Vietnam Journal of Agricultural Sciences

ISSN 2588-1299

VJAS 2022; 5(3): 1571-1585
https://doi.org/10.31817/vjas.2022.5.3.06

Marketing Channels of Freshwater Aquaculture Fish in the Red River Delta of Vietnam: A Case Study in Hai Duong Province

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Abstract

Freshwater aquaculture has played key roles in the livelihood development of farm households in the Red River Delta through freshwater fish ponds, rice-and-fish, and marine cage culture. A market-driven approach is being addressed more and more in promoting new production. This study aimed to analyze the marketing channels of freshwater aquaculture fish in Hai Duong province. The study was conducted with 151 farm households belonging to three fish production system: Fish system engaging fish production only (FS); animal fish system combining animal and fish production (AF) ; and new garden-pond-animal house system (VAC) in the province. The attained results reveal that fish farmers diversified their marketing strategies to obtain a marketing margin of about 87% of the retail price of the finfish along with their value distribution while the remaining portion of the marketing margins belonged to the intermediary market actors. The cost of the purchased fish commodities accounts for the majority of the total cost for all actors. The cost of dead fish presented the highest proportion of the total marketing cost. A large portion of the marketing costs represented wages, fuel, and the rent of a business place. The marketing margin for the intermediary stakeholders in both the studied channels was 12.7%, in which marketing costs accounted for approximately 5.0%. The results will be used for designing better promotion strategies for freshwater fish production and providing good lessons for small-scale fresh aquaculture development towards livelihood diversification and development in rural areas.

Keywords

Marketing channels , analysis, freshwater aquaculture, fishes, Red River Delta

Received: February 27, 2021
Accepted: June 10, 2022

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Introduction

In Vietnam, fish has recently become one of the main food items in people's diets because it is a major source of protein, minerals, vitamins, and micronutrients (Kawarazuka & Béné, 2011). The tropical and monsoonal climate, and a wide range of low depth water bodies, long coastlines, and preferable conditions make Vietnam a dreamland for freshwater aquaculture. These conditions are the main reasons for the high and rapid levels of fish production with over 500,000 aquaculture farms in Vietnam occupying more than one million hectares, and the number of farms has doubled since 2000. The total annual fish production was estimated to be approximately 6.72 million tons in 2016. The country's aquaculture sector generates an estimated 3.0 billion US$ per year and this sector employs more than 1.6 million people full time, a majority of whom are women (Uyen, 2018).

Freshwater aquaculture in the Red River Delta, Vietnam, vastly depends on different types of carp and freshwater fish, but no individual species is able to provide a high level of production or high profits. Different fish producers try to maximize their profits and production with their available resources and species. Among all the carp species, freshwater fish are the most suitable choice for farmers (Nguyen Ngoc Thach, 2002). With a high demand for fish food, freshwater fish cultivation can balance the gap between supply and demand of food sources (Fao, 2011). Therefore, the opportunities for cultivation of several freshwater fish species have significant potential in Vietnam. Particularly, the rapid growth of a population with high fish demands has caused an immense gap between demand and supply. Enhancing the marketing system is extremely needed (Thang & Linh, 2014).

In the Red River Delta of Vietnam, fish markets are available in both rural and urban areas, of which, Yen So is the largest wholesale market of freshwater fish for domestic consumption. By tracking the marketing system of fish, Ikeguchi identified the main stakeholders associated with distribution, namely fish farmers, suppliers, traders, and laborers (Ikeguchi, 2007). In rural areas, the fish market consisted of several involved intermediaries such as fish farmers, collectors, wholesalers, and retailers (Mai Thi Kim Khanh, 2012). Through the distribution system, fish were traded through different intermediaries such as local middlemen, traders, and retailers, etc. A high proportion of the fish traded were recorded for the traders while the local retailers purchased a small percentage of low quality fish directly from the farmers (Van Huong, 2020).

A number of constraints were identified in the present domestic fish marketing channels, which form the basis of recommendations for the improvement of the present marketing arrangements (Lem *et al.*, 2004). These include the establishment of fish wholesale markets in large urban areas, a build-up of well-functioning assembly markets at important fish landing sites, improvement of the legal framework for the operations of fish wholesalers, establishment of information systems of fish market prices, encouragement of contract farming/trading systems among fish market operators certified by local authorities, upgrading fisheries statistics systems for better fish market planning, development of a domestic fish market strategy, and improvement of a coordination mechanism for the public sector for fish marketing and fish market management (Tracey-White, 1991; Burny, 2000; Howieson *et al.*, 2016; Hop & Burny, 2017; Pascual-Fernández *et al.*, 2019).

