

THE VALUE CHAIN OF EXPORTED WHITELEG SHRIMP: CASE STUDY IN KHANH HOA PROVINCE, VIETNAM

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Abstract

*This study focuses on systematic mapping and verification of benefit distribution among stakeholders in the value chain of white-leg shrimp in Khanh Hoa Province, Vietnam. The question is, can reorganization of small farmer groups enhance participation and efficiency of the value chain? Convenient sampling and face-to-face interview method were employed in 2014 and 2015 to solicit information from 100 shrimp producers, 10 middlemen and 3 exporters. Males account for 98 percent of small independent producers. There is an involvement of middlemen (middlemen type #1 and middlemen type # 2) in the chain. The middlemen are the drivers in the chain and engage in risk shifting on producers. The distribution of shrimp materials by middlemen type #1 to the processing plant is based on shrimp size. An alternate design to assist collective bargaining by unified small farm *groups shows in order to attain a sustainable value chain for white-leg shrimp, one should improve vertical integration and coordination among the market participants; and seek government intervention to build the image of Vietnam seafood in international markets.*

Key words: *Whiteleg, shrimp, value chain, integration, Vietnam*

Jel Codes: *Q13, Q22, and Q34*

1. Introduction

Vietnam is one of the largest shrimp exporters in the world. Since 2010, Vietnam has earned about two billion dollars annually through shrimp exports. By the end of 2016 shrimp exports were expected to reach 3.1 billion US dollars (Vietnam Trade Promotion Agency [VTPA], 2016). Khanh Hoa province is the cradle of the shrimp farming movement in Vietnam, thanks to its successful experiment in producing shrimp fry in captivity in the 1980s. The province is a well-known center for shrimp hatcheries (Lan, 2013). Khanh Hoa Province, which is located in the coastal southern central part of Vietnam, with 385- kilometer seashore and surrounded by a large range of rivers, ponds, bays, canals and hundreds of islands, has a

natural advantage in the seafood industry. In 2014, there were 44 enterprises processing and exporting seafood to three major markets: 40% to USA, 20 % to Japan, 15 % to the EU, and 25 % to other markets. Of all exported marine products in 2014, shrimp accounted for slightly more than 56 %, tuna approximately 28 %, and mollusc 16 % (Statistics Office of Khanh Hoa Province, 2010 and 2014).

According to reports published by Khanh Hoa Province Department of Agriculture and Rural Development (2012 to 2014), while the total quantity of Giant tiger prawn (*Penaeus monodon*) production area was about 422 ha, accounting for 13.4 % of shrimp produced, the production area of whiteleg commercial shrimp (*Litopenaeus vannamei* or *Penaeus vannamei*) was 2,725 ha. This was nearly 86.6 % of the province total shrimp production area. However, unplanned and unstructured shrimp production area growth resulted in far-reaching consequences: polluted environment, decline in larvae (seed) quality, dangers of food safety due to chemical and antibiotic drug misuse, the increasingly high intensity of complex shrimp-disease epidemics, strict food safety requirements and traceability by importing countries.

The above problems plaguing the industry impose major constraints on the efficiency of the marketing channel value chain and product quality control. This study uses the value-chain approach to evaluate the present development and efficiency of Khanh Hoa whiteleg shrimp export industry based on infrastructure, production control, environmental management, disease epidemics, and product-distribution activities and proposes an alternative approach to improve the efficiency along the value chain. The study continues with the theoretical approach and research method, findings, discussion, recommendations and policy derivatives.

2. Theoretical Approach

Value chain analysis is the measurement of value addition at different stages of transfer of the good or service from producer to consumer (Reddy, 2013). It is the whole range of activities required from conceptualization of the product to its transfer to the consumers (ILO, 2009). The value chain involves a range of necessary activities carried out to create a product (or service); from forming ideas, going through different manufacturing stages, to distributing products to end users and discarding after use (Kaplinsky, 2000; Kaplinsky and Morris, 2001). Value chain analysis is necessary to understand markets, their relationships and the role of different actors along the chain (IFAD, 2009). Vertical integration is a diagnostic tool to determine problems in the value chain and indicate opportunities to enhance the performance, profitability and relationships in the distribution channel (Taylor, 2005). There are different approaches employed to analyze the value chain: (1) *Filière Methodology (chain, pulse)*; (2) *Porter's Definition Framework (1985)* and (3) *Kaplinsky's Global Value Chain approach (2000)*. Despite the differences in approaches, there are four main common techniques used to evaluate the value chain, namely (1) *systematic mapping* (2) *definition of the benefit distribution among stakeholders in the chain* (3) *research on the upgraded role in the chain*, and (4) *emphasis on the role of governance*.

The value chain implies all vertically linked stages of the marketing distribution channel that allow the flow of goods from producer to consumer (Lem et al., 2004). Vertical integration is the process through which integrated firms participate in a supply chain. The process combines technically (different processes such as production, distribution, processing, wholesaling and retailing under the rubric of one firm or unified ownership (Anrooy and Nguyen, 2004). The relationship of stages in the value chain allows products and services to integrate forward and backwards of operating procedures towards the sources of raw materials as well as delivery and distribution networks (Williamson, 1979; Hill and Jones, 1998; Waterson, 1984; Glenn et al., 2000; Dawson, 2003 and Lee et al., 2011).

