

# Factors Affecting Good Agricultural Practices (GAP) Standard by Durian Farmers in Chanthaburi Province, Thailand

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## ABSTRACT

This study investigated the Good Agricultural Practices (GAP) standard by durian farmers in Thailand, Tha Mai District, Chanthaburi province. The study used a survey to obtain information from the farmers on demographic, economic, and cultivation technique factors. The implementation of GAP was evaluated based on the survey results. The sample size was 354 durian farmers, and the data were collected using an interview schedule as the instrument. The results showed that overall, durian farmers used durian cultivation technique factors and practices of durian cultivation at the high-level GAP components at the high level. In addition, hypothesis testing showed that the significant demographic and economic factors regarding applying GAP in practices were: age, marital status, group member, and area of durian planted. Furthermore, the critical cultivation factors regarding adopting GAP in practices were: the cultivation plan, planting area selection, cultivation method, shading, post-planting, and pest management. Consequently, GAP standards are necessary to encourage durian farmers to develop their techniques and cultivation planning continuously to guarantee the quality of the durian products to market for a sustainable agricultural market in Thailand.

**KEYWORDS:** durian cultivation, farmers, Good Agricultural Practices (GAP), practices, technique

## INTRODUCTION

Durian is called the “King of Fruits” in 2009, 114,454.56 hectare (ha) of durian were planted in Thailand. In the last five years, production has been in the range of 524,000–632,000 tons, and in 2017 the production volume was 652,000 tons, while in 2018, domestic durian consumption was 100,834 tons and 417,122 tons were exported. The main export markets are China, Vietnam, and South Korea. The export price from 2014 was 21,671 million baht, 2015 was 28,270 million baht and 2016 was 32,613 million baht, respectively (Office of Agricultural Economics, 2018).

The Chinese consider durian to be a healthy fruit. Regular consumption of durian is beneficial for

physical fitness, as it warms the body, improves blood circulation, alleviates menstrual pain in women, improves abdominal cold, stimulates the kidneys, and overcomes male impotence, among other benefits. From 2006 to the present, the fruit trade exports by Thailand to the world have increased, and Thai durian volumes have been growing consistently. Imports by China from Thailand were 1,153,257 US dollars (20%) of the total. Durian is the fruit dominating the Chinese market. Several factors affect the development, including Chinese regulations, development of the durian industry in Thailand, the role of Chinese entrepreneurs, and transport improvements in the Mekong region (Reantong et al., 2018).

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Since the 2000s, many countries of the Association of South-East Asian Nations (ASEAN) have introduced the national public to GAP standards with the objective of improving the safety and quality of agricultural produce. Largely a response to rapidly increasing levels of agricultural pesticide uses in the region and increasing concerns of foreign and domestic consumers about food safety (Schreinemachers et al., 2012).

Thailand, as a member of the World Trade Organization (WTO) Thailand, adopted the agreement on the application of sanitary and phytosanitary measures and the agreement on technical barriers to the trade to respond to the international food safety and the quality concerns. Ministry of Agriculture and Cooperative (MOAC) Thailand has implemented GAP programs for food crops as the first step toward food safety and trade facilitation. The Department of Agriculture (DOA) under the MOAC, as the certification body is responsible for developing GAP as a guideline and inspecting farmers who register for the certification. In the part of The Department of Agricultural Extension (DOAE) is mandated to promote GAP among smallholder farmers. Since 2006, DOAE has launched the project "Promotion of Safe Agricultural Products" involving 31 kinds of crops nationwide to assist farmers to understand and practice the principles and framework of GAP, including durian fruit crops (Wannamolee, 2008).

Durian farmers in the eastern part of Thailand in Chantaburi province have the country's largest planting area of 32,507.2 ha (Office of Agricultural Economics, 2018). 'Monthong' durian is the most famous durian, generally known as Thailand's export to China and there are several varieties with different tastes, textures and colours. Monthong is the variety most exported by Thailand. Thai durian exports are covered by their own regulations and specifications at least two basic standards that must be complied with, namely the GAP and the Good Manufacturing Practices (GMP) standards. According to Thai regulations, farmers must comply with the GAP requirements to export fresh durian. DOAE is responsible for contributing knowledge and assessing the practices, before listing approved farmers and passing the list to the DOA for GAP certification. Alternatively, farmers should contact DOA directly to seek certification. For a long-cycle crop like durian GAP certification is effective for three years before requiring renewal (Reantong et al., 2018).

In Thailand, as an established commercial durian-growing area. Commonly recommended that growers avoid using organic in animal manure, as the most

troublesome disease of durian trees in Thailand is the fungus *Phytophthora palmivora* disease, which thrives under moist, fertile conditions at ground level around the trunk that can be initiated by applying manure and mulch. However, it is unclear that advice holds true for conditions elsewhere when using good organic tree-planting practices, as traditional organic fertilizers are used with good results in Malaysia and elsewhere. The economic importance to the Thai economy of fruit exports means that GAP is essential to reassure consumers who demand high quality and safe food products (Mankeb et al., 2013).