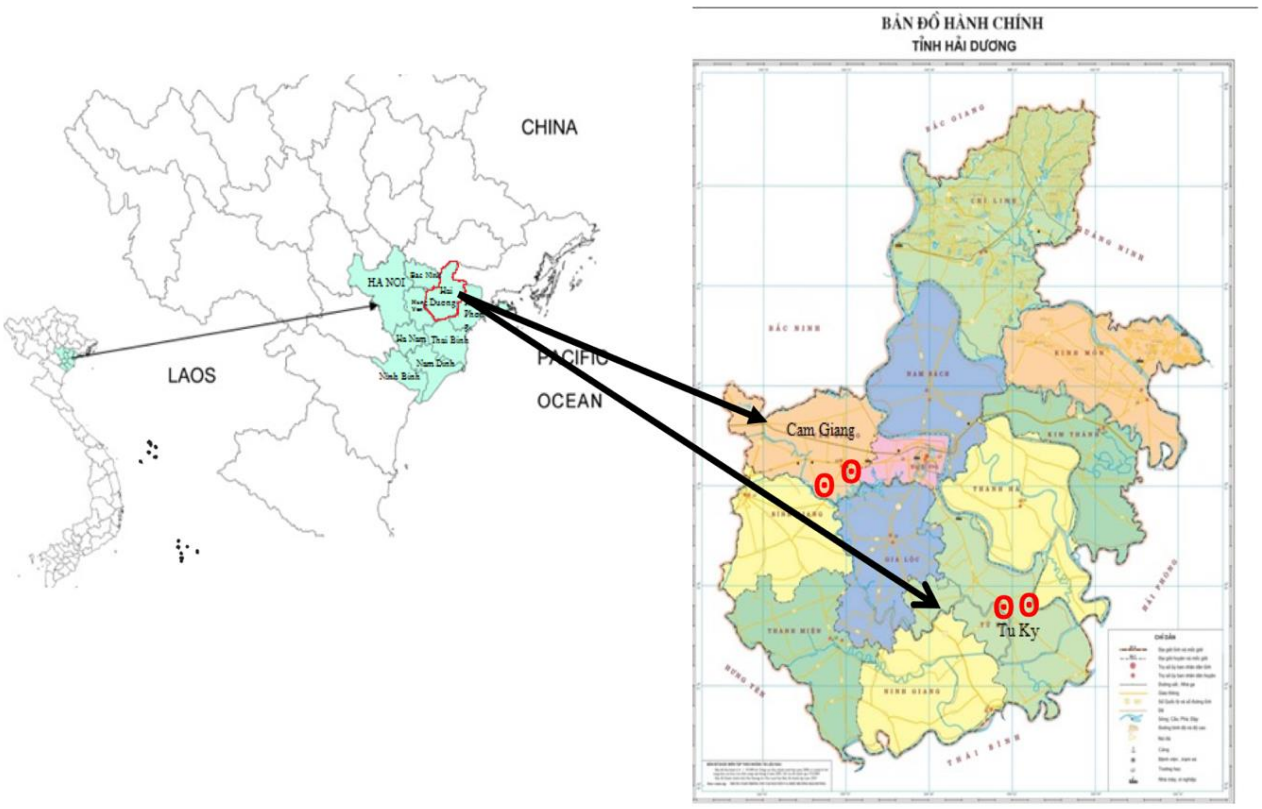
Therefore, this paper aims to analyze the marketing channels and define the marketing cost share along the supply chain of freshwater fish from production to retailers in rural and urban markets. The study results could be used in the design of promotion strategies for freshwater fish production in Hai Duong province and many parts of Vietnam where freshwater fish play a vital role in food and foodstuff provisions for domestic demand both in local and urban areas (Lebailly *et al.*, 2015). Our findings could not only be a good reference for the provincial authorities and policymakers to enhance their promotion strategies of freshwater aquaculture production in Vietnam but also provide contributions to the enrichment of the literature and methodologies for understanding small-scale fresh aquaculture farming in delta regions.

Methodology

Sample size and data collection

The study was designed to explore the production and marketing channels of freshwater aquaculture fish at diversified and developed sites in Hai Duong province. The first step of the study was selecting four developed and diversified villages from four communes in two districts in the province for freshwater aquaculture production at the household level due to the limitation of the secondary data (reports or records). Therefore, Cam Giang and Tu Ky were selected for the study investigation at the production stage (see **Figure 1**). The samples are presented in **Table 1**, which shows the three targeted groups of fish system (FS; 51 households), animal-fish system (AF; 65 households), and the new garden-pond-animal house system (VAC; 35 households).

In the marketing and distribution stage, a rapid market appraisal was carried out to understand the marketing channels, market participants, and marketing activities associated with fish commodities produced by the aquaculture households in the selected survey sites. The participatory method was conducted in parallel with semi-structured questionnaires to collect the data and information. The participatory method was used to explore the marketing channels, market organization, and nature of marketing activities by tracking the flow of the sold fish commodities. Group discussions with key fish farmers in every village about the actuality of farm gate wholesaling were normally attended by two frequently contacted fish traders who then were selected for semi-questionnaire interviews at each of the selected survey villages. Two farm collectors - local villagers engaged in wholesale purchasing of fish at the aquaculture producers' farm gate were selected in each of the four villages, hence, eight farm collectors in total were interviewed (**Table 1**).



Source: Vietnam department of survey and mapping (2015)

Figure 1. Site selection of two districts in Hai Duong province

Table 1. The sample sizes of the targeted groups for marketing channels of the freshwater fish commodities in Hai Duong

Target group	Sample size
Fish farmer	151
Farm collector	8
Commission wholesaler	10
Merchant wholesaler	10
Retailer	10
Total	205

In the second stage (38 market stakeholders), the rapid market appraisal method was applied to understand the flow of the fish outputs going into the markets, and then to identify the main marketing channels of the sold fish commodities in the research region. This method could also help to estimate the fish producers' share in the consumer's price, marketing costs, and margins of market participants along the main marketing channels of the fish commodities in the study areas. Moreover, the marketing strategies, marketing activities, and encountered problems of the fish producers and the main marketing actors could be understood and analyzed such as the scale of production, product quality, price settings, market demands, bargaining power, and other concerns that may be linked to the economic efficiency of small-scale aquaculture operated by fish farmers in Hai Duong province.