There are two types of value chain, 'producer driven', and 'buyer driven' (Gerrefi et al., 2005). In the producer driven value chain, the farmers play the major role in gathering and providing the logistics for the transfer of products to the primary buyers. The more powerful the farmer the further forward along the value chain he or she operates. The participation of farmers at various stages of the marketing chain enhances efficient transfer of the product. The buyer-driven value chain involves participation of retailers, wholesalers, and exporters who are usually capital endowed and play a major backward role along the marketing chain.

According to Bjørndal et al. (2015) small-scale fish and aquaculture producers seem powerless and face asymmetric power relationships that impact on the distribution of costs and benefits. These small-scale producers are at a disadvantage with limited capital, traditional technique and depend on family labor to manage their enterprises (De Janvry and Sadoulet, 2005; Daviron and Gibbon, 2002; Reardon and Barret, 2004; and Trienekens, 2011). Small-scale producers who perceive themselves as powerless are likely to seek new forms of collaboration and become dependent on external sources to improve efficiency and profitability (Rondot and Collion, 2001). In the situation of the Khanh Hoa Province small-scale whiteleg shrimp producers are likely to be less powerful than other market participants and taken advantage of by the buyers (Schimitz and Knorrninga, 2000). On the other hand, if the buyers become too powerful they may dominate the small-scale producers and lose a powerful ally in product quality improvement to satisfy the requirements of global competition. The efficient operation of the channel requires joint ownership and participation by farmers in the value chain and some contractual agreement among the actors at the various integrated stages (Kotler and Armstrong, 1994; Berman, 1996). Hence, the posed question is whether disjointed, non-functional small-scale farmer groups can organize to supply shrimps of international standards and have a voice in the value chain of whiteleg shrimp?

Tran et al. (2013) used global value shrimp farming industry chain (GVC) theory to apprehend governance of Vietnam's shrimp farm traders' operation. They concluded that governance relations are fragmented further down the chain where large numbers of small-scale producers and traders operate. Joffre and Bosma (2009) and Ho (2012) reiterated the statement that small-scale producers dominate shrimp farming in Vietnam and that resulted in a disjointed and inefficient distribution channel. Hence, producer bargaining power was weak and the producers operated at the mercy of the more organized buyer group. Bui (2011) studied the value chain of shrimps in Khanh Hoa province and indicated that the buyers dictated to shrimp producers who accepted their position in the market because they depended on the services of the market intermediaries. Ha (2010) suggested that the role of government is essential to foster improved participation and compliance between the state and the private actors to improve the activities and relations along the marketing chain. It is important to investigate whether there can be improvement in efficiency with greater attention placed on strategic arrangements of vertical and horizontal integration and coordination.

This study employs: (1) *systematic mapping* and (2) *definition of the benefit distribution among stakeholders in the chain in order to evaluate the status of whitelegshrimp market participants in Khanh Hoa Province* and the relationship of these stakeholders in the chain. The authors also examine the possible use of the vertical and horizontal integration and cooperation model approach plus collective action of small-scale producers to enhance their producer power.

3. Research Method

A sample of 113 representative farmers was selected in Ninh Hoa District, mainly located in Ninh Giang, Ninh Phu and Ninh Loc Communes where the largest white-leg shrimp production area is located. The sample included a group of 100 small-scale farmers, 10

middlemen and three exporters. Additionally, the author exclusively interviewed a group of processors/exporters. The sampling procedure brings to light the restrictions of the value chain of whiteleg shrimp, particularly the relations among chain stakeholders (small farms, middlemen#1, middlemen#2 and processors). The number of participants declined along the line from producer to consumer.

A set of three trained interviewers conducted a face-to-face interview with the farmers, middlemen, processors and importers at their convenience during the day. We then employed systematic mapping technique to identify the value chain and illustrate the main participants and activities using a diagram. We calculated revenue, costs, and value addition at various stages of the chain at the end of the harvest in November 2014 and 2015. The researchers also used secondary data from the Khanh Hoa Province Department of Agriculture, 2010 to 2014, in addition to the survey instrument results to evaluate the current condition of whiteleg shrimp stakeholders. The researchers used the SPSS software to analyze the data.

4. Findings

4.1 Population Demographics of Farms

The result shows that male accounts for 98 % of the owners of limited resource farms. The 31 to 50-year old group makes up the majority of the farmers (87%), whilst above 50-year old and below 30-year old are responsible for 10 and 3%, respectively. The years of farming experience is about 2 to 6 years. About 6% of farmers had less than 2 years, and 9% more than 6 years of experience. The majority of farmers completed secondary school (54%); whereas, 33% of these finished primary school and the remaining 13% completed high school. Moreover, 86% of producers did not hold any aquaculture, fisheries advanced degrees or technical education. Only 2% obtained their university or college degrees. The low level of academic qualification is one of the problems that could retard production expansion, technology adoption and sustainable development of the shrimp production industry, especially under the circumstances of poor urban planning, pollution and epidemic threats currently menacing the industry.

4.1.1 Small Farm Size

Whiteleg shrimp are produced in Khanh Hoa Province using intensive, semi-intensive and improved extensive farming methods by 16%, 57% and 27% of farms, respectively. The majority of whiteleg shrimp production ponds average less than 10,000 square meters. Square-meter ponds of 3000 to 7000 account for highest (62%) number while 28% of these are below 3000-square-meters, and the rest is 7000 and above square-meter ponds. In terms of the small-farm performance, 3000 to 7000 square-meter growing ponds are ideal for caring and tracking of growth and disease problems. Intensive shrimp farming also employs high stocking density, but with aeration system.

