quality ☐ Near your home

☐ Home delivery ☐ Other reasons (like ….)

9. Do you perform waste treatment before used water is emitted to the surrounding environment?

☐ Yes ☐ No

10. To whom do you sell your shrimp?

☐ Middleman ☐ Processor ☐ Local market ☐ Others (like……)

How much do you sell to each buyer?

Middleman …..% Processor ……% Local market ……% Others …….%

Do you sign legal contract with your buyers?

☐ Yes ☐ No

11. What difficulties do you encounter as doing shrimp farming?

……..

12. Do you request for loans from bank?

☐ Yes ☐ No

13. Do you learn culturing techniques and diseases preventions before starting your business?

☐ Yes ☐ No

If yes, from whom do you learn?

☐ Training courses ☐ Guidelines ☐ Other farmers ☐Other sources

14. Have there been any scientific studies that benefit shrimp farmers?

☐ Yes ☐ No ☐ No idea

15. Do you receive any supports from processors?

☐ Yes ☐ No

If yes, what are they? ……

16. Do local authorities offer any aid programs to farmers?

☐ Yes ☐ No

If yes, what are they? ……

17. Do you seek for market information related to your business?

☐ Yes ☐ No

If yes, what information are you most interested in? ……..

Where can you find the information you need?

☐ Mass media ☐ VASEP ☐ Other farmers ☐Other sources

18. Do you use any services dedicated to your shrimp farming?

……..

19. Do you have to comply with any regulations during your shrimp farming?

……..

20. Costs and earnings

Culturing area: …… ha

Cost items	**Unit**	**2008**			**2009**			**2010**		
		Price	Quantity	Total	Price	Quantity	Total	Price	Quantity	Total
Seed										
Feed										
Labor										
…										
…										

	2008	**2009**	**2010**
Harvest			
Farmgate price			

21. Why do you have to sell your harvest to middlemen?

QUESTIONNAIRES FOR MIDDLEMEN IN KHANH HOA PROVINCE

1. How long have you been doing this kind of business?

2. What are the steps included in the procurement process?

No	Steps	Activities
1		
2		
3		

3. As doing your business, what are difficulties you encounter?

…….....

4. What services do you use to support your business?

……

5. What are regulations that you have to comply with?

……

6. To whom do you sell your shrimp?

☐ Middlemen level 2 ☐ Processors

How much do you sell to each type of buyers?

Middlemen level 2 …….% Processors ……..%

If you do business with middlemen level 2, please explain the working mechanism between both of you?

……

7. Costs and earnings

Purchasing price of shrimp	**2008**	**2009**	**2010**

Selling price of shrimp	**2008**	**2009**	**2010**

Added costs	Amount		
	2008	**2009**	**2010**
Ice			
Labor			
…			

Capacity per year	**2008**	**2009**	**2010**

8. Why do you think farmers prefer to sell their harvest to you than to processors?

……

9. (Optional) Have you ever somehow tried to increase weight of shrimp?

☐ Never before ☐ Sometimes ☐ Often

QUESTIONNAIRES FOR PROCESSORS IN KHANH HOA PROVINCE

1. Who are your suppliers of shrimp?

☐ Farmers ☐ Middlemen

How much do you buy from each type of suppliers?

Farmers …….% Middlemen ……..%

Why do you buy more shrimp from middlemen than from farmers?

……

2. Regarding middlemen as suppliers, do you buy shrimp from middlemen level 1 or level 2?

Middlemen level 1 ……..% Middlemen level 2 ……...%

3. To whom do you sell your shrimp products?

☐ Exported (types of products ……)

☐ Supermarkets (types of products ……)

☐ Local markets (types of products ……)

4. What are the steps of processing raw shrimp into final products ready to export?

Steps	**Activities**

5. Do you encounter any difficulties during your operation? What are they?

……

6. What services do you use during your operation?

……

7. What are regulations that you have to abide with during your operation?

Regulations	**Issued by**

8. Do you handle export affairs on your own or outsource specialized exporters?

Self manage …….% Outsourcing …….%

9. Do you know where your shrimp products are sold in the US market?

☐ Supermarkets ☐ Restaurants ☐ Others ☐ No ideas

10. Costs and earnings

(Derived from the accounting department)

Appendix B: Descriptive statistics on costs and earnings

Table B1: Costs/kg, farmgate prices and profits of farmers

Year 2008 Unit: VND

Items		Mean	Maximum	Minimum	S.D
Cost component	Seed	2,489	3,450	1,895	507.18
	Feed	21,902	24,150	18,700	1,312.55
	Labor cost	1,559	2,160	1,053	349.22
	Depreciation	1,026	2,631	381	652.34
	Electricity and fuel	1,320	2,301	488	514.61
	Canvas	904	1,560	438	359.37
	Land rental	1,140	2,000	1,000	367.97
	Chlorine	712	1,152	365	174.84
	Lime	838	3,250	492	627.50
	Microbiotics and medicines	310	484	84	104.66
	Others	295	426	95	106.64
Total cost per kg[18]		(1.97 US$) **32,495**	**35,789**	**28,411**	**1,786.34**
Farmgate price		(2.74 US$) **45,344**	**49,300**	**43,000**	**2,004.36**
Profit per kg		(0.79 US$) **12,849**	**14,589**	**11,261**	**1,001,43**

Source: Own calculations from surveys from farmers

Year 2009

Items		Mean	Maximum	Minimum	S.D
Cost component	Seed	2,723	3,680	2,105	508.16
	Feed	23,605	25,990	19,800	1,376.26
	Labor cost	1,666	2,280	1,123	366.52
	Depreciation	1,026	2,632	381	652.34
	Electricity and fuel	1,450	2,526	536	565.23
	Canvas	919	1,579	444	363.19
	Land rental	1,140	2,000	1,000	367.97
	Chlorine	733	1,179	375	178.86
	Lime	967	3,750	568	724.04
	Microbiotics and medicines	330	500	105	101.03
	Others	312	444	105	107.22
Total cost per kg		(1.88US$) **34,871**	**37,935**	**30,639**	**1,728.06**
Farmgate price		(2.43 US$) **45,044**	**49,000**	**43,100**	**1,847,62**
Profit per kg		(0.55 US$) **10,173**	**12,461**	**8,716**	**951,64**

Source: Own calculations from surveys from farmers

[18] To be converted into U.S dollars at contemporary exchange rates.

