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**Marketing channels of fish and aquatic plants
in Hanoi City**

by

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1. Acronyms and terms

RIA 1 Research Institution for Aquaculture N° 1
AP Aquatic plants

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Abstract

A survey and subsequent analysis of the markets and marketing channels of peri-urban cultured fish and aquatic plants in Hanoi city was carried out by staff from Research Institute for Aquaculture No.1 (RIA 1) from 15th April to 9th October, 2003.

The survey and interviews were done at 81 markets including 7 wholesale, 44 retail and 30 street markets within the city. The questionnaires were used to interview 18 managers, 56 wholesalers, 21 collectors, 189 retailers and 158 consumers. The results and findings of this survey showed that the number of women involved in trading aquatic plants was proportionally more than for fish with generally more men involved in transport and collection than other activities. It was found that most retailers and consumers are women. Most wholesalers and collectors are aged between 36-45 with on average at least 10 years experience in the business. Most freshwater fish production which supplies Hanoi's markets comes from the provinces around Hanoi such as Nam Ha, Ha Tay, Hung Yen, Hai Duong and Phu Tho, with only 10-20% of freshwater fish production supplying the city's markets originating from peri-urban Hanoi, this mainly from Thanh Tri district. Cultured aquatic plants found in Hanoi's markets come primarily from peri-urban areas such as Yen So, Tran Phu, Hoang Liet and Vinh Quynh communes of Thanh Tri district – this constituting almost 100% of the aquatic plants bought and consumed within the city.

The results of the survey supplied detailed information about general status of marketing channels, price, production and supply areas of aquatic products in Hanoi city.

5. Introduction

This study was carried out from 15th April to 9th October 2003 by the RIA 1 team composed of Nguyen Thi Dieu Phuong, Pham Van Trang, Kim Van Van, Nguyen Huu Hoa and Nguyen Chien Van. The team used 8 specific questionnaires to interview managers, wholesalers, collectors, retailers and consumers who are involved in the fish and aquatic plants market chain in Hanoi city (please see questionnaires attached in the Annex to the report). It was carried out as part of WP1 of the PAPUSSA project in order to get an overview of the overall markets system in Hanoi relating to the sale of fish and aquatic plants cultured within the city.

6. Methodology

6.1 Questionnaire

The questionnaires were constructed jointly by RIA1 staff and co-ordinators of the PAPUSSA project following an initial checklist which was produced at a PAPUSSA workshop in April 2003 in Bangkok.

There were 8 types of questionnaires each specialized for interviewing particular categories of market actors: 3 to interview wholesalers, collectors, and retailers who were involved in fish marketing, a further 3 questionnaires to interview wholesalers, collectors and retailers who were involved in aquatic plants marketing, and finally one questionnaire to interview market managers, and another for consumers (these are all included in the Annex).

The purpose of these structured questionnaires was to obtain information and details that relate to the marketing of peri-urban cultured fish and aquatic plants in Hanoi. This would then provide the PAPUSSA project with an initial understanding, situation appraisal and overview of the aquatic production market chain, which could then be built on and developed in more detail in the subsequent work packages of the project.

Questions were based on concepts and a Vietnamese language that local people could understand which respected and encouraged the value of local feedback and information. In the design of the questionnaires, leading questions were as far as

possible avoided. Questions were both open-ended, for example ‘How long have you been working in this business?’ and closed, for example ‘Do retailers require a license?’ answer Yes or No. Wording in questions was as far as possible unambiguous, brief, polite, unemotional and non-technical. After the questionnaires were constructed and written in English they were translated into Vietnamese. The initial questionnaires were checked by pilot testing with colleagues and traders to determine and if there were any ambiguous questions or other problems that needed to be modified.

The modified questionnaires were then used during direct interviews with traders, consumers and market managers. All the interviews were conducted by RIA-1 staff who as a team had constructed the questionnaires. Every effort was made to ensure that the questions were delivered in an identical manner on each form.

6.2 Market levels and actors

The different levels of fish and aquatic plants markets and associated actors were surveyed and interviewed and are shown below:

Level 1: Fish and aquatic plants wholesale markets

The actors in the wholesale markets include market managers, wholesalers, collectors/middle men and retailers.

Level 2: Retailer markets

The main actors in the retail markets include market managers, collectors/transporters, retailers and producers.

Level 3: Street markets

The main actors who were interviewed at the street market level included retailers, producers and consumers.

All above levels are shown in Figure 1, and the name of the markets surveyed is given in the Appendix.

The actors who were chosen and interviewed were working in the market as traders.

By asking the retailers and managers of markets we found out the wider list of names

of wholesalers and collectors whom we could subsequently go to interview. Collectors were identified by observation and interviewed. Most retailers were interviewed during their work hours trading at the market. The consumers chosen to be interviewed were members of the public who were actively buying aquatic plants and fish at the time the interviewer was implementing the survey with traders at the markets.

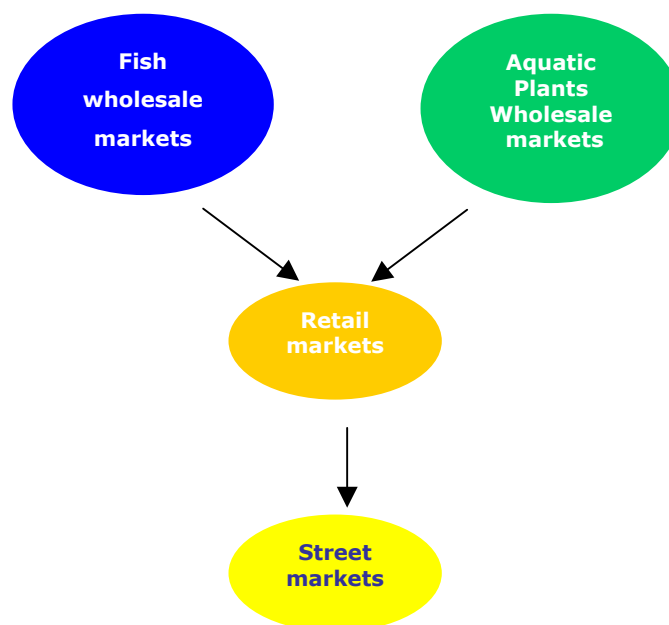


Figure 1. Market levels interviewed in Hanoi

6.3 Market location and time for interviews

The interviews generally took place within Hanoi's markets whilst the traders/market managers were working:

+ Fish wholesale markets include Three Cross road of Yen So, Thanh Tri Bus Station, The south of Hanoi Bus Station, Long Bien Bus Station and the vegetable wholesale market in Bac Qua, Van Dien bridge.

+ Retail and street markets in the centre of Hanoi city, peri-urban Hanoi such as Gia Lam, Dong Anh districts.

For the surveys of the fish and aquatic plants wholesale markets, the questionnaires had to be conducted very early in the morning, beginning at 1:00 AM (fish wholesale markets) and 3:00 AM (aquatic plants wholesale markets).

6.4 Marketing analysis

The data and questionnaires collected from the survey were entered into Excel and initially analysed separately for fish and aquatic plants and the different actors (consumer, retailer, collector right through to wholesaler) before being combined for the final report.

The sequence of marketing analysis is shown below in Figure 2.

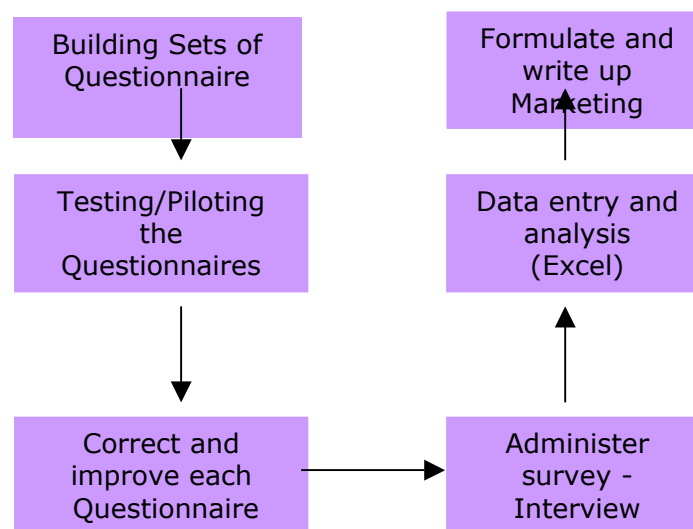


Figure 2: The sequence of marketing analysis

7. The results and discussion

From our findings, the marketing channels of fish and aquatic plants within peri-urban Hanoi are summarized below in Figures 3 and Figure 4.