The data released by Khanh Hoa Province Department of Agriculture and Rural Development (2014) states that Khanh Hoa Province has currently five tide-based production areas - Nha Trang City, Cam Ranh City, Van Ninh District, Cam Lam District and Ninh Hoa Town – whose major product is whiteleg shrimp. Table 1 shows area and production data for 2012 to 2014. The table shows that production area decreased from 2012 to 2013 but increased in 2014. However, the output decreased from 2012 to 2014. This means that yield declined throughout. In recent years, factors such as disease epidemics, unfavorable weather conditions and environmental pollution are the main cause of reduced whiteleg shrimp production and yield variation in Khanh Hoa Province.

Table 1. Production area and output of whiteleg shrimp in Khanh Hoa Province, 2012-2014

Year	Production area (ha) by district					Total	
	Van Ninh	Ninh Hoa	Nha Trang	Cam Lam	Cam Ranh	Production area (ha)	Production output (tons)
2012	118	1,226	96	142	578	2,160	10,788
2013	50	809	48.5	35	97	1,039.5	8,850
2014	231	1,671	56	312	455	2,725	7,912

Source: Khanh Hoa Province Department of Agriculture and Rural Development

4.1.2 The Inconsistency in Stocking Quality

The choice of stocking material depends on farm size and capital availability. At the beginning of each season, 66% of farmers obtained their larvae from unidentified sellers originating from various nursery grounds, whereas only 34% of small farms source from recognized, prestigious companies in Binh Thuan and Ninh Thuan Provinces. Charoen Pokand (CP) Food company, Viet Uc Corporation, Nam Mien Trung Aquaculture Investment Company, and Uni President Company are all well known supply firms of shrimp larvae. Unrecognized sources of shrimp larvae are cheaper (17-to-34 VND/shrimp U.S. (\$0.0007 to \$0.00014 per unit) compared to those from recognized companies 60-to-82 VND/shrimp) U.S. (\$0.0027 to \$0.0037 per unit). Small farms that are risk averse and stock at low densities (below-60-larvae per meter) usually prefer non-recognized sources of stocking material because of lower prices. In contrast, small farms that seek large profit margins stocked at high densities accompanied by high risks often choose prestigious suppliers of shrimp larvae.

Most small farms that purchase stocking material from unidentified sources do not check quality as stipulated in the regulations. Small farms choose stocking materials in their farming area based on their own experiences, and sensory norms (body color, intestine color, features and homogeneousness of breeds). Some small farms are more careful in their evaluation procedures, and use formalin shock (from 200 to 300 ppm, 30 mins), or modern technology-based techniques like molecular biology (checked by using PCR machine). Nevertheless, the percent of farms that adopt those techniques is miniscule. Small farms are not fully aware of the benefits of using clean stocking material, or they simply lack capital to travel the distance from the farm to the supply source to acquire good stocking material because of the prohibitive cost of transportation. These factors influence the stocking efficiency and uniformity of quality products reaching processors and exporters. For prestigious companies, they often do disease epidemic checks based on regulatory requirements.

4.1.3 Disease Epidemic Prevention

The result shows that 97% of Khanh Hoa province small-scale farms raising whiteleg shrimp was infected with eight popular diseases: acute hepatopancreatic necrosis syndrome (70%), white spot (60%), early mortality syndrome (55%), red body, white faeces, infectious myonecrosis, black gill, Taura syndrome (13 – 23%). The fatality rate varied among those diseases. White spot and acute hepatopancreatic necrosis syndrome are considered the most contagious and dangerous, with fatality rates ranging from 90 to 100 %. Hence, once a farm is infected the entire farm ceases production.

The 2012 disease epidemic outbreaks led to the financial collapse of a large number of small farms. Farmers mortgaged their shrimp ponds to manage their debts. However, because of the low price of land, they could only acquire small amounts of capital. As a result, only 50% of the 2012 area was engaged in production in 2013. Table 2 shows the outbreak of diseases from 2012 to 2014 in production districts. In 2012, there were 1090 ha infested with diseases but this declined in 2013. Ninh Hoa had the largest number of cases from 2012 to 2014 while Cam Lam had the least cases in 2013 and 2014.

Table 2. Epidemic situation of whiteleg shrimp, 2012-2014

Year	District areas afflicted by disease epidemic (ha)					Total area (ha)
	Van Ninh	Ninh Hoa	Nha Trang	Cam Lam	Cam Ranh	
2012	57	659	35.8	68	271	1,090.8
2013	15	126	6	2.7	24	173.7
2014	29.7	350	8	6.5	8.8	403

Source: Khanh Hoa Province Department of Agriculture and Rural Development, 2012 to 2014.

