

IMPROVING SAFEFRUITS AND VEGETABLES (SF&V) SUPPLY CHAIN IN HANOI

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SUMMARY

Producing, trading and consuming safe vegetables and fruits is a hot and necessary issue of the social life. In this trend, safe vegetable supply chain studies would be meaningful in resolving problems. The article focuses on the difficulties of safe fruit and vegetable supply chains and looking for a solution to improve the efficiency of the chain. The current supply chain for SF&V is unsustainable because of some reasons that are loose linkage between factors, confusing market mechanism, difficulties in traceability and breach of commitment in quality and food hygiene and safety, etc. In order to develop SF&V supply chain in Hanoi, the above problems need to be solved thoroughly by a number of solutions that are targeted at each factor in the chain and concentrate on solving key constraints of these factors. These solutions should be completing the chain's structure; raising awareness of the whole society as well as of factors about SF&V; fulfilling institutions and policies related to production and consumption SF&V; advertising, popularizing and propagating widely to people about processes, effects and images of safe vegetables and solving problems of traceability, etc.

Keywords: Added value, safe fruits and vegetables, supply chain.

I. INTRODUCTION

Currently, a number of F&V supply chains have been established in Hanoi with diversified types and varied types of supply. Huge market demand, many chain participants and large cultivating areas are some of favorable elements for building and developing an efficient chain. However, sustainable supply chains for F&V including all stages from production, preliminary treatment to consumption have not been built yet in Hanoi and especially, F&V consumption is difficult due to lack of participated enterprises. These problems lead to the fact that consumers do not have faith and producers do not have efforts. On the other hand, the Government does have enough regulations on conditions for trading F&V to ensure food hygiene and safety, regulations on business management and transportation of vegetables, and especially regulations on management of F&V in markets. In addition, most of the products have not been able to be identified and distinguished that whether they are safe or unsafe. Many previous studies have also shown that the linkage between factors in the chain is not very

tight and sustainable, the solutions to create added value have not been agreed by all factors, policies are not closed to the reality of production, and the market is not properly regulated. In order to achieve high efficiency, the development and improvement of Hanoi's SF&V supply chain should be based on evaluations and analysis in new conditions and trends. The article focuses on the difficulties of safe fruit and vegetable supply chains and looking for a solution to improve the efficiency of the chain.

II. RESEARCH METHODOLOGY

Method of collecting data

The secondary data is collected and analyzed as an overview of the F&V industry in Ha Noi. These documents include: reports Report of state management agencies (Department of Agriculture and Rural Development in Hanoi, Hanoi Statistics Office), research papers, master theses.

The primary data: Conducted a random and direct interview of 200 producers, traders and consumers in the field of vegetables and fruits in Hanoi such as Gia Lam, Chuong My and Hoai Duc. The authors implement a face-to-

face interview by using Questionnaire for 100 production households, 20 collectors, 20 wholesalers, 20 retailers and 40 consumers in March 2017. After that, the collected information was verified by some staff working in the Ministry of Farmers Association, management boards of markets and supermarkets... in Hanoi

Method of analyzing data

Chain analysis methodology has been applied to identify the agents participated in the chain (from input supply to production, productive process, collection, preliminary treatment and marketing) and flow analysis of products from manufacturing to consumption across different channels.