Producer

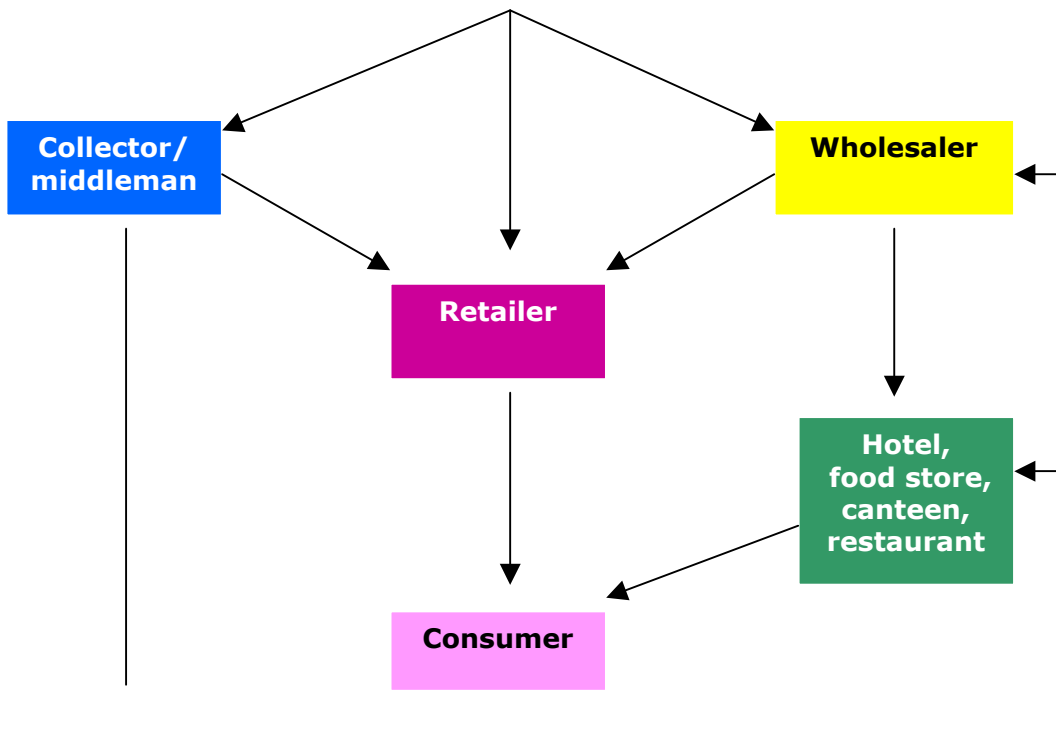


Figure 3. Summary of marketing channels of fish in Hanoi

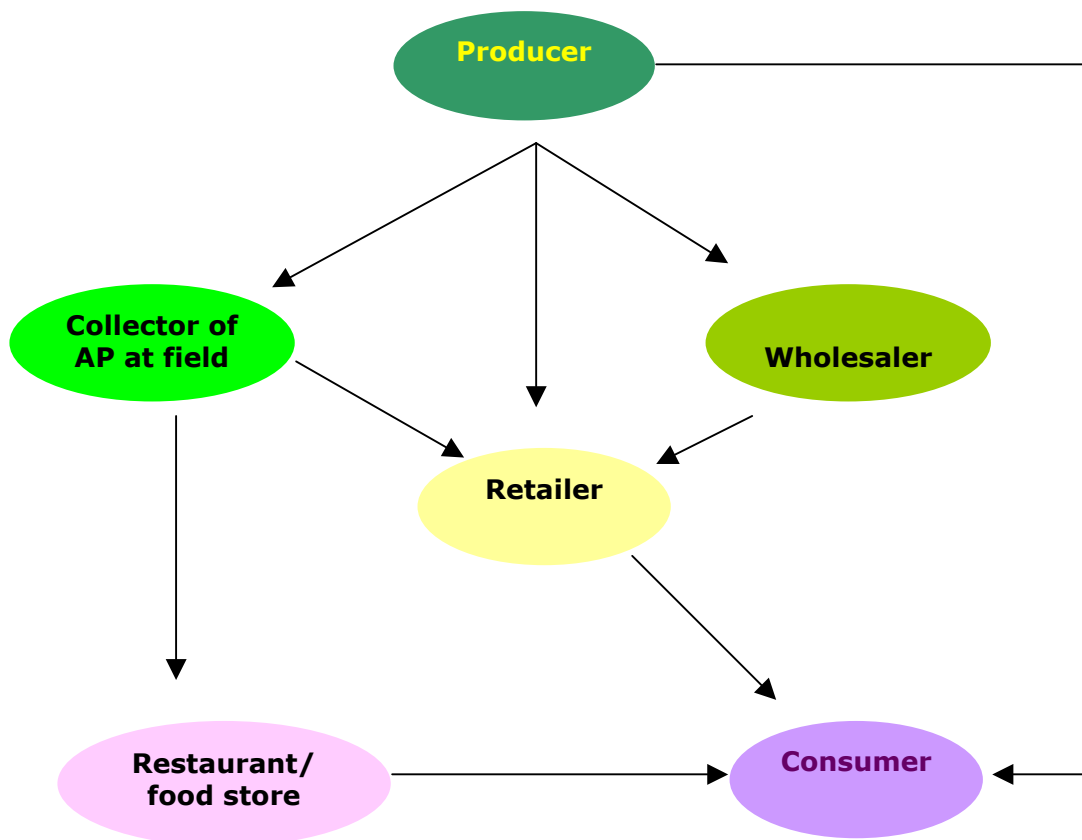


Figure 4. Marketing channels of aquatic plants in Hanoi

Fish and vegetable wholesale markets are mainly in business from the middle of the night to the early morning (6:00 AM). Wholesale markets in Hanoi mainly sell products to retailers or commercial outlets such as canteens, restaurants - no public consumers were observed or interviewed in wholesale markets during this survey.

Hanoi retail markets mainly do business from 6:00 AM to 19:00 PM and are managed by the Urban District People's Committee. Street markets are similar to retail markets but actually located on Hanoi's streets and are characterized by no management, little business regulation and also being very flexible. Some street markets only open from 6:00 AM to 12:00 AM, have a break and then continue from 15:00 PM to 19:00 PM in order to create a more convenient service to the consumer. Both retail and street markets normally only sell to public consumers.

7.1 The number of markets and people who were interviewed

The survey was carried out at 81 Hanoi markets including 7 Wholesale markets (names shown in Table 1), 44 retail markets and 30 street markets. This is shown below in Figure 5.

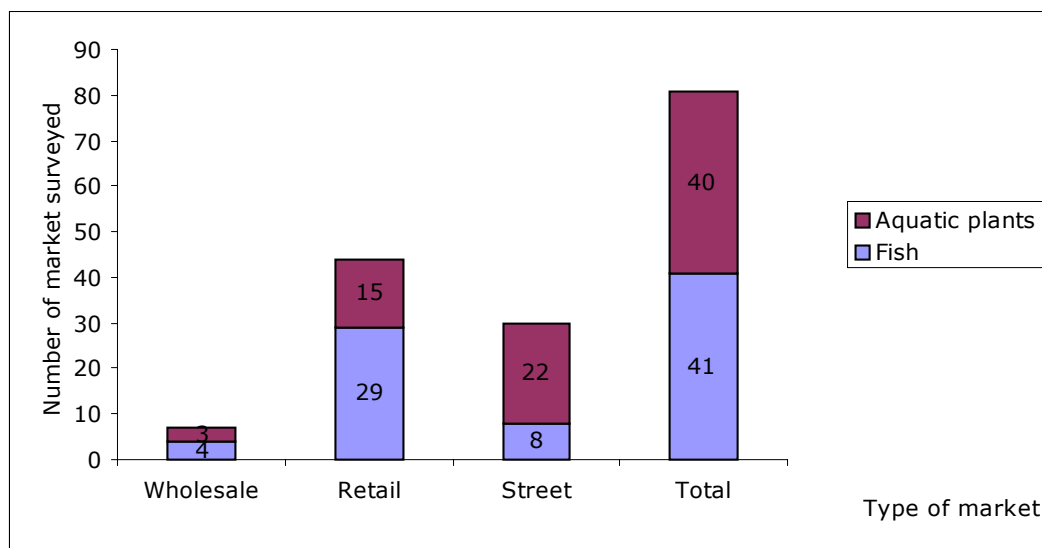


Figure 5. The number of markets surveyed

Table 1. Wholesale markets in Hanoi which were surveyed

| No | Fish wholesale markets | Aquatic plant wholesale markets |
|----|-------------------------------|-------------------------------------|
| 1 | Yen So Three Way - cross road | ‘Dau moi phia Nam’ wholesale market |
| 2 | Thanh Tri Lorry Station | Van Dien bridge |
| 3 | Giap Bat Bus Station | Long Bien Bus Station |
| 4 | Van Dien Bridge | Cau Giay |
| 5 | Long Bien Bus Station | Nga Tu So |

Overall we interviewed 379 people in total, including 18 market managers, 56 wholesalers, 21 collectors, 189 retailers and 158 consumers as illustrated below in Figure 6.

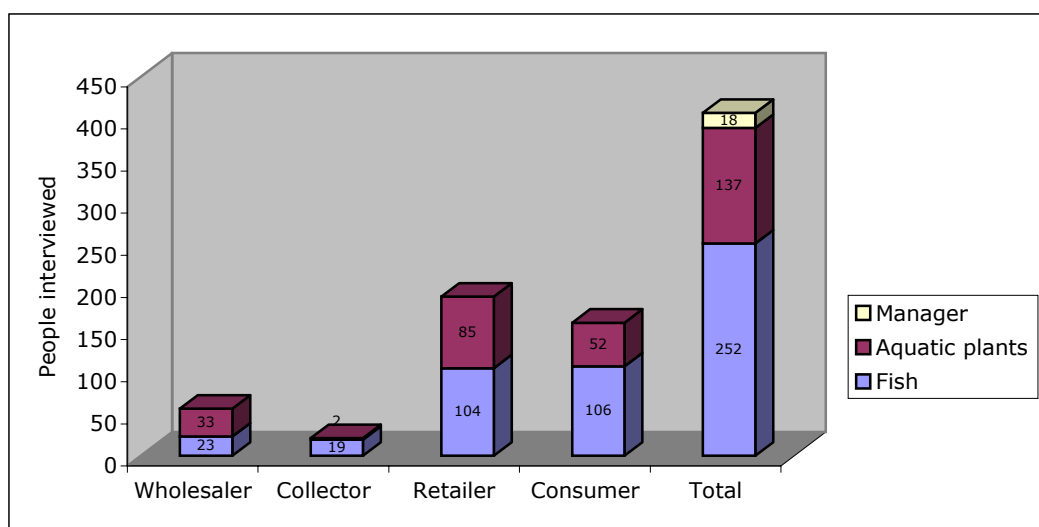


Figure 6. The number of people interviewed

7.2 Gender in the survey

Our findings indicated that more women are involved in aquatic plant trading than in fish. Collecting and transporting fish to the markets is more dominated by men compared to all of the other activities, whilst equal numbers of men and women are involved in collecting and transporting aquatic plants to markets.