Data analysis

Farm budget analysis

Economic efficiency is defined as the difference between total revenue and total cost. In order to examine how profitable small-scale aquaculture is for fish farmers in Hai Duong, the farm budget technique introduced by Engle (2012) was employed for data analysis. Households' farming enterprises may or not be profitable as the total cost can be higher than the revenue generated from fish production. A similar approach was employed for other farming activities to estimate the total whole farm income for each fish household.

Marketing channel analysis

Kotler *et al.* (2014) defined direct marketing channels as a method of marketing commodities directly to the consumer, which are used by manufacturers/producers with no middle man or intermediary involved. When one or more middlemen participate in the marketing chain, it is referred to as an intermediated marketing chain or channel. On the other hand, the marketing of live fish outputs practiced by smallholder farmers is complex and has diverse activities including direct sales, which might concern the various intermediate marketing actors, and one could consider the direct marketing channel as corresponding to the direct sale of fish outputs to consumers accomplished by fish farmers (Edoge, 2014).

In this study, a market survey focusing on the marketing of freshwater fish outputs from the Small-Scale Aquaculture (SSA) models employed the market rapid appraisal with the participatory approach. This approach enabled the market participants to identify their characteristics, marketing costs, marketing margins, and other activities involved in the marketing of freshwater fish outputs in Hai Duong province. The market data and information of the marketing activities which were directly associated with the freshwater fish farmers and market participants, along with the marketing channels, were gathered, analyzed, and discussed in the study region. The flows and the marketing channels of the fish commodities marketed by fish farmers, including the market participants along the marketing channels, were then mapped based on the participatory discussions of the involved market participants.

In order to deeply understand the economic benefits of each market participant in the marketing channels of the live fish commodities, the fish farmers' share in the retail prices and the

profitable levels of the business in fish trading, which were accounted for by fish farmers and the market participants along the marketing channels, were calculated, analyzed, and discussed for the further conclusions and implications in the study. Thus, the cost-benefit method was mainly used to calculate the marketing costs and margins of the market participants. These study calculations were examined by the T-test and ANOVA tests, which significantly supported the conclusions and implications such as the direct sales of fish outputs, the differences in farm gate prices of fish commodities associated with the grading involvement with market demand and requirements, and the differences in the fraction of the "premium quality" fish outputs concerning the differences in the net returns of fish commodities from the SSA models in Hai Duong province.

The Likert scale method was used to measure and understand the negotiation competencies between the fish farmers and fish traders referring to the internal capacity of fish farmers during the marketing of their farmed fish outputs and to examine the satisfaction levels of fish farmers with their current marketing situation of fish outputs referring to the external factor of the marketing constraints and problems encountered in the study areas. Thus, the average scale of 3.0 of the decision rule was applied to make the argument and conclusions accordingly.

This rule can be considered as follows:

Decision point: < 3.0 => Rejected

> 3.0 => Accepted

Decision rule: $\bar{x}$ = (Σ x) /n = (5+4+3+2+1)/5 = 15/5 = 3.0

Where $\bar{x}$ = mean

Σ = summation

x = value Likert points

n = number of respondents

Calculating marketing cost

The marketing cost of a product/service refers to the expenses incurred by different middlemen in the process of performing various marketing functions to move the product/service from producers to the end consumers (Khan & Raha, 1999). Different marketing stages of the fish commodities incurred several related costs such as the costs of shop rent/land tax, fuel, materials (ice, salt, water, and electricity, etc.), wages (hired laborers), repairs and maintenance (motorbikes and trucks), transportation (hired shipments of fish commodities), transactions (telephone bill, etc.), interest (loans and credits), taxes and fees (transportation tolls and market fees), wastage (loss of dead fish), and miscellaneous expenditures. The total marketing cost calculated in this study included the cost of the fish sales with farm gate prices paid by the fish farm collectors and all related costs incurred by the number of market participants in the marketing channel. However, the study mainly calculated the marketing costs of the market participants at each stage along with the marketing channel to determine their marketing margin based on 100kg of mixed fish commodities due to the fact that the fish commodities were produced in the poly production system with different farmed fish species in Hai Duong province.

Fish farmer's share in the retail price

The fish farmer's share in the retail price was the cost of the purchased fish commodities paid by fish farm collectors in the absolute calculation which was expressed as the percentage between the price received by the producer/farmer (Pf) and the price paid by the consumer (retail price - Pr). The fish farmer's share in the retail price was also calculated on a basis of 100 kg of mixed fish commodities which represented the basic unit of the calculations and comparisons in the entire discussion of this market survey.

Marketing margin

The marketing margin of fish trading was determined by the difference between the value of 100kg of mixed fish commodities which were ready for sale from the farm gate of the fish farmers and the cash amount received by the fish retailers from the fish buyers based on the same calculation with 100kg of fish commodities in the retail markets. The absolute marketing margin of a market participant was the difference between the total payment (the marketing costs +

purchasing prices of the fish commodities) and the receipts (the selling prices of the fish commodities) of that market participant (i^{th} participant). This marketing margin was also measured as an indicator of the percentage as illustrated below:

The absolute margin of the i^{th} market participant (Ami): Ami = Pri – (Ppi + Cmi)

Percentage margin of the i^{th} market participant (Pmi)

$$P_{mi} = \frac{P_{Ri} - (P_{Pi} + C_{mi})}{P_{Ri}} \times 1$$

Where

Pri= Gross value of the receipts per 100kg of mixed fish commodities

Ppi = Purchasing value of mixed fish commodities per 100kg

Cmi = Costs incurred during marketing per 100kg of mixed fish commodities

Results and Discussion

Marketing channels of freshwater fish commodities

The flow of freshwater fish commodities is diversified in both the marketing channels and number of stages from the fish farmer to the end consumer. To simplify, the fish market can be separated into four main stages: the production stage, the wholesaling stage, the retailing stage, and the consumption stage. However, in reality, the fish marketing channels are complicated and diversified as each market operator may perform more than one marketing function. The research findings showed that the main internal flow of fish commodities may go through one to several market operators (**Figure 2**). For example, in the case of the wholesaling stage, there were three main types of wholesalers participating in the marketing channels of fish commodities produced in Hai Duong province: the fish farm collectors, commission wholesalers, and merchant wholesalers, but in some cases, the provincial traders were also included.

