

Comparison and Evaluation of the Roles of Tomato Farmer Cooperatives in Taiwan and The Netherlands



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ABSTRACT

Tomato is one of the most popular vegetables all over the world and the production was 145 million tonnes in 2011. In Taiwan and The Netherlands, tomato also became an important vegetable nowadays. In both countries, the farmer cooperatives are the way to help farmers accessing markets. However, Taiwanese farmers consider the cooperatives can only provide limited services compare to better functioning cooperatives in other countries for example The Netherlands. The purpose of this thesis is to examine Taiwanese and Dutch tomato cooperatives in every aspect and to conclude recommendations for Taiwanese cooperatives.

The interviews were adopted in this thesis in order to understand the functioning of the cooperatives in Taiwan (Lunyang Cooperative Farm) and The Netherlands (Prominent Farmer Association). The consumer preference survey was conducted in Taiwan to provide market information to the cooperative. The questionnaires were delivered to Dutch farmers to obtain the opinions to the cooperative from members.

In general, Prominent provides more services to farmers include collection, grading, packing, marketing recommendations and information from customers. Members of Prominent are well organised and willing to share information to others while there is no communication among members in Lunyang. It is better for Lunyang to implement this idea because farmers can share risk and improve the cultivation methods, facilities and quality of tomatoes together. The higher quality and more stable production are also easier for them to sell tomatoes directly to wholesalers or retailers who prefer stable suppliers. For farmers can concentrate on production and reach the quality demands on markets, Lunyang should provide more inputs and market information for members. This helps farmers to decrease the production cost as well.

On the other hand, the consumer preference survey showed that Taiwanese consumers prefer to purchase cherry tomatoes and they are concerned about food safety and sustainable issue these days. Lunyang should convey this information to farmers which helps farmers to make proper cultivation plan. In addition, they can help farmers to get certification to indicate that there is no chemical residue on tomatoes.

However, there is always possibility to improve even for well functioning cooperative like Prominent. They are trying to do more marketing activities and distinguish from competitors on the market which are also important for Taiwanese farmers. Lunyang can put more efforts on emphasising the advantages and establish a brand for farmers.

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List of Abbreviations

AVRDC	Asian Vegetable Research and Development Centre – The World Vegetable Centre
CAS	Certified Agricultural Standard
EU	European Union
GAP	Good Agricultural Practice
gw1	groeneweg I of Prominent Company
gw2	groeneweg II of Prominent Company
IOM	integrated organisation model
PO	producer organisation
TAP	Traceable Agriculture Product

1. INTRODUCTION

1.1 Background Information

Tomato (*Lycopersicum esculentum* Mill.) is a plant of Solanaceae family and the wild tomatoes are native from western South America (Peralta and Spooner, 2007). Tomatoes has become an important vegetable in the world and there were about 145 million tonnes of tomatoes were produced by main producing countries namely China, United States, India, Turkey and Egypt in 2010 (FAOSTAT, 2012). The production of tomatoes has increased from 2001 to 2010 (FAOSTAT, 2012; Figure 1) and showed the demand of tomatoes is increasing around the world. Tomatoes are not only consumed as vegetables, much of production is also processed as canned tomatoes, ketchup, juice, sauces, soups and other kinds of products. Tomato is popular for a rich source of nutrients such as vitamins A and C, carbohydrates, minerals, lycopene, carotene which is important for human diet (Chen, 2005; Peralta and Spooner, 2007).

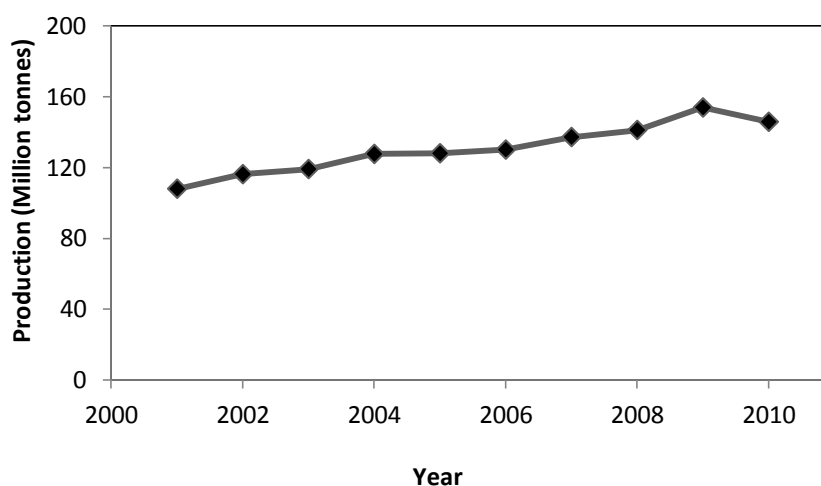


Figure 1. Tomato production worldwide (2001 to 2010).

Source: FAOSTAT (2012)

Taiwan is an island which located at the south-eastern of mainland Asia. The total land area is about 36,000 km² and the population is about 23 million. Taiwan has tropical, sub-tropical and temperate climates and is consisted by mountains, hills, plains, basins, coastlines and other different landscapes (Tourism Bureau, Republic of China (Taiwan), 2012). There is about 808,294 ha of land is used for crop production in Taiwan and the agriculture production value was 475.5 billion TWD (about 12.6 billion EUR¹) in 2011. Among all, the value of vegetable production was 55.6 billion

¹ 1.00 TWD = 0.0264909 EUR (XE Universal Currency Converter, 2012)

TWD (about 1.5 billion EUR) in 2011 (Council of Agriculture, Executive Yuan, 2012). To look at the tomato sector in Taiwan, the planted area of was 4,817 ha in 2011, which produced 122,870 tonnes tomatoes (Agriculture and Food Agency, 2012).

On the other hand, The Netherlands is located at the north-western part of Europe. The total surface area is about 41,528 km² (18.41% water) and the population is about 16.5 million. The Netherlands is full of flat landscape with 26% of land is under sea level. Though there is only 4% of population work in agriculture sector, The Netherlands is one of the biggest exporter of agriculture and horticulture products (The Netherlands Board of Tourism and Conventions, n.d.). The total agriculture area was about 19,100 km² in 2011 (OECD, 2012). Among all, the planted area of tomatoes was only 1,700 ha which produced 815,000 tonnes of tomatoes in 2010 (FAOSTAT, 2012).

The farmer cooperatives act as the important role in the horticulture chain around the world. The main function of cooperatives is to provide services to farmers in order to improve the income of farmers (Bijman and Hendeikse, 2003). The cooperatives link small scale farmers to market and shorten the value chain (Bijman and Hendrikse, 2002; Singh, 2009). In Taiwan, many farmer cooperatives provide limited services and do not help farmers to expand their markets or bargaining for better price, farmers mainly sell their products through auction (Kuo, 2011). Nevertheless, the tomato farmers in The Netherlands formed grower associations it helps farmers to managing the sales and to provide different markets (Prominent, 2012).

1.2 Problem Statement

There are several tomato farmer cooperatives in Taiwan which help farmers in coordination of their activities. However, these cooperatives offer limited services such as collection and transportation of tomatoes, but they do not help farmers to get better price. This often leads to farmers trying to find alternative ways to sell tomatoes instead of joining cooperatives, such as selling products through internet which makes cooperatives less important in the tomato sector. On the other hand, farmers and cooperatives in Taiwan do not contact with customers or consumers directly. It caused they cannot obtain clear market information and this information is necessary for them to make cultivation plan. In contrast, in some countries like The Netherlands, farmer cooperatives offer varieties of services, for example marketing of tomatoes for members and negotiating the price with customers which means farmers can focus on production and do not need to worry about the selling. There is a need to improve the functioning of Taiwanese farmer cooperative by using the successful example in The Netherlands to benefit the Taiwanese tomato farmers.

1.3 Justification of Study

Tomato farmers in Taiwan are small scaled, the production area normally under 0.5 ha. It is difficult for small scaled farmer to access the market with little quantity of produce. For this reason, the farmers pay the cooperatives or associations help the collection and transportation tomatoes to auction. The farmer cooperatives and associations do not own the products and they provide limited services because they do not see the benefits of providing more services to farmers. But in some countries, such as The Netherlands, the farmer cooperatives provide more services and play an irreplaceable role in the chain. They manage the sales and help to access different markets. The Taiwanese farmer cooperatives would like to improve their functions by learning from successful cases. This study will compare Taiwanese and Dutch tomato farmer cooperatives and evaluate their functions in the chain.

1.4 Research Objective

To examine the functioning of Taiwanese and Dutch tomato farmer cooperatives in order to identify how Taiwanese tomato farmer cooperatives can adopt new changes to better serve the tomato farmers.

1.5 Research Questions

Main question 1: What are currently functioning of Taiwanese tomato farmer cooperatives and the market information in Taiwan?

Sub-questions:

- 1.1. How did the tomato farmer cooperative develop in Taiwan?
- 1.2. How does the tomato farmer cooperative manage the services in Taiwan?
- 1.3. What is consumer preference to tomatoes in Taiwan?

Main question2: What is the role of tomato farmer cooperatives in The Netherlands?

Sub-questions:

- 2.1. How did the tomato farmer cooperative develop in The Netherlands?
- 2.2. How does the farmer cooperative manage the services to members in The Netherlands?
- 2.3. What services do farmers received from the cooperative?

2. LITERATURE REVIEW

2.1 The Background Information of Tomato

Tomato is one of the main vegetables in the world. The ancestor of tomatoes was identified as *S. lycopersicum* var. *cerasiforme* which is a type of wild cherry tomato. Wild tomatoes are perennial herbaceous plants with erect or prostrate growth habit (Peralta and Spooner, 2007). The flowering of tomatoes does not affect by the length of dark period (day-length neutral) and they are warm-season plants (Csizinszky, 2005). The suitable growing temperature for tomato differs from every stage. Twenty-eight to 30 °C are most suitable for seed germination and the seed cannot germinate when the temperature is lower than 5 °C or higher than 40 °C. During flowering stage, the appropriate temperature is between 15 and 30 °C while 18 to 26 °C is suitable for fruiting (Chen, 2005). The postharvest handling is different from processing tomatoes and fresh-market tomatoes. Processing tomatoes are harvested at fully ripe stage and transport to processing factory. On the other hand, fresh-market tomatoes are harvested when tomatoes are maturity enough but not fully ripe. Tomatoes are climacteric fruits and the atmosphere control (especially ethylene) is an important issue for postharvest (Saltveit, 2005).

Tomatoes were introduced to Europe in early 1500s as ornamental plants. Until 1600s to 1700s, tomatoes were grown for culinary purpose in large quantities. Thereafter, tomatoes have been selected and bred worldwide (Peralta and Spooner, 2007; Robertson and Labate, 2007). According to different purposes of fruit, tomatoes can be divided into fresh market, processing/dual purpose and cherry/high beta carotene lines (AVRDC, 2011).

2.2 The Tomato Sector in Taiwan

Tomatoes were introduced to Taiwan as the ornamental plant in 1622 and become an important vegetable nowadays (Chen, 2005). Breeding of tomatoes started in the late 1900's, of which there are numerous varieties available on the market. In Taiwan, tomatoes are mainly divided into two categories, namely cherry tomatoes and fresh market tomatoes (large fruit type tomatoes). Cherry tomatoes include small size tomatoes and normally consumed as fruits. The most popular variety is Shengnyu. Large fruit type tomatoes are consumed as vegetables and used in salad dressing or cooking. The most popular variety is beef tomato (Chen, 2005). Though the production area and the production decreased from 2002 to 2009, it has increased in 2010 and 2011 (Figure 2; Agriculture and Food Agency, 2012). In 2011, the production area was 4817 ha which produced 122,879 tonnes tomatoes. The main tomato

production area in Taiwan is Chiayi County which accounted over 20% of total area in 2011 (Agriculture and Food Agency, 2012). However, the average temperature from June to September in Chiayi County is around 27 to 28 °C and in 2011, there are only nine days that the highest temperature below 30 °C. The tomato could not be cultivated during summer season in Chiayi County.

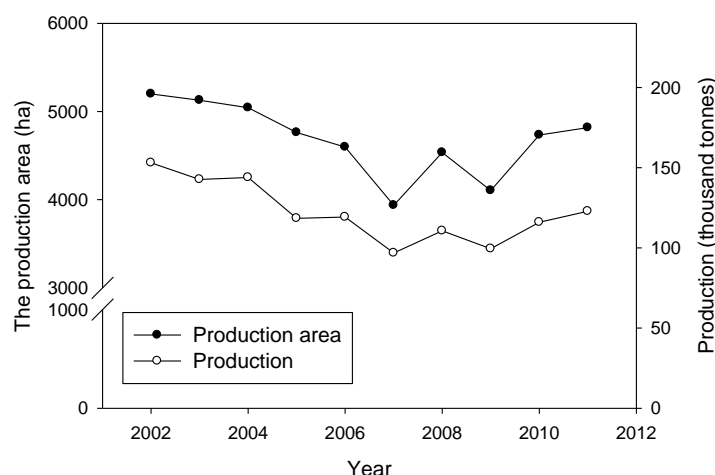


Figure 2. The production area and production of tomatoes in Taiwan from 2002 to 2011

Source: Agriculture and Food Agency, 2012

In Taiwan, farmers are mainly using simple tunnels covered by insect screen and polyethylene film to raise seedlings (Dai, 2009). The weather during autumn and winter is suitable for outdoor cultivation or cultivate with simple plastic tunnels while summer is too hot that tomatoes can only be planted in mountain areas. The production of cherry tomato decreased from 2960 tonnes to 359 tonnes during April to September and the price increased to 81.9 TWD (about 2.2 EUR) on September in 2011 (Figure 3). On the other hand, the production of large fruit type tomato decreased from May to October and the price increased to 39.2 TWD (about 1.1 EUR) on October (Figure 4; The Trade Records of Agricultural Products, 2012). Because of the high temperature in Taiwan influences the tomato cultivation seriously, the Asian Vegetable Research and Development Centre – The World Vegetable Centre (AVRDC) cooperates with Agricultural Research and Extension Stations, to breed and select for heat tolerant and disease resistant cultivars which are more suitable for Taiwan's weather.

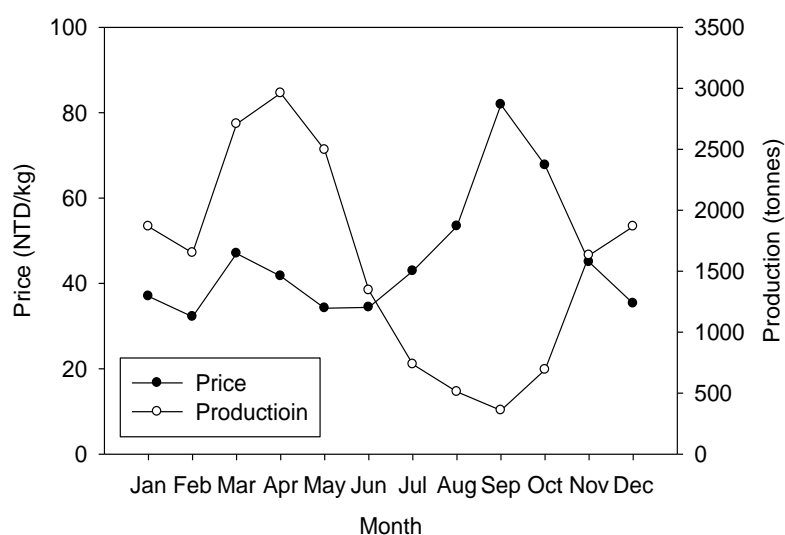


Figure 3. The auction price and production of cherry tomatoes in 2011.