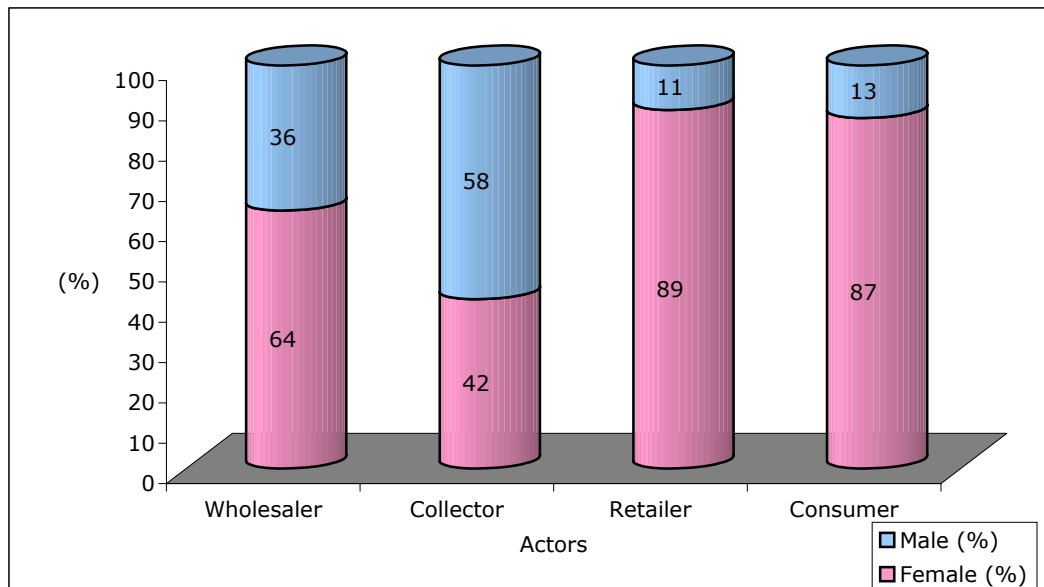


Figure 7. The gender involved in fish trading activities in Hanoi

The proportion of women to men in fish trading is 2 to 3, in aquatic plant trading is 4 to 5 and gender balance is equal for aquatic plant collectors. In general, most of the retailers and consumers are women. These findings are shown below in Figures 7 and 8.

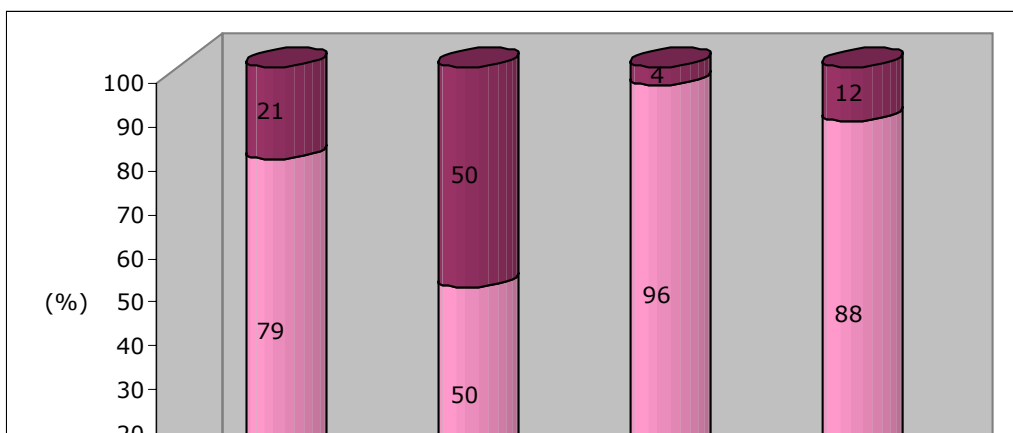


Figure 8. Gender involved in aquatic plants trading activities in Hanoi

7.3 Age of Market actors.

Most wholesalers and collectors are in the range of 36-45 years old with large numbers of people involved; those aged below 25 and above 55 years old are not so prominent in these activities due to either poor health or lack of experience

There is a large range of age groups working in the retail markets sector. Consumers older than 55 years have relatively higher numbers because following retirement, they have more time for looking after their families. These points are illustrated in Figures 9 and 10.

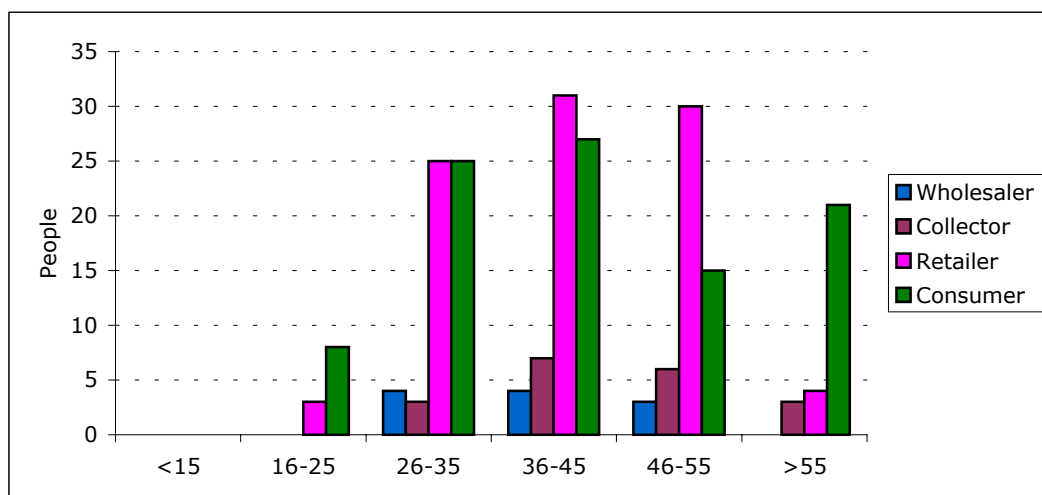


Figure 9. Age range involved in fish trading in Hanoi

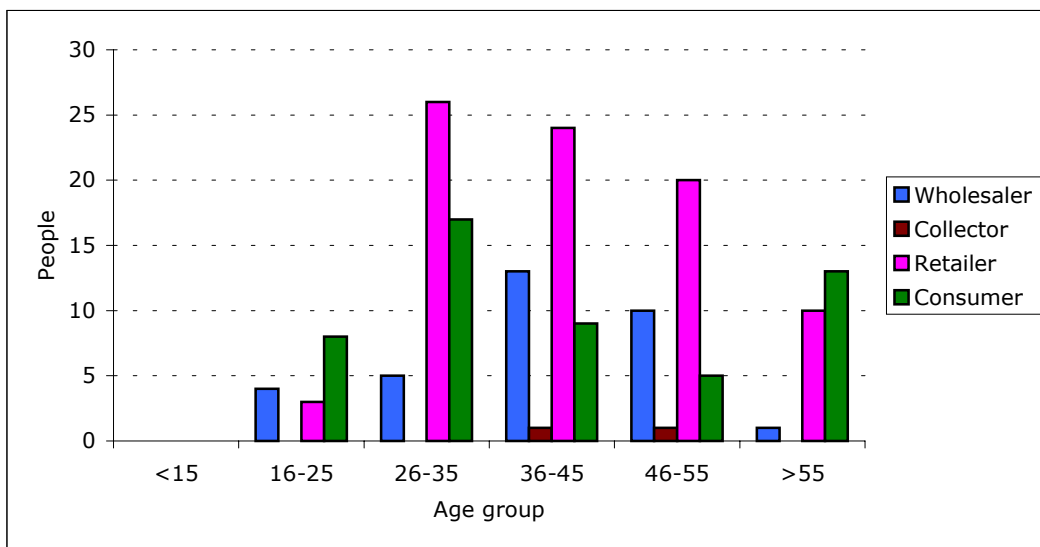


Figure 10. Age range involved in aquatic plants trading in Hanoi

7.4 The experience of traders

Most traders have 10-11 experience years working in the markets sector. This ranges from an average of 7 years experience for aquatic plant retailers in street markets to 14 years for aquatic plant retailers. Some people had just a year experience, others have up to 40 years. This is shown in Table 2 below:

Table 2. The experience of traders 1

| Traders | Experience in trading (years) | | |
|---|-------------------------------|-----|---------|
| | Min | Max | Average |
| Fish Wholesaler | 2 | 20 | 11 |
| Fish Collector | 3 | 20 | 10 |
| Fish Retailer | 1 | 35 | 10 |
| Fish Retailer at Street Market | 1 | 35 | 9 |
| Aquatic Plant Wholesaler | 1 | 30 | 11 |
| Aquatic Plant Retailer | 2 | 40 | 14 |
| Aquatic Plant Retailer at Street Market | 2 | 15 | 7 |

7.5 The origin and sources of peri-urban aquatic produce supplied to Hanoi markets

* The sources of fish supply to wholesale markets

Most of freshwater cultured fish sold in Hanoi markets come from provinces near Hanoi such as Dong Van, Phu Ly - Nam Ha; Nam Dinh; Nho Quan - Ninh Binh; Thanh Hoa; Hung Yen; Hai Duong; Thuong Tin, Phu Xuyen - Ha Tay and Phu Tho. According to the replies of wholesalers, the above sources outside Hanoi contribute between 80-90% of the total amount of fish sold in the markets, with the remaining 10-20% coming from within Hanoi (mainly cultured in Thanh Tri district). Fish prices fluctuate daily depending on the supplies and sources available, in general during the year prices of fish are higher from 15th of December to 1st of April as following the Chinese calendar.

* The sources of fish supply to retail markets

In Urban areas: Fish are supplied from wholesale markets in, Thanh Tri - Hanoi, Ha Tay province, West Lake. According to most of the retailers urban consumers tend

to prefer larger, live fish such as Common carp, Tilapia, Grass carp & Silver carp... compared with peri-urban consumers.

In (peri-urban) Gia Lam district, fish are supplied to retail markets in this area from Gia Lam and Dong Anh districts within peri-urban Hanoi, and from the outside provinces of Bac Ninh, Hai Duong and Hung Yen.

In (peri-urban) Thanh Tri district, fish sold for retail mainly originate from within the district.

In (peri-urban) Dong Anh district, sources of fish sold in retail markets are produced in this district of Dong Anh as well as from Bac Ninh province.