Besides the study applies descriptive

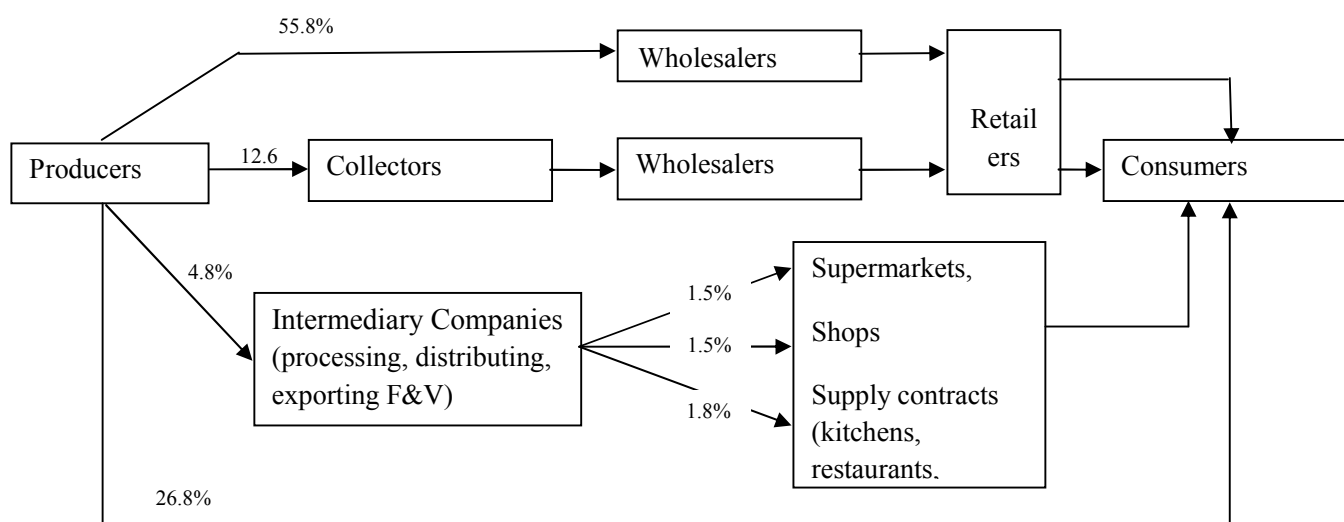


Figure 1. Structure of Hanoi's safe fruits and vegetables supply chain (Sở NN&PTNT Hà Nội, 2016)

3.1.2. Characteristics of the factors involved in the Hanoi's safe fruits and vegetables supply chain

The SF&V consumption channel consists of the following main factors: producers, collectors (traders are individuals or companies), wholesalers, retailers (shops, stalls in markets and supermarkets) and consumers (Ho Thanh Son, Đao The Anh, 2006).

Producers: F&V production is considered one of the main income sources for farmers due to its year-round cultivation. Especially in

statistical methods, cost-revenue analysis, economic analysis of the chain, value-added analysis for each stage and for the whole value chain of several main product channels.

III. RESULTS AND DISCUSSION

3.1. Structure of safe fruits and vegetables supply chain in Hanoi

3.1.1. Model of safe fruits and vegetables (SF&V) supply chain in Hanoi

Hanoi's supply chain for SF&V has its own characteristics (the market fluctuates frequently, including fluctuations in supply, demand, price and notably fluctuations in the adjustment of income distribution between different stages of the chain). This chain consists of 4 channels, shown in the figure.

recent years, safe vegetables growers have been receiving lots of guidance on production process and the integrated disease prevention (IPM) in projects and programs inside and outside Vietnam. In addition, these projects and programs have also been supporting farmers in fertilizers, supplies, net houses and wells so that they can actively grow vegetables in harsh weather conditions. As a result, the scale of F&V production has increased in both area and type, in which leaf vegetables production still occupies the leading position.

Collectors

Most collectors are members of groups and cooperatives producing SF&V, and they are capable of trading, so they collect SF&V to sell to their customers.

- The collectors sell products to customers: retailers (shops, stalls and supermarkets, etc.) and consumers (kitchens of kindergartens, primary schools, etc.) in Hanoi.

- The average volume of consumed SF&V is 300 kg/day or 108 tons/year/person.

- The purchase and sale of clean F&V is under contracts or agreements between the two parties.

- The main means of transportation are motorbikes (transport 200 - 250 kg/trip), small trucks (transport 1 ton/trip).

