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THE FUNCTION OF FARMERS' ASSOCIATIONS IN IMPROVING THE EFFICIENCY OF AGRICULTURAL PRODUCTS MARKETING -A CASE STUDY OF TAIWANESE MANGOES

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ABSTRACT

In the past, the price of Taiwanese mangoes was often low due to abundant production. In recent years, the government, agricultural, Farmers' Associations, and farmers have strived to improve various measures for production and sale. The Farmers' Association plays an important role, including setting up group areas and a safety management system, implementing grading and packaging, improving quality and safety, and promoting direct selling and diversified processed products. As an important representative fruit and considered as the most competitive fruit tree in Taiwan, mangoes have been exported to more than ten countries. In addition, mango farmers benefit from the stable production and sale as well as the increase in price. The mango industry has become a successful model for the fruit industry in Taiwan.

Keywords: Group area, Safety management system, Direct selling, Processed product

INTRODUCTION

There are more than 30 kinds of fruits in Taiwan, with a cultivation area of more than 180,000 hectares and a total output value of US\$3.23 billion. Thanks to experimental research, promotion, counseling by the government and Farmers' Associations, and farmers' efforts, the quality of fruit products is premium, making Taiwan win a reputation as the fruit kingdom. Tropical fruits in Taiwan are very competitive, and mango is one of them, being an economically important fruit tree. In recent years, mango has become Taiwan's representative premium fruit. Fresh mangoes are sold in domestic and international markets, and processed mango products, such as mango ice and dried mango, extend the value chain even further. Mangoes have become the domestic and foreign customers' favorite, and have significantly increased farmers' incomes. Taking the Taiwanese mango as an example, this study introduces the function of Taiwanese Farmers' Associations in counseling farmers in the production and sale of mangoes as well as in the key elements in the successful marketing of Taiwanese mango. Farmers' Associations and the government work together to stabilize the production

pricing and sale of mangoes, allowing the mango industry to become a model for success.

TAIWANESE MANGO PRODUCTION AND SALE OVERVIEW

Mango is an important tropical tree fruit in the world, cultivated over about 5.17 million hectares (FAO 2012). Mangoes are generally distributed in tropical and subtropical regions. The most important turning point in the history of cultivation of Taiwanese mango was the introduction of the Irwin species from Florida, U.S. in the 1960s. Since then, the cultivation area has increased rapidly. An overview of production and sales are as follows:

1. Taiwanese mango production overview

In 2014, the acreage of Taiwanese mango was 15,068 hectares, the output was 152,932 tons, and the output value was US\$245 million (see Table 1). The main production area is located in Tainan, Pingtung, and Kaohsiung in south Taiwan. The peak harvest period is from May to July, making the production and sale challenging. According to species, Taiwanese mangoes can generally be divided into local species and new species. The local species refers to Tu mango, accounting for 18% of the total acreage; the new species include Irwin, Jinhuang, and Keitt. Among them, the production of Irwin is the largest, accounting for about 49% of the total acreage, followed by the Jinhuang mango, accounting for about 26% of the total acreage. Due to its bright color, fragrant aroma, and good taste, the Irwin mango has become the favorite of domestic and foreign markets, and is considered as the most important export species.