Source: The Trade Records of Agricultural Products, 2012

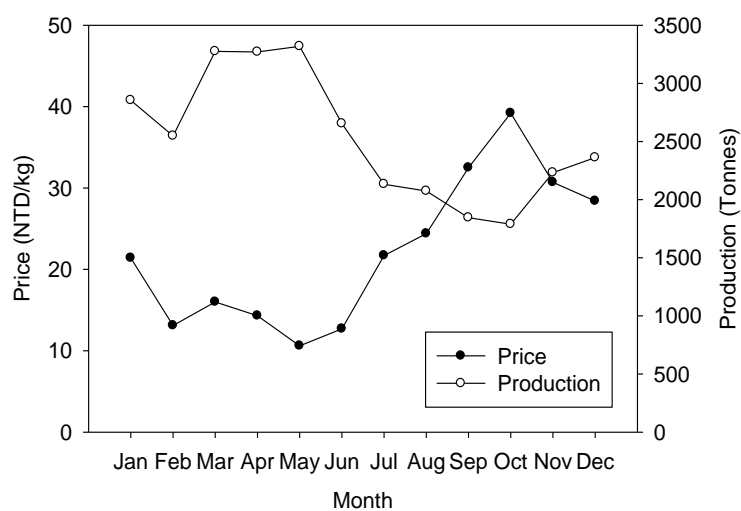


Figure 4. The auction price and production of large fruit type tomatoes in 2011.

Source: The Trade Records of Agricultural Products, 2012

In recent years, consumers pay more attention on food safety issue. Therefore, the government set several certifications to identify food safety standards. These certifications include Good Agricultural Practice (GAP), Certified Agricultural Standard (CAS) and Traceable Agriculture Product (TAP). Especially GAP focus on all products that are free from pesticide residues, or existing pesticide residues are below the

standard maximum residue levels. This certification is most widely used in vegetable sector in Taiwan (Taiwan Agexporter, 2011).

2.3 The Tomato Sector in The Netherlands

In European Union (EU), fruit and vegetable sector accounts an important part in agriculture. The production value was about 46.5 billion EUR in 2007 which was 25% of all crop production values. Among all products, tomatoes (15.3 million tonnes in 2007) are the most important one (Camanzi et al., 2011).

Dutch sold their tomatoes, cucumbers and sweet peppers to Germany in 1990s. However, the consumers were not satisfied the quality and described tomatoes from The Netherlands as 'water bombs'. German importers and retailers started buying tomatoes from other European countries. The Dutch farmers started to take the opinions from traders and retailers into account. This event showed the power of consumers increased that importers and retailers concerned more about the consumers demand. The value chain started to transit to consumer-driven chain (Buurma et al., 2012).

In The Netherlands, greenhouse horticulture is considered as an important part of social and economic which produces vegetables, cut flowers and pot plants. The majority of greenhouses are glasshouses until 2001. The total area of greenhouses has increased dramatically and reflecting the high profitability of greenhouse production (Pluimers, 2001). For total vegetables, tomatoes are the largest being grown under greenhouse for a long time (Nass, 2010). In 1992, 23% of all glasshouse area was used to cultivate tomato and tomato is one of the most important glasshouse crops (Meijaard, 1992). The greenhouse production of tomatoes has an upward trend from 1133.2 ha to 1701.6 ha between 2000 and 2011 (Table 1; Centraal Bureau voor de Statistiek, 2012).

Table 1. Area of total greenhouse horticulture, vegetables and tomatoes in The Netherlands from 2000 to 2011.

Source: Centraal Bureau voor de Statistiek, 2012

Year	Horticulture under glass (ha)	Greenhouse vegetables (ha)	Greenhouse tomatoes (ha)
2000	10520.9	4200.2	1133.2
2005	10539.7	4445.0	1395.9
2009	10324.1	4826.1	1628.2
2010	10307.5	4986.3	1675.8
2011	10249.2	4988.7	1701.6

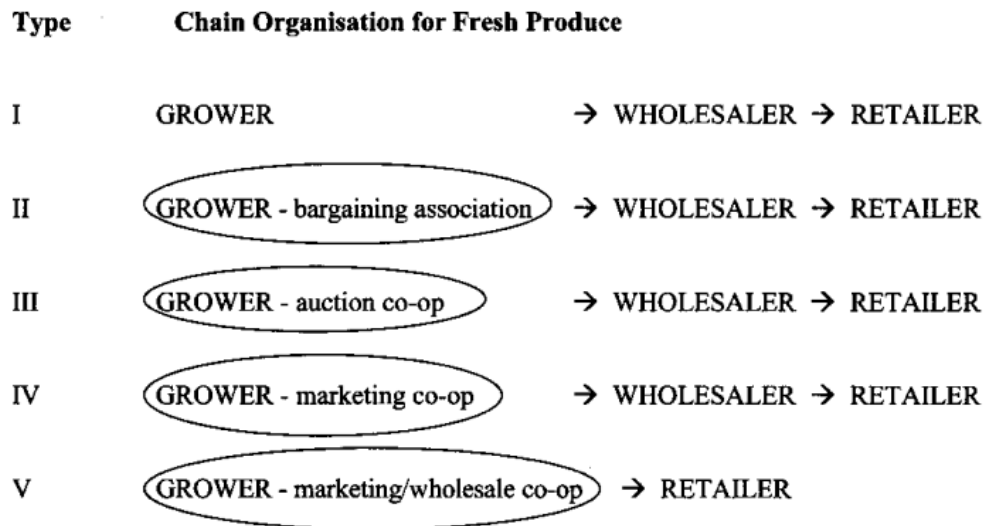
However, greenhouse production has been criticised about the environmental problems due to high inputs of energy and artificial substrates, many technologies are used to become more sustainable (Pluimers, 2001). Take Royal Pride Holland as an example, this commercial tomato producer uses gas to produce heat and electricity. They also pump the CO₂ from generator back into greenhouse as the CO₂ fertiliser. In addition, they provide enough electricity to surrounding houses (Nass, 2010).

In The Netherlands, all greenhouse tomatoes are using bees as the pollinator. Farmers cannot use chemicals because bees are sensitive to them. For this reason, integrated pest management are used in greenhouses and the use of chemicals in the greenhouse is reduced or eliminated. On the other hand, the tomatoes are grown semi-hydroponically and the density of plants is about 2.5 plants/m². So there is little use of soil and these companies recycle the water to reduce the amount of water. By doing this, the current practices are more and more sustainable (Nass, 2010).

2.4 The General Functions of Farmer Cooperatives

Farmer cooperatives play a major role in the agricultural and food industry. The cooperative provides specific services that support the activities of the members. According to different services, the cooperatives can be categorized into five types: (1) supply cooperatives: purchasing and producing inputs; (2) marketing cooperatives: processing and marketing products; (3) cooperative banks: provision of credit; (4) cooperative auctions: selling horticultural products; (5) cooperatives that provide other services: insurance, contract work, accountancy and farm assistance (Bijman and Hendeikse, 2003).

The fresh produce chain basically consists of three parts which are grower, wholesaler and retailer (Figure 5). When a farmer sells products by himself, he is facing asymmetric information from demand and also asymmetric market power (Bijman and Hendrikse, 2002). Incomplete and asymmetric information is in the relationship between farmers and inputs suppliers or buyers. This is caused by measuring cost such as measuring product attributes. Incomplete and asymmetric information have opportunity to lead into moral hazard (post-contractual opportunism) and adverse selection (pre-contractual opportunism) because one or other party is afraid of being victimised. On the other hand, asymmetric market power is caused by the difference in efficient size between production level and processing and marketing level. Because of processing and marketing farms deal with many small scale producers at the same time, they hold bigger economies level. This structure gives the processors more market power and causing lower price or higher transaction risks to farmers (Bijman and Hendeikse, 2003).



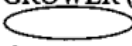
GROWER (capital letters) = independent firm; auction co-op (small letters) = dependent firm;
 = ownership structure, the independent firm owns the dependent firm;
→ = intrafirm transaction; -- = interfirm transaction.

Figure 5. Five types of chain organisation for fresh produce.

Source: Bijman and Hendrikse, 2002

For solving these problems, farmers form different types of cooperatives (Figure 5). Firstly, the bargaining cooperative (type II) helps to bargain the price with customers. Secondly, the auction cooperative (type III) brings many products together from farmers and helps to get higher price. This type of cooperative eliminates the problem of asymmetric information and growers can focus on production. Thirdly, the marketing cooperative (type IV) is formed by farmers who want to invest in marketing and build up a brand. This kind of cooperative helps farmers to have an asset named 'reputation' but this is strongly influenced by wholesaler because the quality of fresh produce is affected by time and handling seriously. For preventing the quality influence by wholesalers, the marketing cooperative starts wholesaling activities (type V) to shorten the whole chain and trade to retailers directly (Bijman and Hendrikse, 2002).

One of the important issues for farmers is to strengthen horizontal collaboration between primary producers in order to increase their bargaining power and share the risk. These economic producer organisations (POs) act as the intermediary between farmers and customers. They also support economic development and social cohesion by providing different services such as collection, processing and marketing

produce, implementing quality assurance programs and consulting and training members. For improving functioning, POs concern more about the consumer demand and they change from producer oriented into consumer oriented because consumer demands and public policies are more important these days. They emphasize more on PO - customer relationship than producer – PO relationship by putting more efforts in marketing, innovation and internationalization (Bijman et al., 2006).

Small producers have numerous competitive advantages in horticultural sector such as lower cost (family labour), higher flexibility in working capacity and traditional knowledge. For this reason, linking small producers to markets is one of main topics for improving livelihoods. Take India as the example; there are different ways to link farmers with markets. Some of them provide better price to farmers and some marketing the produce in lower cost. One successful example is linking grape growers in Maharashtra. They help to promote grapes globally by providing marketing for them and the National Co-operative Development Corporation financially supported the promotion of marketing grapes. Another example is the tomato market linkage in Uttarakhand. They link tomato farmers with retailers. Farmers brought tomatoes to collection centres and graded and packed tomatoes by the quality parameters. This helped farmers adding value to tomatoes and expanded markets. However, some farmers tried to mix poor quality tomatoes together which may cause the rejection of whole truck (Singh, 2009).

In European vegetable and fruit sector, POs have been playing an important role since 1972 that the Common Market Organisation established. POs were established for promoting certain purpose for producers, for example regularization of prices at producer stage. For increasing the competition for producers, POs have been developing to different purposes for members (Camanzi et al., 2011). In 2006, Galdeano Gómez used indicators to compare 51 cooperatives in Spain. According to the result, there was a positive but not significant correlation between the size of the cooperatives and the efficiency. However, there was the significant positive correlation between quality and efficiency (Galdeano Gómez, 2006).

2.4.1 The General Information and Regulations of Farmer Cooperatives in Taiwan

For agricultural development and promoting the government policies, the different types of farmer organisation have been formed. According to the services, the organisations are classified as social type (farmer's association), political type (farmer rights promotion organisation), economical type (farmer cooperative), education type (4H organisation) and maintenance type (irrigation association). These organisations

are formed by farmers who wanted to protect the rights and enhanced the efficiency and effectiveness (Chang, 2008).

Because most of farmers in Taiwan are small scaled, low production yield caused farmers do not have bargaining power and weak competitive in the market. Therefore, linking producers and selling products together is necessary (Jhong, 2010). In recent years, some farmer organisations also helped to adding values to products by establishing regional brand. These brands help consumers to identify the origins, the features and the quality of the produce. Farmers can also marketing their products together (Jan et al., 2011).

A farmer association is a judicial person which formed by the government. The purposes are *“safeguarding farmers’ rights and interests, enhancing farmers’ knowledge and skills, boosting the modernization of agriculture, increasing crop yields, improving farmers’ livelihood and developing rural economy”* (The Farmers Association Act, 2009). The farmers associations are divided into the following categories: Town, township (city) or district farmers associations, county (city) farmers associations, provincial (municipal) farmers associations and a national farmers association (The Farmers Association Act, 2009).

The cooperatives are referred the *“associations organized based on the principle of equality and mutual aid, and with a view to improve the economic benefit and living standard of the members by means of joint operating”* (Cooperatives Act, 2011). The number of members and the total amount of capital stocks of a cooperative is variable. The business of farmer cooperatives (cooperative farm) is engaged in agricultural production, marketing, supply, and utility services (Cooperatives Act, 2011).

2.4.2 The General Information of Farmer Cooperatives in The Netherlands

The cooperatives act as important roles especially in agriculture, horticulture and financial sectors. In 2001, cooperatives processed 84% of all milk, 63% of all sugar beets and provided 87% of all credit to farmers. 60% of all fruits and vegetables was sold through cooperative auctions and marketing cooperatives (Bijman and Hendrikse, 2003).

The auctions were the main selling channels to vegetables in The Netherlands in the past (Figure 6). More than 90% of greenhouse vegetables and 50 % of open field vegetables were sold by auctions in 1990. The auction cooperatives provide the price determination, sales ministration, logistic services and quality classification and inspection to producers and buyers (Bijman and Hendrikse, 2003).

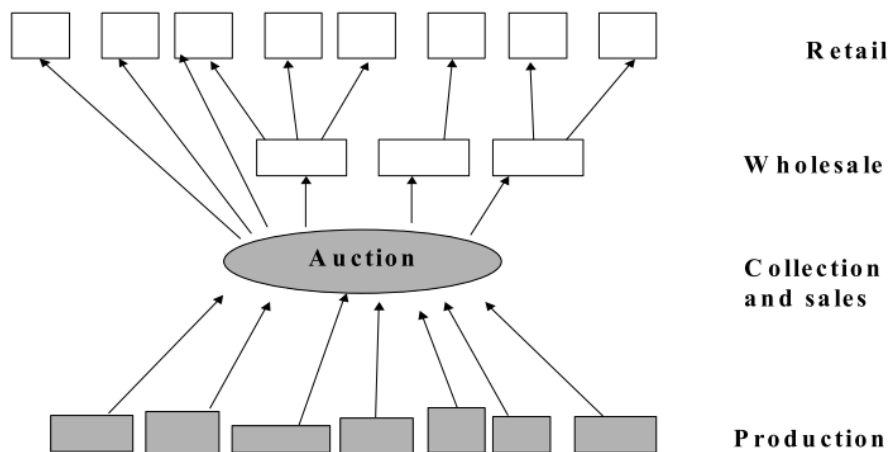


Figure 6. Traditional marketing channel for fresh produce in The Netherlands.
Source: Bijman and Hendrikse, 2003

However, during years, the consumers became more caring about quality, variety and convenience of fresh produce. Additionally, many issues such as food safety and environmental friendly are more concerned by consumers. On the other hand, more than 70% of fruits and vegetables are sold through supermarkets in The Netherlands. Therefore, retailers prefer to deal with fewer suppliers. As these changes occurred, buyers became dissatisfied with auctions because it is difficult for them to purchase big amount of produce with stable price. Also, buyers could not ask producers about their demands. Consequently, auction cooperatives have transformed into marketing cooperatives to negotiate with wholesalers or combining the wholesale function (Figure 7; Bijman and Hendrikse, 2003).