- The collectors supply to a maximum number of 10 customers/retailers and a minimum number of about 3 retail outlets including retail stores, supermarkets and kitchens.

- Collectors usually have relationships with about 10 producers, however they only purchase from 4 - 7 producers each time with a volume of about 40 - 100 kg/producer.

Intermediary companies: They are limited companies that accounts for intermediate stages in consuming F&V. They contact directly with groups and cooperatives of production through Hanoi Plant Protection Department (as a technical supervisor of production) to purchase F&V for selling to shops, stalls and supermarkets in Hanoi. Some companies cooperate with Hanoi Plant Protection Department to monitor the production stage as well as the post-harvest stages such as packing, pasting bar codes and leading each bunch of vegetables after signing contracts with the producers. Those companies consume 400 - 2000 kg of vegetables in 10 - 40 varied types depending on the season every day.

Wholesalers: Wholesalers in Hanoi's SF&V supply chain are shop owners, stall owners at wholesale markets and central markets. They buy the bulk of vegetables from producers that are transported either by themselves or by the producers, and then sell to retailers in two ways: on-the-spot or transport to the retailers as requested. In this chain, wholesalers take up large quantities and are responsible for distributing large amounts of products to the rest.

Retailers: In Hanoi, retailers are supermarkets and clean vegetable shops/stalls located on the streets and in the central markets. A clean F&V shop or stall consumes an average of 120 kg per day, or about 40 tons per year per store/stall while a safe vegetables store consumes at least 40 kg of and at most 200 kg per day. In addition, a normal supermarket consumes from 80 kg to 350 kg, but each of Big C supermarket and Intimex supermarket is currently able to consume around 500 - 700 kg/day.

Consumers: Consumers of SF&V have great demand now. In Hanoi, demand for SF&V is about 3,000 tons/day. However, the SF&V supply chain in Hanoi only meets about 30% of the demand, while the remaining 70% is supplied by agents outside Hanoi. It becomes more difficult and complicated than ever to manage the quality of F&V. Consumers want to use safe products, but their faith has been gradually lost due to the lack of transparency of the market and the chaotic quality of F&V currently.

3.2. Difficulties in developing fruits and vegetables supply chain in Hanoi

3.2.1. Weak linkages among actors (horizontal and vertical links)

Horizontal linkages in the Hanoi's SF&V supply chain have not yet been formed clearly (Nguyen Thi Tan Loc, Do Kim Chung, 2015). The factors in the same stage do not have the cooperation with each other, and even are

exposed to compete fiercely with each other, causing the sales relationships become tense and broken. Specifically, horizontal linkages in the chain of SF&V in Hanoi are as follows:

- Households (groups, cooperatives) growing SF&V: Most of the groups and households have less communication and coordination in using methods for production and consumption. Meanwhile, agricultural cultivation always requires close coordination and cooperation in order to share experiences, apply science and technology as well as implement pest control. In the production of F&V in Hanoi, we still see some pictures of farmers spraying pesticides when the other households are harvesting, or throwing bottles on the rice field after using. Spraying pesticides individually and separately will reduce prevention effect and increase costs or even seriously affect the quality and food hygiene and safety. In the consumption of products, the households are clearly demonstrating a high competition when fighting for customers and causing bad news that makes other producers suffer losses, etc. Clearly, producers are likely to lack strong solidarity with each other leads to the fact that the private traders take advantage of price forcing. After all, the producers will suffer the heaviest losses.

- Intermediary traders: Collectors who collect SF&V do not have clear market segmentation. In many cases, farmer households sell F&V to far-off traders, while local traders have to collect in other remote areas. This increases the cost of transportation during the collection process. In addition, there are many cases where traders suddenly raise their prices temporarily to win customers and this problem will disturb the purchase of F&V and negatively affect the linkage between farmers and previous collectors.

