

# Fresh Vegetable Supply Chain in Nakorn Pathom Province for Exporting

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**Abstract**—Thailand is the agriculture country as the weather and geography are suitable for agriculture environment. In 2011, the quantity of exported fresh vegetable was 126,069 tons which valued 117.1 million US dollars. Although the fresh vegetable has a high potential in exporting, there also have a lack of knowledge such as chemical usage, land usage, marketing and also the transportation and logistics. Nakorn Pathom province is the area which the farmer and manufacturer of fresh vegetable located. The objectives of this study are to study the basic information of the local fresh vegetable farmers in Nakorn Pathom province, to study the factor which effects the management of the fresh vegetable supply chain in Nakorn Pathom province and to study the problems and obstacle of the fresh vegetable supply chain in Nakorn Pathom province. This study is limited to the flow of the Nakorn Pathom province fresh vegetable from the farmers to the country which import the vegetable from Thailand. The populations of this study are 100 local farmers in Nakorn Pathom province. The result of this study shows that the key process of the fresh vegetable supply chain is in the supply sourcing process and manufacturing process.

**Keywords**—Exporting, Fresh Vegetable, Nakorn Pathom Province, Supply Chain.

## I. INTRODUCTION AND BACKGROUNDS

FRESH vegetable is the top priority exported product of Thailand which accounted for 117.1 million US dollar or 126,069 tons in quantity. The main importers of Thai fresh vegetable are Japan, Taiwan, Indonesia and Malaysia. Japan is the largest importer of Thai fresh vegetable. Even though the fresh vegetable is the very potential exported product, there still have a lot of weakness for both Thai government and private sector to develop.

Nakorn Pathom is the province in the west region of Thailand which has the capability to produce and export the fresh vegetable because it still has high natural resource and the good irrigation system. That makes Nakorn Patom is the province that be able to grow the fresh vegetable all year long. It is the location of several fresh vegetable exporting companies and also close to Bangkok which makes the transportation is very efficient.

Fresh vegetable is a perishable product so it needs a very careful and delicated storage but nowadays the process that the farmers handle the fresh vegetable are not quite appropriated.

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So as the policy of Thai government that wants Thailand to be the “World kitchen”, the entrepreneurs along the supply chain of fresh vegetable are grouping with each other in order to strength the supply chain of the fresh vegetable of Thailand in both quantity and quality aspects. According to those reasons, the study of the factors, problems and difficulties in the supply chain of the fresh vegetable of Nakorn Pathom from the upstream which is the local farmers to downstream is Thai fresh vegetable importer is very essential in order to develop and promote the Thai fresh vegetable competitiveness and become the leader in the fresh vegetable exporter market.

There are 2 objectives of this research which are to study the pattern of the fresh vegetable supply chain for export in Nakorn Pathom province and to study the factor that might affect the fresh vegetable supply chain for export in Nakorn Pathom province.

## II. LITERATURE REVIEW

### A. Supply Chain Management Definition

There are so many definition of supply chain management such as Supply chain management encompasses materials/supply management from the supply of basic raw materials to final product (and possible recycling and re-use). Supply chain management focuses on how firms utilize their suppliers' processes, technology and capability to enhance competitive advantage. It is a management philosophy that extends traditional intra-enterprise activities by bringing trading partners together with the common goal of optimization and efficiency [4], Network of organisations that are involved, through upstream and downstream linkages, in the different processes and activities that produce value in the form of products and services in the hands of the ultimate consumer [1] and etc. But for the fresh vegetable supply chain definition there still have no specific definition for. This research is based on the supply chain definition not by the fresh vegetable supply chain definition

### B. Related Research

Reference [3] shows that the supply chain management of fresh vegetable in Nakorn Pathom Province is started from the farmers to the factory and to the market place. It also showed that the supply chain of the fresh vegetable can be divided into 2 types which are the original supply chain and the exported supply chain. The research also found out that the most concerned issue of the fresh vegetable supply chain is the price of the crop. And the suggestion from this research is to promote the co-operative between the farmers and educated the farmer about the agricultural technology and marketing

because nowadays it is very essential for the farmers to be educated about the technology and marketing.

