Model of Agricultural Extension of Orange Production for Sai Nam Phueng Fang Mandarin Orange Growers in Chiang Mai Province

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ABSTRACT

This research aims to 1) study Mandarin orange growers' knowledge, attitude, and orange production in Chiang Mai Province, 2) investigate the elements influencing Mandarin orange production by producers in Chiang Mai Province, and 3) study the orange production promotion model for Mandarin orange growers in Chiang Mai province. Information was gathered from 226 Mandarin orange growers in Chiang Mai Province using quantitative research questionnaires. Descriptive statistics and Multiple Regression Analysis were used for qualitative research. Data were collected through structured interviews with government agencies, including Chiang Mai Provincial Office officials. Agricultural district officer Citrus gardening is an academic expert's specialty. A total of 12 Mandarin orange growers in Chiang Mai Province provided data, which was analyzed using content analysis. The research results discovered that 1) Agriculture has a high level of knowledge in growing Mandarin orange. Mandarin orange growers' attitudes and production were at a high level. 2) Factors such as educational level and the number of years that Mandarin orange has been grown communication with officials attending training awareness of information to advance the production of Mandarin orange by Chiang Mai province growers. 3) A model for promoting orange production for Mandarin orange growers in Chiang Mai province is useful. There is an opportunity that is appropriate and accurate.

1. Introduction

The Ministry of Agriculture and Cooperatives has established policies and guidelines for agricultural development plan operations under the National Economic and Social Development Plan No. 12 (2017-2021) as part of Strategy 2, "Creating fairness and reducing inequality in society. The community becomes more self-sufficient and receives a more significant portion of the financial benefits when its potential is increased, and the grassroots economy is strengthened. The main policy for developing this country has given importance to promoting growers and farmer institutions. Managing agricultural products guarantees

quality and safety throughout the supply chain, emphasizing the "Value-Based Economy" in the sense of doing less, getting more (Do Less Get More), and promoting agricultural products for industry are all necessary for being self-reliant in addition to growing production capabilities and promote the use of the Thailand 4.0 model of entrepreneurship in agriculture by farmers and farmer institutions by setting policies into action and working with provinces and groups of provinces to develop strategies that are suitable for each region and maximize benefits to farmers. There are guidelines for promoting farmers. Farmer organizations enhance the potential of farmer leaders and networks regarding production management. Marketing of agricultural products, including promoting cost reduction and expanding competitive opportunities to enter the ASEAN Economic Community, according to Prime Minister General Prayut Chan-o-cha, "Upgrading Thailand's agricultural sector to Farmer 4.0 places importance on research and development to create additional value, process products, reduce production costs and creating innovations such as food innovation." The government should handle it from the start by forming a partnership with Thai farmers to become Smart Farmers, giving them access to learning centers run by different ministries around the country, and encouraging group integration into cooperatives for community-based businesses to strengthen and integrate large-scale agriculture, which includes crops, fisheries, and livestock, helping to reduce production costs. Simple to manage, additionally, to assist in decision-making, determine which areas should be planted and invested in, whether there will be enough water, crops will not be harmed, prices will not drop, management of water resources, drainage, water delivery systems, and the development of a database supporting agriculture must link information about soil, water, and weather to forecast. The Pracharat Rak Samakkhi Company, which is in charge of transferring knowledge and contemporary digital and online technology, must be the intermediary and final destination. Regarding advertising, internet marketplaces, tying together the industrial and agricultural domains, and so forth.

A collaborative learning process within the group must arise to promote and develop farmers and organizations to be strong and self-reliant. Organizations and communities carry out various activities both at the level of self-reliance and at the level of competition. One mechanism that supports farmers and farmer organizations to develop to their fullest potential by placing farmers at the center of development. Indeed, its goal is the introduction of the group formation process. Basic group management in network connectivity participation strengthens the knowledge exchange between farmers to help and support one another. The ability to seek information and problem analysis are guidelines for smartly finding and managing local resources, including bringing knowledge to local wisdom, innovation, and environmentally friendly production technology. These are based on creativity used to create added value to agricultural products. Applied to drive the development of agricultural promotion work, this creates a network of cooperation in both business and social aspects. In addition, improving farmers' quality of life must also be good for health. This requires a safe food production system or a sustainable food system. It will help create food security at the household and community level. Promoting growers and farmer institutions aims to support and strengthen farmers and producer institutions. To be able to rely on this will affect the development of agriculture and farmer society creatively and sustainably.