The relationship between factors including

intermediate companies, wholesalers, and retailers also manifests many weaknesses when regularly competing to buy and sell, and even distorting competitors. This makes prices in the market unstable, product quality reduced as a result of unfair competition, etc.

- Preliminary treatment and processing units of SF&V also have no connection in sharing raw materials when necessary. Some units speculated deliberately to wait for price increasing or maintaining the upper position in the market and this problem is very risky because the market is unstable and the mechanism of coordination in associations is still weak. Meanwhile, many units lack raw materials for preliminary treatment and processing due to their weak relationships with the traders. In particular, local preliminary treatment units also have fierce competition on raw materials and human resources, etc. Therefore, the horizontal linkage at the stage of preliminary treatment in the value chain is not strictly close and does not support each other for sustainable development.

The vertical linkage in Hanoi's SF&V supply chain is very loose (Nguyen Thi Tan Loc, Do Kim Chung, 2015), the allocation of added value in the chain has as inconsequential bias and the structure of the chain is not strong and solid. In particular, the vertical linkage in the supply chain for SF&V of Hanoi is as follows:

- Linkage between growers and traders: Most transactions are carried out by oral or short-term contracts with less risk-sharing terms. In many cases, farmers can sell to different traders in different harvests. This causes the flow of material to be unstable and makes the process of the chain's operation at the first stage less rhythmic.

Moreover, in the process of operating Hanoi's F&V supply chain, producers still take more disadvantages when traders or

intermediary companies show their upper positions in the market. Producers are still suffering price forcing and quantity squeezing because they cannot sell their products.

- The linkage among collectors, wholesalers and retailers is very superficial. They clearly show that their main goals are to seek profit and only a few of them are providing good-quality products for the market. But when the market is in trouble, they are not ready to deal with it. In Hanoi, wholesale markets are the places where the F&V transactions are taken place most hectically, but are based solely on buy and sell relationships, with no official contracts being used.

- The linkage between retailers and consumers today can be considered to be the most rigorous, as consumers tend to buy F&V at familiar sale units that close to their houses or near the their offices. However, this relationship is rarely sustained or consolidated as it is done on buy and sell transactions. Complaints or feedbacks of consumers after using are often not satisfactorily resolved by retailers because they are out of reach of these retailers.

In short, the linkage in Hanoi's SF&V supply chain is quite loose, the process of operation is not based on sustainable and tight linkages and the structure of the value chain is not solid enough and strongly affected by outside factors. Horizontal and vertical linkages have not been formed properly that causes the chain's operation has many gaps, so that it will be very difficult to guarantee quality, food hygiene and safety as well as price stability of the chain.

3.2.2. Difficulties in safe fruit and vegetable traceability and verification

In order to trace the origin of vegetable products, Hanoi has piloted stamping agricultural products that was identification label of wholesale safe vegetable products in

2011 (Van Duc). In 2012 the project has been replicated with the retail products in some provinces: Duyen Ha, Thanh Da, Trang Viet... By 2015, 40 establishments had been affixed identification stamp, each of them was provided a code number, stamped products had been widely sold in Hanoi and other provinces, which is appreciated by enterprises and consumers. From the results of pilot labling and identification stamp, Hanoi Production and Plan Protection Subdepartment has registred "the certification of Hanoi safe vegetables" and has been granted by the National Office Of Intellectual Property in Decision No. 9258/QD-SHTT dated 9th/02/2015. Up to now, enterprises have self-printed and affixed identification stamp to develop their brand. However, in Hanoi, only 50 percent of vegetable land had been certified safety according to Vietgap or Globalgap standard, making up approximately 2% of vegetable land (Hanoi Statistic Department). These results are very modest for a large market like Hanoi, 92% of safety vegetables sold in Hanoi market without stamps and identification labels. This makes difficulty in tracing and verifying vegetable products and has negative impact on psychology of customers as well as difficulty in management.