Reference [2] found out that the logistics cost of the pineapple agriculturist in the case that the transportation is done by the agriculturist himself is 0.723 baht per kilogram which is accounted to 18.66 percent of the total cost. But if the transportation is outsourced, the logistics cost will decrease to 0.245 baht per kilogram which is accounted to 7.2 percent only. And it was found that the highest logistics cost is not the transportation cost but the order processing cost which is accounted to 28.41 %

III. RESEARCH METHODOLOGY

This research is the descriptive research and exploration research which is objected to study the pattern of the fresh vegetable supply chain for export in Nakorn Phathom province and study the factor that might affect the fresh vegetable supply chain for export in Nakorn Phathom province in order to plan the most suitable supply chain pattern for the fresh vegetable supply chain for export in Nakorn Phathom province. In this research, the descriptive questionnaire is used. The population of this research is 100 local farmers and exporters of the fresh vegetable in Nakorn Phathom province selected by using the purposive selection.

The questionnaire is developed by study the related information of the objective and literature review then created the drafted questionnaire and sent to the 2 veteran researchers for correction. After the correction had been done, the try-out drafted questionnaire is tested to verify the rightness of the questionnaire. The questionnaire can be divided in to 3 parts which are the general information of the farmer, the information about the related process in the supply chain of the fresh vegetable for exporting and the problem and difficulties of the production, marketing, exporting and the related government agencies.

IV. CONCEPTUAL FRAMEWORK

This study is aim to study the flow of the fresh vegetable supply chain for export in Nakorn Pathom province from the upstream which is local farmer to the downstream which are the Thai fresh vegetable importer countries. The main processes are sourcing, producing, product handling and transportation, quality control system, marketing system and exporting system which started from the supplier via farmer, consolidator, factory, and market then finally reach the consumer.

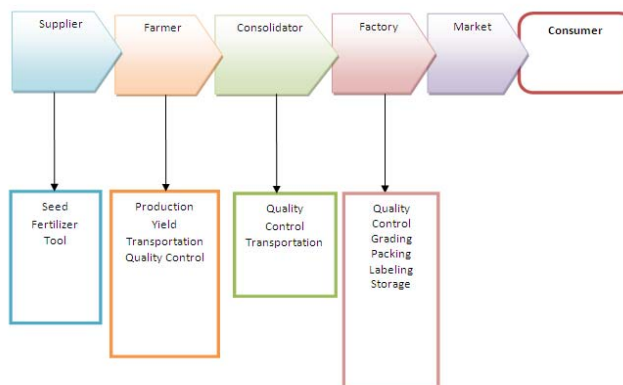


Fig. 1 Conceptual framework of the fresh vegetable supply chain in Nakorn Pathom province for exporting

V.RESULT

A. Overall Result

The result of the research shows that the most significant process of the fresh vegetable supply chain for export in Nakorn Pathom province from the population of this research is the sourcing process as shown in Table I. The sourcing process has the  $\bar{X} = 4.04$  while the other process which are production, quality control and packaging has the  $\bar{X} = 3.66, 3.92$  and  $3.41$ . The result is shown in Table I.

TABLE I  
RESULT OF THE SIGNIFICANT PROCESS OF THE FRESH VEGETABLE SUPPLY CHAIN FOR EXPORT IN NAKORN PATHOM PROVINCE

Process	$\bar{X}$	SD	Significant Level
1. Sourcing	4.04	0.74	Very High
2. Production	3.66	1.02	Moderate
3. Quality Control	3.92	0.90	High
4. Packaging	3.41	0.97	Moderate

B. Sourcing Process

The sourcing process of the fresh vegetable supply chain has 4 main factors that influence the process which are seed quality, pesticide quality, tools quality and sourcing information. The result from the questionnaire shows that the sourcing process has a high significant to the fresh vegetable supply chain. As shown in Table II, the quality of the seed quality obtains the highest significant at the 4.9 while the pesticide quality also has a high significant at 4.15.