Fish farmers operating the FS, AF, and new VAC models wished to have a direct wholesale of their fish commodities to many marketing agents. However, only fish farm collectors can buy bulk fish commodities from fish households in the study region. Therefore, the main flow of freshwater fish commodities goes through fish farmers, farm collectors, commission wholesalers, merchant wholesalers, retailers, and consumers in the distribution chain (**Figure 3**). At the lower level of the channel, the fish commodities supplied from wholesalers are the most preferred because of: (i) diversified types and forms of fish commodities; (ii) a large quantity of products available; (iii) stable supplies over time; and (iv) flexibility in the market prices of fish commodities.

The FS, AF, and new VAC households in Hai Duong province are the primary providers who supply a large proportion of the fish commodities to the fish wholesale markets (in suburban areas both in Hai Duong and Hanoi cities) through the marketing channels as follows:

Fish farmers → local retailers → consumers

Fish farmers → farm collectors → commission wholesalers → retailers → consumers

Fish farmers → farm collectors → commission wholesalers → merchant wholesalers → retailers → consumers

Fish farmers → farm collectors → commission wholesalers → provincial traders → retailers → consumers

However, the study only focused on the marketing channels (ii) and (iii) due to the fact that these channels are the main flows of fish commodities from producers to the retail stage and account for the major proportion of fish sales from farm households operating the FS, AF, and new VAC models. Then, the main marketing stakeholders were defined as the fish farm collectors, commission wholesalers, merchant wholesalers, and the retailers, which will be depicted and analyzed in the following sections.