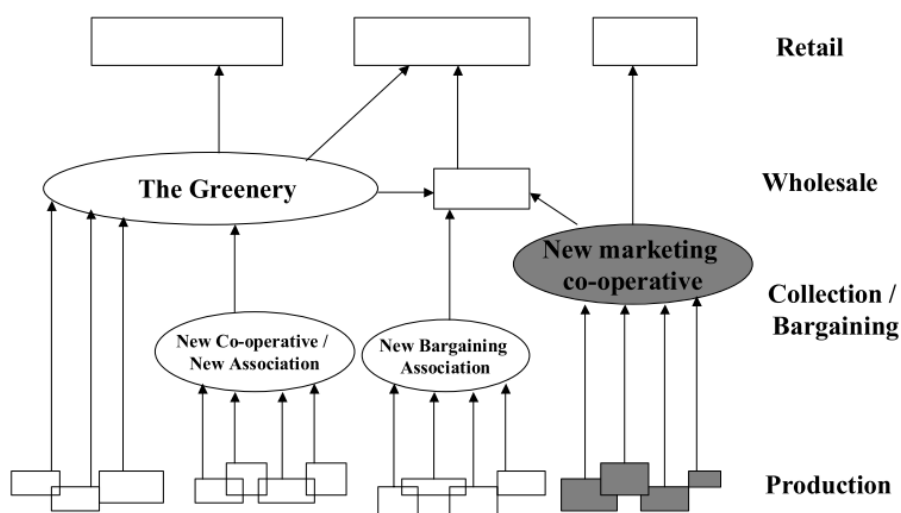


Figure 7. The new structure for marketing fresh produce in The Netherlands.
Source: Bijman and Hendrikse, 2003

The Greenery is a marketing firm and was formed by nine auction cooperatives in 1996. The Greenery provides services to both producers and wholesalers, and also functioning as the wholesaler. Some other farmers formed new bargaining associations and marketing cooperatives and invested on the product innovation. Some members of Greenery also set up new producer organisations in order to provide services such as sorting, packing and quality control. Among these new organisations, some of them also help farmers to sell products under brand name to achieve high quality/high price market segments (Bijman and Hendrikse, 2003).

3. METHODOLOGY

This chapter elaborates the data collection strategy and data analysis of the research. The approach of this research covers both quantitative and qualitative data. Data collection was done by desk study, case study and questionnaires (Figure 8).

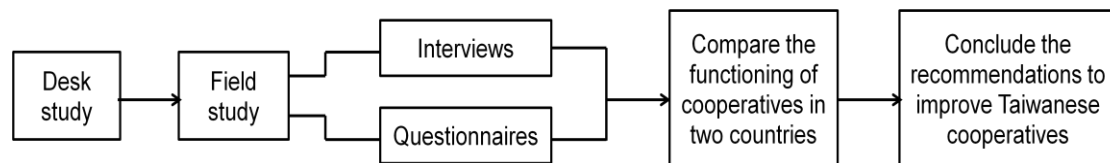


Figure 8. Conceptual framework

3.1 Desk Study

Desk study is to obtain insight of the subject, and it is a process to organise relevant information about the topic. In order to analyse the tomato farmer cooperatives in Taiwan and The Netherlands, a background data were collected by searching relevant resources including journals, books, reports and official websites relative to the farmer cooperatives in both countries. Relevant information obtained includes the general cultivation patterns, the official statistic data of production area, quantity and price, the market information, the functions of cooperatives, and the regulations of the cooperatives.

3.2 Field Study

The case study approach was applied in this research. To give the insight of tomato farmer cooperatives in Taiwan and The Netherlands, the interviews and questionnaires were carried out in this research.

3.2.1 Study Areas

This study is focused on two countries, Taiwan and The Netherlands.

3.2.1.1 Taiwan

The research was conducted in Chiayi County, Taiwan (23°48'N, 120°58'E; Figure 9). Chiayi County is located at east-central part of Taiwan and the area is about 1,903 km². It has been selected because it is the major tomato production area in Taiwan.

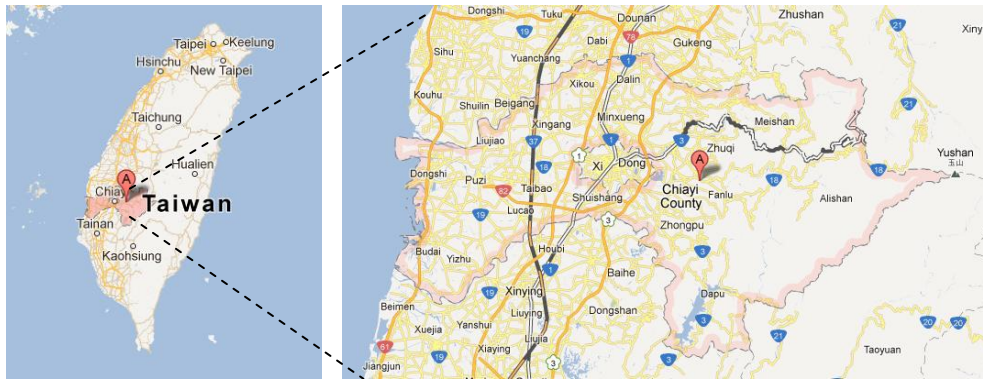


Figure 9. The map of Chiayi County, Taiwan (the broad is indicated by red).

Source: Google map, 2012

3.2.1.2 The Netherlands

The research was conducted in Westland, The Netherlands (52°00'N, 4°21'E; Figure 10). Westland is located at south-west part of The Netherlands. Westland is near Rotterdam which has the big port and airport in The Netherlands and most Dutch farmers built their greenhouses around this area.

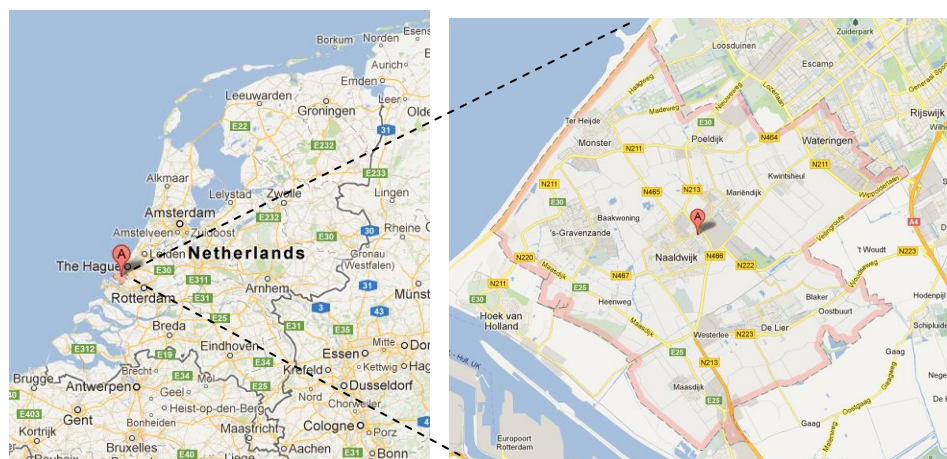


Figure 10. The map of Westland, The Netherlands (the broad is indicated by red).

Source: Google map, 2012

3.2.2 Interview

The interviews were used in this research as to obtain the detail information of the cooperatives in Taiwan and The Netherlands.

3.2.2.1 Interview of farmer cooperative in Taiwan

For analysing the functioning and difficulties of farmer cooperative in Taiwan, the manager of Federation of Taiwan Provincial Agriculture Cooperatives, Mr. Chen, Jie-Ren, was interviewed. The Federation of Taiwan Provincial Agriculture Cooperatives is an organisation that in charge of 29 farmer cooperatives in Taiwan. The interview took Lunyang Cooperative Farm, Chiayi County as an example and included the development of the cooperative, current services of the cooperative and how they organise to members, the challenges and future plans. The checklist helped to acquire the detailed information (Annex 1).

3.2.2.2 Interview of tomato farmer cooperative in The Netherlands

In order to gain the information of the role of farmer cooperative plays in the value chain, the manager of groeneweg II, Prominent Grower Association, Mr. Joost Van Der Voort, was interviewed. Prominent Grower Association is one of the biggest tomato grower associations in The Netherlands. It is consisted of 23 tomato farmers around Westland, The Netherlands. The checklist was developed for helping to get relevant information (Annex 2). Firstly, to understand the composition of the cooperative and to get an overview of the organisation. Secondly, to examine the development of the cooperative from past to present and future possibilities. Thirdly, to have the insight of the services they provide to members.

3.2.3 Questionnaire

3.2.3.1 Questionnaire for Taiwanese consumers

The questionnaire focuses on the consumer preference of tomatoes in Taiwan. Because farmers and the cooperative rarely contact to consumers directly, it is necessary to know the demand from consumers in order to provide information to make appropriate cultivation plan. The questionnaires were translated into Chinese by author and done via the internet (Annex 3). The questionnaires were done by 70 people who live in Taiwan from 2 August 2012 to 26 August 2012. The participants were 38 female and 32 male and the basic information of the participants is shown in Annex 4.

3.2.3.2 Questionnaire for Dutch tomato farmers

The questionnaires were done by 13 members of the Prominent Grower Association in Westland, The Netherlands. The participants were randomly selected. The questionnaire was translated into Dutch by a native Dutch speaker. The questionnaire focuses on the services received from cooperatives, the satisfaction of the cooperative, the information acquire from members and the cooperative and the future expectation of the cooperative (Annex 5).

3.3 Analysis of Data

To compare the farmer cooperatives in two countries, the integrated organisation model (IOM) was used in this report (TACSO, n.d.). IOM gives the overview and the details of the organisation, external and internal components. The IOM consists of 5 external components which are mission, outputs, inputs, factors and actors. These external components are used to describe the environment of the organisation and the relations with the environment. It consists of 6 internal components which are strategy, structure, system, staff, management style and culture. The internal components of the organisation are used to describe the internal choices.

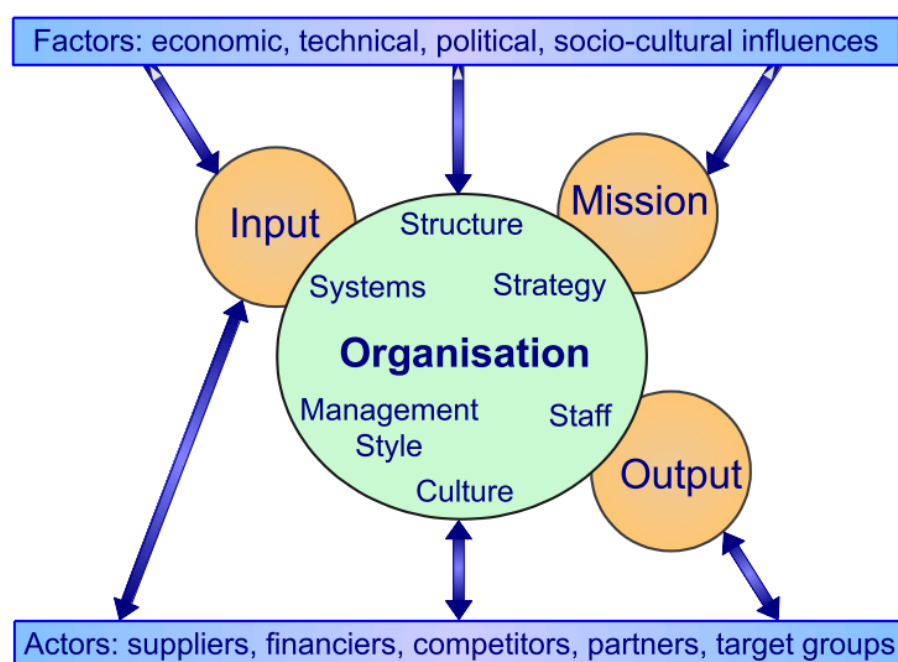


Figure 11. The integrated organisation model.

Source: TACSO, n.d.

The qualitative data was analysed by different analysis tools such as chain mapping, PEST (political, economical, social and technological) and SWOT (strength, weakness, opportunities and threats). Chain mapping can analyse the specific environment (actors) that the organisation is dealing with. PEST is used to explain the general environment (factors) influences the organisation. SWOT helps to distinguish the hindering factors (S and W) and outside factors (O and T) of the organisation. The quantitative data is analysed by SPSS statistic programme.

3.4 Limitations of Thesis

The opinions from Taiwanese farmers were not included in this thesis. From their opinions can understand what services and changes they expect from the cooperative and satisfaction of the cooperative which are important for the improvement of the cooperative. This is because farmers are not willing to share information and they were busy during the data collecting time of this thesis.

4. RESULTS

4.1 The Current Situation of Farmer Cooperative in Taiwan

Lunyang Cooperative Farm is located at Lunyang Village, Liujiao Township, Chiayi County. The cooperative was set up in 1978 and started the collecting services and supplying some chemicals in 1979 and 1982, respectively. The following results of Lunyang Cooperative Farm are obtained from the interview of Mr. Chen, Jie-Ren.

4.1.1 The External Components of IOM of Lunyang Cooperative Farm

4.1.1.1 Mission

The mission of Lunyang Cooperative Farm is to organise farmers, standardise the products and provide the selling channel to shorten the chain in order to create the benefits to farmers and improve the agriculture sector.

4.1.1.2 Outputs

Farmers decided the type of vegetables, the varieties and cultivation ways by themselves. Before farmers start new cultivation season, the cooperative would hold the meeting to inform them the general market trend and the preferable packing style. If farmers think it is necessary, they can ask the cooperative to give the information about grading system, packing criteria and the application of chemicals. These are based on the regulations set by Agriculture and Food Agency, Council of Agriculture, Executive Yuan.

The cooperative helps farmers to organise the logistics from farms to auctions. After farmers harvest, some big size vegetables for example cabbage would pack in the field and label the grade, weight and farmers' code on the boxes. The cooperative organises trucks to collect the produce from every farm to auction. Other vegetables for example tomatoes were selected in the field and sent to warehouse. In warehouse, grading and packing are done by machine. The cooperative contacts the transportation company to transport products to seven major auctions in Taiwan.

On the other hand, the cooperative is trying to develop more services such as expanding other selling channels for example exportation and selling to big supermarket and selling more inputs to farmers. The cooperative put more efforts on expanding other selling channels because supermarkets and hypermarkets have replaced some traditional market and become more important nowadays. However, farmers produced tomatoes in open field and the production was affected by the weather seriously. Unstable production makes it difficult to supply supermarket year round so they see supermarket as the alternative selling market during peak season.

It is difficult for them to export tomatoes to nearby countries because they do not have enough quantity and quality of tomatoes.

4.1.1.3 Inputs

Lunyang had 24 members in 1978 and now has 100 members (Table 2). Most of members are farmers in Lunyang village (80 to 90 members) and others are from nearby villages. The farmers grow vegetables and fruits in nearby areas can apply to join the cooperative. The directors and supervisors of the cooperative will discuss and decide who can join the cooperative on the meetings. Farmers grow different types of vegetables and fruits such as cabbage, broccoli, sweet corn, tomato, sweet pepper and bean. Ten of members grow about 0.3 to 0.5 ha of tomatoes and the production season of tomatoes is from October to April. In average, daily production is around 1000 to 1600 kg/ha and it can reach 4000 to 6500 kg/ha during peak season. The varieties of fresh tomatoes are Tomato Taoyuan AVRDC 20, Fenshih tomato and beef tomato while the varieties of cherry tomatoes are Shengnyu, Jiaonyu and Yunyu.

Table 2. The number of members, the share of credit and the cultivation area of Lunyang Cooperative Farm.

Year	Members	The share of cooperative (TWD)	Total cultivation area (ha)
1978	24	141,000	33.45
1979	57	165,000	71.05
1980	83	298,000	96.28
1982	86	309,000	101.78
1985	85	1,851,000	101.78
1988	97	1,877,000	117.60
1992	103	1,977,000	124.23
1993	102	1,974,000	124.03
2006	101	1,974,000	124.00
2007	100	1,974,000	124.00
2008	100	3,948,000	124.00
2012	100	3,948,000	124.00

Members have to pay the share of the cooperative and the par value is 100 NTD (about 2.5 EUR) of each share. According to the Cooperatives Act (2011), Article 24: *“After the surplus is allocated in accordance with the provision of the above article, the residuals shall be distributed according to the transaction amount of the members. If it is resolved in the member’s congress that the residuals as referred to in the above*

paragraph should not be distributed, it may be deposited as capital stocks subscribed by the members or allocated into the public accumulation fund.”

