



## Model of Chachoengsao Province Network of Growers of Quality Mangoes for Export

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**Abstract** The study on a successful farmer network is a mixed-method research that focuses on mango farmers in Chachoengsao province under a protocol of multistage sampling. Several factors influencing farmers to set up their own network are common interests, problems and needs that led them to establish a new production system based on Good Agricultural Practice (GAP) in order to fulfill their customer needs in terms of quantity and quality. The results of hypothesis testing regarding the farmers' opinions on GAP in the aspect of understanding, positive thinking and positive behavior before and after network setup revealed statistically significant difference. Farmers who owned different farm sizes had different opinions on GAP in terms of understanding and positive thinking before network setup, but not different after setup. Meanwhile, the positive behavior had no statistically significant difference before and after network setup. The network model should have an operating protocol to link inputs and outputs. Operation under suitable strategies can organize the farming system to fulfill customer needs by transferring appropriate changes directly to customers or target groups. The strategic map should start from giving knowledge, changing internal process management, fulfilling stakeholder expectation and end with fulfilling customer satisfactions under the support of government and private sectors.

**Keywords** network, model, mango, Chachoengsao province

### INTRODUCTION

Solving agricultural problems in the form of integrated development for farmers to become sustainably self-reliant is a challenging and crucial task that requires time, serious contribution and continuity. Since the past, many governments have consistently implemented this kind of development. Recently, all sectors have been more involved in participating in the integration. The concepts and approaches for dealing with these problems have been developed in various ways. The concept of integrating farmer networks is yet another approach that has been used and considered to help strengthen the farmers as well as offer synergy. However, in integrating farmer networks, there is still the problem of absence of model and potential strategies for possible application of such prototype.

As for the nature of operation as a network, it requires coordination and connection between members in the groups and between small groups that are interlinked in the network. Moreover, it's very crucial to have relationship and correlation among groups as well as the connection of information and knowledge which contributes to learning process, exchange of knowledge, ideas, experiences and working process, in the form of integrations among groups, networks that will eventually result not only in increasing success of implementation but also more chances in eliminating weaknesses, and developing strengths and competency to effectively deal with external situations. In addition, constant participation in the collaboration will also help strengthen and ensure members and groups of the network and raise awareness in the management of lifestyles, environment and local resources which contribute to the empowerment and encouragement for the government to participate in the operation e.g., encouraging the establishment of community forums as well as group operation for self-reliant development (Thana, 2544).

Considering the agricultural sector, fruit is a significant product. As for the years 2013-2015, fruit is ranked the fifth out of ten agricultural plant commodities for export. The export of fruit is in the form of chilled, frozen and dried fruit products. (Office of Permanent Secretary Ministry of Commerce, 2015). Furthermore, the development of fruit products is recognized and prioritized by the government for agricultural development, and there are strategies formulated for the development of Thai fruit products. In Thailand's fruit development strategy for the years 2010-2014, mango is defined as one of the six major economic fruits that the Ministry of Agriculture and Cooperatives provides the policy for, focusing on the promotion of production, and marketing in the form of mango planting network with systematic, unified management to provide sustainable solutions, so as to stabilize the price, increase value for export and to gain sales revenue for farmers (Office of Agricultural Economics, 2010).

Thailand is regarded as a source of tasty mangoes with most desirable quality that meets the standard, for either domestic or foreign consumers, particularly, in Chachoengsao province where there are approximately 86,000 Rai of mango plantations, the country's largest mangoes plantation area. Mango fruit is, therefore, regarded as a major economic fruit of the province. Every district is capable of producing mangoes. Districts capable of mango planting for exports include Bang Khla, Ratchasan, Phanom Sarakham, Plaeng Yao, Sanam Chai Khet, Tha Takiap and Klong Khuean. Apart from domestic markets, these mangoes have also been distributed to international markets, which tend to keep increasing. Since the province is capable of producing mangoes of good tastes and good quality, there have been signed contracts for exporting mangoes between farmers and export companies made every year from 2001 until present. More importantly, the mangoes produced in this province are safe for consumers as they are certified garden products based on Good Agricultural Practice (GAP) by the Department of Agriculture. Mango varieties grown in the province include Barracuda (Nam Dok Mai), Nam Dok Mai Si Thong, Nang Klang Wan, Raed, and Khiaw Sawoei. Major varieties of mangoes for export of the province are Nam Dok Mai #4 and Nam Dok Mai Si Thong. The largest markets for A-grade mangoes are Japan, Europe and the United States, respectively. For the inferior quality mangoes, the markets for export are Malaysia, Indonesia and Singapore (Kenan Institute Asia et al, 2006).