3.2.3. Ineffective law and regulations enforcement on food quality management

The policy mechanism is still confusing

Policy is an indirect but important factor in the implementation of the chain's activities and enhancing the added value of Hanoi's SF&V supply chain.

The Government's policies support in the production, consumption and development of products and goods. Specifically, the supporting in consultancy, scientific and technological transferring and agricultural extension has been implemented, but has a bias in formality and does not emphasize the roles

of agricultural extension organizations and local authorities. In addition, there is limitation of the production consultancy on seeds and techniques as well as propaganda to raise awareness and knowledge of the chain's factors and of the society and that problem makes the quality of the chain's linkage decreased.

Policies related to planning production areas and linking production areas with processing and consumption activities have not been paid enough attention.

Policies regarding to market management on quality, price, food hygiene and safety, etc. are overlapped and lack of communication among different ministries and industries. The management of products and goods in the market is still loose because the regulations of penalties and punishment are too light and insufficient to deter violators. That causes the market to be chaotic in terms of quality, price, food hygiene and safety, etc. Consumers lose their faith upon products so that creating and developing the real chain have many obstacles.

Another problem is that the policies in advertising and developing brands are not been invested and paid proper attention. Among the thousands of F&V in the market, a few of them are branded and consolidate their brands over time because the chain's factors are not aware of the importance of brand development, nor have the capacity and experiences to successfully build and develop their brands. In order to do that, the role of the Government is very important in supporting consumption, advertising and marketing brands both in Vietnam and other countries.

The violation of engagement in ensuring food quality and food safety (Moustier, Nguyen Thi Tan Loc, 2003)

Firstly, the agents in the chain abuse pesticides in cultivating and preserving vegetables, it is no doubt that pesticides are important factors that affect productivity,

quality and cost of agricultural products. However, using too much chemical substance may negatively influence on benefit of customers and other members in the chain, farmers still overuse pesticides because of their profit. This is not a positive situation which greatly affects the value added for farmers in particular and the whole chain in general.

Using pesticides has two-way harmful effect on both cultivators as well as consumers, according to a inspection of Ministry Of Agriculture And Rural Development (2016), in 25 samples of vegetables in the districts of Hanoi, up to 24% of them contained pesticide residues and 1.4% of them exceeded the limitation standard of toxic substances. Overusing pesticides could directly damage the health of customers and other participants in the supply chain.

Hoang Van Thuc, a cultivators of safety vegetables in Dong Anh, said farmers do not want to use pesticides because of understanding harmful effect on themselves. However, without using pesticides, they could not earn enough income for their family. Therefore, all households have to participate into pesticide war. With intermediate agents as wholesalers, they want to preserve vegetables longer and to make them more attractive, they also easily use toxic substances. In addition, with desire of making quick profit, many people merge regular vegetable and safe vegetables together for sale in the market.

Secondly, the application of technology on cultivation, preservation and consumption process is limited.

In Hanoi, many households have not met the technical standard in cultivation such as VietGAP, GlobalGAP which causes reducing quality of vegetables, lowering price and added values. At present, in Hanoi, the area of vegetable has been certificated safety is very small (no more than 2% of total area). And only 50% of vegetable cultivating in the area

has been sold under safety label. This fact make customers have no choice to use high quality products, producers get lower profit due to high level of competition, vegetable products lose potential market when the demand of society has changed a lot.

Furthermore, cultivated processes almost are manual in many stages, breed selection stage is an example, many farmers choose vegetable varieties under the consideration of their sense, tips or advertising. As a consequence, the quality of vegetable seed is not good that leads to low productivity. Other limitation is in cropping and processing stage, using backward technology, lacking of storage equipment, bad habit of farmers. So, losing rate in harvest is high. According to statistics of the Institute of Agricultural Economics, almost agricultural and forestry companies are using outdated technology, factories are temporary, only 1 - 5% of the products are of international quality.

In addition, the connection between farmers and processing factories in the supply chain in Hanoi has shown many weaknesses, making the chain difficult to obtain good results.