Article 25:

“Public accumulation fund shall be stored in credit cooperatives or other reliable banks with the resolution of the member’s congress. Where the public accumulation fund is more than 50% of the total capital stock, the excessive proportion may be used to operate the cooperative with the resolution of the member’s congress.”

The directors and supervisors are elected by the cooperative members and normally they are larger scale farmers. There are 4 directors, 1 chief director (Mr. Su, Jin-Huang), 2 supervisors, 1 chief supervisor (Mr. Su, Qing-Shui), 4 employed staff and 1 representative of farm (director, Mr. Su, Ying-Ren, also in charge this position). The cooperative provides the collection warehouses which include two collection area and (total area is about 500 m²) and 1 warehouse (about 500 m²). The directors and supervisors do not have salary but they get attendance fee for meetings.

Farmers have to pay the cost of packing material, the transportation fee based on the weight of the produce, the management fee (1.5%) and service fee (5%) to the cooperative. Auctions transfer the money to the cooperative and the cooperative transfer the rest of money (minus the cost which farmers should pay) to farmers.

4.1.1.4 Factors

The factors (general environment) of Lunyang are discussed by PEST (Table 3).

Table 3. The PEST analysis of Lunyang Cooperative Farm.

Political	(1) In order to protect small scale farmers, the government is willing to give subsidy to both farmers and the cooperative. (2) The consumers pay more attention on food safety these years, and the government is trying to improve the application of certification.
Economic	The economic crisis affects the consumer behaviour in recent years and they prefer to buy cheap products. However, some high income consumers care more about food safety issue and are willing to pay more for safe products.
Social	Because of Taiwanese press emphasise on the advantages of tomatoes (high nutrients source) in recent years, more people consider tomatoes are healthy food and the demand has increased.
Technological	Farmers do not have sufficient techniques on cultivation and they consider it is too expensive to invest new techniques. The cooperative provides grading and packing machine in warehouse.

4.1.1.5 Actors

Lunyang Cooperative Farm acts as the connection between farmers and auctions (Figure 12). They help farmers to contact with auctions and manage the money flow for farmers.

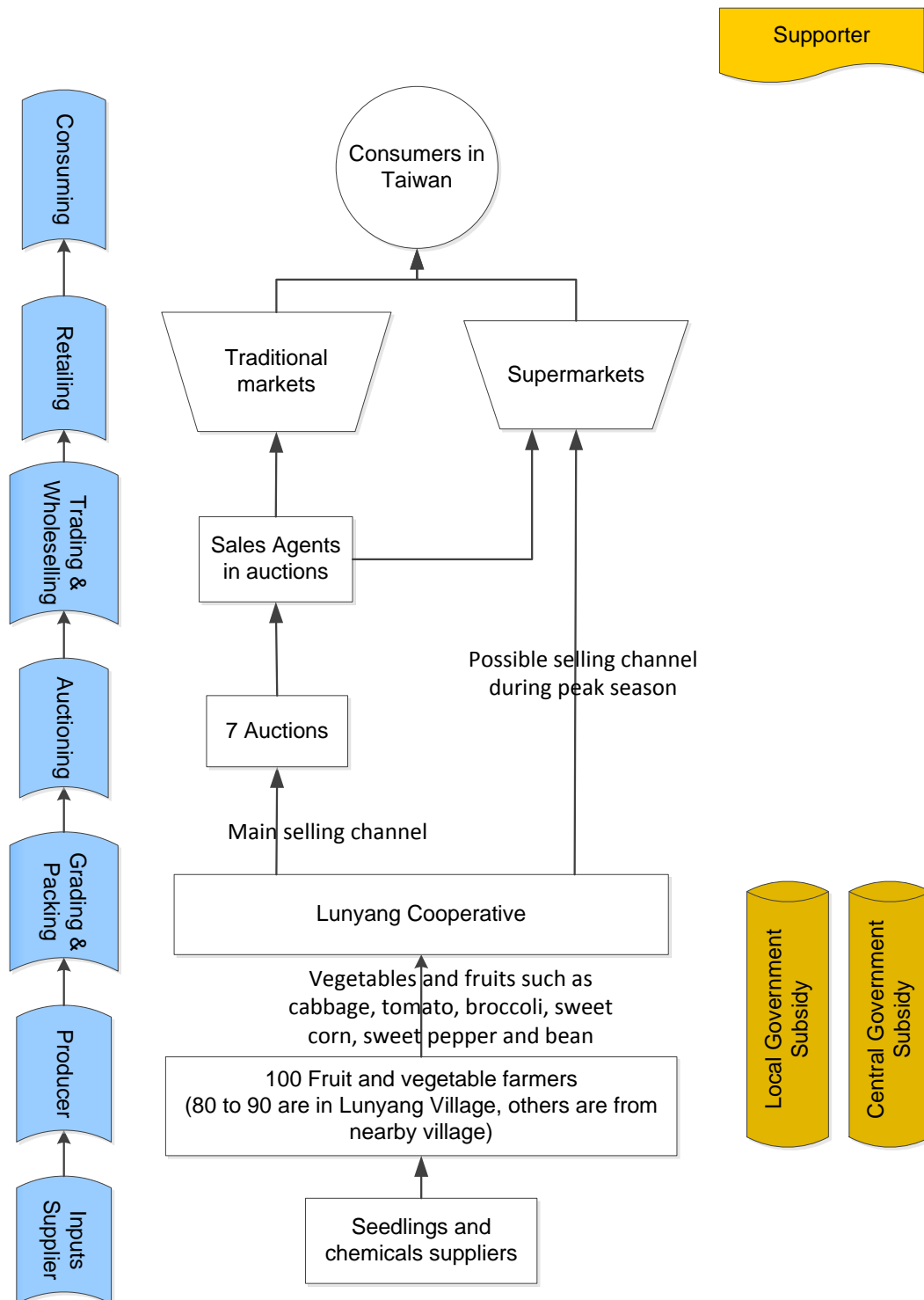


Figure 12. The value chain of Lunyang Farmer Cooperative.

The relations of the Lunyang Cooperative Farm are described in following aspects:

Formal/vertical linkages:

The directors and supervisors of the cooperative have meetings every two month. The aim of the meetings is to discuss the current situation of the cooperative and to make decisions for farmers, such as the permission of new members, the investment of money from members, the purchasing of new facilities, the subsidy application from the government and the decision of appointments and dismissals. The member's congress is hold at the end of year to discuss the performance that year and to know the opinions from members. When farmers have any opinion, they can contact staff of the cooperative and directors and supervisors will discuss on the meetings to know whether it can be implemented or not. Lunyang Cooperative Farm is a member of Federation of Taiwan Provincial Agriculture Cooperatives which acts as the connection between Lunyang and the central government. They also help their cooperative members to manage the selling after products arriving auctions. By doing this, Lunyang does not need to send people to every auction to deal with auction agencies.

Customer and target group:

The cooperative mainly sell their products through auctions by the auction clock system. They do not directly contact with the customers / sales agency. But they get information from auctions such as the results of random sampling (weight, quality and residues sampling) and the selling price. Because the quality of vegetables will decide the price in the auction clock system, so there seldom has the problem about rejection unless the quality is not uniform in the box. They also try to sell vegetable wholesalers, supermarkets, and catering food companies during peak season but it is not very successful so far. Though from this way, the cooperative knows the consumer demand such as varieties, quality, size, flavour, price and quantity from customers, they cannot steadily supply to customers year round.

Competitors:

It is necessary for farmers to gather their products and selling together. For this reason, there are many farmer associations and farmer cooperatives all over the country. Some farmer associations not only provide social services and also help to transport products to auction which is the same with the cooperative. For this reason, farmers can compare the services provided by different organisations in terms of fee, convenience, effectiveness and efficiency.

Suppliers of input:

Apart from the 4.1.1.3 Inputs mentioned, the cooperative can apply the subsidy from the government for different facilities in the chain:

- (1) Subsidy for the materials of greenhouses and tunnels to farmers
- (2) Subsidy for lifting trucks and other machines to the cooperative
- (3) Subsidy for cardboard box or other packing materials
- (4) Subsidy for cooling system and cooling warehouse to the cooperative

Subsidy is provided when farmers or the cooperative need the subsidy to improve the facilities, then the cooperative apply from the government. The government will check and evaluate and the evaluation criteria includes the organisation structure of cooperative, the turnover of the cooperative, the number of members and the certifications (GAP, CAS or TAP). After approving the application, the government will make the budget proposal and give the subsidy to the cooperative.

Policy makers and regulators:

The cooperative has to follow the Cooperatives Act. According to the Article 2-1:

'The regulating authorities of cooperatives refer to the Ministry of the Interior at the central level, the municipal governments at the municipal level, and the county (city) governments at the county (city) level. However, the target businesses of cooperatives shall be directed and supervised by the regulating authorities in charge of the target businesses.'

When the cooperative has problem, they can contact directly to the local government (Chiayi County Government). They also can contact to Federation of Taiwan Provincial Agriculture Cooperatives and revealing the problem to the central government.

4.1.2 The Internal Components of IOM of Lunyang Cooperative Farm

4.1.2.1 Strategy

For achieving the mission of the cooperative, the specific strategies are outlined in the following part.

Long term strategy:

- (1) Increasing the equipment and educating staff in order to improving the service quality.
- (2) In recent years, people pay more attention on chemical residues on vegetables. Increasing the amount of GAP certification and showing there is no residues on produce.
- (3) Increasing the product quality and establishing a brand to farmers.

Short term strategy:

- (1) Increasing selling channels and to contact customers directly in order to know the demand of products.
- (2) Providing more inputs such as fertilisers and pesticides to farmers to reducing their production cost.
- (3) Helping members to do the farm work during busy season and decreasing their cost.

4.1.2.2 Structure

The structure of the cooperative is shown in Figure 13. The cooperative is composed by 100 members and they elect the directors and supervisors to help them manage the cooperative. The representative of the cooperative is one of the directors who in charge to manage the secretary, accountant and finance of the cooperative.

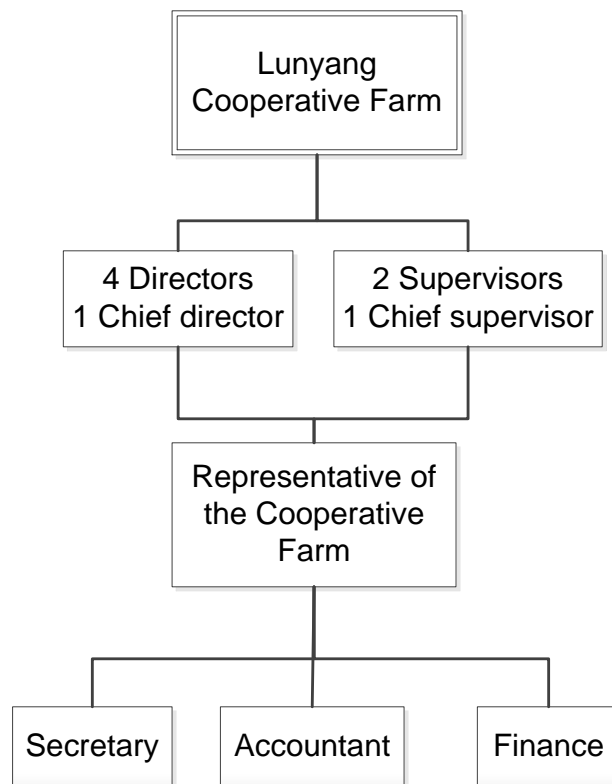


Figure 13. The structure of Lunyang Cooperative Farm.

4.1.2.3 System

The cooperative helps to monitor the chemical residues on the produce. The farmers have to keep the records on the application of fertiliser, pesticides and other chemicals and they have to send the products to the cooperative to check the residues before harvesting. The produce will be checked at auction randomly and the farmers have to pay fine when their products have residues (Each farmer has different code so produce can be traced back to farm level). When this problem occurs, the cooperative will ask farmers to improve and the cooperative would hold the training class to teach farmers. The local markets do not ask the certification and the test record, only supermarkets ask them to provide the testing result of residues. The cooperative does not pay attention on helping farmers to get organic certificate. It is because the organic products are not suitable for the auction and they have other selling channels. In order to improve the quality of products, they also call the meetings and convey the market information to farmers.

4.1.2.4 Staff

The decision making staff, directors and supervisors, are selected from election and they are also farmers. Every member has chance to participate in elections but most of the time, larger scale farmers were elected to be directors and supervisors. They make most decision in meetings in order to increase the effectiveness of the cooperative. They also consider arranging the training class to staff which helping them to understand more about the functioning of the cooperative.

4.1.2.5 Style of Management

Because of the directors and supervisors are member, they are also influenced by the decisions they made. Therefore, they consider how to make them get more benefit on decision making. On the other hand, the members of the cooperative make the cultivation plan by themselves without cooperative involved. The cooperative only decide the services they deliver and do not have big influence on the profit of farmers.

4.1.2.6 Culture

There is no communication and information sharing among members. Farmers acquire knowledge only from the cooperative which is the policies, regulations or information from the government. They focus on the short term strategies especially expanding the market channels for their members.

4.1.3 The SWOT analysis of the Lunyang Cooperative Farm

To show the internal and external influencing factors and summarise the information of the cooperative in Taiwan, SWOT analysis tool is used in Table 4.

Table 4 The SWOT analysis of Lunyang Cooperative Farm.

Internal factors	Strengths: <ul style="list-style-type: none">• The cooperative was set up for long time and is familiar with the auction system.
	Weaknesses: <ul style="list-style-type: none">• The relationship among members is weak.• Unstable production and the failure of continuous cropping.
External factors	Opportunities: <ul style="list-style-type: none">• The benefits of consuming tomatoes are emphasised on Taiwanese press.• Selling tomatoes to supermarket is an alternative channel.
	Threats: <ul style="list-style-type: none">• Some farmer associations provide same services and become competitors.• Products from other farmers and cooperatives are the competitors in auction.

Lunyang Cooperative was set up for over 30 years to organise the logistics for farmers and well understand the auction system. Nevertheless, farmers cannot stable supply products because unstable production and failure of continuous cropping which caused by inappropriate cultivation methods and insufficient facilities. This is also caused the cooperative cannot see direct selling to wholesalers or retailers as the only selling channel because they prefer stable suppliers.

There has been an increasing awareness of the benefits of consuming tomatoes hence tomatoes are popular nowadays. But the tomatoes from other farmers became the competitors in the auctions. On the other hand, there are some farmer associations also help farmers sending products to auction. This leads farmers can find other ways to sell tomatoes and do not join the cooperatives.

4.1.4 The Difficulties of the Lunyang Cooperative Farm

Recently, consumers more aware of the benefits of consuming tomatoes, and there is no problem on selling tomatoes. However, the cooperative still has many problems. Firstly, the unstable production and the failure of continuous cropping cause farmers

cannot stable supply. Secondly, the cost of facilities, materials, chemicals and other inputs have increased dramatically these years. Thirdly, the competition among other farmers and cooperatives influence the auction price. Therefore, the cooperative seeks for more selling channels and tries to increase the quality of products.

4.2 The Current Situation of Farmer Cooperative in The Netherlands

The cooperative and the company Prominent Grower Association was set up by five tomato growers in 1995 and the cooperative has expanded and now has 23 tomato growers. The following results of Prominent Grower Association are obtained from the interview of Mr. Joost Van Der Voort.