In addition, growers of quality mangoes for export have integrated in the form of network, which, at present, consists of two main groups with 230 members in total, including Chachoengsao Mango Exporter Community Enterprises, and Chachoengsao Mango Cooperative. The integration of farmers in the form of network represents an approach that will help strengthen farmer's capacity. Thus, the studies about the prototype of mango growers networking in such areas will be a significant part in effectively solving the problems of integrated development for farmers to become sustainably self-reliant.

## **OBJECTIVE**

The objectives of this research were 1) to understand farmer's network. 2) to study farmers' opinions on Good Agricultural Practice (GAP) in three aspects, namely understanding of GAPs content, positive thinking and positive behavior and 3) to propose the network model in the form of prototype model called Model of Chachoengsao Province Network of Growers of Quality Mangoes for Export.

## **MATERIALS AND METHODS**

This study was an applied research that focused on Chachoengsao province network of growers of quality mangoes for export as a form of mixed-method research with both qualitative and quantitative research. Multistage sampling was used including 1) Purposive Sampling 2) Quota Sampling, with the criteria as follows: a) must be member of Chachoengsao Mango Exporter Community Enterprises or Chachoengsao Mango Cooperative b) only active operators were selected. In addition, accidental sampling technique was used for data collection and the criteria include willingness to participate and focus group interview with a sample of 36 members, accounting for 15% of the total members of 230.

The tools for data collection consisted of interviews, questionnaires, in-depth interviews and focus groups interview. Qualitative data was analyzed by descriptive and content analysis, while quantitative data employed statistical analysis software for social science research, including descriptive statistics, t-test and one-way anova (F-test).

## **RESULTS AND DISCUSSION**

### **General Characteristics of Mango Growers**

It was found that their average age was 56.83 years, and the mango plantation area was divided into 3 groups, including not exceeding 15 Rai (30.56%), 16-30 Rai (44.44%), and more than 30 Rai (25.00%). The average farm size was 22.89 Rai. Most of the farmers were members of Chachoengsao Mango Cooperative, which accounted for 61.11%, and the remaining farmers were members of Chachoengsao Mango Exporter Community Enterprises.

### **Mango Growers Network**

It was found there were two main groups of growers of quality mangoes for export, including Chachoengsao Mango Exporter Community Enterprises, and Chachoengsao Mango Cooperative. Each group had their own operation and divided the works according to their skills. Several factors influencing the farmers to set up their own network were common interests, problems and needs that led them to establish a new production system based on Good Agricultural Practice (GAP). In addition, there were also links to other mango grower groups which were important groups of mango growers from around the country under the Thai Mango Growers Association whose goals are to jointly plan production and marketing, as well as perform quality control to meet the same standard for domestic sale and export throughout the year, and to establish reliability for consumers. The main exported markets were Japan and South Korea, etc.

### **Farmers' Opinions on Good Agricultural Practice (GAP)**

The results of farmers' opinions on Good Agricultural Practice (GAP) in three aspects, namely understanding of GAPs content, positive thinking and positive behavior are as follows: (The items consisted 8 element: water resource, cultivation site, use of agricultural substance, product storage and on-site transportation, disease and pest-free production, management of quality production, harvesting and post-harvesting handing, data recording. The meaning of mean scores were: 1.00-1.49 = lowest level, 1.50-2.49 = low level, 2.50-3.49 = medium level, 3.50-4.49 = high level, 4.50-5.00 = highest level).

1. It was found that the farmers had the overall opinion on mango production according to Good Agricultural Practice (GAP) in three aspects, including; a) understanding, b) positive thinking and c) positive behavior at a low level before network setup, with average scores of 2.16, 2.20 and 2.02, respectively. After network setup, the opinion was at a high level with average scores of 3.90, 4.12 and 4.22, respectively.

2. The results of the study of farmers' opinions on mango production according to Good Agricultural Practice (GAP) in three aspects, including ; a) understanding, b) positive thinking, and c) positive behavior found that there was a difference before and after network setup at a statistical significance level of 0.01, where  $t = -32.46, -42.83$  and  $-31.94$ , respectively, and  $df = 35$

3. The results of the study involving the relationship of size of plantation area (farm area) farmer's opinions associated with Good Agricultural Practice (GAP), in 3 aspects: a) understanding, b) positive thinking and c) positive behavior before and after network setup (integration of working as network) revealed that;

1) Farmers with different plantation sizes had different opinions on compliance with Good Agricultural Practice (GAP) in terms of understanding and positive thinking before network setup at

a statistical significance level of 0.01. However, after network setup, their opinions were not different at a statistical significance level of 0.01 (Table 1).

2) The opinions of farmers with different plantation sizes on compliance with Good Agricultural Practice (GAP) in terms of positive behavior before and after network setup were not different at a statistical significance level of 0.01 (Table 1).