Thirdly, the limitations of awareness and knowledge of agents in the supply chain that make several mistakes in implementing of food quality and food safety policy. Farmers lack of knowledge about post-harvest, seed selection, market, business, building brand. Their opinion about becoming a member in supply chain is ambiguous. Their desire to get benefit quickly ignore consumer's right by using unsustainable seeds, overusing of pesticides. As a result, their products are unsafe that is harmful for customer's health.

The perception of agricultural suppliers, collectors, wholesalers, retailers, processors, also have a significant impact on the efficiency and added value of the supply chain

The perception and knowledge of consumers have a direct and important

influence on food safety. In the current supply chain of vegetables and fruits in Hanoi, many consumers are skeptical and losing confidence in vegetable products but for economic reasons they still have to consume these products. Consumers themselves are not sufficiently aware and wise to be able to decide which product is the best suited. In addition, a large number of people prefer to buy foreign goods rather than domestic ones, because they believe that imported vegetables are safer for their health inspite of expensive cost, especially, when the safe vegetable market in Vietnam is chaotic and lacking of transparent. As a consequence, consumers do not have opportunity to use safe and well-known products which are cheaper than imported ones.

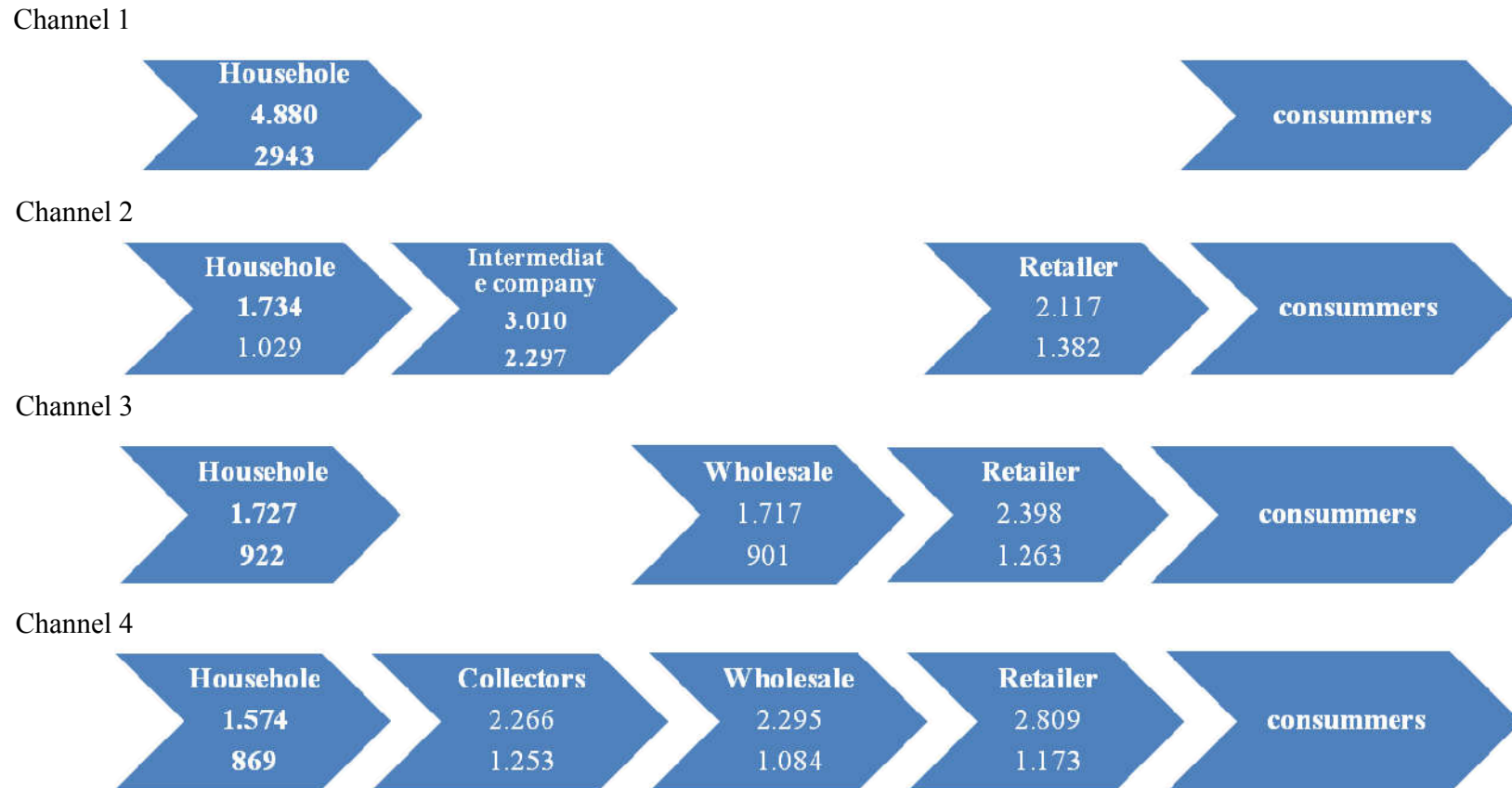
3.2.4. Unequal distribution of added value among actors