4.2.1 The External Components of IOM of Prominent Farmer Association

4.2.1.1 Mission

The mission of Prominent is organising farmers around Westland and selling and marketing tomatoes together. Before, every farmer does everything by himself but since the land expanding during the time and it became difficult to manage everything in effective way. Farmers decided to work together and professionalize their work that every farmer does not need to get involved in details.

4.2.1.2 Outputs

The cooperative formed a sales group (three people) and help to contact with customers everyday to make sure the quantity and types of tomatoes they want. Sales group and traders make the weekly contract (traders make the order base on the week price). Sales group manages the selling and farmers do not have to involve. The greenhouse tomatoes are sold as the first class, when the demand of market decrease or the production increase (especially during summer time), the sales group has to find other market to sell tomatoes. For example, reduce the price and expand the market. The cooperative also helps farmers to maintain the standards of certification. Certification auditing is held twice per year (1 internal and 1 external).

The packing division manages the collection from farmers. After sales group knows the quantity and types of tomatoes customers want, they contact to the packing division. Packing division checks the order from traders, they pack the tomatoes in the stock to get ready for the traders (traders pick up tomatoes in packing area, packing division do not need to manage delivery). If the amount in the stock is not enough, they contact the growers to harvest to meet the demand.

Two other divisions of the company, groeneweg I (gw1) and groeneweg II (gw2), are two growing greenhouses. They grow different varieties by using different facilities for example artificial lighting and cooling system. When there has potential varieties, they grow in gw1, gw2 and small scale in members' greenhouses in order to share the risk. These two divisions have to record the conditions of each variety and to make the report.

According to farmers' personal interest, they have to join certain group to improve

different aspect. The growing group compares the production of each variety every week and make the report. The buying group purchases all the inputs. The marketing group decides the style and package of products. The variety checking group is formed by 8 farmers to check the variety and follow the crop year round to select the right variety for growers. The energy group put efforts on developing the energy controlling in greenhouses. And these all results are shared among members.

4.2.1.3 Inputs

At beginning, members were the farmers around Westland but nowadays, as long as farmers in The Netherlands have chance to be members. There are 23 members who grow different varieties / types (about 20 types) of vine tomatoes (different in size, quality and production). When a farmer wants to join the group, four farmers from Prominent go to check the company whether it is qualified as the Prominent member. They have some criteria to choose the members, the company must be sustainable, the cultivation must be professional (not necessary to be certain cultivation method but have sufficient knowledge), the quality of tomatoes has to reach their demands and must be food safety and the company must have certifications such as MPS. They also want to know whether the farmer is willing to share the knowledge and growing data to members. Farmers need to pay certain fee per hectare to join the cooperative and need to share the information they have. Every farmer has to put effort on certain aspect, for example, growing, energy or techniques. Farmers put efforts and also get benefits from other farmers. Farmers have to pay certain percentage of the selling to the cooperative. When the cooperative has extra profits, they put money to the Prominent Company.

4.2.1.4 Factors

The factors (general environment) of the Prominent are discussed by PEST (Table 5).

Table 5. The PEST analysis of Prominent Farmer Association.

Political	The EU pays much attention on food safety issue and it is necessary to the cooperative to follow the law. But the EU provides subsidy for production area.
Economic	The economic crisis in Europe has big influence on the selling. Both price and demand decreased in these years.
Social	Tomato is the important vegetable around Europe. Germany and UK are two nearby countries with high population, and they see these two countries as main customers.
Technological	Farmers, gw1 and gw2 can apply subsidy to invest new techniques from EU. They also can apply loans from Rabobank to the innovation in production area.

4.2.1.5 Actors

Gw1 and gw2 not only in charge of variety testing, they also act as producers in the chain. They send tomatoes to packing division together with other members. Packing division collect tomatoes from farmers and transport to warehouse then grading and packing tomatoes according to the customer demands (Figure 14).

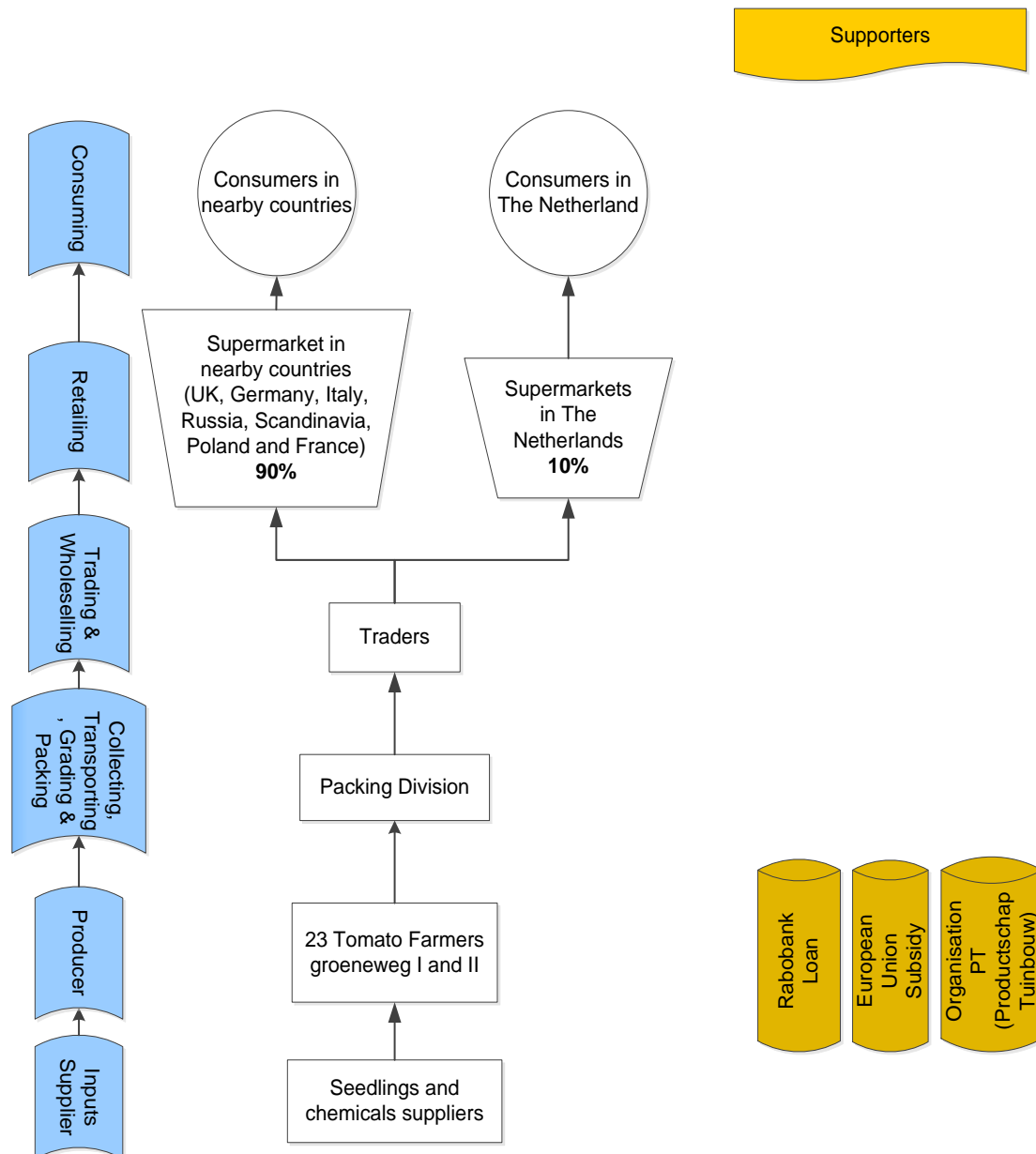


Figure 14. The tomato value chain of Prominent Company.

The relations of the Prominent Farmer Association are described in following aspects:

Formal/vertical linkages:

Five representative farmers were elected by members and form the board. The directors of the cooperative are hired by the growers to manage the cooperative and the Prominent Company. The board and directors have meetings once a week. The aim of meetings is to discuss the situation of whole company and make decision for most things for the cooperative and Prominent Company. All the members, directors of the cooperative, manager of Prominent and managers of each division have meetings once a month. In meetings, the managers have to report the current situation of each division to let every member knows the functioning of the company. Gw1 and gw2 also present the cultivation report and give recommendations on choosing varieties to farmers. The sales group report the quality and price of each dealing and the checking report of every farmer. When members have opinions about company, they can discuss in the meetings and improving the functioning of the company.

All farmers are the members of FresQ. FresQ is a financial structure, it works like insurance company. The customers (traders) give the payment to FresQ and FresQ gives the money to farmers. If the customers do not pay the money, the FresQ will pay to farmers. Because only big organisation like FresQ can apply the subsidy (GMO) from EU, farmers have to join it to get subsidy.

Customer and target group:

The customers of the company are traders. The sales group contact them directly and negotiate the price, quality, quantity and type of tomatoes. After they sell tomatoes to traders, 90% of tomatoes are sold to nearby countries such as UK, Germany, Italy, Russia, Scandinavia, Poland and France (UK and Germany are main groups), and 10% of tomatoes are sold to the supermarket in The Netherlands, for example, Albert Heijn and C1000. Growers, customers and sales group make the quality requirement of the tomatoes together (also consider the EU standard for food safety). Nevertheless, during the winter time (December to March), it is necessary to use artificial light to increase the quantity of high quality tomatoes in order to keep the customers. Because during this period, large amount of cheap tomatoes from Spain are imported to The Netherlands. This may causes traders to buy cheap tomatoes when Prominent cannot provide enough quantity of tomatoes to them. After this period, the production increase from April and it is easier to sell tomatoes to traders when you can supply tomatoes to customers year round.

Competitors:

The traders are dealing with many suppliers at the same time and it is necessary to distinguish the products from other competitors. During summer season, sufficient sunlight makes the production of tomatoes increase in The Netherlands. The main competitors at this time are other tomato producers in The Netherlands. On the other hand, during winter season, the weather in southern part Europe such as Spain is suitable for cultivating tomatoes and is the main competitor to them.

Suppliers of input:

The payment from farmers and the income of the cooperative and company are used to invest new techniques in three divisions or other developments, the salary of staff and other cost of company. Farmers do not pay salary to them directly.

The EU gives subsidy for investment of new techniques in production area such as new grafting techniques and biology system. Therefore, farmers, gw1 and gw2 can apply for the subsidy and subsidy can only apply through FresQ. Organisation PT (Productschap Tuinbouw) is formed by the government and they work for horticulture sector in The Netherlands. Rabobank gives the loan to innovation of the production area. When farmers, gw1 and gw2 have 25% of total investment, can apply the loan for the rest 75%.

Policy makers and regulators:

The cooperative and Prominent Company are working as the company not the government organisation. Therefore, the government do not have big influence to them. However, they have to follow the food safety standards of EU. The legislation includes '*the general and institutional provision, the food hygiene, plant health checks, contamination and environmental factors, international dimension and enlargement and the regulations of other specific themes* (EU Food Safety Law, 2002).' For this reason, they consider this law when making the quality standards to their products.

4.2.2 The Internal Components of IOM of Prominent Farmer Association

4.2.2.1 Strategy

For improving their functioning, they focus on marketing in the future. Consumers want more taste of tomatoes but retailers are not willing to pay more money. They can produce tastier and contains more aroma tomatoes but with lower yield. The selling price should be higher to maintain the profits. Also, the cost is getting higher in recent years. Therefore, marketing of tomatoes is the most important. They will focus on emphasizing the features of their tomatoes which are food safety because using less chemicals than imported tomatoes, higher quality and transportation distance is shorter than the tomatoes from Spain or Morocco (environmental friendly).

4.2.2.2 Structure

The structure of the cooperative is shown in Figure 15. Twenty-three tomato growers own the cooperative and 5 of them formed the board as the connection between members and the cooperative. The directors manage the Prominent Company which has three divisions namely packing station, gw1 and gw2. These three divisions were set up in 2000, 2003 and 2006, respectively. Each division has sub-divisions in charge of the energy, estate and exploitation sectors.

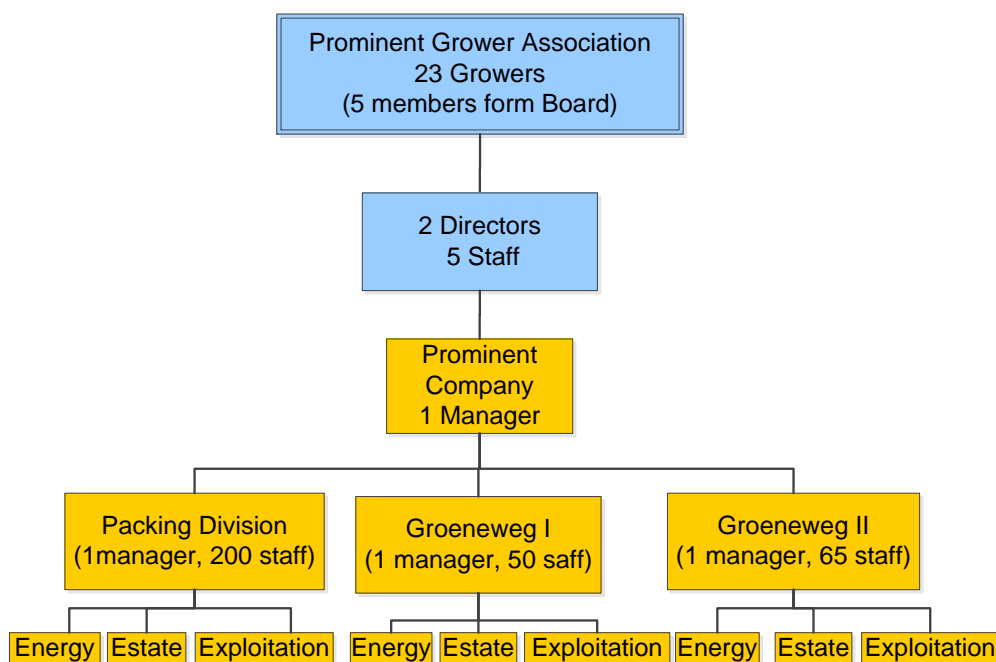


Figure 15. The structure of Prominent Company.

4.2.2.3 System

In order to make sure the products reach the quality standards, sales group check the tomatoes before sending to customers. They make checking reports every week and present to farmers in monthly meetings. They discuss the solution with farmers when there has problems. Most of the time, the tomatoes which have problems can be sold as lower class. If farmers make too much mistake, gw1 and gw2 will give consultant to solve the problems. But when farmers cannot improve for a long time, farmers have to leave the cooperative.

Prominent have well complaining system for customers. When customers find problems of products, they ask customers to give the information on the products. The sales group will go and check the tomatoes according to the quality requirements. When the tomatoes do not reach the requirements, they will contact packing division to prepare new delivery to customers but they will not give new products when the tomatoes meet the requirements. Because they have 23 farmers, preparing enough tomatoes for new delivery can be done in short time. The sales group can trace back to greenhouse and to know who harvest the tomatoes by the information on the products (each farmer has a set of number and is regulated by the government).

4.2.2.4 Staff

Most of the decisions are made in the meetings of the board and directors because it is difficult to discuss and make the conclusion by 23 members. Mr. Joost Van Der Voort mentioned: *'There never had the same opinion from all members so far'*. However, big decisions such as new investment or development of the company are made by all members. The staffs of sales group not only receive regular salary, they also get incentive when their performance is very well.

4.2.2.5 Style of Management

For the effectiveness and efficiency of the association, the directors and managers in charge to make some basic decisions for smoothing the functioning of the company and they have to make report weekly to the members. The board make final decisions during the meetings with directors and inform other members on the monthly meetings. The decisions are made basically according to get more benefits to both company and all members.