According to wholesalers, a proportion of fish production from Hanoi which is mainly smaller size fish tend to be cultured in wastewater within Thanh Tri district and the urban lakes of Hanoi city is transported and sold outside Hanoi city, and to the provinces or mountain area markets such as Vinh Phuc, Thai Nguyen, Ninh Binh, Quang Binh, Son Tay, Lang Son, Thanh Hoa... for lower income consumers in the provinces.

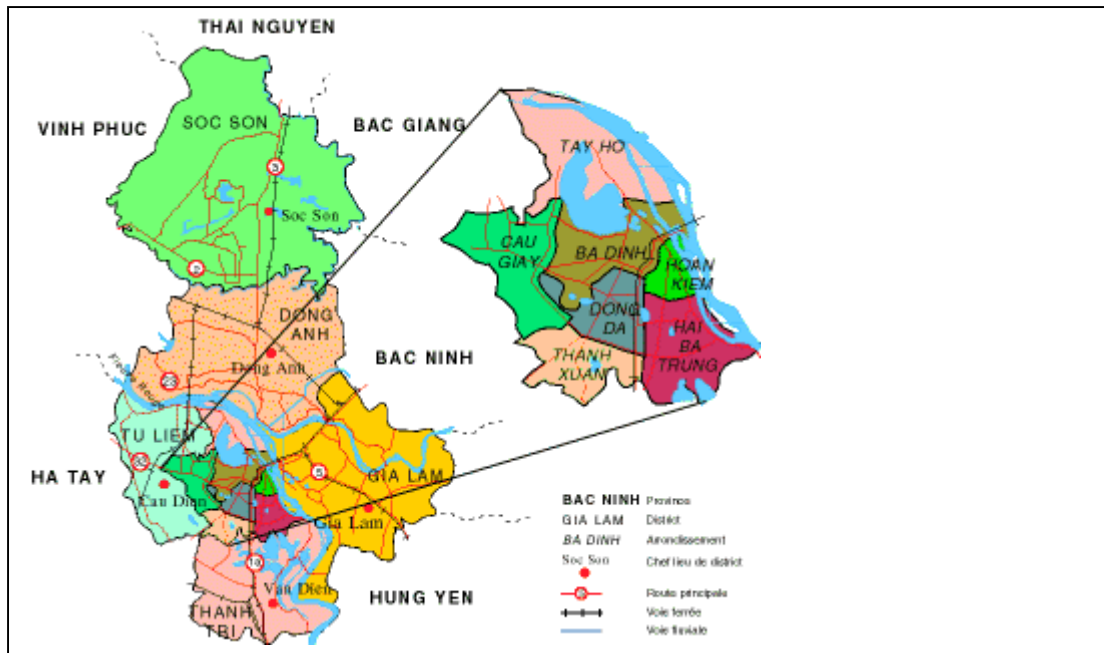


Figure 11. Map of Hanoi and some neighbouring provinces

*** Origin of Aquatic Plants supplied to wholesale and retail markets in Hanoi**

The main source of aquatic plants supplied to markets within Hanoi originate from communes such as Hoang Liet, Vinh Quynh, Tran Phu, Yen So and Vinh Tuy in Thanh Tri district. Some aquatic plant production comes from Hoang Van Thu commune (in Hoang Mai new urban district), small ponds of Hao Nam (in Dong Da urban district). In Gia Lam district the aquatic plants production from Tram, Tu Dinh, Long Bien, Yen Thuong and Dong Du Communes as well as from Tu Liem and some of production from Dong Anh districts.

7.6 Means of Transport for peri-urban aquatic production in Hanoi.

The lorry is the main means of transport for fish, used by almost all wholesalers and collectors, whilst motorbike is the main means of conveyance for aquatic plant

collectors and fish retailers. Bicycle is mainly used for transport of aquatic plants from producer to retailer, some of aquatic plants wholesalers also use motorbike as mean of transport. For street market traders still use a carrying pole for selling fish and aquatic plants as well as physically driving along the streets. Our findings concerning markets transportation are shown below in Figure 12.

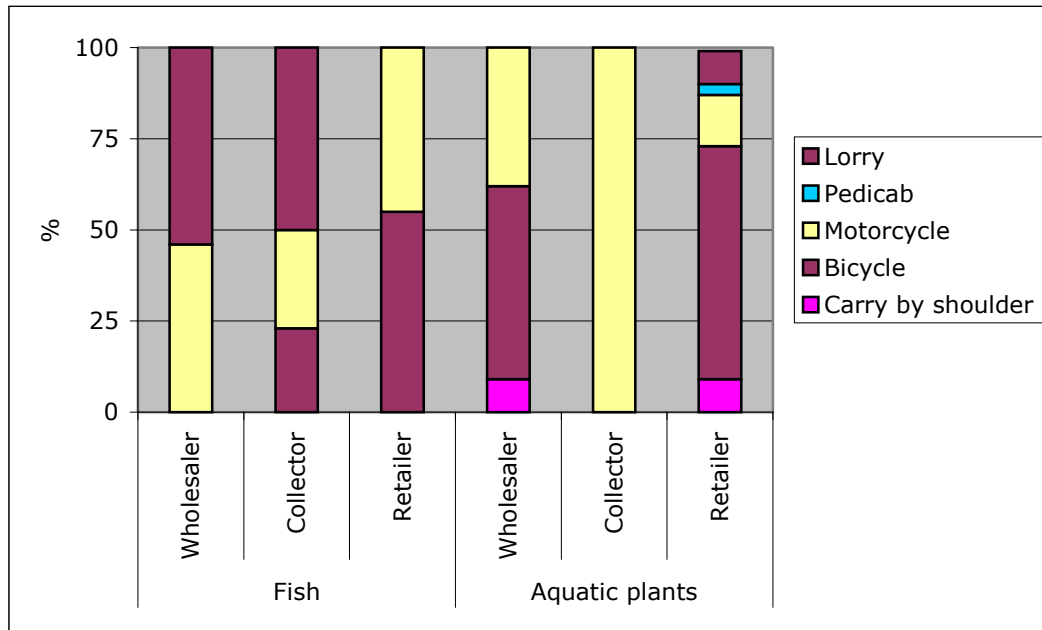


Figure 12. Transport used for aquatic production transfer to markets

7.7 Additional information - Perceptions

There are differing ideas and perceptions between Hanoi’s inner city and peri-urban retailers. 64% of retailers interviewed in inner city Hanoi are aware about the culture of fish in the city’s wastewater, but only 4% of fish retailers in the peri-urban areas claim to know about the culture of fish in wastewater. This is illustrated in Figure 13.

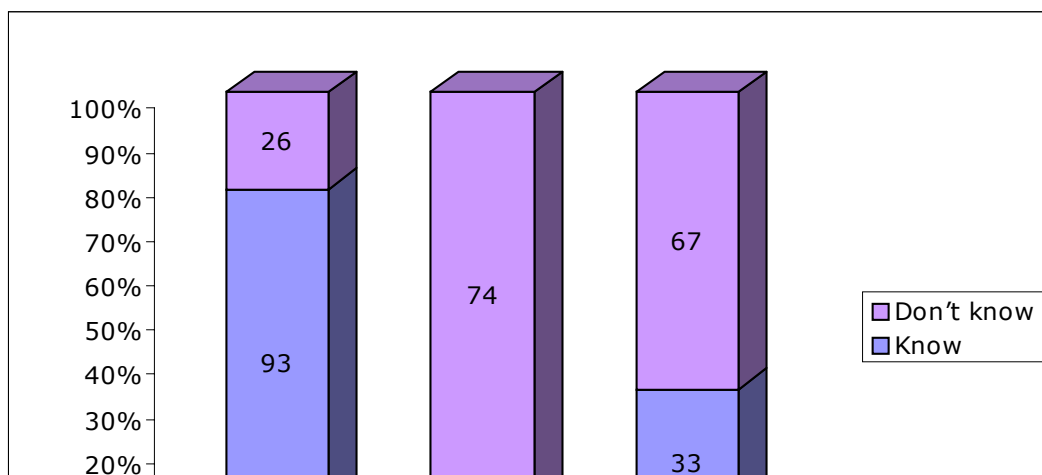


Figure 13. Knowledge of inner city and peri-urban fish retailers about wastewater cultured fish in Hanoi

34 out of the 94 fish traders including wholesalers, collectors and retailers who were interviewed had help with labour from their families, amongst these wholesalers proportionally getting more assistance with labour from family members than retailers or collectors in fish. This is shown in Figure 14.

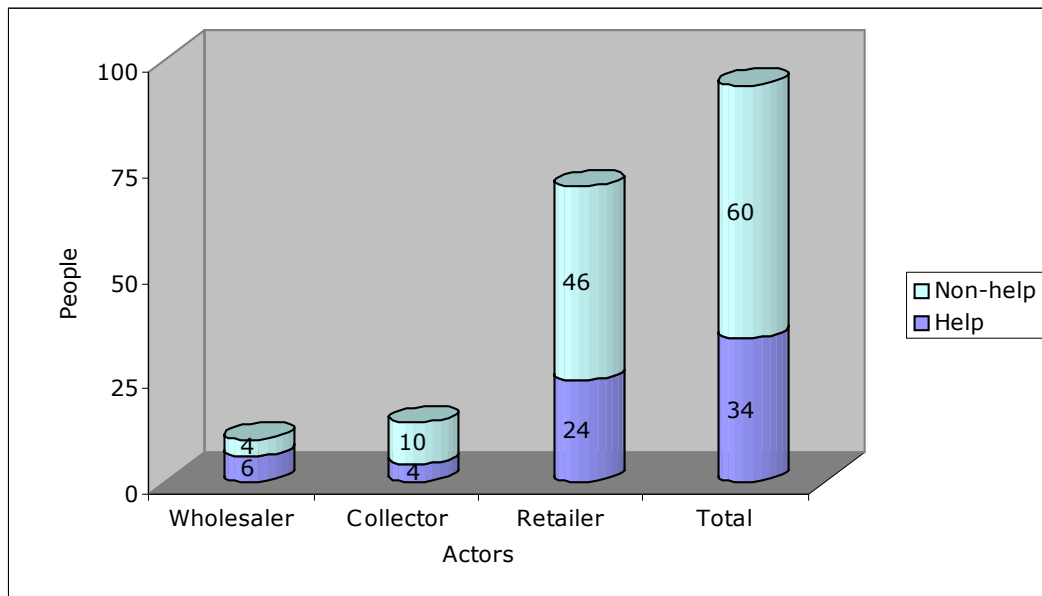


Figure 14. Extra (family) help in trading

7.8 Prices and consumption patterns of fish and aquatic plants in Hanoi:

The main species of aquatic plants that are grown in Hanoi include: water morning glory (WMG), water cress, water dropwort, water mimosa, and spice vegetables such as coriander. For fish sold in wholesale and retail markets, most of these fish are sold live, with traders putting fish into aerated iron tanks for display (most wholesalers use tanks of 2m² diameter whilst retailers use smaller tanks of 1 m² diameter), Aeration is used in order to keep the fish alive thus looking more healthy and fresh for the buyers. Sometimes due to electricity power cuts or the traders keeping fish at too high densities in the tanks fish can die, and in these instances the fish trader will keep fish on ice or for Tilapia process as fillets, for Common carp Indian and Bighead Carp cut into pieces and sell off as quickly as they can. For the low quality fish that they cannot keep alive such as Silver Carp and small fish sizes, they sell dead from water. Fermenting and smoking of fish is not practiced in Hanoi markets.