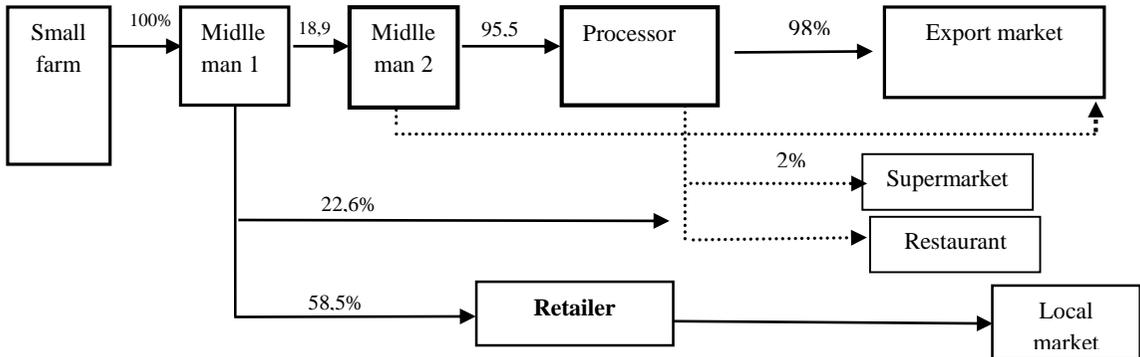
Now early mortality syndrome (EMS) is under control, and stocking is back to normal. However, a number of threats such as inclement weather (the difference in day and night temperatures, off-season rain), especially the increasingly polluted shrimp stocking areas hamper stocking time and quality.

4.2 The Value Chain of Khanh Hoa Whiteleg Shrimp

Mapping the value chain is identifying a series of activity steps and the main actors and relationships involved at every marketing stage. This process constitutes the development of an illustration of the activities carried out at each stage of the value chain. Figure 1 describes the value chain of Khanh Hoa Province whiteleg shrimp production and marketing. The first stage starts with the farmer who is the supplier of shrimp. The purpose is to produce final products that are transferable to the consumer. The majority of farms engaged in finished shrimp product exports are small-size and independent. Second, there is involvement of the buyer who obtains the shrimp from the producer and performs certain functions related to assembly, transportation and transfer before the product goes to the processors. The buying and supply functions are performed by two groups of middlemen, (middlemen#1 and middlemen#2).

Middlemen#1

Middlemen#1 is located at the farmgate level or local level. During harvest seasons, all small farmers contact middlemen#1 to assist with the marketing of their shrimp at the pond banks. Middlemen must, however, provide their business license and show evidence of product origin. The function of middlemen#1, besides assembly, buying and transportation, also includes the duties of triage and intermediary financing. Middlemen#1 contributes a valuable service to farmers at the local level in terms of collection of shrimps, triage and standardization. Middlemen#1 pricing and buying decisions are based on shrimp size. Middlemen#1 distributes shrimp size from 70 to 120 per kilogram (18.9%) to middlemen#2; if the size is in the range of 120-to-200 shrimps per kilogram, they distribute to restaurants and supermarkets (22.6%); if the size is above-160-shrimps per kilogram, they are distributed to retailers (58.5%) which is also the main distribution channel for middlemen#1.



Source: Based on the author's calculation

Figure 1. The Value Chain of Khanh Hoa Whiteleg Shrimp

At present, trading arrangement between small farms and middlemen is mainly verbal, without any written formal contractual agreement. This could be a source of contention for both sides.

Middlemen#2

Middlemen#2 is located at the regional level, closer to the processing plants. Middlemen#2 is those having access to large capital resources and are able to offer advances to middlemen#1 who then deposit certain amounts to the accounts of the limited resource farmers, or pay for the shrimps in advance of harvest. Middlemen#2 also has direct links to processors. The middlemen#2 gather the shrimps selected from middlemen#1 and transport them to processors. The profits gained by more capital, endowed middlemen#2 are dependent on middlemen#1's ability to purchase higher quality products, guaranteed to supply to processors.

Communication between the middlemen is quick and efficient. Middlemen communicate mainly through the phone. Once middlemen#1 notices the quality and time of harvest of a farm, a deposit is requested from middlemen#2 and contact is made with processors. After negotiating with processors, middlemen#2 transfers money straight away to middlemen#1 and requests a margin of 500VND or (\$0.22) per kilogram of raw shrimp which is above processor price. Most middlemen#2 carefully selects processors with whom they trade. Processors also want to build the network with certain middlemen even though there is no written business contract between the two parties. In fact, middlemen and processors always maintain good relationship is always to enhance smooth trade.

4.2.1. Processors

There are currently six shrimp-processing-and-exporting firms in Khanh Hoa province. The exclusive interview with three exporter and two quality controllers from Nha Trang Seafoods Joint-stock company - F115 and F17, disclosed that the firms are in contact with their middlemen partners to select raw materials that match their manufacturing needs in terms of quality, sizes and prices. The raw materials are shipped to the exporting firms for quality evaluation. Those that fail to meet the sensory evaluation are returned to suppliers.

Whiteleg shrimp are processed by firms based on set quality standards as dictated by: Hazard Analysis and Critical Point Control (HACCP), Good Manufacturing Practices (GMP), International Organization of Standardization (ISO) 9001:2001, British Retail Council (BRC), Aquaculture Certification Council (ACC), International Feature Standard (IFS), and Best Aquaculture Practices (BAP). The standardization requirements are a challenging task for the firms to check the origin of goods (breed, food, animal drugs). Since most small-scale farms produce shrimp on their limited areas, they encounter difficulties following standardized-production processes of GAP, BMP, and VietGAP.