TABLE II  
THE SIGNIFICANT FACTOR OF THE SOURCING PROCESS IN THE FRESH VEGETABLE SUPPLY CHAIN FOR EXPORT IN NAKORN PATHOM PROVINCE

Sourcing Process	Significant Level :Amount (Percentage)					$\bar{X}$	SD	Significant Level
	VeryLow	Low	Moderate	High	Very High			
1. Seed Quality	0 (0.00)	0 (0.00)	0 (0.00)	10 (10.00)	90 (90.00)	4.90	0.32	High
2. Pesticide Quality	0 (0.00)	0 (0.00)	15 (15.00)	55 (55.00)	30 (30.00)	4.15	0.67	High
3. Tools Quality	0 (0.00)	15 (15.00)	25 (25.00)	35 (35.00)	25 (25.00)	3.70	1.03	Moderate
4.Sourcing Information	0 (0.00)	15 (15.00)	45 (45.00)	25 (25.00)	15 (15.00)	3.40	0.94	Moderate
Total						4.04	0.74	High

### C. Production Process

The producing process of the fresh vegetable supply chain has 5 main factors that influence the process which are product method, irrigation system, weather, quality of the production tool and quality of the harvest tool. The result from the questionnaire shows that the production process has a

moderate significant to the fresh vegetable supply chain. As shown in Table III, the weather obtains the highest significant at the 3.92 while the production method, irrigation system, quality of production tool and quality of harvest tool also has a moderate significant at 3.42, 3.54, 3.7 and 3.7 respectively.

TABLE III  
THE SIGNIFICANT FACTOR OF THE PRODUCTION PROCESS IN THE FRESH VEGETABLE SUPPLY CHAIN FOR EXPORT IN NAKORN PATHOM PROVINCE

Production Process	Significant Level :Amount (Percentage)					$\bar{X}$	SD	Significant Level
	VeryLow	Low	Moderate	High	Very High			
1. Production Method	4 (4.00)	12 (12.00)	38 (38.00)	30 (30.00)	16 (16.00)	3.42	1.03	Moderate
2. Irrigation System	4 (4.00)	12 (12.00)	30 (30.00)	34 (34.00)	20 (20.00)	3.54	1.07	Moderate
3. Weather	0 (0.00)	8 (8.00)	24 (24.00)	36 (36.00)	32 (32.00)	3.92	0.95	Quite High
4. Quality of Production Tool	0 (0.00)	15 (15.00)	25 (25.00)	35 (35.00)	25 (25.00)	3.70	1.03	Moderate
5. Quality of Harvest Tool	0 (0.00)	15 (15.00)	25 (25.00)	35 (35.00)	25 (25.00)	3.70	1.03	Moderate
Total						3.66	1.02	Moderate

### D. Quality Control Process

The quality control process of the fresh vegetable supply chain has 6 main factors that influence the process which are quality of the quality control staff, quality of the quality control technology, transportation during quality control, quality control location, time consuming in quality control and hygiene of the quality control process. The result from the

questionnaire shows that the quality control process has a quite high significant to the fresh vegetable supply chain. As shown in Table IV, the quality of the hygiene of the quality control process obtains the highest significant at the 4.24 while the quality control location also has a high significant at 4.04.