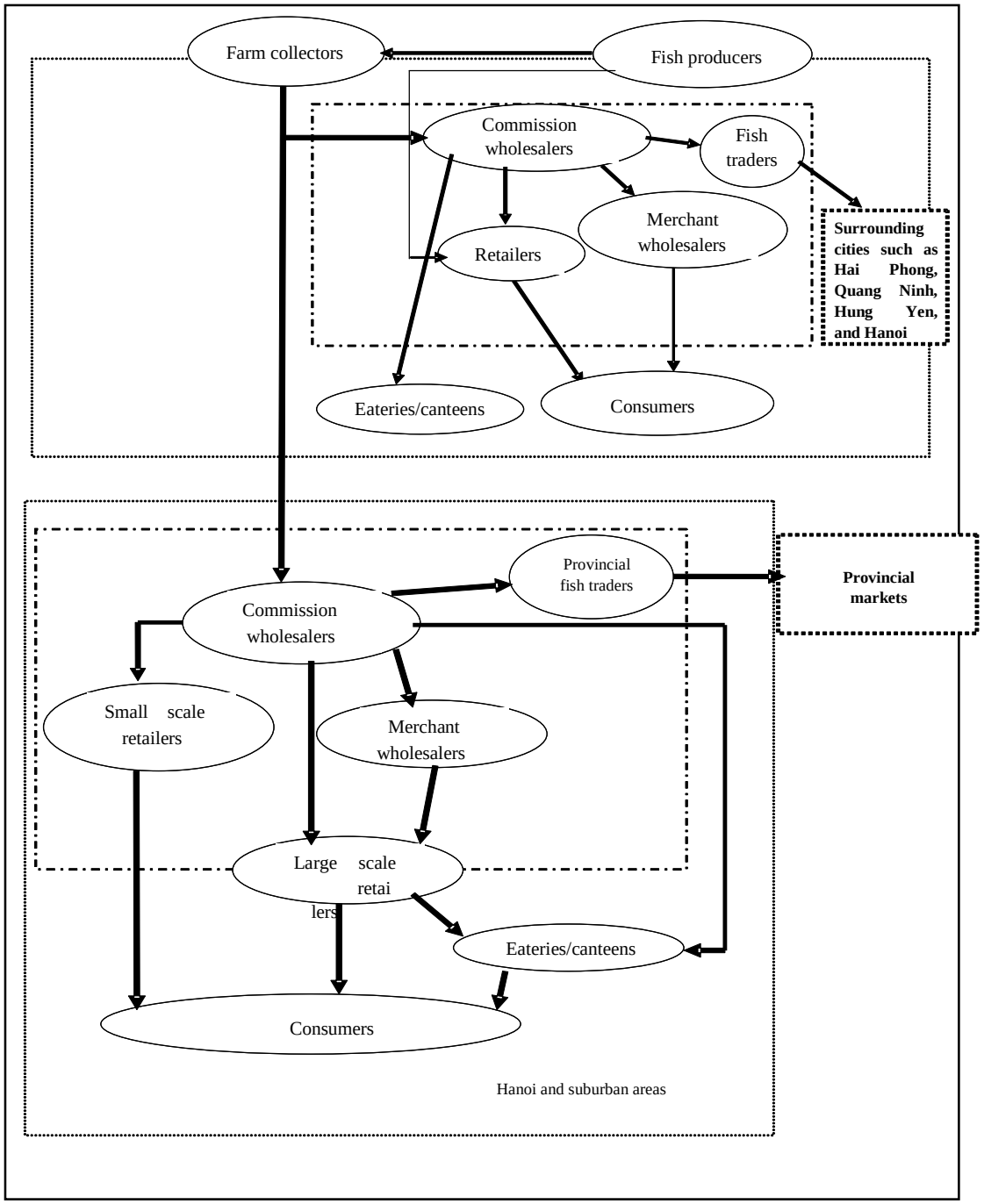


Figure 2. Flow of the freshwater fish commodities in Hai Duong

Main functions of the freshwater fish market participants

In the study areas, market intermediaries were responsible for the various tasks of marketing activities such as assembling, sorting, grading, handling, transporting, price setting, risk-taking, and distributing. The farm collectors were the main actors who performed these functions while the commission wholesalers undertook a role as the facilitating agents. In general, the merchant wholesalers were involved in all the functions performed by the intermediaries in the study (**Table 2**).

+ Farm collector: The functions performed by farm collectors were to purchase fish from fish farmers at the areas of fish production and to

sell fish to other agents at the wholesale markets. All farm collectors were villagers in the fish production in Hai Duong province. Transportation was the most important marketing activity that farm collectors performed.

+ Commission wholesalers: Their main task was to help the farm collectors sell the fish to the buyers including merchant wholesalers at the wholesale markets. As compared to the other marketing agents, there were fewer commission wholesalers who participated in trading fish at wholesale markets. The commission wholesalers provided the financing for the small retailers on credit and farm collectors by paying cash immediately at the wholesale markets.

+ Merchant wholesalers: They acted as the purchasers and sellers in the wholesale markets at the suburban and urban markets. Sometimes, they also helped other buyers' and sellers' operations through financial support as loans. They usually bought freshwater fish commodities from the farm collectors through the commission wholesaler and sold them to the urban retailers. In comparison with the commission wholesalers, the merchant wholesalers had limited financial sources, permanent customers, and smaller fish volumes traded daily.

+ Retailers: The urban retailers performed their functions as they bought live freshwater fish commodities from farm collectors through the commission wholesalers and merchant wholesalers at the wholesale markets and sold them to the suburban consumers. The local retailers purchased fish commodities from fish farmers in the areas of fish production and sold them at their retail market to end consumers in the district areas.

Bargaining power of the fish farmers

The bargaining power of fish farmers can be examined through the negotiation competencies and the levels of satisfaction with the current

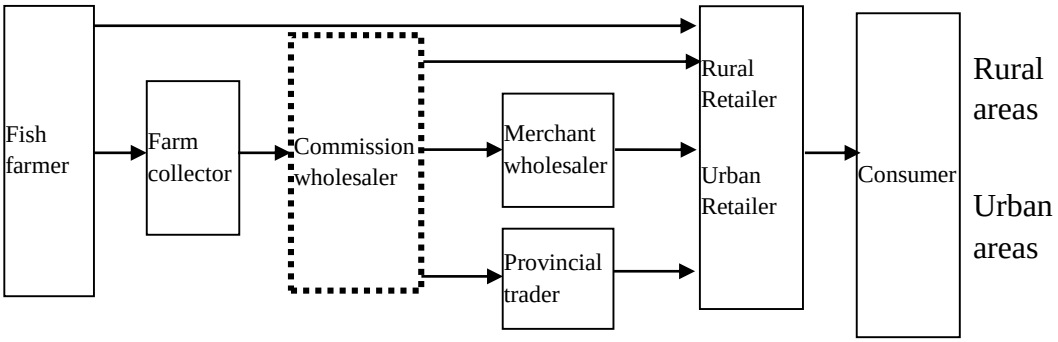


Figure 3. Marketing channels of the freshwater fish commodities from the FS, AF, and new VAC models in Hai Duong province

Table 2. Main functions of market participants in the marketing channels of fish commodities in Hai Duong province

Functions performed	% of respondents			
	Farm collectors	Commission wholesalers	Merchant wholesalers	Retailers (*)
Assist buyers and sellers		100.0	70.0	
Buy and sell in the same market			40.0	40.0
Buying from one place and selling in another market	100.0		90.0	60.0
Finance sellers and buyers		100.0	50.0	
Provide business premises and temporary storage facilities		100.0	30.0	

Note: (*) estimation from the volume of fish sales

marketing situation of the fish commodities for fish farmers in the research areas. While the negotiation competencies indicated the internal capacity of fish farmers in the marketing of their fish commodities, the levels of satisfaction with the current marketing situation reflected the external factors that impact the capacity of fish farmers in the marketing activities of fish products. Differences in these concerns between the FS, AF, and new VAC models were found in the study region.

It was assumed that fish farm collectors might take advantage of fewer participants in trading fish commodities in the areas of fish production as they would have a good bargaining power in purchasing fish commodities from fish farmers in Hai Duong province. Therefore, the study examined the negotiation competencies of FS, AF, and new VAC households in terms of some concerns related to the coping strategies in the farmers' marketing of the harvested fish commodities such as the number of fish traders with whom households have had business relationships (traders) – traders compete to offer a better price to fish farmers; negotiating time to accept to sell the harvested fish to farm collectors (days) – farmers' selling time; and the production days that fish farmers can extend or prolong in fish farming to look for better farm gate prices.