Based on the results of a study on safe tomatoes in Gia Lam - Hanoi, the table below may explain some of the issues involved.

Firstly, the fourth chain is full of participants and the price is highest compared with other chains while quality of services and products are not better than other chains. This indicates that the fourth chain need to be redesigned to solve the weakness and to meet the consumer's needs.

Secondly, only in the first chain, farmers enjoy 100% of added value because they sell directly their products to consumers. Whereas, in the second chain, the third chain and the fourth chain, farmers get smallest part of added values while they have to work hard and face with high level of risk. This situation put farmers under high pressure, most of them hard to overcome seducement of temporary benefit, who accept cheating buyers. The huge disparity between final price of vegetables and farmer's income is root cause of unsustainable agriculture.

**Table 1. Valued and gross profit of tomato supply chain in Hanoi
(Unit: VND/kg)**



It is thought that in the supply chain, the intermediate agents are the most important, they have the power to decide how to distribute value to the remaining agents in the chain, therefore it is obvious that farmers will get the lowest added value. As a result of this opinion, intermediate agents pay unfairly for farmer's products, obviously farmers always are loser. In fact, farmers don't have enough power to reverse the situation because their output depend on distributors. Consequently, the intermediary still proves its superiority.

3.3. Solutions to develop and improve fruit and vegetable supply chain in Hanoi

At present, Hanoi's authority has issued policies to support agriculture sector such as training of safe vegetable cultivation techniques for households, supporting funds for irrigation systems, grouping individual households into safe vegetable co-operative with specific address and brand. In addition, Hanoi Department of Industry and Trade will open 29 trading places for safe agricultural products and supporting safe vegetable to sell in all supermarkets. The facts have shown that fresh fruit and safe vegetables are difficult to sell because the authorities loose control. Thus, in order to overcome this situation, Hanoi Department of Science and Technology is preparing to issue specific quality standards for safe vegetables and fruits for both producers and traders (MARD, 2012).

However, the strategic solutions will focus on the following content:

- The State, departments and local authorities should pay more attention on planning of specialized vegetable production

areas. Developing safe vegetable production on farm scale or cooperative model, thus enabling good horizontal links in the supply chain.

- Improving chain structure is a strategic solution, long chain has many disadvantages such as managing hard, increasing cost, lowering quality. Therefore, so as to develop the chain sustainably and creating more added values for all agents, long chain needs to be carefully researched to improve the structure.