4.2.2.6 Culture

It is necessary to share information among members that everybody can improve together and are willing to put efforts to the cooperative. They directly contact to their customers very often and well understand the demand. They focus on increasing the marketing activities as the long term strategy to improve their profits.

4.2.3 The Difficulties of Prominent Farmer Association

The economics problems influenced the sector dramatically. Prominent is trying to seek markets for high quality tomatoes by marketing their products. Basically, there is no big problem in the cooperative but it is important for the company to have good communication among members. Members have to build trust between each other and willing to share all information then everyone can get benefits from the cooperative.

4.3 The Consumer Preference in Taiwan

Among total 70 participants, the age ranged from 18 to 65 years (Table 6). The monthly income ranged from 0 (included students and unemployed) to 100000 TWD and the average was 36043 TWD.

Table 6. The maximum, minimum and average age and income of participants.

Residence (number of participants)	Age			Monthly income (TWD)		
	Max	Min	Average	Max	Min	Average
Taipei City (25)	60	22	32.0±2.1 ^z	60000	0	30120±3541.8
New Taipei City (15)	58	23	31.3±2.2	60000	0	34533.3±5039.7
Taichung City (2)	40	24	32 ^y	33000	10000	21500
Tainan City (5)	37	26	30.2±2.2	40000	8000	31400±6144.9
Kaochiung City (4)	36	21	27.8±3.1	35000	20000	28000±3391.2
Others (19)	65	18	37.8±2.9	100000	0	49473.7±7066.7
Total (70)	65	18	33.1±1.2	100000	0	36042.9±2738.6

^z Standard error of the mean.

^y There is no standard error of the mean because the sample size was 2.

Apart from the basic information, the participants were asked about the frequency of purchasing tomatoes (Figure 16). Most of participants do not purchase tomato very often. Over 70% of participants purchased tomatoes less than twice per month and 15.7% of participants never purchase tomatoes. Among 59 participants who would purchase tomato, 43 of them (72.9%) usually buy cherry tomatoes which are consumed as fruits in Taiwan (Figure 17).

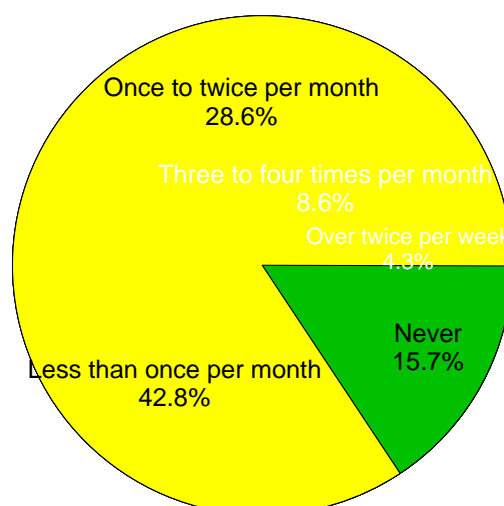


Figure 16. The frequency of purchasing tomato by consumers in Taiwan.

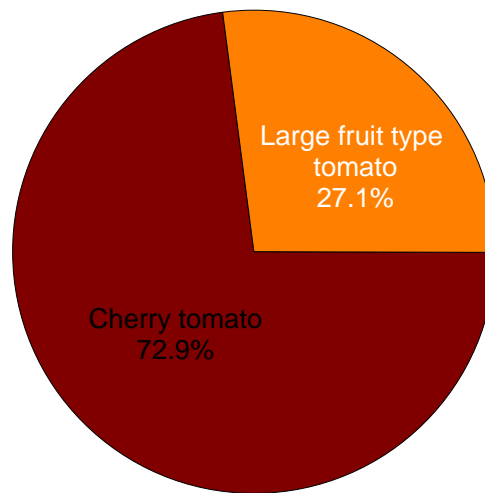


Figure 17. The preferable type of tomato by Taiwanese consumers.

The participants preferred to purchase tomatoes in traditional market (50.8%) and supermarket (40.7%) and 2 others bought tomatoes in fruit shops (Figure 18). When they purchase tomatoes, the appearance is the most important criteria. Every participant mentioned they would pick tomatoes by the appearance (Figure 19). The second important criteria is the price and 74.6% of participants care about the price when they purchasing. The participants do not pay attention on whether tomatoes are organic product or not. The participants also mentioned some other criteria such as quality, sweetness, variety, colour, opinions by friends and some people decide to buy after testing the free samples.

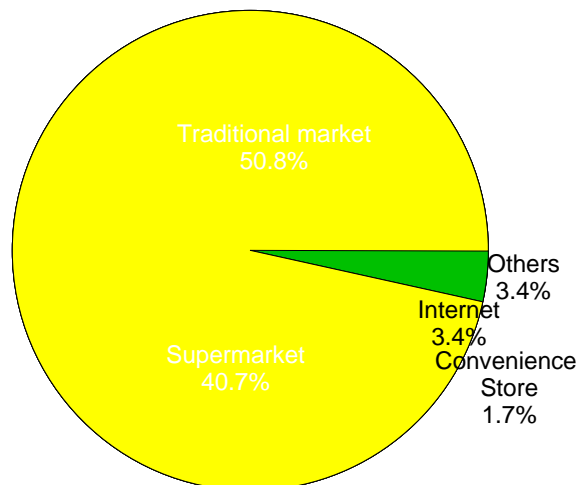


Figure 18. The preferable place to purchase tomatoes in Taiwan.

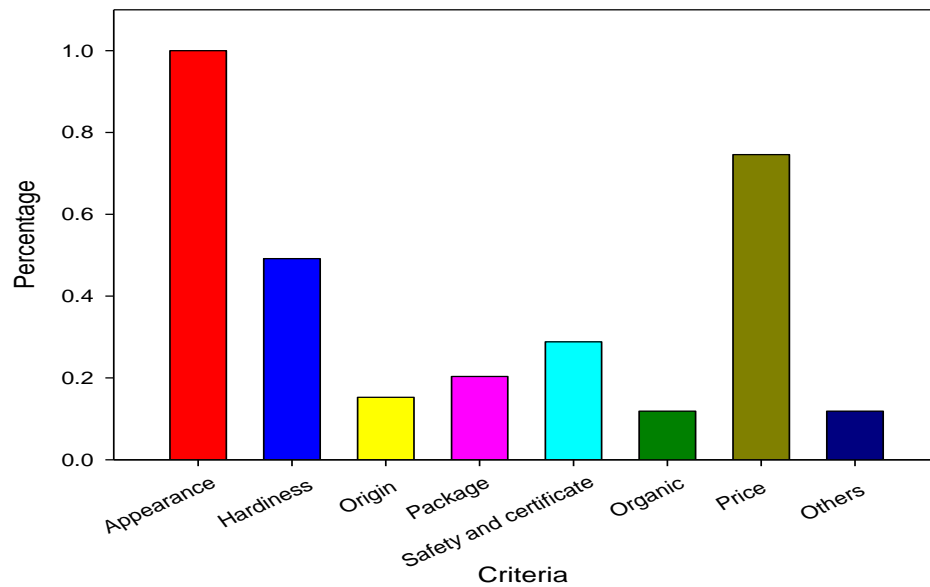


Figure 19. The criteria for Taiwanese consumers to purchase tomatoes.

Among these criteria, most of people (50.8%) considered the appearance is the most important one for them to choose the tomatoes (Figure 20). 16.9% of them considered the price is the most important while 15.3% of them saw the certificates is important.

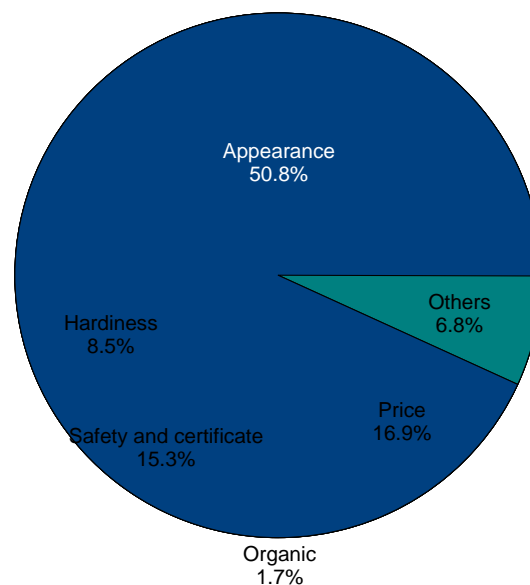


Figure 20. The most important criteria for Taiwanese consumers to purchase tomatoes.

Most of participants (69.5%) preferred to buy tomatoes without package (Figure 21). The main reason is that they want to touch and check every tomato before they purchase. Also, they can decide the colour, quality, hardness and quantity by their personal preference. Other participants (27.1%) preferred to buy tomatoes with package because they considered it is cleaner and more convenience.

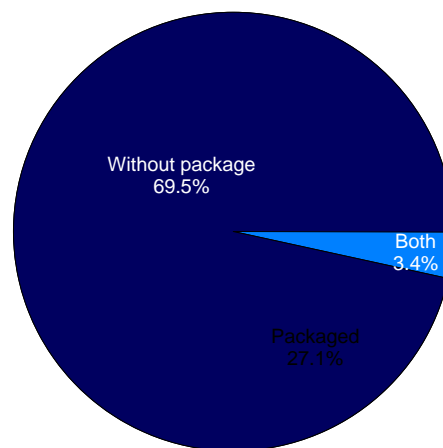


Figure 21. The preferable type of tomato package to consumers in Taiwan.

There were 11 participants never purchase tomatoes and they mentioned it is mainly because they do not like tomatoes and there is no motivation for them to purchase (Figure 22). Some participants mentioned that they do not purchase is because they do not cook, friends or other family member would purchase. Two participants do not like eating tomatoes.



Figure 22. The main reason of Taiwanese consumers are not willing to purchase tomatoes.

Every participant considered the advantages of greenhouse tomatoes are important (Figure 23). And 58 of them (82.9%) are willing to pay more for purchasing greenhouse tomatoes (Figure 24).

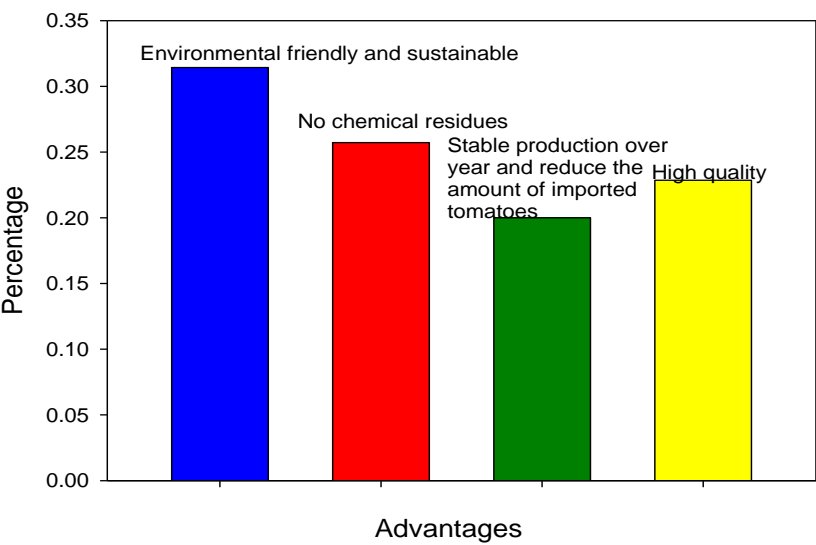


Figure 23. The most important advantages of greenhouse tomatoes are concerned by Taiwanese consumers.

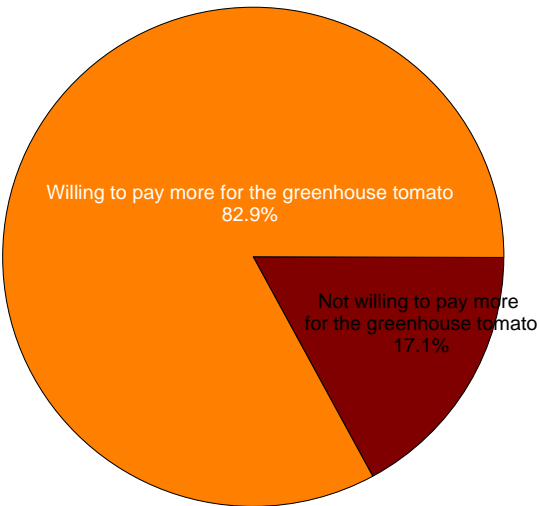


Figure 24. The willingness of Taiwanese consumers to pay more for greenhouse tomatoes.

In their opinion, most of them (79.3%) are willing to pay 10% to 30 % more for greenhouse tomatoes than conventional tomatoes (Figure 25).

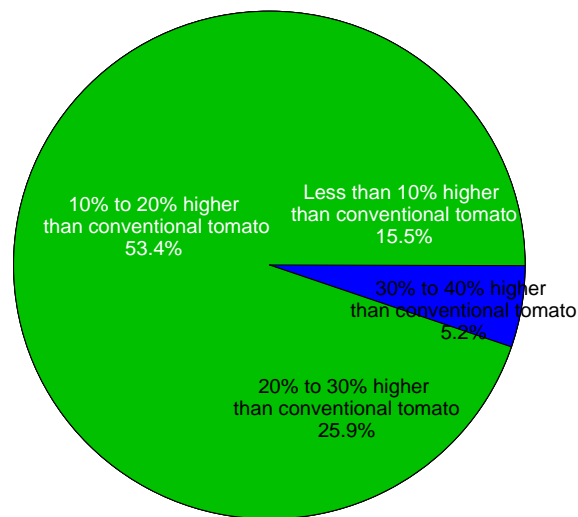


Figure 25. The preferable selling price of greenhouse tomatoes by Taiwanese consumers.

4.4 The Opinions from Dutch Farmers to The cooperative

The participants grow different varieties of tomato such as Pruim, Ronde, Joos Cocktail, Cocktail, Tros Grof, Tros Middel and Briosio and the range of farm size is from 3 ha to 16 ha. Most of them make their cultivation plan according to the market price (61.5%) and personal experience (53.8%). They do not discuss the cultivation plan among members. They also mentioned about the opinion from crop advisor, sales department and the production and quality of the variety (Figure 26).

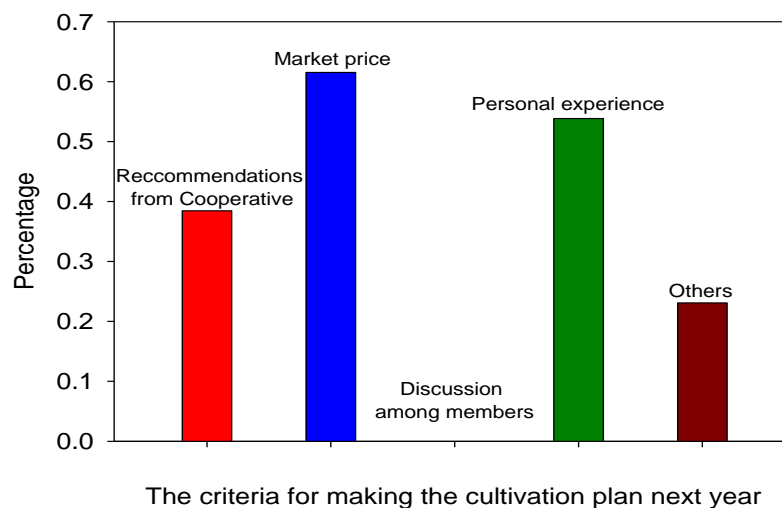


Figure 26. The information for Dutch farmers to make the cultivation plan for next year.