4.2.2 Unstable Source of Supply

The result shows that only 19% of small farms meet the required standards of 70-to -20-shrimp per kilogram. Those that produce from 121-to-200-shrimp per kilogram account for 22%, and those that produce from 200-to-350-shrimp per kilogram, 28%, the rest are those that drain their ponds due disease epidemics (31%). This loss due to diseases gives rise to the scenario of outsourcing where processors have to buy from outside the province to meet adequate processing and export demand. As a result of purchasing outside the geographic area, the cost increases while the quality varies.

4.2.3 Uneven Benefit Share

Table 3 presents the breakdown of additional value and profit margin ratio among stakeholders in the value chain of exported white-leg shrimp. Small farms hold a large proportion of additional value in the chain, which is 71-72%. However, the profit margin ratio related to the cost encumbered by them can be considered low with 6-to-40% but not so different from the other operators. By contrast, middlemen receive very low profit to cost ratio that varies from 2.6 to 6.1 per cent in a high price year (2014) but high in a low price year (2015). Processing and exporting enterprises had a profit margin to cost ratio of 9.04 to 11.1 percent. There is no indication that the small farmers are at a disadvantage overall but in low price years. Processors, exporters and middlemen set prices so that their margins remain positive in bad as well as good years. However, in bad years the risks are shifted on the farmers.

4.3 Limitations in the Value of Whiteleg Shrimp in Khanh Hoa Province

4.3.1 Poor Infrastructure and Production Equipment

The result shows that 85% of small farms use the same system for both water supply and waste-water disposal. Moreover, 67% of small farms have not gotten their own waste sludge system, which is the reason that untreated water is delivered into their ponds. This results in a potential threat of disease epidemics among small farms in the same area. In addition, aeration devices and the testing sticks for water quality evaluation are unavailable or are in delapidated conditions and require refurbishment.

4.3.2 Poor Coordination among Stakeholders in the Value Chain

After harvest most small farms sell shrimp to middlemen# 1, and have little or no contact with processors. As usual, middlemen# 2 receives processors' quotation and send a signal to middlemen# 1 who use the information as a basis to negotiate with farmers quality, price and time of delivery. Therefore, the presence of middlemen# 2 is of extreme importance in the information flow channel and they are key in price setting, while small scale farms have little market power and are merely price takers. In the absence of written contractual agreement, product destination is based on farmer loyalty and long-term relationships. Payments are made right at the pond banks or 3-to-4 days after harvest. In case of processor bankruptcy, and if middlemen# 1 and middlemen# 2 are incapable of processing their payments, the small farms bear the most loss.

Table 3. Additional value and margins in the chain of exported whiteleg shrimp, 2014-2015 (Unit: VND/kg)

	Small Farms	Middlemen 1	Middlemen 2	Processors Enterprise
Average trading price (2014)	100,000	103,000	110,000	140,000
-Average total cost	71.21	100.43	103.65	128.39
-Average additional cost	-	430	650	18.39
-Average profit margin	28.79	2.57	6.35	11.61
-Profit margin/total cost (%)	40.43	2.56	6.1	9.04
-The distribution of additional value (%)	71.42	2.14	5	21.42
-Average trading price (2015)	90,000	91,000	94,000	125,000
-Average total cost	84.88	90.43	91.65	113.05
-Average additional cost	-	430	650	19.05
-Average profit margin	5.12	570	3.35	11.95
-Profit margin/total cost (%)	6.02	0.6	3.6	10.57
-Profit margin/additional cost (%)	-	132.5	515.38	62.73
-The distribution of additional value (%)	72	0.8	2.4	24.8

Source: Based on the author's calculation

5. Discussion, Recommendations and Policy Directives

5.1 Discussion

The value chain of whiteleg shrimp exports in Khanh Hoa Province is semi-controlled by exporters. Based on the findings of the previous studies (Joffre and Bosma, 2009; Ho, 2012; Ha, 2010; Anrooy and Nguyen, 2004; Kotler and Armstrong, 1994; and Berman, 1996), the

value chain in Khanh Hoa province defies all the rules that govern the smooth and efficient operation of a value chain and distribution channel. The market participants in the value chain in Khanh Hoa province include a large number of fragmented small-scale shrimp farmers that independently supply shrimps of varying quality and standards to middlemen. The suppliers seem to lack market power and the buyers are the drivers of the marketing activities. There is no unified horizontal or vertical integration stage of the distribution channel; there is a lack of joint ownership and an absence of contractual agreement between market participants; yet the chain continues to function to some degree. The exporters dictate the price, quality and quantity. Limited resource farmers are price takers and bear market as well as environmental (weather), biophysical (quality and stocking material variability), production (health), market (prices, demand and supply), and institutional (regulatory) risks. The producers are fragmented and do not speak with one voice (Tran, 2013). They then operate at the mercy of the middlemen and accept their offers without collective bargaining.

The major factors that influence the whiteleg shrimp production, value chain and standards are the stocking material and infrastructure. The small scale farmers decide on the source of seed materials based on their expected profits and levels of risks. The stocking material from various sources results in early losses, poor and varied growth rates. The result of this is a small percent 19% of small farms meet the factory standards of 70-to-200-shrimp per kilogram. Those that can produce from 121-to-200-shrimp per kilogram account for 22%, and those that can produce from 200-to-350-shrimp per kilogram, 28% suffer losses due to early death from diseases. The level of triage is high and there is a large variability in size. Only 19 % of the shrimp are acceptable for exports. This shows a lack of efficiency and a great loss of revenue to farmers. These could impede sustainable growth of the industry as well as reduce the popularity of shrimp production, and exporters' demand. The relationship among participants in the market chain is based on loyalty and goodwill. This does not always work since farmers sometimes sell to middlemen with the money and who offer a higher price. The distribution of benefits is uneven among the stakeholders, however, there is no solid evidence that shows that the farmers are exploited by the buyers in terms of distribution of marketing margins when the price is high, but a large part of low price risk falls on the shoulders of the producers.