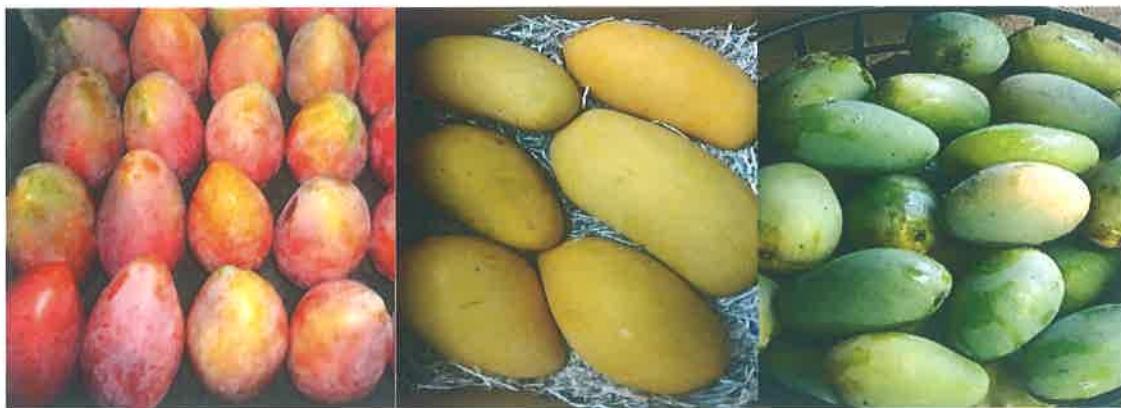


Figure 1. Irwin mangoes, Jinhuang mangoes and Tu mangoes

Table 1. Production and sale overview of Taiwanese mango in the recent decade

Year	Acreage (hectare)	Output (Ton)	Output Value (US\$ million)	Price in the wholesale market in Taipei (Irwin) (US\$/kg)	Price in the production area (Irwin) (US\$/kg)
2005	18,394	149,996	195.96	1.64	2.26
2006	18,200	191,332	206.45	1.25	2.01
2007	18,375	215,292	219.11	1.23	1.67
2008	18,090	176,716	213.77	1.59	1.99
2009	17,130	140,290	163.37	1.29	1.91
2010	16,796	135,293	162.35	1.41	2.30
2011	16,695	169,380	208.99	1.62	2.24
2012	16,356	167,247	226.32	1.97	2.57
2013	16,508	215,168	296.17	1.59	1.84
2014	15,068	152,932	245.83	1.81	2.16

Remark: Exchange rate: US\$1: NT\$31

2. Taiwanese mango production and sales overview

In recent decades, the wholesale price of Taiwanese mangoes in fruit and vegetable wholesale markets in Taipei has been between US\$1.23~1.97/kg, while the price in the production area has been between US\$1.67~2.57/kg. The reason the price in the production area is higher is because exporters directly sign contracts with the Farmers' Association, and the price of mangoes which comply with the export specifications becomes higher. In recent years, exports of mango have been smooth, and combined with the increasing demand for mango processed products, have led to a significant rise in price. Low prices in the peak harvest period have disappeared. In 2014, 6,438 tons of Taiwanese mangoes were exported, with an export value of US\$17,454,000. In recent years, exports have increased on a yearly basis due to the influence of climate on the output in 2012, as well as its export value. The main exporting countries include Mainland China, Hong Kong, Korea, Japan, Singapore, Malaysia, Canada, Russia, Brunei, Macao (see Table 2).

Table 2. Major exporting countries, amount, and output value of Taiwanese mango in the recent decade (Unit: US\$1,000/ton)

Year	Japan		Mainland China		Hong Kong		Singapore		Korea		Other countries		Total	
	Amount	Output Value	Amount	Output Value	Amount	Output Value	Amount	Output Value	Amount	Output Value	Amount	Output Value	Amount	Output Value
2005	481	2,483	161	336	137	155	94	58	40	193	0	2	915	3,227
	Hong Kong		Singapore		Japan		Korea		Mainland China		Other countries		Total	
2006	1,125	758	887	571	430	2,104	152	664	54	125	55	57	2,703	4,278
	Hong Kong		Singapore		Japan		Korea		Canada		Other countries		Total	
2007	1,573	890	1,436	1,022	787	4,001	742	3,413	83	80	217	420	4,838	9,827
	Hong Kong		Japan		Singapore		Korea		Mainland China		Other countries		Total	
2008	915	590	838	5,209	650	751	551	2,973	248	262	106	269	3,307	10,052
	Hong Kong		Singapore		Japan		Korea		Mainland China		Other countries		Total	
2009	1,506	823	1,170	950	993	5,782	415	1,609	313	420	143	262	4,539	9,845
	Hong Kong		Singapore		Japan		Korea		Mainland China		Other countries		Total	
2010	1,576	1,034	1,069	948	1,009	6,631	541	2,553	402	567	101	191	4,699	11,924
	Hong Kong		Japan		Singapore		Korea		Mainland China		Other countries		Total	
2011	1,356	1,321	1,161	8,335	750	953	524	3,079	479	727	113	304	4,382	14,717
	Japan		Mainland China		Hong Kong		Korea		Singapore		Other countries		Total	
2012	834	6,977	429	771	425	483	417	2,597	181	340	71	206	2,357	11,374
	Hong Kong		Mainland China		Singapore		Japan		Korea		Other countries		Total	
2013	2,107	1,928	1,378	1,800	1,158	1,151	810	6,025	721	4,194	93	223	6,266	15,320
	Mainland China		Hong Kong		Korea		Japan		Singapore		Other countries		Total	
2014	2,064	3,090	1,889	1,833	917	5,594	760	5,806	700	847	106	285	6,438	17,454
	Korea		Mainland China		Hong Kong		Japan		Singapore		Other countries		Total	
2015 (June)	1,220	7,346	1,037	2,179	672	647	363	2,737	299	315	16	41	3,607	13,265
	Korea		Mainland China		Hong Kong		Japan		Singapore		Other countries		Total	