- The role of state and local authority is extremely important. Moreover, it is necessary to increase the propaganda and orientation of vegetable cultivation to ensure the profitability of producers, the safety of users and the interests of agents. Local authority need to prevent farmer to use toxic pesticides in their cultivating process and encourage them to use environmentally-friendly pesticides.

- The state need to institutionalize the process of cultivating, harvesting, producing, collecting and businessing safe vegetables and fruits. Even authorities can criminalize serious incidents that may harmful for customer's health. As a result, safe agricultural products market is likely become stable and sustainable.

- Continuing to build a safe vegetable and fruit brand by enhancing production activities, improving quality of products, broadcasting high quality products that meet international standards. At present, the vegetable area and output is much smaller than consumer's demand, however output for safe vegetable is still difficult because of lacking believe of buyers. Thus, it is need to advertise and prove the high quality and safety of vegetables by

strictly fulfilling international standards. Moreover, vegetable farms should build consumer's trust by speeding up the process of stamping, labling and branding to meet the standard requirements and it help buyers easily to trace the origin of products.

- Improving operation of quarantine, quality control and food safety systems.

One of the reasons why the fruit and vegetable chain has not achieved the desired effect is that the market is still disturbed, the product quality is unreliable, the operation of management agencies is lax and incomprehensive. Therefore, necessary solution is to strengthen in term of market policy, synchronizing and radicalizing in market management to help consumers having more oppotunity to use safe agricultural products.

IV. CONCLUSION

The study shows the most basic issues of the safe fruit and vegetable supply chain in Hanoi. Basing on survey data, calculations and analyzes of collected information, author has been assessed value added at different stage in the supply chain of vegetable, and clarified the difficulties in developing fruit and vegetable supply chain in Hanoi. Based on that, the author has proposed solutions to improve the supply chain, increase the efficiency and sustainability.

Conducting survey of the supply chain (for producers, collectors, intermediaries, retailers and consumers) takes a lot of time and effort. However, due to limitation of fund and capacity, the sample size was relatively small,

the sampling method was only on safe tomato products. Thus, the result may not as good as expectation.

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HOÀN THIỆN CHUỖI CUNG ỨNG RAU QUẢ AN TOÀN TẠI HÀ NỘI

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TÓM TẮT

Sản xuất, kinh doanh và tiêu dùng rau quả an toàn hiện đang là vấn đề nóng và bức thiết của toàn xã hội. Trong xu thế ấy, các nghiên cứu chuỗi cung ứng rau quả an toàn sẽ có ý nghĩa nhất định trong việc giải quyết các khó khăn vướng mắc. Bài viết tập trung vào các khó khăn mà chuỗi cung ứng rau quả an toàn đang gặp phải và tìm kiếm các giải pháp hoàn thiện, nâng cao hiệu quả của chuỗi. Chuỗi cung ứng rau quả hiện nay rất thiếu bền vững bởi mối liên kết giữa các tác nhân thường lỏng lẻo, cơ chế thị trường còn nhiều khúc mắc, vấn đề truy xuất nguồn gốc sản phẩm khó khăn, các cam kết về chất lượng và VSATTP bị vi phạm... Muốn phát triển chuỗi này đòi hỏi phải giải quyết triệt để những tồn tại trên đây. Các giải pháp đề xuất được hướng vào từng tác nhân tham gia trong chuỗi, tập trung vào giải quyết những khó khăn mấu chốt của các tác nhân này, đó là: hoàn thiện cấu trúc chuỗi, nâng cao nhận thức của xã hội, của các tác nhân về rau quả; hoàn thiện các thể chế chính sách liên quan đến sản xuất, tiêu thụ rau quả; quảng bá, phổ biến, tuyên truyền rộng rãi tới toàn thể người dân về quy trình, tác dụng và hình ảnh, thương hiệu RAT; giải quyết vấn đề truy xuất nguồn gốc sản phẩm...

Từ khóa: Chuỗi cung ứng, giá trị gia tăng, rau quả an toàn.

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