TABLE IV

THE SIGNIFICANT FACTOR OF THE QUALITY CONTROL PROCESS IN THE FRESH VEGETABLE SUPPLY CHAIN FOR EXPORT IN NAKORN PATHOM PROVINCE

Quality Control Process	Significant Level :Amount (Percentage)					$\bar{X}$	SD	Significant Level
	Very Low	Low	Moderate	High	Very High			
1. Quality of the quality control staff	0 (0.00)	4 (4.00)	20 (20.00)	52 (52.00)	24 (24.00)	3.96	0.79	Quite High
2. Quality of the quality control technology	0 (0.00)	12 (12.00)	24 (24.00)	34 (34.00)	30 (30.00)	3.82	1.00	Moderate
3. Transportation during quality control	4 (4.00)	8 (8.00)	18 (18.00)	32 (32.00)	38 (38.00)	3.92	1.12	Quite High
4. Quality control location	0 (0.00)	8 (8.00)	22 (22.00)	28 (28.00)	42 (42.00)	4.04	0.99	High
5. Time consuming in quality control	0 (0.00)	8 (8.00)	44 (44.00)	32 (32.00)	16 (16.00)	3.56	0.86	Moderate
6. Hygiene of the quality control process	0 (0.00)	0 (0.00)	12 (12.00)	52 (52.00)	36 (36.00)	4.24	0.66	High
Total						3.92	0.90	Quite High

### E. Packaging Process

The packaging process of the fresh vegetable supply chain has 4 main factors that influence the process which are quality of the package, quality of the packaging staff, hygiene of the packing location and time consuming in packaging. The result from the questionnaire shows that the packaging process has a

moderate significant to the fresh vegetable supply chain. As shown in Table V, the quality hygiene of the packing location obtains the highest significant at the 3.92 while the quality of the package and time consuming in packaging have a moderate significant at 3.48 and 3.42 respectively.

TABLE V

THE SIGNIFICANT FACTOR OF THE PACKAGING PROCESS IN THE FRESH VEGETABLE SUPPLY CHAIN FOR EXPORT IN NAKORN PATHOM PROVINCE

Packaging Process	Significant Level :Amount (Percentage)					$\bar{X}$	SD	Significant Level
	Very Low	Low	Moderate	High	Very High			
1. Quality of the packaging	4 (4.00)	8 (8.00)	40 (40.00)	32 (32.00)	16 (16.00)	3.48	1.01	Moderate
2. Quality of the packaging staff	14 (14.00)	18 (18.00)	48 (48.00)	14 (14.00)	6 (6.00)	2.80	1.05	Low
3. Hygiene of the packaging location	0 (0.00)	8 (8.00)	24 (24.00)	36 (36.00)	32 (32.00)	3.92	0.95	Quite High
4. Time consuming in packaging	2 (2.00)	12 (12.00)	36 (36.00)	42 (42.00)	8 (8.00)	3.42	0.88	Moderate
Total						3.41	0.97	Moderate

## VI. CONCLUSION AND RECOMMENDATION

From the result of the research, there are 4 significant processes of the fresh vegetable supply chain, so there are 4 issues to be discussed.

### A. Sourcing

From the result, the population of this research thinks that the sourcing process as the most important process in the supply chain of fresh vegetable for exporting of Nakorn Pathom province. And the result also shows that the quality of the seed is the most important factor to the supply chain of fresh vegetable for exporting of Nakorn Pathom province.

### B. Production

The result of the research shows that the weather is the most important factor to the production process of the supply chain of fresh vegetable for exporting of Nakorn Pathom province. Because nowadays Thailand's agriculture still relies on the weather as the irrigation system is still not efficient.

### C. Quality Control

The result of the research shows that the hygiene of the quality control process is the most important factor to the quality control process of the supply chain of fresh vegetable for exporting of Nakorn Pathom province. As if the Thai company wants to export the fresh vegetable to the other

countries, there must be the certificated or quality assurance paper from the reliable government agency unless the fresh vegetable will be returned from the destination country.

#### *D. Packaging*

The result of the research shows that the hygiene of the packing location is the most important factor to the packaging process of the supply chain of fresh vegetable for exporting of Nakorn Pathom province as the hygiene of the packing location will affect the hygiene of the product and packaging. The packaging is not only for keep the product inside but it is also be able to promote the product and keep the product in the consumable condition longer..

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