Year 2010

Items		Mean	Maximum	Minimum	S.D
Cost component	Seed	2,956	3,910	2,316	503.08
	Feed	25,717	28,175	21,780	1,454.01
	Labor cost	1,761	2,400	1,179	388.86
	Depreciation	1,026	2,632	381	652.34
	Electricity and fuel	1,546	2,695	571	602.76
	Canvas	937	1,609	451	370.70
	Land rental	1,140	2,000	1,000	367.97
	Chlorine	771	1,243	395	188.11
	Lime	991	3,845	583	742.38
	Microbiotics and medicines	352	520	126	100.46
	Others	332	463	116	111.31
Total cost per kg		(1.92 US$) **37,530**	**40,661**	**33,493**	**1,727.26**
Farmgate price		(3.00 US$) **58,625**	**61,000**	**57,000**	**1,053.27**
Profit per kg		(1.08 US$) **21,095**	**23,507**	**19,339**	**923.92**

Source: Own calculations from surveys from farmers

Table B2: Total costs and profits per ha

Unit: VND

		2008	2009	2010
Total cost per ha	Mean	(18,883 US$) 310,755,763	(18,020 US$) 333,377,919	(18,394 US$) 358,698,265
	Maximum	379,415,000	403,800,000	431,868,333
	Minimum	227,285,714	245,114,286	267,942,857
	S.D	38,241,653.69	39,432,733.42	41,087,550.11
Total profit per ha	Mean	(7,420 US$) 122,437,987	(5,241 US$) 96,965,831	(10,291 US$) 200,676,735
	Maximum	159,585,000	131,900,000	228,784,533
	Minimum	104,624,000	82,800,000	186,708,114
	S.D	13,415,547.63	12,018,311.82	12,396,974.23

Source: Own calculations from surveys from farmers

Table B3: Costs/kg, selling prices and profits of middlemen

Year 2008 Unit: VND

Items		Mean	Maximum	Minimum	S.D
Added cost components	Transport	282	375	109	82.23
	Labor cost	467	484	453	9.14
	Ice	268	270	265	2.06
	Depreciation	320	380	250	34.06
	Others costs	502	626	441	66.80
Total added cost per kg		**1,839**	**2,074**	**1,630**	**149.75**
Purchasing price of shrimp		**45,370**	**49,300**	**43,200**	**2,118.51**
Selling price to processors		**48,160**	**52,400**	**45,700**	**2,235.71**
Profit to middlemen level 2		**200**	**200**	**200**	**0**
Profit to middlemen level 1		**709**	**1,028**	**524**	**143.66**

Source: Own calculations from surveys from middlemen

Year 2009

Items		Mean	Maximum	Minimum	S.D
Added cost components	Transport	287	380	114	82.17
	Labor cost	481	500	470	8.60
	Ice	327	350	310	13.45
	Depreciation	320	380	250	34.06
	Others costs	530	650	470	63.95
Total added cost per kg		**1,945**	**2,199**	**1,724**	**158.91**
Purchasing price of shrimp		**45,100**	**49,000**	**43,000**	**2,050.85**
Selling price to processors		**49,140**	**53,200**	**46,500**	**2,172.65**
Profit to middlemen level 2		**400**	**400**	**400**	**0**
Profit to middlemen level 1		**1,659**	**1,831**	**1,376**	**123.54**

Source: Own calculations from surveys from middlemen

Year 2010

Items		Mean	Maximum	Minimum	S.D
Added cost components	Transport	302	400	120	86.49
	Labor cost	508	530	500	9.80
	Ice	395	410	380	10.25
	Depreciation	320	380	250	34.06
	Others costs	570	700	500	69.86
Total added cost per kg		**2,095**	**2,345**	**1,790**	**179.00**
Purchasing price of shrimp		**58,700**	**61,000**	**57,000**	**1,100.00**
Selling price to processors		**63,180**	**65,300**	**60,500**	**1,312.86**
Profit to middlemen level 2		**500**	**500**	**500**	**0**
Profit to middlemen level 1		**1,857**	**2,090**	**1,640**	**141.90**

Source: Own calculations from surveys from middlemen

Table B4: Costs, export prices and profits of the processor

Unit: VND

tems	2008	2009	2010
1. **Direct material costs**	77,833	80,339	104,286
Raw shrimp	72,000	73,500	94,500
Package	3,675	5,364	7,012
Chemicals	1,308	1,185	1,398
Additives and fuels	850	290	1,376
2. **Direct labor costs**	1,981	3,754	4,112
3. **Direct manufacturing overhead costs**	2,950	4,338	5,115
4. **Marketing costs and Interests**	8,250	9,562	14,625
5. **Administrative costs**	8,250	10,449	15,600
6. **Total cost per kg**	**99,264** (6.02 US$)	**108,442 (**5.86 US$)	**143,748** (7.37 US$)
7. **Export price**	6.4 US$ (**105,600**)	6.7 US$ (**123,950**)	8.76 US$ (**170,820**)
8. **Profit before tax**	**6,336** (0.38 US$)	**15,508** (0.84 US$)	**27,072** (1.39 US$)

Source: Nha Trang Seafood Joint Stock Company