They considered that joining the cooperative is the way of accessing market, to get information both from the cooperative and members and purchasing inputs. One participant thought that joining the cooperative and cooperating together then each farmer get stronger (Figure 27). Among the services, 84.6% of participants thought joining the cooperative can help marketing tomatoes but none of them acquire the consultant of cultivation. One participant considered selling tomato is one of the services he got (Figure 28).

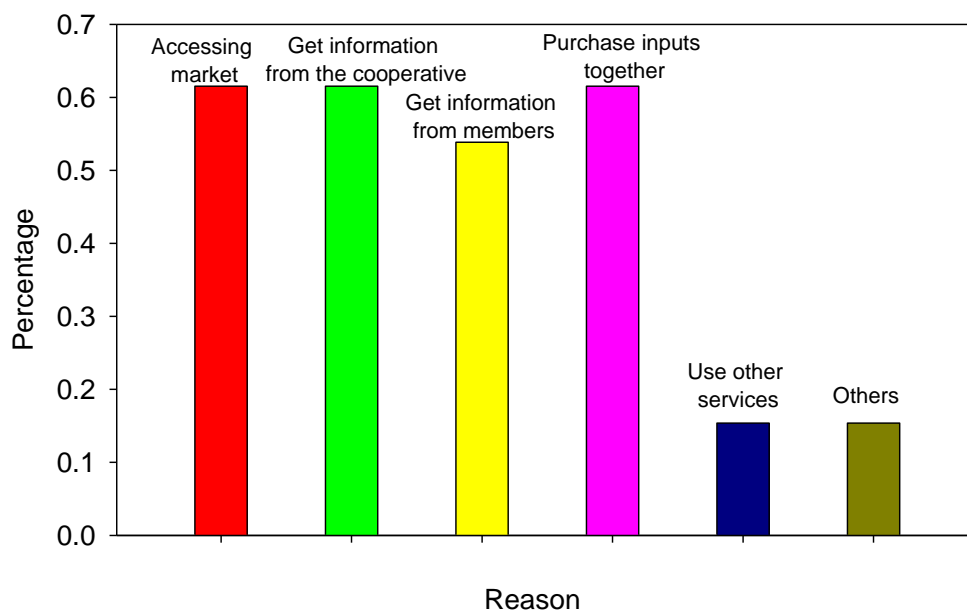


Figure 27. The reasons for members to join the cooperative.

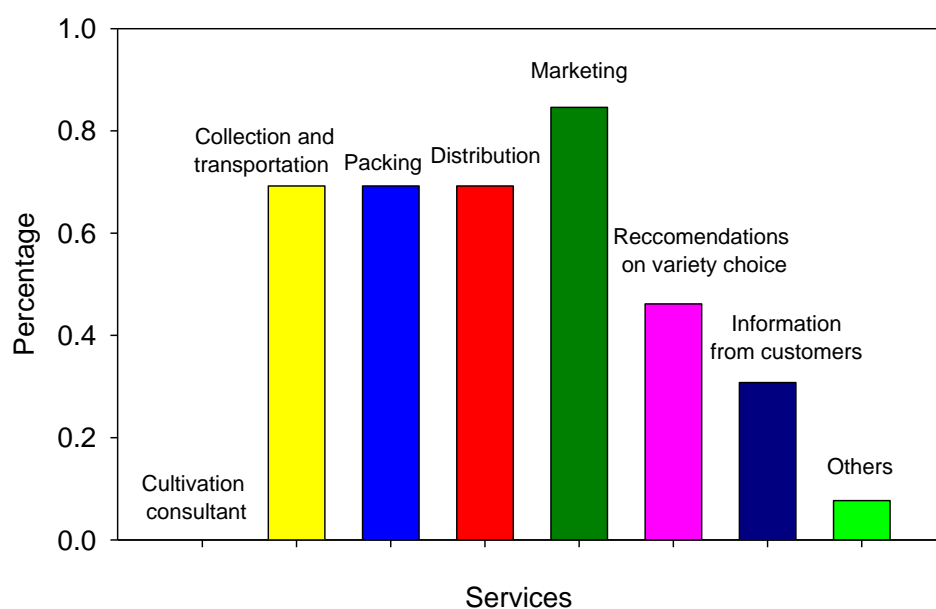


Figure 28. The services receive from the cooperative.

Most of them are satisfied with the services provided by the cooperative. Because they thought they became more professional, stronger, can get more information and these services were decided by all members. However, they considered it always possible to improve and become better. Apart from the charge of services, transparency and the effectiveness of information flow, one participant thought they do not put enough efforts on adding value to products (Figure 29).

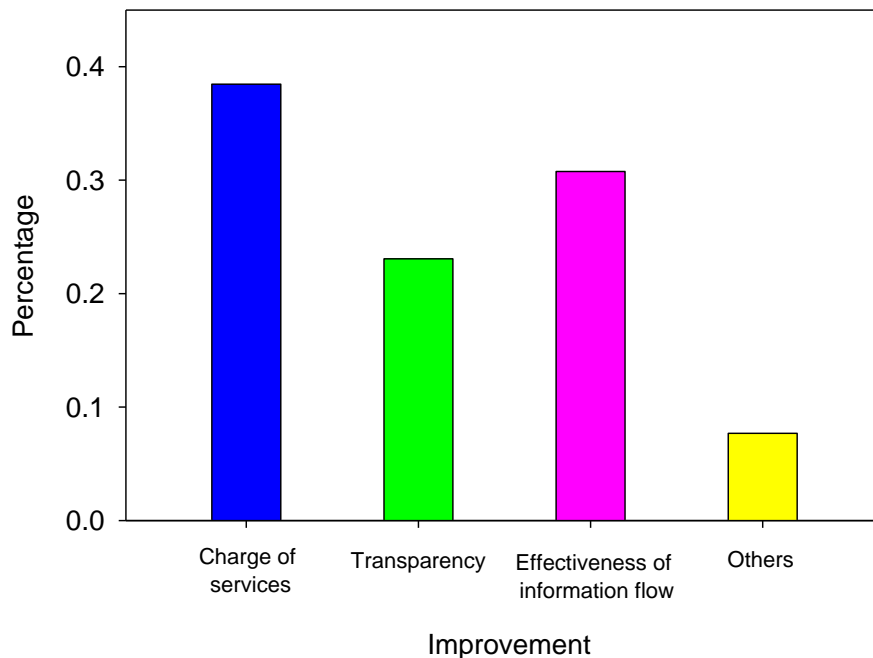


Figure 29. The suggest improvement from members to the cooperative.

Most participants do not expect the cooperative to provide new services while two participants mentioned the marketing activities. They thought that although the cooperative provided marketing tomatoes, it still not enough. They joined the member meetings of the cooperative and some excursions. One participant mentioned that he can visit to other members' greenhouses. Every participant thought they can get information about the quality requirements from the cooperative (Figure 30).

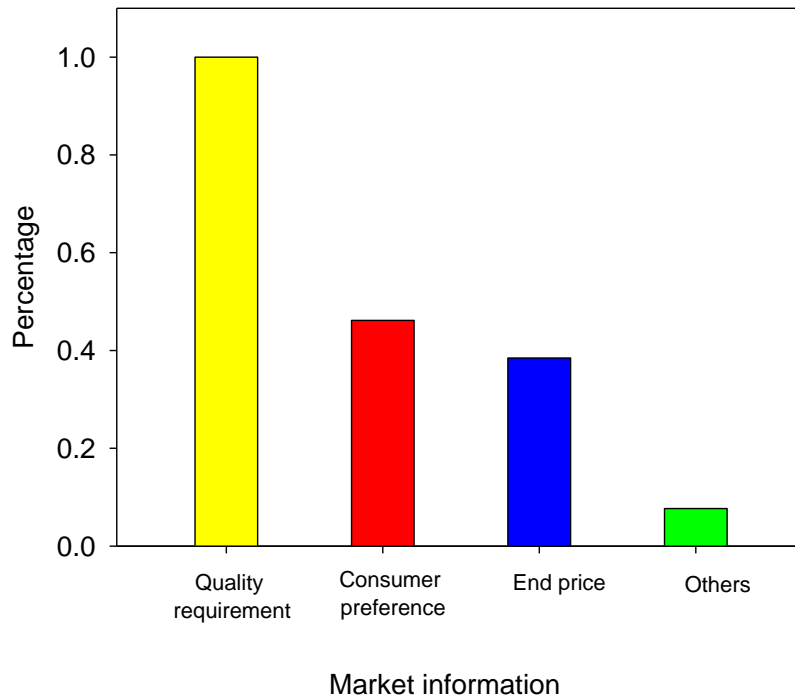


Figure 30. The market information from the cooperative to members.

Every participant knew who are their customers and it included supermarkets in The Netherlands and nearby countries such as Germany, UK, Scandinavia, Russia, Italy, Spain and Eastern Europe. Especially Germany and UK are main selling countries.

They also mentioned there some difficulties for them in the market. Two participants considered that it is difficult to distinguish them from other competitors. Other two thought that it is difficult to deal with supermarkets because the power of supermarkets is too big. One participant mentioned that everything focused on the price too much but not the quality of tomatoes. And the other considered that they do not have enough communication with end consumers.

5. DISCUSSION

5.1 The Comparison of Cooperatives in Taiwan and The Netherlands

The research focused on every aspect of two cooperatives in both Taiwan and The Netherlands. It showed two cooperatives are functioning in different ways (Table 7). First of all, because Taiwanese farmers are small scaled and cultivating many kinds of vegetables and fruits, the cooperative do not focus on one vegetable but providing services to the vegetable and fruits farmers in nearby area. There is no specific criterion for choosing member, the fruit or vegetable farmers can join the cooperative. However, the cooperative in The Netherlands only focus on the tomato growers. They have strict criteria to decide who can join the cooperative. It is because they created a brand imagines for their company and members should have ability to produce high quality greenhouse tomatoes. Consequently, they can sell their tomatoes as first class product.

Compare to Taiwanese farmers decided types and varieties of vegetables by themselves, Dutch farmers also consider the recommendations from the cooperative when choosing the varieties (Figure 26). Each member of the cooperation in The Netherlands puts efforts on different aspects in order to improve their situation and they are willing to share information to each other. Because they think cooperation can make everybody stronger. Dutch farmers hired directors and managers to manage the cooperative, Prominent Company and three divisions. Therefore, every staff can focus on their specific work and also farmers do not need to involve in every details of their company. In addition, they hired a sales group to in charge of contacting the traders and responsible for expanding selling channels. In this way, farmers can concentrate more on their production and do not need to be worried about selling. Although the cooperative in Taiwan held several training and education meetings to farmers, the relationship among members is weak.

Lunyang helped to organised the transportation from collecting warehouse to auction, but they could not guarantee farmers can sell their produce because they did not contact directly with customers. They also could not make sure members can get best price because the price is judged by auction clock system and there is no negotiation with customers. Taiwanese cooperative acted like the fifth type of cooperatives that provide other services like farm assistance (Bijman and Hendeikse, 2003). And they do not help farmers to bargain the price and marketing the products (Bijman and Hendeikse, 2002).

Table 7. The comparison of the cooperative in Taiwan and The Netherlands

	Lunyang Cooperative Farm	Prominent Farmer Association
Products	Vegetables and fruits	Tomatoes
Members	100	23
Criteria of members	Fruit or vegetable farmers in nearby area	Sustainable, professional, meet the quality demand, food safety and certification
Services	Grading, packing, transportation, consultant, training	Collection, grading, packing, marketing, recommendation of varieties, information from customers, purchasing inputs
Meetings	(1) Directors and supervisors (every two months) (2) All members (the end of year) (3) Education meetings (grading, packing, chemical usage)	(1) Representatives and directors of the cooperative (every week) (2) All members, directors, manager of Prominent and manager of each division (every month)
Financial inputs	Members pay the share of the cooperative and the services fee	(1) Members pay the admission fee and the services fee. (2) The income of the company.
Member contribution	--	Each member has to put efforts on certain aspect such as cultivation, energy, marketing
Information sharing among members	--	Members have to share information with each other and improve together
Selling channel	Auctions	Traders (weekly contract and contact by sales group)
End consumers	Local consumers	Local consumers (10%) and nearby countries (90%)
Certification	Not necessary but the cooperative helps farmers to get certificate	Necessary and the cooperative helps to maintain certification standards and self auditing

Future improvements	(1) Expanding market channels (2) Supply more inputs (3) Helping farm work	Marketing
Supporters	The government gives the subsidy to both farmers and the cooperative	The EU gives the subsidy to producers. Rabobank provides loan to producers The government forms organisation PT to work for horticulture sector

On the other hand, the cooperative in The Netherlands provided more varieties of services which covered the first (supply inputs), second (marketing) and fifth (other services like farm assistance) types of the cooperative (Bijman and Hendeikse, 2003). They are functioning like marketing cooperative by creating the reputation of their products (Bijman and Hendeikse, 2002). By doing this, they shorten the value chain and their tomatoes could go to end consumers in shorter time which influence the quality seriously. According to the opinions from Dutch farmers, the reasons for joining the cooperative can help them not only accessing market, also get information from members and the cooperative and purchasing inputs (Figure 27). And they can receive many services from the cooperative (Figure 28). Every member knows the quality requirements very well (Figure 30) and because they contact with customers (traders) directly, they can acquire lots of market information such as the consumer preference, end target consumers and end price of tomatoes.

Except from these general services like other POs provide, they work on research and developing techniques as well. Different from Lunyang Cooperative Farm, Prominent is a company which set up by farmers. All members are the boss of the company so everyone wants to improve functioning and make profits. Most of them are satisfied of the services and do not expect new services. However, they thought the cooperative still can improve like the charge, transparency, effectiveness and especially marketing (Figure 29). Because of Prominent focuses only on vine tomatoes, the research on checking new varieties and implementing new techniques can benefit all members.

Taiwanese cooperative is functioning like Dutch cooperatives in the past (Figure 6). Every producer sells their products through auction system and do not contact to customers directly. In contrast, Prominent Company acts like new bargaining association or new marketing cooperative in Figure 7. The main reason caused the auction system no longer important in The Netherlands was that most of vegetables and fruits are sold through chain supermarkets (Bijman and Hendrikse, 2003). Nevertheless, according to the survey, more than 50% of participants purchased tomatoes in traditional market in Taiwan (Figure 18). This means that the auction system is still needed in Taiwan because wholesalers are dealing with many retailers at the same time. It is different from the wholesalers in The Netherlands that are more concentrate on fewer retailers (Bijman and Hendrikse, 2003).

Though farmers in The Netherlands are growing tomatoes in greenhouses which used more artificial materials and energy for cultivation, they focused more on environmental issues just like other tomato producers in The Netherlands (Nass, 2010). For this reason, they consider about the sustainability to choose their members (Table 7). In addition, tomatoes must be food safety and members have to maintain

the certification. Taiwanese cooperative do not pay much attention on this issue that farmers do not necessary to have certification. This is also because the wholesalers and retailers do not ask products with certification. Nevertheless, the results from consumer survey, every participant considered the advantages of greenhouse tomatoes (environmental friendly and sustainable, no residues, stable production and high quality) are important (Figure 23) and 82.9% of them are willing to pay more for greenhouse tomatoes (Figure 24 and 25). The government also takes this issue more seriously and promotes farmers to acquire for the certification. It is possible to invest on greenhouse tomatoes in Taiwan that many consumers are concerned and willing to buy.

5.2 The Consumer Preference in Taiwan

According to the survey, only 15.7% of the participants never purchase tomatoes (Figure 16). Among these participants, there are 5 participants do not like the flavour of tomatoes and others were because inconvenience, other family member or friends would buy or they do not cook but not they do not consume tomatoes (Figure 22). Cherry tomatoes, normally be consumed as fruits, are more preferable for consumers in Taiwan (Figure 17). However, the production of cherry tomatoes was lower than large fruit type tomatoes in 2011 (Figure 3 and 4). Especially from June to December, the production was very low and it was only 359.3 tonnes in September (Figure 3) hence the auction price reached 81.9 NTD/kg in September. As a result, the farmers should consider cultivating more cherry tomatoes that more consumers prefer to purchase.