Fang River Basin, Chiang Mai Province, is the largest source of tangerine cultivation in the northern region, especially Fang District, Mae Ai District, and Chai Prakan District. The most popular type of tangerine is the Mandarin orange variety because it has a cool climate suitable for growing Mandarin orange. In addition, this type of orange has a sweet and aromatic taste, making it more palatable for consumers than other types

of tangerines. This attraction to consumers caused farmers to turn to growing Mandarin orange in the past. In 2000, there was a total planting area of 26,410 rai, increasing to 84.559 rai in 2005, and the planting area remained constant until 2010 before it began to decrease to only 30,841 rai in 2011, with Fang District. This change indicates having the most area to grow Mandarin orange growers (Chiang Mai Provincial Agricultural Office, 2012) because farmers encountered problems managing orange orchards, such as price and cost control, disease in oranges, and the impact of the opening of the Thai-China Free Trade Area. Thai growers cannot compete with the lower price of oranges from China. As a result, many growers have given up on citrus orchards and turned to other occupations instead.

On the contrary, the demand for oranges has remained the same, causing farmers with orange orchards to produce several generations of oranges throughout the year. This demand causes orange trees to be stimulated to produce several generations of young shoots so they can be harvested throughout the year. Therefore, many types of citrus pests come to destroy all growth stages, such as thrips (Scirothrips dorsalis Hood), African red mites, Eutetranychus Africanus (Tucker), Orange Rust Mite (Rust Mite), and pest outbreaks throughout the year. Growers frequently use large amounts of insecticides and mites to reduce insect and mite outbreaks (Kriangkrai et al., 2007).

According to the survey, it was found that more than 52 percent of orange growers in the Fang River Basin solve soil fertility problems. They always use chemical fertilizer formulas (15-15-15 or 16-16-16) at a rate of 2-3 kilograms/plant/year. Without the growers knowing before that using chemical fertilizers that contain all three nutrients continuously and at a high rate. It will cause the residue of some chemicals to remain. As a result, the soil becomes more acidic. and lacks a balance of plant nutrients in the soil because it contains beneficial amounts of phosphorus (Available P) and exchangeable potassium. (Exchangeable K) in the soil is too much. This causes a negative effect on the growth and decreases the yield of oranges (Chanvichit, 2009). In addition, a study by Pittaya Samruamsiri and colleagues (2008) has shown the conditions of areas using chemical fertilizers in orange orchards in the Fang River Basin orange planting area: 70 percent. It is in a very acidic condition and more than 80 percent contain very high levels of beneficial phosphorus and exchangeable potassium, reducing soil fertility. Severe disease and insect outbreaks in the area cause farmers to have higher production costs and face the problem of falling product prices causing losses to farmers. Some have turned to planting other types of crops instead. Some of them have given up their career in growing oranges. Abandoning the plot allows it to be a breeding ground for diseases and insects, causing germs to spread quickly. As a result, the situation of orange cultivation in the Fang River Basin has become more serious. That’s why, the area for growing Mandarin orange has decreased gradually.

Therefore, given the importance of problems in Mandarin orange farming in Chiang Mai Province, it is necessary to promote Mandarin orange growers to be promoted with better efficiency in solving various problems. This research aims to model for promoting orange production for Mandarin orange growers in Chiang Mai Province, using the information obtained from the study. As a guideline in formulating policies to promote growers who grow Mandarin orange growers to be more efficient in the future.

2. Objectives

1. To study the knowledge, attitude, and production of Mandarin orange growers in Chiang Mai Province.
2. To study the factors affecting orange Mandarin orange production in Chiang Mai Province.
3. To study the form promoting orange production for Mandarin orange growers in Chiang Mai Province.