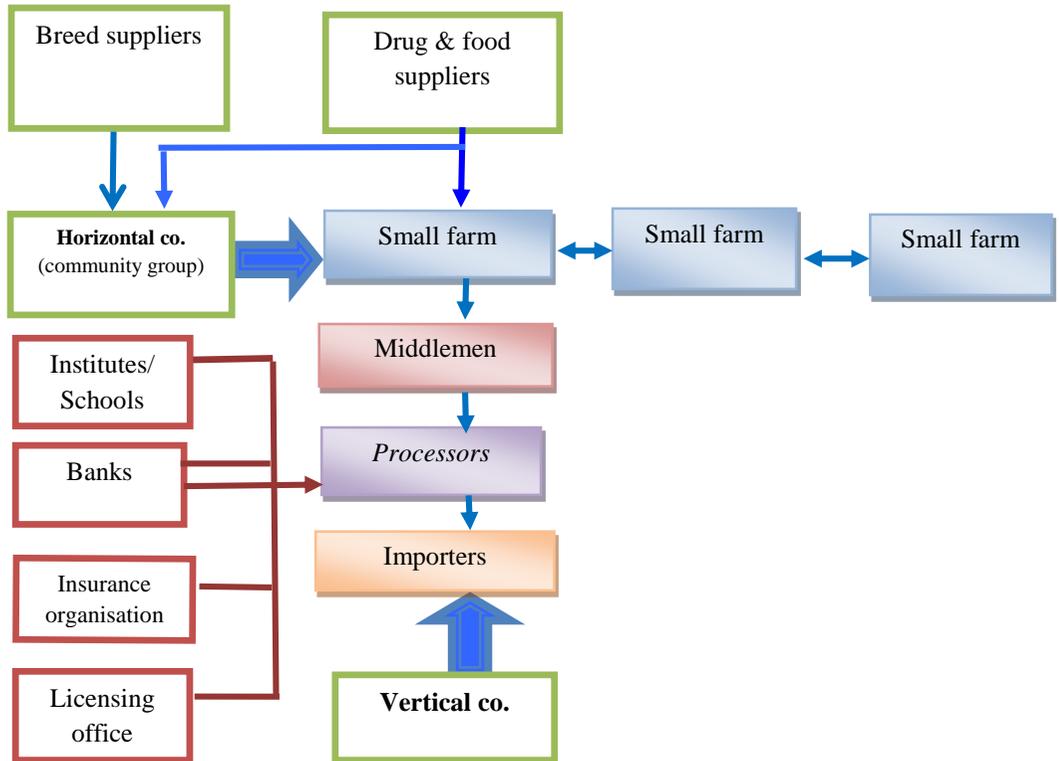
5.2 Recommendations and Policy Directives

As a long-term solution one major recommendation is that the industry must reorganize into a unit as seen in figure 2 to allow the efficient organization of value chain and to give a competitive edge to value chain operators.

Organization through horizontal integration is essential. Horizontal integration is the cooperation among individuals who work at the same stage or among the same type of stakeholders (among small farms or among enterprises, for example). Prime development of horizontal integration helps to enhance and nourish the success of vertical cooperation and vice versa. Small-scale farms must unify and act as a collective group so that they can access and operate at various stages of the marketing chain and benefit from the value chain.

Horizontal integration at the community level will encourage all small farmers to form producer groups in their local areas (Bijman, 2007). There can be information exchanges among farmers in terms of the purchase and use of inputs that result in less mortality, shrimp growth rates and a more standardized final product. Such producer groups will act collectively to ensure the observance of regulations that enforce the use of waste sludge systems, medicine usage, seafood epidemic prevention, and the determination of price of each size of shrimp after harvest (so as to reduce the probability of cut-price goods). Such horizontal move will facilitate a more solid vertical functioning among institutions, banks, insurance companies and licensing offices and will enable limited resource farmers to benefit from the various stages

(processing as well as input provision) of vertical integration. The solid collective bargaining of producer groups may allow them to assume the functions of middlemen#1 or absorb middlemen#1 in their group to represent them instead of working solely with middlemen#2. As seen in figure 2, there is only place for the operation of one middlemen group in figure 2. The absorption of middlemen#1 in the farmer groups is expected to lower costs and enhance efficiency.



Source: The author's proposal

Figure 2. A Cooperation Model in the Value Chain of White-Leg Shrimp

The proper functioning of the value chain and distribution channel both at the processor and input provider levels require the participation of farmers. The farmers should become part owners through the purchase of shares in input market and the processing industry. This will allow them to form an integral part of the value chain and have more say in the operation of the various enterprises at different marketing stages. As farmers share in the benefits of the business enterprises, they will become more responsive to the adoption of practices that will build the reputation of the Vietnamese shrimp industry internationally.