Aquatic plants are sold in bunches not by weight. The plants have to be sold very fresh. Producers pick and harvest Water morning glory from 2 to 4 am in the morning and then transport it to nearby wholesale markets (normally by bicycle or motorbike) where it is displayed and sold from 4 - 6 am. By 7 am most of the aquatic plants have already been transported and sold in the city's retail markets In general this process from harvest to sale in Hanoi's retail markets takes about 5 hours. Some other producers pick and harvest from 22:00 PM the previous evening, keep them fresh and then divide them into bundles, which are then transported and sold at 4:00 AM.

Cultured fish which are preferred live and fresh by consumers are normally harvested from 22:00pm to 2.00am in the early morning and then transported live by truck or motorbike often in plastic lined tanks or containers with water and aeration to

wholesale markets to be sold to retailers. Most retailers buy fish from wholesale markets which will then be sold at retail markets throughout inner city Hanoi. On average it takes approximately 8 hours from harvest to be sold live to the consumer. If fish are transported from provinces very far from Hanoi they might be harvested earlier than normal. Retailers in peri-urban Hanoi also regularly go to the pond-side to buy live and thus very fresh fish from the producers at 4:00 - 6:00 AM thus it only takes between 1 - 3 hours between harvesting the fish and selling them live in some of the city's retail markets.

Figure 15 shows that the difference in price of aquatic plants between producer and retailers is 815 VND/bunch for mimosa. The difference in price between the farm gate and retailers for Mimosa is higher at 502 VND/bunch than Water Morning Glory and 225 VND/bunch than spice vegetables (eg. coriander *Rau ngæ*, fragrant knotweed *rau rãm*).

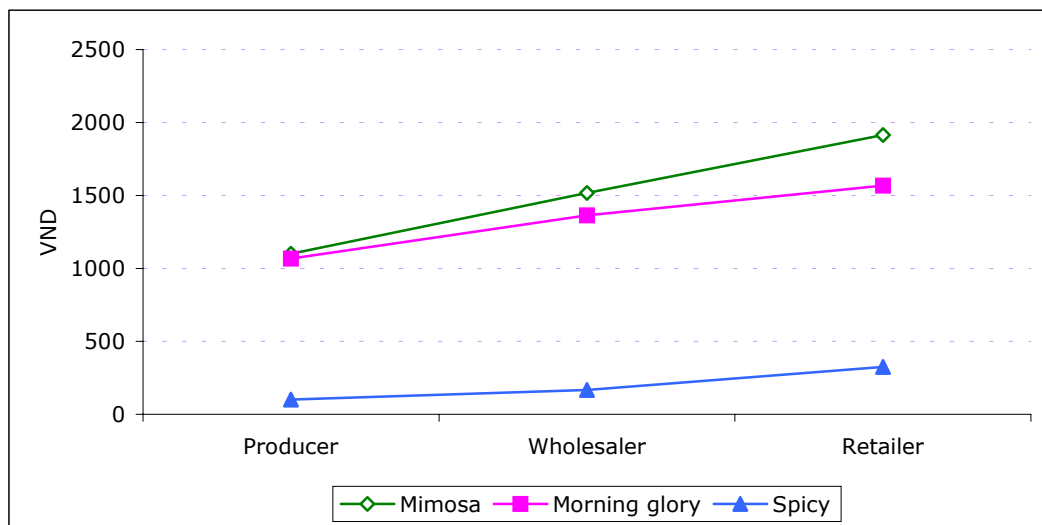


Figure 15. The differential tariff of aquatic plants between market actors

The main cultured fish species consumed in Hanoi city are Common carp, *Colomsoma* sp. and Nile Tilapia which are sold at higher prices than Indian carp, Grass carp, Silver carp and Bighead carp (Figure 16). This is the same as the difference in price between different levels of fish traders.

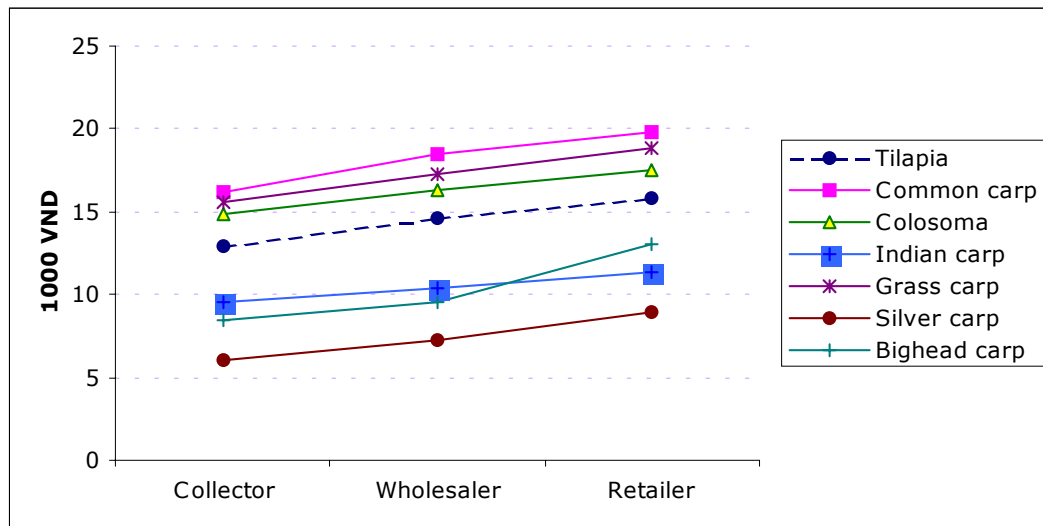


Figure 16. The difference in price of popular fish species between different levels of fish traders in Hanoi

From our survey on average Hanoi consumers buy fish twice per week, each purchase around 1 kg, and 3-4 times per week for aquatic plants, each time around 2 bunches. The number of bundles of mimosa & spice vegetables purchased from wholesalers is on average 10 times higher than that from retailers, however for water morning glory this figure is only 2-3 times that purchased from retailers (Figure 17). Similarly for fish the volumes sold are considerably higher than those from retailers (Figure 18).

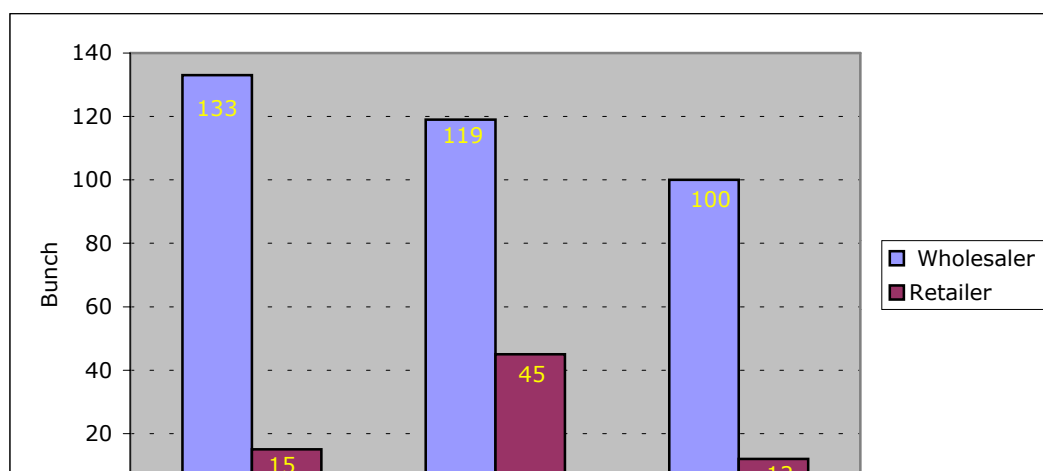


Figure 17. The average daily sales (bunches) of Aquatic plants for wholesalers and retailers

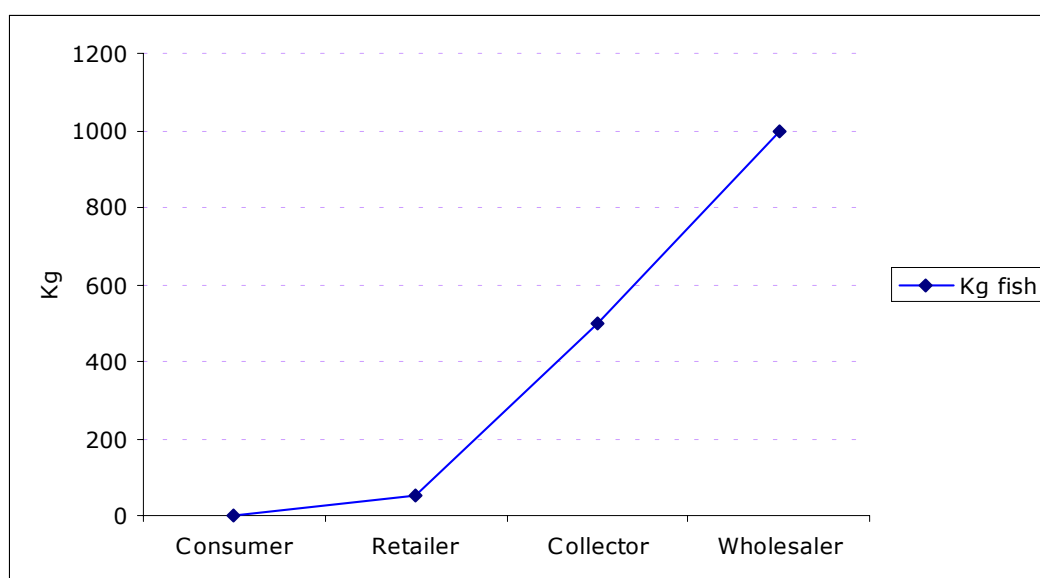


Figure 18. Average volume (kg) of cultured fish traded per day in Hanoi markets

Hanoi consumers generally buy the different fish species of cultured freshwater fish at the following sizes (Figure 18): Common carp (0.5-1 kg/fish), Grass carp (> 1.2 kg/fish), Major carp (0.5-0.8 kg/fish), Silver carp (0.8-1 kg/fish).