3. Literature Survey

Theoretical concept of knowledge, academics have given the meaning of the word "knowledge and understanding" by summarizing the meaning as cognition means the ability to remember and understand the details of various information. People have accumulated and passed on to each other as well as being able to convey meaning, translate, interpret, expand or express opinions about various matters after receiving news about those matters (Channuwong et al., 2023; Phonpairin, 2007; Jutavijit, 2007). The Modern American Dictionary gives 3 different definitions of knowledge (Wikstrom and Normann, 1994: 98) as follows: 1) Knowledge is familiarity with facts (Fact), truth (Truths) or general principles (Principles) 2) Knowledge is to know (Known) or may know (May be Known) 3) Knowledge is consciousness, interest (Awareness)

Bloom and colleagues (1975) studied and classified knowledge behavior into 6 levels, arranged in order of ability from low to high as follows: 1) Knowledge refers to the ability to remember or feel. But it's not using understanding. Interpret the meaning of that matter, divided into knowledge about the story which is factual. Operational methods, concepts, theories, structures, and principles. 2) Understanding means being able to understand the main points of various stories in terms of language, codes, symbols, both concrete and abstract, divided into translation, interpretation, and expansion. 3) Application means the ability to use things that have been experienced such as concepts, theories, and various aspects to be useful. These can be used to solve problems in various situations. 4) Analysis means being able to separate stories, divided into small gardens To study the relationship between sub-components and principles or theories in order to understand various stories 5) Synthesis means the ability to bring stories or small gardens. Let's be one story. By modifying, starting, creating, and improving things to make them more valuable. 6) Valuation means being able to consider and judge the value of an idea with criteria. It is the decision of what is good and bad using reliable criteria based on Internal and external facts. Summary of knowledge refers to the behavior that people acquire from learning which arises from experiences received in the past and accumulated in the form of remembering

The theoretical concept of attitude is a term the Department of Academic Affairs, Ministry of Education, has used throughout the present. It has the same meaning as the word "attitude," which psychologists and educators have given as follows: Thaweerattana (2007) states that attitude refers to the mental preparedness of a person to do something. Attitude is an emotion that exists in everyone but at different levels. Attitude pushes people to react to various stimuli satisfactorily. This attitude depends on the learning process and experiences of the individual (Allport. 1986: 798). The meaning of attitude is a state of being. Mental readiness, which arises from the experience of this state of readiness, will be the force that will determine the direction of the reaction of the person, thing, or situation involved (Bangbon et al., 2023). The meaning of attitude refers to the bias or preference of a person. That expresses specific results towards objects, situations, or values typically consisting of feelings and emotions. Channuwong et al. (2022) and Anastasi (1976) defines attitude in summary: attitude refers to the tendency to express one's likes or dislikes; such things as customs, traditions, value, belief and satisfaction cannot be directly observed.

In conclusion, attitude means knowledge, feelings, and an inclination to act in good and bad ways towards something. For example, an attitude towards energy conservation means knowledge, feelings, and an inclination to act in good and bad ways. Good for energy conservation from gaining experience in energy conservation.

The Department of Agricultural Extension Has a policy to promote the production of Mandarin orange taste of good quality with the production process as follows (Department of Agricultural Extension, 2019) 1) Preparation of orange planting areas, 2) Preparation of orange seedlings, 3) Planting and care, and 4) Harvesting and post-harvest processes.

4. Research Methodology

Research on "Form of promoting orange production for Mandarin orange growers in Chiang Mai Province" uses a mixed methods research design during quantitative research. (Quantitative Research) and Qualitative Research (Qualitative Research). The population used in quantitative research includes Mandarin orange growers. In Chiang Mai Province, there were 520 people, a sample size of 226 people was obtained from Yamane's sample calculation formula (Taro Yamane, 1967), the error level was .05, and a questionnaire was used as a tool to collect questions. The four parts include a questionnaire on personal factors of the respondents. Knowledge about orange production, attitudes about orange production and production for Mandarin orange growers. Data analysis methods were used using descriptive statistics and using descriptive statistics and multiple regression analysis. and the main groups of informants in qualitative research are: Officials from Chiang Mai Provincial Office District agricultural officer (Educational academic Expert) experts in citrus gardening. He found out that a total of 12 Mandarin orange growers in Chiang Mai Province were selected by purposive sampling, using in-depth interviews to analyze the data in terms of content.

5. Research Findings

1. Mandarin orange growers mainly know the production of the orange. According to the principle of agriculture practices, accounting for 123 percent, or 55.2 percent, followed by medium level 87 percent, 39.0 percent, and 13 percent, and the low level of 13 people, accounting for 5.8 percent (Table 1)

Table 1: The knowledge of growers in the production of oranges according to the agricultural practices.