FUNCTION OF FARMER'S ASSOCIATION IN THE PRODUCTION OF MANGOES

Because of the strength of advanced cultivation techniques and its geographical setting, competitiveness of Taiwanese mangoes is pretty high. Farmers' Associations and the government have worked together to implement the following measures for the production of mangoes in order to bring sustainable development to the mango industry.

1. Promote the establishment of group areas

Farmers' Associations are responsible for integrating farmers of adjacent production areas and product marketing classes into group, expand the scale of operations, introduce premium species and techniques, and improve the percentage of high quality fruit products.

2. Forge cooperation contracts between supplying orchards and exporters

Farmers' Associations match exporters and supplying orchard farmers to build a long-term steady cooperation and counsels supplying orchard farmers for export to enter into contracts with exporters and register for management. As of 2015, 26 exporters and 690 farmers are registered, with a total area of 667 hectares.

3. Establish a safety management system

To ensure food safety meeting production specifications of exporting countries, each mango is labeled with a traceability barcode. Inspection of pesticide residues is held before harvest, and farmers may only harvest mango after passing inspection. In addition, mangoes for export to Japan are additionally inspected in the steaming house. Once they are passed, documents for approval of export to Japan are issued for exporters to proceed.



Figure 2. Each mango is labeled with traceability barcode

4. Enhance the quality of fruit products

The government invites experimental stations scholars and experts to form a mango technical service group to hold seminars in production areas. Since 2014, the government asked farmers and exporters to participate in training seminars so that they will be qualified to export. Farmers' Associations are responsible for inviting farmers of each production area to participate in seminars and counsel farmers on cultivation management and pesticide use. The courses include cultivation management, proper fertilization, safety pesticide use and post-harvest handling. In addition, the technical service group provides on-site counseling and orchard diagnosis in farming seasons, introduces GAP (Good Agricultural Practice) and traceability or organic marks, and builds a premium and safe quality management system.

5. Promote the quality standard of mango – Brix should be at least 12 degrees

Since 2013, Farmers' Associations counseled farmers on enhancing the self-inspection and control of mango Brix. In addition to the inspection of pesticide residues in the steaming house, inspection of mango Brix is also implemented. If the Brix is less than 12 degrees, export of mangoes will not be permitted.

FUNCTION OF FARMERS' ASSOCIATIONS IN THE MARKETING OF MANGO

With the support of the government, Farmers' Associations set up a modern collecting and packaging center, installed marketing facilities for grading, packaging, and processing, achieved standardized operations, and implemented the following measures for the marketing of mangoes so as to improve its efficiency.

1. Set up collecting and packaging centers equipped with air conditioning

From May to August, mangoes are usually harvested in high temperatures during the summer. The temperature of the fruit which is delivered from the field is relatively high. Consequently, Farmers' Associations set up collecting and packaging centers equipped with air conditioning to reduce the temperature of fruit prior to packing and effectively maintain quality. In addition, the paper bags of mango are removed in the isolated packaging center to reduce fruit fly damage.

2. Employees of the Farmers' Association serve as sorting personnel to carry out the grading and sorting operations

To win the trust of farmers from product marketing classes regarding the grading and sorting standards, employees of the Farmers' Association serve as sorting personnel to fairly and thoroughly carry out grading and sorting operations based on the neat shape, spots, bug spots, scars, crushes, and sap contamination on the peel. Later, the harvested mangoes will be graded by the grading machine based on their weight.

3. Preservation and hot water treatment

In addition to reducing the temperature in the packaging field equipped with air conditioning, water selection and wash based on weight are carried out to remove dust and spots. Later, hot water treatment is implemented to constrain latent diseases from developing and extend the fruit's shelf life.