In the harvesting time, studied fish farmers typically sold their fish commodities to farm collectors who traveled between villages and wholesale markets in suburban areas (both Hanoi and Hai Duong). Thus, farm collectors were likely to take advantage of the farmers' ignorance of the market price and extract a margin from them by offering fish farmers low prices. The study results showed that the FS households were the most vulnerable to market volatility and faced a lower level of bargaining power with their buyers than that of the AF and new VAC households in their fish sales due to their largest scale of fish production. Due to more efforts made in seeking traders or farm collectors, FS farmers had the highest number of fish traders with whom households had business relationships (average of 5.53 fish traders) as compared to 4.7 fish traders and 4.1 fish traders for households operating the AF and new VAC models, respectively.

In regards to the negotiation time to sell the fish commodities and the days that households could prolong their fish farming to seek better farm gate prices, the FS households appeared to accept the fish farm collectors' purchasing offer in 5.3 days. On average, they had to sell their fish within 12 days in spite of the unreasonably low prices. The ANOVA test showed a significant difference of these calculations (**Table 3**). The conclusion from the study could be that the FS farmers have a lower level of bargaining power with farm collectors in comparison to AF and new VAC farmers.

The FS households' lower level of bargaining power against fish farm collectors was further underpinned when a Likert scale was used to examine and test the farmers' satisfaction with the farm gate prices and current marketing conditions between targeted fish groups (**Table 4**). The FS households recorded a low satisfaction level with the farm gate prices (3.06),

Table 3. Negotiation competencies of fish households

Bargaining power	FS model	AF model	New VAC model
Number of fish traders having business relationships (traders)	5.53[a]	4.71[b]	4.09[b]
	(1.57)	(1.86)	(1.20)
Negotiating time to sell fish commodities (days)	5.29[a]	7.17[b]	8.14[b]
	(1.46)	(2.64)	(3.34)
Extended production for better prices of fish sale (days)	12.27[a]	16.11[b]	24.97[c]
	(1.59)	(2.69)	(3.44)

Note: Different superscripts ([a,b,c]) denote significant differences between means within rows (P <0.05). Brackets denote the standard deviation.

which was significantly different from the new VAC farmers' satisfaction level (3.77) (ANOVA test P <0.05). According to the 3.0 of the decisive rule, all the FS, AF, and new VAC farmers were not satisfied with the farm gate prices of fish. This phenomenon reflects the fact that most fish farmers had shortages of price and market information due to the limited level of access to other marketing agents at the wholesale markets. Moreover, the relationships and the vertical coordination between market participants in the current marketing chain of farmed fish commodities were poor and relatively limited, particularly between the fish farmers and the farm collectors. This was also a common characteristic of the marketing channels of most aquaculture commodities coordinated by small-scale farmers leading to unstable fish farming systems in the Red River Delta.

In general, while the internal factor of marketing fish commodities referring to the negotiation competencies of fish farmers made the FS farmers more dependent on the fish farm collectors as compared to the AF and new VAC farmers, the external factor of the fish marketing referring to the poor level of coordination between the fish farmers and farm collectors pushed the new VAC farmers to diversify their marketing strategies such as direct sales at local markets and wholesales to collectors in Hai Duong province.

Marketing costs and margins of the freshwater aquaculture fish value chain

Various costs occurred in the business of fish trading along with the marketing chain. **Table 5** presents the cost structure of selected fish market operators i.e., farm collectors, commission wholesalers, merchant wholesalers, and retailers. The cost of the purchased fish commodities was the main cost item that accounted for more than 97 percent of the total cost for all market operators. The cost of dead fish presented the highest proportion of the total marketing cost (16.9%) as fish are sold alive. Wages, fuel, and the rent of a business place (shop or stall) also accounted for a large share of the total marketing costs. Other cost items such as equipment maintenance and depreciation, transportation, transactions, interest, and taxes and fees were minor. Higher expenses on fuel were found for farm collectors and the retailers from their total marketing costs. While the farm collectors transported the live fish by trucks, the retailers' means of transportation were motorbikes. In daily business, retailers had to travel far distances from 5 to 20 km to buy the fish from the location of the seller to the retail markets where they retailed the fish to their clients. The farm equal to

Table 4. Levels of households' satisfaction with their current marketing situation

Levels of satisfaction	FS model	AF model	New VAC model
Satisfaction with fish selling prices	3.06 [a]	3.91 [b]	3.77 [b]
	(0.79)	(1.03)	(1.26)
Low farm gate prices due to fish farm collectors' coordination	4.22 [a]	3.65 [b]	2.77 [c]
	(0.78)	(1.11)	(0.73)
Traders respect their commitments of harvesting and buying date as agreed	4.18	4.06	3.89
	(0.84)	(0.83)	(0.76)
Traders' buying capacity	2.90 [a]	3.29 [a]	4.00 [b]
	(0.92)	(1.01)	(0.94)
Product grading standards not relevant	4.08 [a]	3.80 [a]	2.37 [b]
	(0.87)	(1.06)	(1.46)
Settlement for delayed payment	3.93	3.09	2.80
	(0.73)	(1.14)	(0.84)

Note: 1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree; and brackets denote standard deviation. Different superscripts ([a,b,c]) denote significant differences between means within rows (P <0.05).

22,100 VND in 2017) per 100kg of fish to transport the fish from production to the wholesale market. The distances from production areas to the Yen So wholesale market and Gia Loc wholesale market are 70km and 30km, respectively.

The cost of materials for fish storage was also recorded for all the marketing stakeholders along the fish chain. These materials consisted of ice, salt, and water along the chain to keep the fish alive. The farm collectors owned trucks with the design of an aeration system that does not require many materials to keep the fish alive during transportation to the wholesale markets. It was estimated that they can reduce a significant portion of their material costs for their enterprise while the merchant wholesalers spent the highest amount for materials (14.4 thousand VND per 100kg of fish) due to the fact that they had to keep the fish alive at their market stalls to sell to subsequent market operators; they were followed by the retailers who handled the fish to the end consumers. In the retail stage, fish were kept alive in basins or cement tanks at the selling place and the retailers preprocessed the fish to make them ready for selling to consumers. As a result, ice, electricity, water, and salt contributed to the retailers' cost of materials.