Acknowledgement Level	Number (Person)	Percentage
Low	13	5.8
Medium	87	39.0
High	123	55.2
Total	226	100

2. From the study of agricultural attitudes toward growing and producing Mandarin orange, it was found that farmers' attitudes in growing and producing Mandarin orange. Overall, it is at a high level with a mean of 3.84 (S.D.=.42). When classified by aspect, it is found that agricultural promotion and agricultural institutions support orange growers to strengthen them. The greatest mean is 4.03 (S.D.=0.67), while the

one with the least mean Includes the process of group formation. Group management is the basis leading to networking among growers to help and support one another with an average of 3.13 (S.D.=0.81) (Table 2).

Table 2: Attitudes of agriculture in growing and producing Mandarin orange.

Topic	$\underline{x}$	SD	Interpretation
1. Promoting and developing agriculture and grower organizations to be strong and dependable. These come from a collaborative learning process among groups, organizations, and communities.	3.13	0.81	Moderate
2. Cultivators are the center of a development mechanism that supports farmers and agricultural organizations to develop their full potential.	3.87	0.74	Maximum
3. Group formation Group management is the basis for networking among farmers to help and support one another.	3.24	0.75	Moderate
4. Applying knowledge of Local wisdom, innovation, and production technology is the basis for creativity to create value for agricultural products and products.	3.96	0.85	Maximum
5. Agricultural promotion and agricultural institutions support citrus growers to strengthen them.	4.03	0.67	Maximum
6. Promoting citrus growers will affect the creative and sustainable development and agricultural society.	3.98	0.82	Maximum
7. Field trip: Take a group of citrus growers to study various activities outside.	4.01	0.74	Maximum
8. Supervision is a part of the operation, which must act as a mentor to advise citrus farmers.	3.88	0.92	Maximum
9. Demonstration is a method of agricultural promotion where officials transfer knowledge by explaining and demonstrating practices simultaneously.	3.99	0.97	Maximum
10. Group agricultural promotion conveys knowledge or communication and exchange of ideas between supportive officers and citrus growers' groups.	3.93	0.97	Maximum
11. Home and citrus farm visits allow agricultural supportive officers to meet and visit citrus growers.	3.84	0.98	Maximum
12. Methods for promoting agriculture individually. It is a transfer of knowledge or communication between agricultural supportive officers and citrus farmers.	3.97	0.70	Maximum
13. Projects and activities promoting agriculture must align with the needs of citrus growers and communities.	3.89	0.71	Maximum
14. Agricultural promotion The objective is to make farmers change their behavior in citrus orchards.	3.93	0.67	Maximum

15. The primary basis for promoting agriculture or citrus production is agricultural cooperation.	4.00	0.97	Maximum
Total	3.84	0.42	Maximum

3. Mandarin orange is produced by growers in Chiang Mai Province. It was found that mandarin orange is being produced by growers in Chiang Mai Province. The overall picture is at a high level. The average value was 3.80 (S.D. = 0.43). When considering each aspect, it was found that preparation of planting areas. The average value was 3.92 (S.D.=.53), followed by seed preparation. The average value was 3.87 (S.D.=.53) for harvesting and post-harvest processes. There is an average value of 3.85 (S.D.=.60) in planting and care. The mean was 3.55 (S.D.=.57) (Table 3).

Table 3: Production of Mandarin orange by growers in Chiang Mai Province.

TOPIC	$\underline{x}$	S.D.	Interpretation
1. Preparing the planting area	3.92	0.53	Maximum
2. Seed preparation	3.87	0.53	Maximum
3. Planting and care	3.55	0.57	Maximum
4. Harvesting and post-harvest processes	3.85	0.60	Maximum
Total	3.80	0.43	Maximum

4. Results of analysis of factors affecting the production of Mandarin orange by growers in Chiang Mai Province. From multiple regression analysis, it was found that the factors affecting the production of Mandarin orange by growers in Chiang Mai Province include gender factors (Beta = .625, p <.01), an education level (Beta = .406, p <.01), Status (Beta = .236, p <.01) Source of funds for Mandarin orange production (Beta = .201, p <.01) amount of household debt (Beta = .203, p <.01), number of years growing Mandarin orange (Beta = .129, p <.05) and attending training (Beta = .143, p <.05).