Figure 3. Hot water treatment is constrain latent diseases and extend shelf life

4. Quarantine, packing, basket loading and barcode sticking

Mangoes for export to Japan and Korea require quarantine treatment to ensure that insects are killed completely. After the steaming handling and temperature reduction, the packaging operation is carried out. Starting in 2007, every mango in the packaging process is labeled with the name of each farmer for traceability.



Figure 4 . After the steaming handling and temperature reduction

5. Pre-cooling, storage, and sales

Mangoes for export are stored in refrigerators after packaging and are shipped in refrigerated containers. After grading, sorting, and packaging are complete, the Farmers' Associations hire trucks to ship mangoes for domestic and wholesale markets.



Figure 5 . Mangoes for export are stored in refrigerators after packaging

6. Diversification of mango products

Taiwanese mango tastes good and can be made into various processed products, including dried mango, mango ice, mango popsicles, and ice cream. Mango can even be added to cuisine and made into desserts, such as mango cakes, mango pies, and mango jellies. With the support of the government, Farmers' Associations set up cooperation between mango processing factories or processors to build a long-term steady supply, and effectively help in the production and sale of mangoes, and increase the added value.

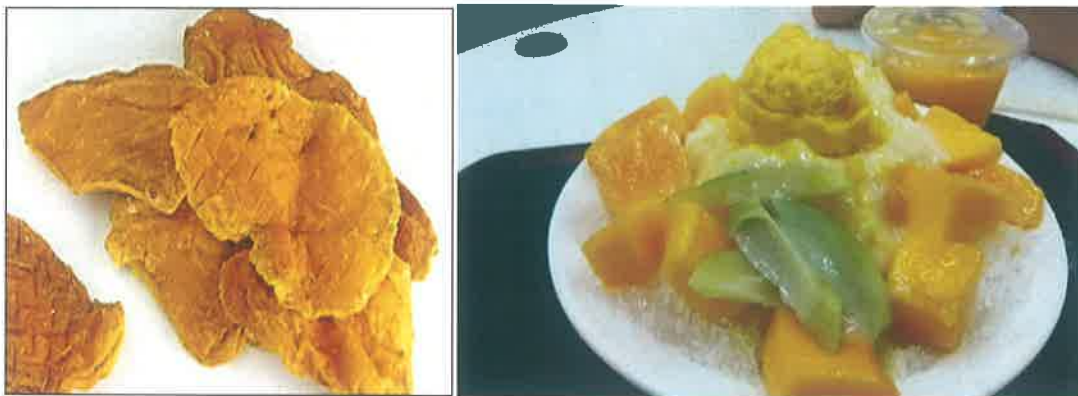


Figure 6 . Taiwanese mango tastes good and can be made into various processed products, including dried mango and mango ice

KEY ELEMENTS IN SUCCESSFUL MARKETING OF TAIWANESE MANGOES

According to a survey conducted by Japan YAHOO in 2007, Taiwanese mangoes were selected by 76% of consumers as the best mango in the Japanese market. In 2008, the Taiwanese mango was selected to be the recommended fruit in the Beijing Olympics. The Taiwanese mango has been successfully sold to more than 10 countries. In the analysis of the successful marketing of the Taiwanese mango, the Farmers' Association plays an important role. The key elements are:

1. Farmers' Association participates in the mango technical service group and integrates the establishment of group areas
2. Strengthen source management and fulfill the safety management system
3. The Farmers' Association set up the modern packaging and collecting center and promotes mango grading and packaging operation
4. The Farmers' Association provides various materials of production and sale and reduces production costs
5. The Farmers' Association adopts a new channel - home delivery - to reduce marketing channels
6. Diversify mango products and promote Taiwanese mango at international fairs

CONCLUSION

Under the joint effort of the government and Farmers' Association, the Taiwanese mango has built up a premium image of safety. Many fruit products have been promoted in both domestic and foreign markets. Especially, the increasing export value even indicates that the safety management system jointly built by the Farmers' Association and the government has improved the quality and safety of the mango. The mango farmers also benefit by the steady production and sale of the fruit and increase in the price. The mango industry has become a successful model in the fruit industry in Taiwan.



圖1 水蜜桃分級包裝處理場



圖2 光波選別機顯示重量及糖度



圖3 水蜜桃分級包裝



圖4 韓國農協流通規模最大量販超市良才店



圖5 超市銷售新鮮安全的100%純韓國產農產品