In general, all the market stakeholders had an equal amount of marketing costs per 100kg of mixed fish commodities except the commission wholesalers. While the merchant wholesalers had a total marketing cost of VND 120 thousand per 100kg of mixed fish commodities and this total marketing cost of commission wholesalers was VND 50 thousand. This was because the merchant wholesalers normally stored the fish commodities for a longer time which generated higher losses of dead fish while the commission wholesalers did not bear this cost. Moreover, the merchant wholesalers hired more workers for the jobs of shipping fish to their customers. The hired workers of the commission wholesalers were mainly responsible for the tasks of unloading and loading fish commodities at the wholesale market. The total marketing costs of farm collectors and retailers were recorded, respectively, at VND 105 thousand and VND 100 thousand per 100kg of mixed fish commodities. The gross marketing cost of all marketing agents reached approximately VND 390 thousand per quintal of fish commodities.

The marketing margin was estimated from the difference between the price received by the fish farmers (farm gate price) and the price paid by consumers (retail price). Net marketing margins consisted of the marketing costs, profits, and losses incurred by all market stakeholders. **Table 6** shows the calculations of the marketing costs and marketing margins by different stakeholders involved in the marketing system based on 100kg of mixed fish. The fish farmers had a total return of approximately 5,000 thousand VND for producing 100kg of mixed fish, which was referred to as the fish farmer's share, accounting for 87.34% of the retail price paid by the end consumers.

The total calculated marketing margin (in channel 1) was 12.7%, which included 3.6% for

Table 6. Value distribution along marketing channel 1 per 100kg of mixed fishes produced in Hai Duong province

Unit: 1000 VND

Price and cost	Fish farmer	Farm collector	Commission wholesaler	Retailer
Purchasing price		4,992		5,199
Selling price	4,992	5,199		5,715
Marketing cost		105	50	111
Marketing margin	4,992	168	88	405
Marketing margin (%)	87.3	2.94	1.54	7.1

the farm collectors, 2.41% for the commission wholesalers, and 9% for the retailers. However, it is a very interesting point that the absolute margin for the farm collectors was reduced by VND 66 thousand per 100kg of mixed fishes when they sold their fish commodities to the merchant wholesalers at the wholesale markets in marketing channel 2. The farm collectors could gain an amount of 168 thousand VND per 100kg if they sold the fish commodities directly to the retailers at the wholesale markets. This result could explain the fact that fish farm collectors always looked for retail buyers who were able to pay them good prices for fish commodities. In general, fish farm collectors obtained a positive marketing margin in cases in which the wholesale markets had a high demand for fish with more retailers' participation through which they got good selling prices of their fish commodities. This shows a loose linkage between farmers and other market actors. Direct sale to retailers was preferred by farmers while farm collectors and wholesalers did not establish good and fair relationships with the farmers.

However, days of poor demand for fish commodities sometimes occurred at the wholesale markets because the retailers were lazy to do business on rainy days. Because of the poor demand for fish at the wholesale markets, the fish farm collectors had no choice but to sell their fish commodities to the merchant wholesalers at low prices. At the wholesale markets, the merchant wholesalers were unique operators who could solve the problem of there being more fish commodities than market demand through their having storing facilities and a considerable number of close customers in the suburban areas. Although many respondents complained about the down pricing of the merchant wholesalers at the wholesale markets, in the view of marketing functions, the merchant wholesalers were playing an important role in connecting farm collectors to retailers in cases when demand was lower than supply at the wholesale markets. The role of merchant wholesalers in the wholesale markets was very important because they could assist the fish farm collectors in cases of huge losses in the trading of fish commodities. Losses might reach VND 100 million – all purchasing costs of a daily trading fish commodities, and if it happened, farm collectors might go into bankruptcy. In exchange, the merchant wholesalers could receive an absolute margin of VND 84 thousand per 100kg of mixed fish commodities. The absolute margin VND 200 thousand per 100kg of mixed fish commodities was recorded for the retailers in the marketing chain of the fish commodities.

The fish commodities of the FS, AF, and new VAC model households have been sold at the wholesale market in Hai Duong (40%) province and at the wholesale market in Hanoi (60%). The fish farmers' share in the retail prices accounted for 87.3% of the total marketing margin. The absolute marketing margin of fish farmers recorded an amount of VND 4,992 thousand per quintal of mixed fish commodities (**Table 6**). The results of the study show that, on average, 87.3% of the farm collectors' gross earnings were transferred to the farmers. This finding is consistent with the finding of another study on the marketing margin of mandarins (Pokhrel & Thapa, 2007). When farmers received a major share of the benefits generated by their products, the marketing system was considered to be providing a fair share of the benefits to all parties involved (Ellis, 1992). However, it does not mean that farmers have to be satisfied with the share that they have received. Whenever it is feasible, efforts should always be made to increase the farmers' share of the income.