Mono-sex (all male) Nile tilapia and *Colosoma* sp. are still new products in Hanoi markets owing to the recent introduction of new fish seed and supply of fingerlings

for the fish farmers. Mono-sex Nile tilapia have been successfully researched and produced from RIA1, and then distributed to the fish farms in the regions around RIA1 and the North Vietnam. The *Tilapia mossambica strain* as a product has been cultured and sold for a very long time in Hanoi (Thanh Tri area), but recently it has proved not so popular in Hanoi markets because of its relatively small size, and perceived taste from being cultured in the city's wastewater. *Tilapia Oreochromis mossambicus* produced in wastewater in Hanoi are increasingly transported and sold to mountain areas for lower income consumers. Red tilapia did not appear in Hanoi markets during this survey in 2003, however are known to be sold in increasing numbers in markets in Ho Chi Minh City (Huy, 2003 pers comm.). *Colosoma* sp. has been introduced recently because supplies of fingerlings are now available from China and RIA1, however due to it being a voracious eater and associated problems with its culture, supply to Hanoi markets is not yet widespread.

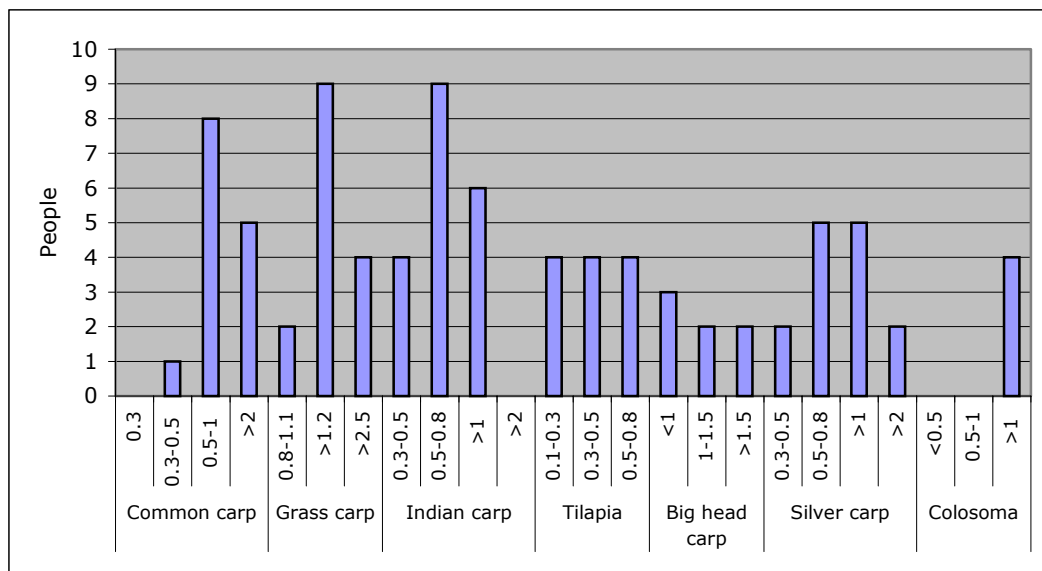


Figure 19. Consumer preferred size ranges for fresh water cultured fish sold in Hanoi markets

Consumers were asked in the survey their preferences for choosing and eating fish from the markets and these preferences are shown below in Figures 20 and 21.

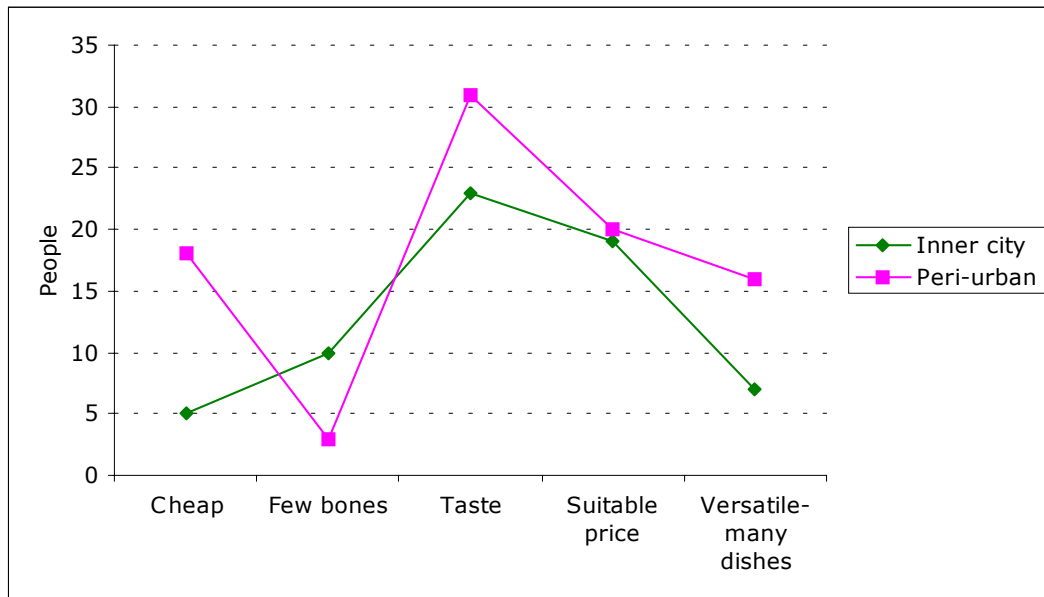


Figure 20. Consumer reasons for buying fish

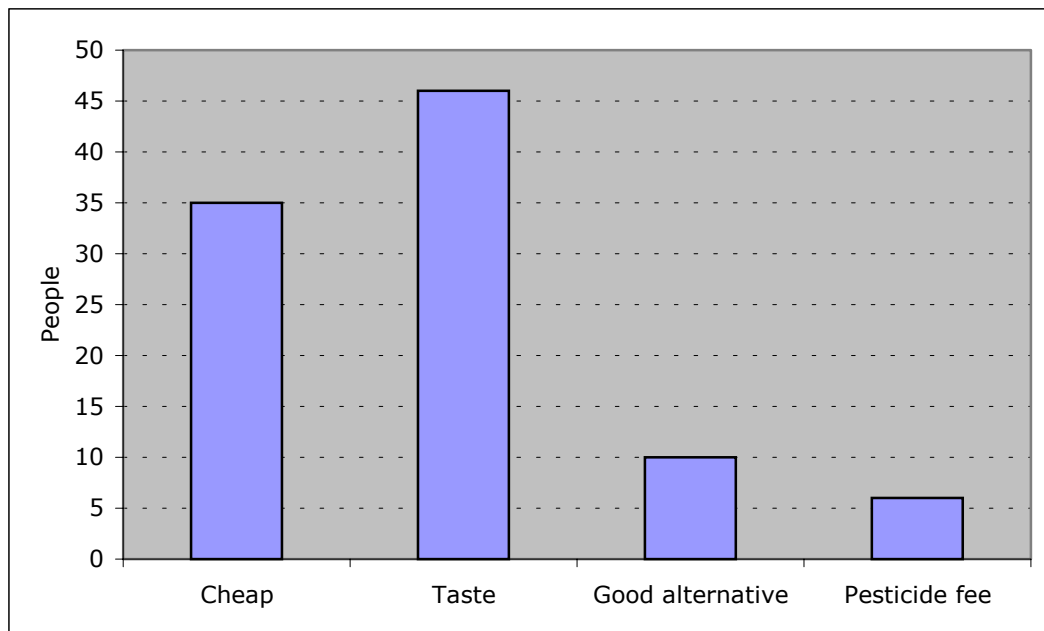


Figure 21. Consumer reasons for buying aquatic plants

Urban fish consumers interviewed chose certain species of fish because they considered them to be tasty, a suitable price, with few bones (especially Tilapia) whilst peri-urban consumers mentioned taste, cheaper price, and versatility ie they can make many different dishes from one fish such as the head and tail of the fish can be made into soup, and the body can be filleted and fried, etc.

Aquatic plant consumers preferred plant species that were easy to eat, and at a cheaper price. Interestingly fewer consumers mentioned the possible presence of pesticides in aquatic plants in preventing them from purchasing them in the city's markets. This is illustrated in Figure 21.

7.9 Market Regulations and Fees

At the time of our survey in 2003, the role of the government in Hanoi's fish and aquatic plant markets is mainly in the retail market sector. According to wholesalers, most fish wholesale markets are now not government managed but within a group of experienced wholesalers who work day to day in the wholesale markets there is an overall manager who oversees the administration and activities throughout the whole market, and usually this person is a man. Wholesaler traders have to pay a fee/rent to the manager for their stall, lorry or motor vehicle parking, electricity, water, security, cleaning and maintenance, loading and unloading, trading, selling, and collecting money. However retailers and collectors who come to wholesale markets are only liable to pay for parking and vehicle security.