Vertical (backward and forward) cooperation is collaboration among stakeholders from the input phase to the output phase. The horizontal integration of small farmers will enable them to gain producer power to work backwards with input supplier groups and operate forward with institutions, companies and agents up the value chain. In fact, the cooperation among stakeholders is the prime concept of the value chain and market connection:

Cooperation among chain stakeholders: Processors, middlemen, service suppliers (foods, breeds, drugs...), banks, insurance companies, and ‘certifying’ boards should cooperate and encourage vertical linkages among producers, processors and input suppliers. These stakeholders can be mutually tied by five contracts: (1) Guaranteed supply among enterprises which supply input services for producer groups. These service suppliers should commit themselves to manufacturing and trading products (like vaccines, feed and small gadgets) on the list issued by Ministry of Agriculture and Rural Development. They should commit themselves to build a network of technicians to assist small farms in technology access, application and the supply of disease-prevention products, epidemic disease control, additional alternative breeds’ (to replace the dead materials during epidemics). They must pledge to set up training courses for producer groups, and employ specialists to train small-scale farmers in techniques of epidemic prevention; and put 100% of shrimps sourced in quarantine before exportation and this allows proof of sanitary verification. (2) They should engage in Exclusive Distribution Agreement made by processors and the producer groups. The producer groups will supply VietGAP-certified materials to processors. (3) A contract that provides credit financing for the cooperation between processors and the producer groups; (4) Insurance contract made between processors and insurance companies; and (5) Evaluation and licensing contract between processors and independent licensing organizations.

The cooperation between processors and middlemen can be built through contracts. Based on such contracts, shrimp purchasing cost is kept stable at every stage and might be adjusted during market price fluctuation, which will be beneficial to all three sides: producer groups, middlemen and processors. Companies may promise to maintain constant prices adopted by middlemen during the purchasing period. If the market price increases, companies might adjust prices to ensure that adequate returns go to small farmers to keep them afloat; small farmers are, therefore, guaranteed not to sell at forced-prices and companies can accordingly buy sufficient quality material to meet high demand.

5.2.1 Encouraging Small Farms to Follow VietGAP Standards for Their Products

VietGAP (Vietnamese Good Aquaculture Practices) are sound practices for seafood production in Vietnam to ascertain food hygiene and safety standards, limit epidemic spread of diseases, reduce pollution, assure social responsibility, and source verification. Benefits of shrimp production under VietGAP standards include building a sustainable shrimp-producing industry together with the reduction of unpleasant effects on the environment and ensuring equitable social benefits distribution; producing safe quality shrimp products; promoting faith in Vietnamese food safety issues; stabilizing product prices; creating competitive advantage; changing production practices, and orienting producers and enterprises towards a sustainable shrimp industry as stated by Circular No. 10/2012/TTg issued by Prime Minister on the 9th of January, 2012. The implementation of VietGAP is expected to raise consumers’ faith in safe clean products. The problem of limited sized farms may in some cases, hinder the efficient adoption of all recommended practices. However, one does not know of the size adoption effectiveness.

5.2.2 Policy Directives

- In order to produce shrimp that meet VietGAP standards in the short run and achieve a sustainable value chain for whiteleg shrimp in the long run, we need to improve the coordination between policy makers and individual farmers. The image of Vietnam seafood products in international markets must also be improved by producing VietGAP standardized products whose quality is comparable to that of international standards. VietGAP standards

should also be aligned to GlobalGAP to ensure that the two standards are equal so that sales on the global market will not face any hold ups in the international front.

- The Government must continue reforming their policies and legislation so as to encourage enterprises and small farms to cooperate vertically and horizontally. As an illustration, if small farms voluntarily group themselves and operate up and down the marketing chain, it will become easier for them to access technology, financial assistance and credit.

- The government must encourage processors, exporters and input providers to entice farmers to become shareholders in the stages of the value chain and have a say in the distribution channel and value chain.

- The Government needs to establish insurance programs to assist small scale shrimp producers and market participants in risk bearing and reduction.

- The Khanh Hoa authorities must check seafood production systems in the whole area and re-examine pond size with the view of determining the optimum pond size that will enhance production efficiency and technology adoption. This is expected to offer producers the opportunities to apply advanced technology, adopt practices and standards to enable the processing and exportation of shrimps, and achieve safe and hygienic products for internal and external markets.

- Market participants (small farms, traders, processors) must unify and act collectively and seek representation operating as associations (teams/groups, clubs, and cooperatives). For example, small-size farms should organize into production groups, associations or clubs to adopt Best Management Practices that meet market requirements and assist in obtaining group production licenses.

References

- Anrooy, R. and Nguyen V. H. (2004). *Vertical chain cooperation in the Vietnamese fisheries products channel*. FAO Fishery Technical Paper, 468.
- Berman, B. (1996) *Marketing Channels*, Wiley, 663 pg.
- Bijman, J. (2007) The role of producer organizations in quality oriented agro-food chains; edited by Ruben, R., M. van Boekel, A. van Tilburg and J. Trienekens, 257-258. Wageningen, Wageningen Academic Press.
- Bjørndal, T., A. Child, L. Audun, and M. M. Dey; (2015) Value chain dynamics and small-scale sector: A summary of findings and policy recommendations for fisheries and aquaculture trade; *Aquaculture Economics and Management*; vol 19(1):148-173.
- Bui, N. P. T. C. (2011) The value of white leg shrimp exported to the US market in Khanh Hoa province, Vietnam, Master thesis, Nha Trang University, Nha Trang, Khanh Hoa Province.
- Daviron, B. and P. Gibbon, (2002). Global commodity chains and the African Export Agriculture. *Journal of Agrarian Change*; 2:131-161.
- Dawson, R. (2003). 'Vertical Integration in Commercial Fisheries.' PhD dissertation, Faculty of Virginia Polytechnic Institute and State University
- Department of Agriculture and Rural Development of Khanh Hoa Province (2010), 2014 *Fish and Seafood Production and Trade Report*, Khanh Hoa Province.
- De Janvry, A. and E. Sadoulet (2005) Achieving success in rural development: Toward implementation of an integral approach; *Agricultural Economics*; 32(1):75-89.
- Department of Agriculture and Rural Development of Khanh Hoa Province (2013), 2012 *Fish and Seafood Production and Trade Report*, Khanh Hoa Province.
- Department of Agriculture and Rural Development of Khanh Hoa Province (2014), 2012 *Fish and Seafood Production and Trade Report*, Khanh Hoa Province.