Given the 12.7% gross marketing margin of intermediaries, critics may argue that fish middlemen receiving a large share without any investment in production is not fair. However, marketing intermediaries bear a lot of costs in the process of transferring the fish commodities from the farm gate to the consumers, which needs to be taken into account while analyzing the marketing margin of intermediaries. Therefore, the profit margin or net marketing margin of intermediaries was calculated and presented in **Table 7**. The wholesaling intermediaries have to pay workers' wages for loading and unloading fish at the farm gate and the wholesale markets, accounting for nearly VND 65.2 thousand per

Table 7. Value distribution along marketing channel 2 per 100kg of mixed fish produced in Hai Duong province

Unit: 1000 VND

Price and cost	Fish farmer	Farm collector	Commission wholesaler	Merchant wholesaler	Retailer
Purchasing price		4,992		5,199	5,404
Selling price	4,992	5,199		5,404	5,715
Marketing cost		105	50	121	111
Marketing margin	4,992	102	88	84	200
Marketing margin (%)	87.3	1.8	1.54	1.5	3.5

quintal of mixed fish commodities and, then, the fuel, repair, and maintenance of trucks and facilities for fish transportation and storage along the marketing chain. According to the calculations of marketing costs, farm collectors bore the considerable amount of VND 42 thousand from dead fish lost from the purchased fish commodities with a farm gate value of VND 4,992 thousand per quintal. They have to pay a transportation toll and some other marketing costs when they move from the area of fish production to the wholesale market. As mentioned above, fish farm collectors have to pay VND 800-1000 per kg of fish as the sale fee for the commission wholesalers, which represents about 1.8%. Commission wholesalers, who have the responsibility of selling fish to retailers and other marketing agents, also incurred costs, though they were not as high as those of farm collectors.

Out of the total 12.7% of the gross marketing margin of freshwater fish commodities produced in Hai Duong province going to the farm collectors, commission wholesalers, merchant wholesalers, and retailers, the former group (in channel 2) received 9.2%, of which the marketing costs accounted for 4.83%. Thus, the farm collectors received a net income (or net marketing margin) of 1.8%, reflecting the income that they could have earned from investments in other businesses, and time spent providing services to farmers, retailers, and merchant wholesalers. The commission wholesaler received 1.54% of the gross income, of which about 1% accounted for marketing costs and the rest was their net income. The merchant wholesalers gained 3.59% of the gross margin, of which about 2.1% accounted for marketing costs and their net income represented 1.5%. The retailers received 5.44% of the gross marketing margin income after deducting 1.94% of the marketing costs. If we consider 8.34% of the net income as the standard rate of income that an investment can earn from another business, then the marketing margin that intermediaries were receiving should be considered fair. Moreover, the farm collectors constantly took risks as the transportation of fish from production to the wholesale markets resulted in the loss of dead fish during the long-distance since live fish are sensitive to transportation conditions and the process of distribution. The study results showed the fact that wholesale markets and farm collectors were playing important roles in fish production in Hai Duong province.

Conclusions

In Hai Duong province, fish commodities are sold through local market outlets, several local fish retailers, and fish farm collectors. There are four main marketing channels of freshwater aquaculture fish identified by the study, namely fish farmers to local consumers; fish farmers to local retailers to local consumers; fish farmers to fish farm collectors to commission wholesalers to urban retailers to urban consumers; and fish farmers to fish farm collectors to commission wholesalers to merchant wholesalers to urban retailers to urban consumers. Marketing channels to external consumers are most popular for fish farmers in the province. The study results reveal the fact that

the absolute marketing margin of fish farm collectors is smaller in the channel through the merchant wholesalers. However, in normal business days, these fish farm collectors often sell their fish directly to retailers with the support (empowerment) of commission wholesalers at wholesale markets.

The study findings of marketing margins for different middlemen levels are similar for the freshwater fish commodities in some previous studies in developing countries such as Bangladesh and Turkey. The retailers received the highest rate in both the short marketing channel and in the long marketing channel of consumer prices among the intermediary levels. However, the small quantity of fish traded every day only provides them a modest profit if they buy fish commodities from the merchant wholesalers and they could earn a double profit when buying fish commodities from farm collectors. This coincides with the opportunity cost that fish retailers mentioned if they stop their business to find alternative earnings from jobs at factories in other sectors. This story implies that the fish retailers are another issue that needs to be paid attention to in order to improve the selling environment as well as working conditions, such as the allocation of more business places in both wholesale and retail markets, and more public investments in the retailing of live fish commodities in order to maintain a group of fish retailers in the markets, indirectly enhancing the development of fish farming in Hai Duong province.

Among the three typical models of commercial fish production, the new VAC model is the most diversified in the marketing of fish commodities. Although new VAC farmers did not produce the largest size of marketable fish commodities as compared with that of AF farmers, they could sell their fish commodities at reasonable prices both to local retailers to serve the communal/district markets and to fish farms collectors supplying fish to urban markets. With this marketing strategy, the new VAC households can earn the best profits among farmers of the three typical models in the region. Moreover, these households improve their bargaining power, compared to FS and AF households, in the same pattern of market conditions. To enhance freshwater fish production in Hai Duong province, marketing strategies should focus on improving the market infrastructures that include the wholesale and retail markets. The transportation of fish should also be paid attention to in order to facilitate the work of the market stakeholders for a better marketing system from the fish production areas to the consumption zones.

Acknowledgments

This paper would not have been possible without the financial support of the Vietnamese government scholarship program 911. I am especially indebted to Prof. Philippe Lebailly, Head of Economics & Rural Development, Gembloux Agro-Bio Tech, University of Liège, who has been supportive of my career goals and provide me with a protected academic PhD program.

I am grateful to all of those with whom I have had the pleasure to work with during my studies. Each of the members of my Dissertation Committee provided me extensive personal and professional guidance, and taught me a great deal about both scientific research and life in general.

I would especially like to thank Prof. Philippe Burny for his scientific advice, which made this paper possible.

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