Retailers in Hanoi retail markets have to pay fees for space/market stall, electricity, water, hygiene and maintenance. On average retailers in inner city markets have to

pay 250,000 VND/month but peri-urban retailers pay a lesser fee of about 120,000 VND/month.

Retailers or producers who have small amounts of aquatic products sell them out side on the periphery of the markets as well as going onto the street where they do not have “a set plot” and as a result pay correspondingly lower fees: 2000 VND/month/fish sellers and 1000 VND/month/ for aquatic plant sellers. In the newly opened (in 2000) government funded wholesale market “Dau Moi Phia Nam” traders only have to pay 2000 VND/per month/fish trader and 1000 VND/ per month for aquatic plant traders.

“Dau Moi Phia Nam” is the new wholesale market with very good facilities and infrastructure but is currently not attractive and under-utilized by fish and aquatic plant traders. This is mainly because the established wholesalers, retailers, and collectors are comfortable and used to doing business in Yen So and Thanh Tri Bus Station markets for many years, and thus do not want to move to the new wholesale market although it is located closer to the centre of the city.

In general, to compare the amount of the taxes/fees that the different types of traders have to pay related to their income is difficult and depends on the capacity and volume of business of individual traders. The value of the fees charged to traders who rent space in inner city retail markets is about 250 times that charged to retailers outside the markets who sell on the streets. This present traders fees structure encourages traders to sell aquatic products on the streets and thus also worsens the city’s increasing traffic problems. Smaller traders who rent market space therefore face difficulties maintaining profits, as they have to pay higher fees.

7.10 Hanoi's supermarkets and role within the marketing of aquatic produce.

Supermarkets have been developing rapidly in Hanoi in the last 5 years with up and coming fish processing companies being increasingly concerned to initially develop new urban markets and then move out to increase sales in the regions inland marketing. Fish are being prepared and sold in a number of new ways and packaging often with higher quality. These companies now regularly promote their product at Fisheries Trade Fairs in Hanoi.

According to our survey of supermarkets in Hanoi many products processed from catfish are produced by the Agifish co-operative company and supplied widely to supermarkets throughout Hanoi. Fivi-Mart supermarket sell packages of two cleaned, gutted farmed mono-sex tilapia frozen at 17.600 VND per 650 g – we estimate this to be twice as expensive compared to the retail price of whole fresh fish in the market. The DAFISH company are selling frozen and packaged farmed Colosoma whole fish without internal organs at 18.400 VND for 340g (54.000 VND/kg). This compares with whole live colosoma being sold in retail markets for 17.000 VND per kilo. It is uncertain if sale of fish in Hanoi's supermarkets is increasing and also the type of consumer who buys them. However if the current relatively high price of fish in supermarkets begins to decrease then volume of sales will increase making them available and attractive to a wider range of consumer.

7.11 Difficulties of aquatic plants traders due to Police

From our interviews a significant number of aquatic plant producers, collectors and wholesalers complained that they face increasing problems transporting their product by bicycle and motorcycle in day time from Hanoi's police who are strict on large loads causing accidents and traffic jams. They have to transport during the night and very early hours of the morning. By the law the police inner city can forbidden people transfer very large product by driving bicycle, motorbike and the retailer are not allowed to stand on the road to sell aquatic products because of the effect to the cities

transport. If any collector breaks the law they have to pay very high fines often up to and equal to their monthly income.

8. Conclusions

1. In the aquatic production marketing channels of Hanoi, there are three levels of market: wholesale market, retail market and street markets. Most of the fish wholesale markets are managed by group of local wholesalers. Aquatic plant wholesale markets are also developed naturally in convenient locations for access and transport.
2. It is mostly women who are involved in the retail sector and as consumers. Generally women are far more involved in aquatic plant trading than in fish trading. It is men who are mainly involved in fish collection/transport and as wholesalers.
3. A high proportion of wholesalers and collectors are between 36-45 and 46-55 years old, with retailers being more equally distributed between all three age group (26-35, 36-45 and 46-55).
4. Peri urban cultured fish make up between 10 -20% of the fish purchased in Hanoi markets – the remaining 80-90% originates from outside provinces. A significant proportion of these fish produced within peri-urban Hanoi actually are transported and sold to outside provinces.
5. Most of the fish products supplied into inner city retail markets come from fish wholesale markets, whilst fish products supplied into peri-urban retail markets come from the peri-urban districts.

6. The main fish species consumed in Hanoi city retail markets are Common carp, Grass carp, snakehead, Indian carps, Nile Tilapia, Colosoma and Silver carp. The main aquatic plants consumed during the survey were Water morning glory, water mimosa and water spice.
7. Most retail markets are managed by local government whilst most wholesale markets being controlled and managed by groups of wholesalers. Hanoi's many street markets are poorly regulated manage often leading to the city's increasing congestion and traffic problems.

9. Recommendations

1. The high demand from consumers for aquatic plants and fish in Hanoi is leading to increasing quantity and quality of the product. There is the need to increase aquatic production to supply the inner city so that agriculture institutions concerned such as District Extension Offices, District People's Committee, Vegetable and Fruit Research Institute and Hanoi Agriculture University should give more help to encourage producers.
2. There is the need to ensure that there are the necessary infrastructure and laws put into place which constructively contribute to help traders transport aquatic plants safely around the city. This would greatly improve the income earning potential of a number of the traders.
3. Fish and vegetable wholesale markets need to improve their management and develop plans from the government for building new wholesale markets whilst also encouraging traders to move their business off the streets to inside the markets so as to reduce the city's increasing traffic congestion.

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Appendix

QUESTIONNAIRE FOR authorities of fish wholesale market

Name of interviewer:

Date of interview:

Name of interviewee:

Name of market:

Address of interviewee:

Phone number:

Age: <15 15-25 26-35 36-45 46-55 >55 Gender: Male Female

How long have you been working in this market?

Do you know?

| Where are the fish and vegetable wholesale markets? | When did the market commence business? | How many wholesalers business in those markets? | Total of fish or aquatic plant exchange per day? |
|---|--|---|--|
| | | | |
| | | | |
| | | | |
| | | | |

- When did this wholesale market commence business?

- What institutions manage this market?

- How are activities in the market organised?

- How many fish wholesalers work in this market?

- Do wholesalers require a licence?

- What type of administration fee do wholesalers pay in this market for?

Space Electric, water Hygiene Security Guard Ticket Other

- Total of fee per wholesaler?VND/month

- Where the wholesalers in general come from?

- Any other important information?

- Do you have any difficulties or recommendations?

QUESTIONNAIRE FOR authorities of vegetable wholesale market

Name of interviewer:

Date of interview:

Name of interviewee:

Name of market:

Address of interviewee:

Phone number:

Age: <15 15-25 26-35 36-45 46-55 >55 Gender: Male Female

How long have you been working in this market?

Do you know?

| Where are vegetable wholesale markets? | When did the market commence business? | How many wholesalers business in those markets? | Total of aquatic plant exchange per day? |
|--|--|---|--|
| | | | |
| | | | |
| | | | |
| | | | |

- When did this wholesale market commence business?

- What institutions manage this market?

- How are activities in the market organised?

- How many wholesaler work in this market?

- Do wholesalers require a licence?

- What type of administration fee do wholesaler pay in this market for?

Ticket of space Ticket to keep motobike/bicycle Hygiene Security

Guard Other

- Total of fee per wholesaler?VND/month

- Where the wholesalers in general come from?

- Any other important information?

- Do you have any difficulties or recommendations?

QUESTIONNAIRE FOR FISH WHOLESALER

Name of interviewer:

Date of interview:

Name of interviewee:

Name of market:

Address of interviewee:

Phone number:

Age: <15 15-25 26-35 36-45 46-55 >55 Gender: Male Female

- How long have you been working in this business?

- Do you require a licence for your business? Yes No

- What type of administration fee do you pay in this market?

Space Electric, water Hygiene Security Guard Ticket Other

- Total fee per wholesaler:VND/month?

- Total quantity of fish you exchange per day?

- What are the sources of fish supply to this market?

+ Which province/District?

+ Rural Peri-urban Urban Fresh water Waste water

+ Distance from producer to wholesale market (km)?

+ Did your fish come via: Collector Directly you buy from a producer?

+ Time of harvesting: This early morning Yesterday afternoon

Other

+ How is it transported? Motorbike 3 wheel motobike Truck

Own Rent How much/trip:.....VND?

- How many Permanent contracts do you have? Collector..... Retailer.....
- How many Temporary contracts do you have? Collector..... Retailer
- How many labours or family members work for you? Cost/day for rent?
- What type of rent labour for? Collect money Guard Sell and weigh Other
- Post harvest handling? Living fish Ice Dead
- Where will your products go? Retail markets Rural Urban/Peri-urban Other
- Who buy your products? Retailer Collector Restaurant Other
- Any other important information?

- What are your difficulties/recommendations?

QUESTIONNAIRE FOR AQUATIC PLANTS WHOLESALER

Name of interviewer:

Date of interview:

Name of interviewee:

Name of market:

Address of interviewee:

Phone number:

Age: <15 15-25 26-35 36-45 46-55 >55 Gender: Male Female

- How long have you been working in this business?
- Do you require a licence for your business? Yes No
- What type of administration fee do you pay in this market?
 - Ticket of space Ticket to keep bicycle Hygiene Security Guard Other
- Total fee per wholesaler:VND/day?

- What are the sources of aquatic plants supply? Your farm Buy from producer

+ Which Province/District?

+ Rural Peri-urban Urban Fresh water Waste water

+ Distance from producer to wholesale market (km)?