When consumers purchase tomatoes, the appearance is the most important criteria for them (Figure 19 and 20). Consequently, 69.5% of participants preferred to purchase tomatoes without package because it is easier for them to pick every single tomato (Figure 21). In contrast, there were 27.1% of participants preferred to buy packaged tomatoes. The cooperative can consider packing tomatoes in different package in order to meet demand from some consumers.

Some other consumers (15.3%) thought safety and certificate is important when they purchase tomatoes (Figure 20). The government set several certifications to inform consumers about the food safety issue which more people concerned recently (Taiwan Agexporter, 2011). The cooperative should encourage farmers to get certification which can expand their market and be accepted by more consumers.

6. CONCLUSION AND RECOMMENDATIONS

Lunyang Cooperative Farm was set up in 1978 and now has 100 members around Lunyang Village, Chiayi County. Lunyang provided collecting warehouse to their members. In warehouse, tomatoes are graded and packed by machine. Then the cooperative managed to contact the transportation company to send tomatoes to auctions. They also provide information about grading, packing and chemical usage to members. Tomatoes are sold only through auctions and the price is decided by auction clock system. The cooperative cannot bargain the better price because they do not contact directly to customers. The cooperative tried to sell tomatoes directly to wholesalers or retailers but not successful. Because the unstable production caused they could not supply year-round and wholesalers and retailers prefer to deal with stable suppliers.

In contrast, Prominent Farmer Association is functioning in different way. The Prominent Grower Association was set up in 1995 and provided services which include collection, grading and packing in packing station. They set up a sales group to contact with traders every day to know demands of customers (type of tomatoes, quality, quantity and package). They also built greenhouses together to test new varieties or techniques in order to share risk. The members of Prominent put efforts on different aspects such as cultivation, energy and techniques and share information with each other and improve together because they believe together is stronger. Prominent helps members to purchase all inputs together which can decrease the production cost and separate farmers with all details then farmers can concentrate on production. Although Dutch farmers are satisfied with the functioning of Prominent, many of them still considered it is always possible to improve especially marketing and distinguishing their products from competitors.

Compare to better functioning Dutch cooperative which provides more services, information and well organised and the survey of consumer preference, the possible improvements for Taiwanese cooperative are listed:

(1) Lunyang can also implement the concept of organising farmers and sharing information. Firstly, they should show the successful case to farmers they can encourage farmers to share the information about new variety testing which can share the risk. The recommendations are important when farmers make the cultivation plan. Secondly, sharing the cultivation methods because farmers cultivate tomatoes by their own way and each has advantages and disadvantages. This can help farmers to produce higher quality tomatoes. Thirdly, researching on investing new techniques and facilities. Farmers are not willing to invest because they only consider the initial investment is too much but not think about the benefits of it. Each farmer can put

small amount of money and evaluate the cost and benefit together. By sharing information and improving together, farmers can put efforts on solving the problems about unstable production and the failure of continuous cropping and to improve the quality. Moreover, they have more chances to sell tomatoes by other channels for example directly supply to wholesalers or retailers who prefer stable suppliers. Hence, Lunyang can help farmers to get better price and more market information.

(2) Lunyang should have good communication with farmers and to organise the inputs purchasing for them. Purchasing inputs includes not only pesticides and fertiliser but also seeds and plants. This means that the cooperative should understand members' cultivation plan and to provide appropriate inputs for them. Because of the cost of all inputs have increased dramatically in recent years and the cooperative can bargain the price to suppliers in this way. This also can help farmers focus more on cultivation but not other details.

(3) Lunyang mostly sells tomatoes through auctions and do not have enough market information. Therefore, it is necessary for them to improve the information flow from end consumers to farmers. They should contact with wholesalers or retailers every week to understand the preference on the market. They also can conduct the consumer preference survey before farmers decide the varieties to help farmers make proper decision.

(4) According to the consumer preference survey, Taiwanese consumers preferred to purchase cherry tomatoes. But the production of cherry tomatoes was lower than large fruit type tomatoes in 2011. Lunyang can encourage farmers to cultivate more cherry tomatoes. Also, some consumers (27.1%) preferred to purchase tomatoes in the package because they considered it is cleaner and more convenience. The cooperative can also provide tomatoes in different types of package in order to be accepted by more consumers.

(5) Taiwanese government and consumers are paying more attention on sustainable and food safety issue nowadays. About 15.3% of participants considered the certification as the most important criteria when purchasing while 82.9% of participants are willing to pay more for greenhouse tomatoes which is more sustainable, no residues and high quality. This issue should be addressed by the cooperative and convey to farmers. Firstly, they should help farmers to get certification and educate them to decrease the usage of chemicals. Secondly, they should help farmers to evaluate the possibilities of investing greenhouse production so as to produce higher quality tomatoes with less chemical inputs.

(6) Promoting is also an important issue for Lunyang. Compare to Prominent who knows the advantages of their tomatoes very well and they are emphasising on these benefits and seeking for new markets. Lunyang can help farmers to know the advantages of their products such as no residues, environmental friendly or importance for human diet. Moreover, they can establish a brand for members and more unique than other competitors.

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ANNEXES

Annex 1. The checklist for tomato farmer cooperative in Taiwan

1. The background information

- The history of the cooperative
- The members of the cooperative
- How can farmers join the cooperative
- Types of tomatoes
- What is the purpose of the cooperative
- What support does the government provide

2. The services of cooperative

- What are the services provided to members
- How does cooperative collect the products from farmers
- How does cooperative manage the transportation to auction
- What fees do farmers need to pay for services and how can farmers get the payment of products
- What service is cooperative going to develop

3. The market

- Who are the customers
- What information can get from customers and how to manage it to farmers (information flow)
- What are the quality and quantity requirements from customers
- Rejection rate of tomatoes
- What are the difficulties of accessing markets
- What are the problems do cooperative facing

Annex 2 The checklist for tomato farmer cooperative in The Netherlands

1. The background information

- The structure of the cooperative. The tasks of each position
- The members of the cooperative
- How can farmers join the cooperative (criteria, fee)
- Types of tomatoes
- The development (history) of the cooperative
 - How was it formed
 - What is the start mission
 - Who formed it
 - What is the purpose of the cooperative (past and present)
- What are the effects of the government? What supports are provided by the government
- Apart from the government, who are the supporters?
- What are the effects of economics problem in EU

2. The services of cooperative

- What are the services provided to members? What are changes of services
- How does cooperative collect the products from farmers (logistics)
- How does cooperative manage the distribution of products(logistics)
- What fees do farmers need to pay for services? How do they pay?
- How do farmers get their money?
- What service is cooperative going to develop

3. The market

- Who are the customers
- How to ensure the market to members? How do you communicate with market?
- What problems about market do farmers reveal to you
- What information can get from customers and how to manage it to farmers (information flow)
- What are the quality and quantity requirements from customers
- How to develop the new markets
- What are the marketing strategy
- What are the difficulties to cooperatives

Annex 3. Questionnaire for Taiwanese consumers

I am a master student of Horticulture chain management at Van Hall Larenstein, part of Wageningen UR. The aim of this questionnaire is to understand the consumer preference on tomato in Taiwan. The data will be used to give recommendations to farmers and farmer cooperatives in order to make production plan. The questionnaire consists of three parts.

Part 1. Background Information

1. Where do you live?

- (1) Taipei City (2) New Taipei City (3) Taichung City (4) Tainan City
(5) Kaoshiung City (6) Others_____

2. Sex (1) Male (2) Female

3. Age_____

4. Occupation

- (1) Military, Civil and Teaching Staff (2) White-collar workers or self business
(3) Agricultural or fishing production (4) Blue-collar workers (5) Housekeeper
(6) Retiree (7) Students (8) Others_____

5. Monthly income_____

Part 2. Consumer Preference

6. How often do you purchase tomatoes?

- (1) Over twice per week (2) Three to four times per month
(3) Once to twice per month (4) Less than once per month (5) Never

If 'Never', please skip question 7 to 10

7. What kind of tomato do you usually purchase?

- (1) Fresh tomato (Beef tomato) (2) Cherry tomato

8. Where do you usually buy tomato?

- (1) Traditional market (2) Supermarket (3) Convenience Store (4) Internet
(5) Others:_____

9. Which are the criteria for you to purchase tomato? (Multiple answers possible)

- (1) Appearance (2) Hardiness (3) Origin (4) Package
(5) Safety and certificate (ex: CAS and GAP) (6) Organic (7) Price
(8) Others:_____

Among these, which do you think is the most important? _____

10. Which do you prefer, without package or with package? Why?

- (1) Without package, reason:_____
- (2) Packaged, reason:_____

Please skip question 11

11. What is the main reason for you do not purchase tomatoes?

- (1) Bad flavour (2) Expensive (3) Bad quality (4) Inconvenience to purchase
(5) Afraid of the chemical residues (6) Others: _____

Part 3. Consumer preference on greenhouse tomato

Nowadays, tomatoes are be cultivated at outdoor or in simple tunnel covered by insect screen in Taiwan. This causes the production and quality of tomato are influenced by weather and pest and disease problems seriously. Taiwanese farmers are planning to introduce technology from The Netherlands and cultivate tomatoes in greenhouse. The advantages of greenhouse tomatoes including: environmental friendly, without using lots of chemicals, no chemical residues, stable production over year, reduce the amount of imported tomatoes and high quality.

12. What do you think is the most important advantage of greenhouse tomato?

- (1) Environmental friendly and sustainable
(2) No chemical residues
(3) Stable production over year and reduce the amount of imported tomatoes
(4) High quality
(5) Not important

13. Are you willing to pay more for the greenhouse tomato?

- (1) Yes
(2) No

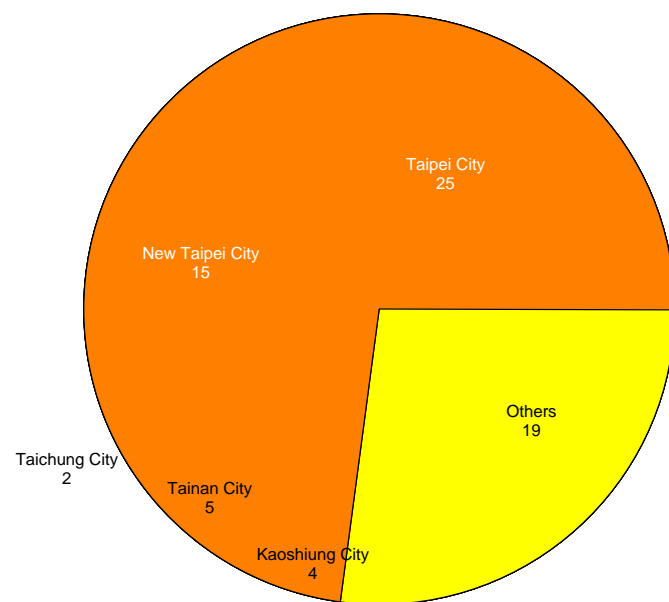
If 'No', thank you for your cooperation and time

14. Compare with conventional tomato, which price do you think is reasonable for greenhouse tomato?

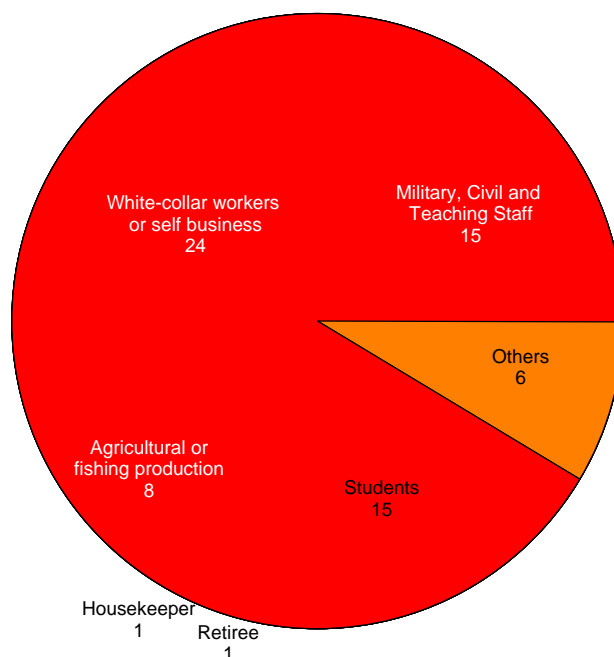
- (1) Less than 10% higher than conventional tomato
(2) 10% to 20% higher than conventional tomato
(3) 20% to 30% higher than conventional tomato
(4) 30% to 40% higher than conventional tomato
(5) 40% to 50% higher than conventional tomato
(6) More than 50% higher than conventional tomato

Thank you for your cooperation and time!

Annex 4. The basic information of the participants of the consumer preference questionnaire in Taiwan.



1. The residence of the participants. Others include Taoyuan County, Taoyuan City, Hsinchu County, Miaoli County, Changhua County, Yunlin County, Chiayi County, Hualien County, Yilan County and Keelung City.



2. The occupation of the participants. Others include unemployed, service industry and military service.

Annex 5. Questionnaire for Dutch tomato farmers

I am a master student of Horticulture chain management at Van Hall Larenstein, part of Wageningen UR. The aim of this questionnaire is to understand the current situation of tomato farmers in Westland, The Netherlands. The data will be used to clarify the functioning of a grower association in order to know the possible changes of cooperatives. The questionnaire consists of three parts.

Part 1. Background Information

1. What is the farm size? _____ha
2. What varieties of tomatoes do you produce?

3. Based on what information do you make your cultivation plan for next year?
(Multiple answers possible)
 - (1) The recommendations from cooperatives
 - (2) The market price of the varieties
 - (3) The discussion among the members
 - (4) The personal experience
 - (5) Others: _____Among these, which do you think is the most important information for you to make a plan? (1-5) _____

Part 2. Cooperatives

4. What reasons for you to join the cooperative? (Multiple answers possible)
 - (1) The way of accessing market
 - (2) To get information from cooperatives
 - (3) To get information from members (improve the relationships with growers)
 - (4) To purchase the inputs together with members (easier to manage the logistics)
 - (5) Use the other services from cooperatives, namely _____
 - (6) Others: _____Among these, which do you think is the main reason? (1-6) _____
5. What services do you get from the cooperative? (Multiple answers possible)
 - (1) Consultant of cultivation
 - (2) Collection and transportation of tomatoes
 - (3) Packing the tomatoes
 - (4) Distribute the tomatoes to customers
 - (5) Marketing of the tomatoes
 - (6) Recommendations of the choice of varieties
 - (7) The information from customers
 - (8) Others: _____

6. Are you satisfied with the services provided by the cooperative? Why?

(1) Yes, reason: _____

(2) No, reason: _____

7. What do you think the cooperative can improve? (Choose the major one)

(1) The charge of the services

(2) Transparency

(3) The effectiveness of information flow

(4) Others: _____

8. What other (new) services do you want the cooperative provide?

9. What cooperative's activities do you join?

10. What market information can you get from the cooperative? (Multiple answers possible)

(1) The quality requirement of customers

(2) The consumer preference

(3) The end price to consumer

(4) Others: _____

Part 3. Market

11. Who are your customers?

(1) Supermarkets in The Netherlands

(2) Supermarkets in nearby countries _____

(3) Others: _____

12. What are current difficulties for you to access the market (meet the requirements of cooperatives)?

Thank you for your time and cooperation!