- Gereffi, G., J. Humphrey, and T. Sturgeon, 2005. The governance of global value chain; *Review of International Political Economy*; 12(1):74-104
- Glenn, S., R. L. Kilmer, and T. J. Stevens. 2000. 'Florida Dairy Market Cooperatives Transfer Cost Associated with Non-Uniform Delivery Schedules.' *Journal of Food Distribution Research* 31 (2): 1-7.
- Ha, T.T.T. (2010) Transformatons of Vietnamese shrimp aquaculture policy: Empirical evidence from Mekong Delta; *Environment and Planning C: Government and Policy*; 1101-1119.
- Hill, W. L., and G. R. Jones. (1998). *Strategic Management Theory: An Integrated Approach*. 4th Ed. Boston, ma: Houghton Mifflin Company.
- Ho, H.M.T. (2012). *Integration of farmers in the shrimp subsector in the Mekong River Delta*, Vietnam. PhD. Thesis. University of Liège, Gembloux Agro-Bio Tech, Belgium, 177 pages, 37.
- IFAD (2009) Value chains, linking producers to makets;
- International Labor Office [ILO] (2009). Value chain development for decent work : A guide to practitioners; government and private sector initiatives ; Geneva.
- Joffre, O.M., Bosma, R.H., (2009). Typology of shrimp farming in Bac Lieu Province, Mekong Delta, using multivariate statistics. *Agriculture, Ecosystems and Environment* 132, 153-159.
- Kaplinsky, Raphael (2000). Globalisation and unequalisation: What can be learned from value chain analysis? *Journal of Development Studies*, 37(2) pp. 117-146.
- Kaplinsky, R., & Morris, M., (2001). *A Handbook for Value Chain Research*, International Development Research Center. Retrieved from <http://asiandrivers.open.ac.uk/documents/Value_chain_Handbook_RKMM_Nov_2001.pdf>
- Kotker, P. and G. Amstrong (1994) Marketing, Prentice Hall, 662 pg.
- Lan, P.T. N. 2013. Social and ecological challenges of market-oriented shrimp farming in Vietnam; PMCID: PMC3872286; doi: [10.1186/2193-1801-2-675](https://doi.org/10.1186/2193-1801-2-675)
- Lee, T., (Jiun-Shen), Yi-Hsu, C. J. Lin, K. Phusavat and N. Sinnarong (2011); Vertical integration in Taiwan Aquaculture Industry; *Managing Global Transitions* 9 (4): 393-414.
- Lem, A., U. Tietze, E. Ruckes, and R. van Anrooy (2004), 'Fish marketing and credit in Vietnam.' fao Fisheries Technical Paper 468, Food and Agricultural Organization of the United Nations
- Reardon, T. Timmer, P. and Rerdegue, J. (2004). The rapid rise of supermarkets in developing countries: Induces organizational, institutional and technological change; *Agrifood Syatems*; 1:168-183.
- Reddy A, A, (2013) Trainning manual on value chain analysis of dryland agricultural commodities; International Crops Research Institute for the Semi-Arid Troapics (ICRISAT) p.4.
- Rondot, P. and M. H. Collion, M. H. (2001); Agricultural producer Organizations: Their contribution to rural capacity building and poverty; World Bank.
- Schmitz, H. and Knorringa, P. (2000) Learning from global 'Buyers' *Journal of Development Studies*, 37(2):177-205.
- Statistics Office of Khanh Hoa Province (2014), *2014 Annual Abstract of Statistics*. Khanh Hoa Province.
- Statistics Office of Khanh Hoa Province (2010), *2010 Annual Abstract of Statistics*. Khanh Hoa Province.

- Taylor, D. H. (2005). Value chain analysis an approach to supply chain improvement in agri-food chains, *International Journal of Physical & Logistics Management*, Vol. 35(10):744-761
- Tran, N., C. Bailey, N. Wilson and M. Phillips (2013) Governance of global value chains in response to food safety and certification standards: The case of shrimp from Vietnam; *World Development* Vol. 45:325-336.
- Trienekens, J.H. (2011). Agricultural value chains in developing countries: A framework for analysis; *International Food and Agribusiness Management Review*, vol. 14(25): 51-84.
- Waterson, M. (1984). *Economic Theory of the Industry*. New York: Cambridge University.
- Williamson, O. E. (1979). 'Transaction Costs Economics: The Governance of Contractual Relations. *Journal of Economic Behavior and Organizations* 4:57-62.