**Table 1 Results of farmers' opinion on Good Agricultural Practice (GAP)**

Subject	Source of variance	SS	df	MS	F	Sig.
Understanding before network setup	Between Group	1.34	2	0.67	9.10	0.001
	Within Group	2.44	33	0.07		
	Total	3.78	35			
Understanding after network setup	Between Group	0.06	2	0.03	1.48	0.242
	Within Group	0.61	33	0.02		
	Total	0.67	35			
positive thinking before network setup	Between Group	1.09	2	0.55	12.03	0.000
	Within Group	1.50	33	0.05		
	Total	2.59	35			
positive thinking after network setup	Between Group	0.10	2	0.05	1.63	0.211
	Within Group	1.05	33	0.03		
	Total	1.15	35			
positive behavior before network setup	Between Group	0.40	2	0.20	5.08	0.012
	Within Group	1.32	33	0.04		
	Total	1.72	35			
positive behavior after network setup	Between Group	0.02	2	0.01	0.08	0.922
	Within Group	3.14	33	0.10		
	Total	3.16	35			

These results suggest that the integration of working as a network results in the increased efficacy of operation among farmers which is consistent with the opinion of Attha Intaralak (Director- General of Department of Agriculture Extension at that time) saying that "The integration and networking of manufacturers provide farmers with rough knowledge about appropriate manufacturing technology in order to develop and enhance the production efficiency, particularly promoting farming group GAP certification standards, as well as the exchange of knowledge and technology among them, and the centralization of production and packaging. In addition, networking will also provide cooperation and cooperative solution"(BioThai Foundation, 2554).

### **The Propose Integrated Network Model in the Form of Prototype Model -Model of Chachoengsao Province Network of Growers of Quality Mangoes for Export**

The results in this study revealed that possible practical model for the integration of fruit farmer networks must contain a structure consisting of subsystems in providing interaction between inputs and outputs of the agricultural systems management. Such model requires appropriate strategies to suit changes and development and it needs to be capable of transferring, distributing, making benefits and responding to the stakeholders and consumers or prospect clients. Such potential model must provide a strategic map initiated from learning / growth and it will eventually result in changing in the management of internal processes to meet the expectations of stakeholders. Finally, the model will lead to added value and provide satisfaction to consumers or target clients with the support of government and private sectors.

When applied, this model focuses on marketing and innovation (innovative marketing), in which development strategies are required based on the collaboration of such network as follows:

1. Synergies resulting from common problems and common needs.
2. Self-reliant development which includes relevant criteria in addition to what is stated in the first clause above, namely,
  - a) task allocation based on individual skills,

- b) equal or fair sharing of mutual benefits.
- 3. The development of self-management organization focusing on
  - a) exchange and transfer of appropriate technology,
  - b) availability of public funds of the network.

Thus, this model is a strategic model which has passed the test of the experimental network group.

All components of this model focus on two main issues:

- a) marketing that meets the expectations of customers in terms of satisfaction and enrichment (values adding),
- b) innovation that focuses on appropriate innovation and technology.

This model contains IPO relevant systems which are inputs, process and results (output, outcomes and impacts). As for the outcome, it will be associated with the overall future scenario from the vision of network leader which will result in public funding of the network for buying production inputs at high prices.

The implementation in accordance with the strategic map will include:

- 1) giving knowledge and developing
- 2) changing of internal processes
- 3) increasing revenue for stakeholders,
- 4) responding to desirable requirements of target consumers.

## **CONCLUSION**

Coordination among various groups of farmers in the form of network include holding seminars to exchange academic knowledge and experience in the production of mangoes so as to offer members a method of producing mangoes with the same standard across the country, and to build credibility and confidence among consumers in general. The network started from two main groups, namely Chachoengsao Mango Exporter Community Enterprises and Chachoengsao Mango Cooperative in order to connect and coordinate the operation among farmer groups. Currently, there are mango grower cooperatives and clubs from nine provinces joining as the core group, including those from Kanchanaburi, Nakhon Pathom, Nakhon Ratchasima, Suphan Buri, Chiang Mai, Chon Buri, Udon Thani, Khon Kaen, and Chachoengsao and many other groups from other provinces and from many communities that are interested in joining.

The results of this study indicated that the integration of operation as a network results in the increased efficacy of operation among farmers, allowing members to share agricultural knowledge and technology. In addition, a potential prototype or model of the integration as a network of fruit farmers to be implemented for practice must contain a structure consisting of subsystems that provide interaction between inputs and outputs of the management of agricultural systems. This prototype/model needs to have an appropriate strategy of management with a strategic map for the operation, and support from government and private sectors.

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