Table 4: Factors affecting the production of Mandarin orange by growers in Chiang Mai Province

Independent variable	Dependent variable: Agricultural production of Mandarin orange in Chiang Mai Province		
	B	t	Sig.
1. Gender	.625	6.496	.000**
2. Age	.000	.137	.891
3. Educational Background	.406	4.100	.000**
4. Status	.236	1.787	.075**
5. Number of members	.030	1.514	.132
6. Number of laborers	.018	.614	.533

7. Total household income	.062	.343	.732
8. Number of cultivated areas	.002	.158	.875
9. Funds for the production of Mandarin orange	.201	2.304	.022**
10. Amount of household debt	.203	.607	.545**
11. Number of years in which have been grown	.129	2.514	.013*
12. Communication with officials	.016	.776	.438
13. Training	.143	3.106	.002*
14. Perception of information	.022	8.542	0.05
15. Membership in community organizations	.027	.338	.736
Constant	1.553	5.305	.000**
R^2 = .301 (30.01%)	F = 7.383	Sig. F = .000	

* Statistically significant at the 0.05 level
** Statistically significant at the 0.01 level

6. Discussions

The research results from statistical analysis can be discussed as follows.

Farmers have a high level of knowledge in growing Mandarin orange. There is a high level of attitude and production of Mandarin orange. This may be because farmers have received knowledge promotion, including communication with officials from relevant government agencies. They participate as a member of a community organization that exchanges knowledge about citrus production within the member group. The research results are consistent with the research results of Coltro, L., Mourad, A.L., Kletecke, R.M., Mendonça, T.A. and Germer, S.P., (2009). The research results found that production in Brazil Farmers must have knowledge. They have an attitude towards planting and have correct production principles

Farmers have communication with officials, training Awareness of Information, forwarding the production of Mandarin oranges by growers in Chiang Mai Province. This may be because growers have knowledge about growing and producing oranges. They have experience in growing oranges for many years. There is communication with officials to request additional knowledge about producing quality oranges. There was training on growing and producing oranges. There is awareness of information regarding orange production. And being a member of a community organization has the opportunity to exchange knowledge about growing and producing oranges within the member group. The results of the study are consistent with the research results of Phuangngamchuen (2013) who studied the management of Mandarin oranges orchards of growers in the Fang River Basin,Chiang Mai Province .The results of the study found that education level, communication with government officials, uumber of years of growing oranges, perception of information and training affect the management of Mandarin orange orchards in the Fang River Basin in Chiang Mai Province.

3. Model for promoting orange production for Sai Nam Phueng orange farmers in Chiang Mai Province. is useful. There is a possibility appropriate and has accuracy. This may be because of a successful model for promoting orange production for Mandarin orange growers required in Chiang Mai Province. They gained knowledge from those with higher levels of education. They have many years of experience in growing

oranges. There is communication with officials and membership in community organizations. This resulted in a model for promoting orange production for Mandarin orange by growers in Chiang Mai Province. It is useful. There is a possibility appropriate and has accuracy. This is consistent with the research results of Chula-iad (2015) who studied the promotion model for self-reliance of rubber farmers in the southern border provinces. The research results found that the promotion model for self-reliance of rubber farmers in the southern border provinces is useful. There is a possibility is appropriate and has accuracy can be used as a practice guideline effectively

7. Conclusions

Growers grew oranges, mostly with knowledge of the production of oranges, along with the principles of good agricultural practices, accounting for 123 percent, or 55.2 percent, followed by medium, 87 percent, and 13 percent, and low levels, accounting for 5.8 percent. The study found that the view of agricultural attitudes for cultivating and producing honey oranges on a large scale. On average, when classified by side, it was found that the promotion of agriculture and agro-industrial institutions were the most robust average for orange growers. The lowest average part is the process of group establishment. Group management is fundamental, leading to linking a network between farmers to help facilitate congestion. The production of Mandarin orange in Chiang Mai Province found that the production of the Mandarin orange growers in Chiang Mai Province was very moderate. Considered side by side, it was found that the preparations for the plantation area were the most significant average, followed by seed preparations while harvesting and after harvesting, and for planting and care. The results of analyzing factors affecting the production of Mandarin orange growers in Chiang Mai province by multiple regression analysis (Multiple regression Analysis) found that the factors affect the production of oranges, Mandarin orange growers in Chiang Mai provinces are factors for gender, education, schools, pictures, finances in the production of Mandarin orange, the debt of the kitchen, the number of years that grew oranges, duration, and training. Mandarin orange growers

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