+ Time of harvesting: This early morning Yesterday afternoon

Other

+ How is it transported? Bicycle Motorbike 3 wheel bicycle

- Please, help us some informations:

| What aquatic plants do you sell? | How many bunch do you sell per day? | Price you buy (VND/bunch)? | Price you sell (VND/bunch)? |
|---------------------------------------|-------------------------------------|----------------------------|-----------------------------|
| Water spinach | | | |
| Water mimosa (dismanthus) | | | |
| Coriander (<i>ngæ</i>) | | | |
| Fragrant knotweed (<i>rau r'ım</i>) | | | |
| Dropwort (<i>rau cÇn</i>) | | | |
| Water cress (<i>c¶i xoong</i>) | | | |

- Do you have permanent contracts with producer? No Yes

- Do you have temporary contracts with producer? No Yes

- How many labours or family members (help) work for you?

Cost/day for rent?

- What type of rent labour for? Cutting vegetable Sell Other

- Who buy your products? Retailer Middleman Restaurant Other

- Where will your buyers go? Retail markets Road market Restaurant

Urban

- What are your difficulties/recommendations?

QUESTIONNAIRE FOR FISH COLLECTOR

Name of interviewer:

Date of interview:

Name of interviewee:

Name of market:

Address of interviewee:

Phone number:

Age: <15 15-25 26-35 36-45 46-55 >55 Gender: Male Female

- Where are you from?
- How long have you been working in this business?
- Total quantity of fish you exchange per day?
- Where do you collect fish (District/Province)?
 - + Rural Peri-urban Urban Fresh water Waste water
 - + Distance from producer to wholesale market (km)?
 - + Time of harvesting: This early morning Yesterday afternoon
- Other
 - + How is it transported? Motorbike 3 wheel motobike Truck
 - Own Rent How much/trip:.....VND?
 - + How often do you collect from producer?
 - + How many producers do you collect for a trip?
- How many Permanent contracts do you have? Wholesaler..... Retailer.....
 Producer
- How many Temporary contracts do you have? Wholesaler..... Retailer.....
 Producer
- Do any members of your family help you or do you employ any one?
Yes..... No
- What fish species do you collect?
- Post harvest handling? Living fish Ice Dead
- Where do you deliver your fish? Retail markets Wholesale markets
 - Rural Urban/Peri-urban
- Who do you work for ? Retailer Wholesaler Restaurant
- Do you require a licence or observe any legislation? Yes No
- Are you: Wholesaler+ Colector Collector+ Retailer Collector ?
- Do you experience any change in collecting fish due to seasonal variations?
Yes No

- Price of fish in species and in size (buy and sell prices)?
- What type of administration fee do you have to pay? Total
fee/month?
- Any other important information?
- What are your difficulties/recommendations?

QUESTIONNAIRE FOR MANAGERS OF RETAIL MARKET

Name of interviewer: Date of interview:
 Name of interviewee: Name of market:
 Address of interviewee: Phone number:
 Age: <15 15-25 26-35 36-45 46-55 >55 Gender: Male Female

- How long have you been working in this market?
- Do you know any road market near here?
- When did this market start business?
- Does this market have any event? Fire Reconstruction Other
- What institutions manage this market?
- How are activities in the retail market organised?

- How many: Fish retailers work in this market? Vegetable retailer?
- What type of administration fee do retailer pay in this market?
 + Fish retailer: Space Electric, water Hygiene Security Guard
 Ticket Other
 + Vegetable retailer: Ticket Space Hygiene Security Guard
 Other
 Total many/month they have to pay? Fish retailer..... Vegetable
 retailer.....
- Where do the retailers in general come from?
 + Fish retailer:
 + Vegetable retailer:
- Do retailers require a licence? Yes No

- Any other important information?

- What are your difficulties/recommendations?

QUESTIONNAIRE FOR FISH RETAILER

Name of interviewer: _____ Date of interview: _____
 Name of interviewee: _____ Name of market: _____
 Address of interviewee: _____ Phone number: _____
 Age: <15 15-25 26-35 36-45 46-55 >55 Gender: Male Female

- How long have you been working in this business?
- Do you go to buy fish for your business? Yes No
 - If yes Which wholesale market? _____
 - If no You engage a collect? _____
 - Where do you buy from producer? _____
 - Producer wild fish from river? _____
- Where will you sell the products? Retail market Road market
- Where are you from? Urban Peri-urban Other provinces:.....
- Can you recognize fish from wastewater region? Yes No
- Do your buyers know which products come from wastewater regions? Yes No
- Which market do you sell your fish (if meet retailer at wholesale market)?
- What fish species do you usually sell?
- On average how many buyers per day do you serve?
- On average quantity per buyer (kg)?

- Do you require a licence?
- What type of administration fee do you pay? Total
fee/month?
 - Space Electric, water Hygiene Security Guard Ticket Other
- Do you have: Permanent Temporary contracts?
- If permanent contact, how many? Wholesaler... Collector...

Consumer.. ..

- Post harvest handling when you buy fish? Living fish Ice Dead
- Post harvest handling when you sell fish? Living fish Ice Dead
- Quantity of product you exchange per day (kg)?
- Are you: Collector+retailer Retailer
- Do any members of your family help you? Yes No What type of activity?.....
- Are there any seasonal varies in consumer buying behavior? Yes No
- Which food consumers are prefer? Aquaculture Wild fish Marine fish Beef Pig
- What are your difficulties/recommendations?
- Price of fish in species and in size (buy and sell prices)?

QUESTIONNAIRE FOR AQUATIC PLANTS RETAILER

Name of interviewer:

Date of interview:

Name of interviewee:

Name of market:

Address of interviewee:

Phone number:

Age: <15 15-25 26-35 36-45 46-55 >55

Gender: Male Female

- Where are you from? Urban..... Peri-urban..... Other provinces:.....
- How long have you been working in this business?
- Do you require a licene?

- What type of administration fee do you pay? Total fee/month?

Ticket of space Hygiene Security Guard Ticket to keep bycycle/motobike Other

- Please, help us some informations:

| What aquatic plants do you sell? | How many bunch do you sell per day? | Price you buy (VND/bunch)? | Price you sell (VND/bunch)? |
|----------------------------------|-------------------------------------|----------------------------|-----------------------------|
| Water spinach | | | |
| Water mimosa (dismanthus) | | | |
| Coriander (ngæ) | | | |
| Fragrant knotweed (rau r' m) | | | |
| Cress (rau cÇn) | | | |
| Water cress (c¶i xoong) | | | |

- Do you know what aquatic plants from?

Pond/lake Waste water Urban Peri- urban

- Where do you buy vegetables? Which wholesale market?

You engage a collect? Producer take to market for you?

- Which market do you sell water vegetable? Retail market Road market

- Distance from producer to retail market (km)?

- Do you know what time aquatic vegetables were cut? Yesterday This morning

- Do you have: Permanent Temporary contracts?

If permanent contact, how many? Wholesaler.... Collector....

Consumer.. ..

- Do any members of your family help you? Yes No What type of activity?

- Are there any seasonal variations in consumer buying behavior? Yes No

QUESTIONNAIRE FOR CONSUMER

Name of interviewer:

Date of interview:

Name of interviewee:

Name of market:

Address of interviewee:

Phone number:

Age: <15 15-25 26-35 36-45 46-55 >55 Gender: Male Female

Occupation:

- What aquatic products do you buy today?

| Fish species and aquatic vegetables? | Why do you like? | Quantity you buy today (No. of fish/No. bunch?) | Average size you buy (kg/fish)? | Price? VND/kg VND/bunch |
|--------------------------------------|------------------|---|---------------------------------|-------------------------|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

- Which fish species and aquatic vegetables you like most, why?

| Fish species and aquatic vegetables? | Why do you like it? | Average quantity/ buying time of (No. of fish/No. bunch) | Average size you buy (kg/fish) | Buying frequency/week? |
|--------------------------------------|---------------------|--|--------------------------------|------------------------|
| | | | | |
| | | | | |
| | | | | |
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| | | | | |
| | | | | |

- Do you worry about products from wastewater? Yes
 No
- Have you experience any problems when buying aquatic products? Yes No
 If yes, how can you know?

10. 2. Price of aquaculture products

| Fish species (Latin and Vietnamese name) | | 11. Size | Price (VND/kg) |
|---|--|-----------------|----------------|
| Tilapia (C, R« phi) | | <0,1 kg/fish | |
| | | 0,1-0,3 kg/fish | |
| | | 0,3-0,5 kg/fish | |
| | | 0,5-0,8 kg/fish | |
| | | >0,8 kg/fish | |
| Common carp (C, ChĐp) | | <0,3 kg/fish | |
| | | 0,3-0,5 kg/fish | |
| | | 0,5-0,8 kg/fish | |
| | | >0,8 kg/fish | |
| Colosoma sp. (C, Chim tr¼ng) | | <0,5 kg/fish | |
| | | 0,5-1 kg/fish | |
| | | >1kg/fish | |
| Mud carp (C, tr«i) | | 0,1-0,3 kg/fish | |
| | | 0,3-0,5 kg/fish | |
| | | 0,5-0,8 kg/fish | |
| | | > 1 kg/fish | |
| Grass carp (C, Tr¼m cá) | | <0,8 kg/fish | |
| | | 0,8-1,1 kg/fish | |
| | | >1,2 kg/fish | |
| | | >2,5 kg/fish | |
| Bighead carp (C, Mĩ hoa) | | <0,3 kg/fish | |
| | | 0,3-0,5 kg/fish | |
| | | 0,5-0,8 kg/fish | |
| | | >0,8 kg/fish | |
| Silver carp (C, Mĩ tr¼ng) | | <1 kg/fish | |
| | | 1-1,5 kg/fish | |
| | | >1,5 kg/fish | |
| Macrobrachium rosenbergii (T«m cụng xanh) | | >30 shrimp/kg | |
| | | 30 shrimp/kg | |
| | | 20 shrimp/kg | |

| | | | |
|------------------|--|--------------|--|
| | | 10 shrimp/kg | |
| Frog (Öch) | | >10 frog/kg | |
| | | 10 frog/kg | |
| | | 5-7 frog/kg | |
| Eel (L-ñ) | | <0,2 kg/eel | |
| | | 0,2 kg/eel | |
| | | >0,2 kg/eel | |
| Fresh water crab | | | |
| Snail | | | |