GAP standard is a voluntary codified system that is related to practical, efficient on-farm and off-farm processes aimed toward sustainability and equity for small-scale farmers. GAP standard was introduced by FAO and implemented in many agricultural countries. Globally, GAP is one of the well-known standards in the world for high-quality food safety in agricultural food producer countries. Global GAP standards are widely accepted by international markets such as the EU and USA. However, strictness and difficulties in the practical implementation of the global GAP standard could not be satisfied by Thai farmers. Thailand is one of the agricultural countries that has adopted the GAP standard the main concept to increase global competitiveness, food security, and standardization of Thai agricultural products with the standard and framework developed, Thailand's national GAP could satisfy the demand of international agricultural markets for high quality, food safety. However, the poor uptake of GAP implementation to date has shown the low level of farmers' understanding and practising of GAP standards. Thai farmers' adherence to conventional farming methods has been a challenge for GAP extension institutions in promoting the standard procedure to farmers, which could improve the farmers' understanding and application of the GAP standards. The problem of declining durian price depends on production quantity and the main reason is that durian farms in each cultivated area did not have enough data to form production plans, sales, and marketing. The practical GAP inspection procedures and limitations in the extension services offered were also resulting in low farmer understanding and practising of GAP and have led to poor practical implementation in the past. Therefore, the current situation problems might be caused by deficiencies in the extension services provided by MOAC (Pongthong et al., 2014). Thus, to solve these problems, the researcher was interested in investigating the factor's affecting to Good Agricultural Practices (GAP) by durian farmers in Chanthaburi province, Thailand. The objectives of

this research were 1) to study demographic and economic factors 2) durian cultivation technique factors 3) level of farmer implementation of GAP for durian and 4) to determine the relationship between demographic and economic factors, and cultivation technique factors and level of GAP implementation. The results of the study as a guideline for the extension of durian farmers' application of the GAP standards.

## LITERATURE REVIEW

### Good Agricultural Practices (GAP)

FAO (2003) stated that the GAP standard is environmentally, economically, and socially sustainable farming practices that produce safe and high-quality food and non-food agricultural products. The food industry, producers' organizations, governments, and non-governmental organizations (NGOs) have developed Good Agricultural Practices (GAP) codes, standards, and regulations in recent years to codify agricultural practices at the farm level for a variety of commodities. The existence of these GAP codes, programmes, and standards is a result of rising global concerns about food quality and safety. The purpose varies from the fulfilment of trade and government regulatory requirements, regarding food safety and quality, to more specific requirements of speciality or niche markets. Their objectives include ensuring the safety and quality of food chain products, capturing new market advantages by modifying supply chain governance, improving the use of natural resources, the health and working conditions of workers, and creating new market opportunities for farmers and exporters in developing nations. The GLOBALGAP standard requires producers to implement a comprehensive control and monitoring system. The products are registered and can be traced back to the precise farm unit where they were produced. GLOBALGAP regulations are relatively flexible regarding agricultural practices such as soil fumigation and fertilizer application. Pesticide storage and pesticide residue limits are governed by stringent regulations. In addition, it is essential to document and justify how the product was produced; therefore, detailed records must be maintained regarding agricultural practices.

### Thai Export of Durian

Tantrakonnsab, W. and Tantrakonnsab, N. (2018) indicated that Southeast Asian countries, including Thailand, Malaysia, Vietnam, Indonesia, the Philippines, and northern Australia, are native producers of durian. Different varieties of durian are cultivated in different regions; the Monthong and Chanee are commercially cultivated in Thailand, while the so-called Musang King variety originates

from Malaysia, etc. As is the case with many tropical fruit trees, durian can be grown in a variety of locations; however, there are only a few locations where the climate and water supply are suitable for planting durian. Although "Monthong" durian is the most well-known durian in Thailand, there are several other varieties, each with a distinct flavour, texture, and colour. Monthong is the variety most exported from Thailand to China, as it appeals to the Chinese market and its quality is ideal as a 'cash crop' and 'export crop,' as it is sweet and can be stored under ideal conditions for approximately 20 days without becoming mushy or rotting. This feature enables the export of Monthong to more distant markets. Since at least five years ago, exports of Thai durian have steadily increased. Even though other fruits exported from Thailand also travel to China, durian is the fruit that dominates the Chinese market. This development is influenced by several factors, including Chinese regulations, the development of the durian industry in Thailand, the role of Chinese entrepreneurs, and transport improvements in the countries of the Mekong region. In the meantime, the rise in Thai durian exports to China has altered Thai durian exports. The durian industry has expanded due to increased demand, and the business activities of some exporters have grown, while others have disappeared or been replaced by Chinese entrepreneurs. Although some Thai stakeholders in the process, such as farmers and sorting and packing plants, may benefit from the increased export volume of durian at the present time, they may face future challenges. Department of Agricultural Promoted fruit export standard (2020) defined that fruit exporters to meet standards for their produce and packaging processes and about 500 operators have agreed to cooperate. in Chanthaburi province was speeding up its procedures to issue Good Agricultural Practices (GAP), Good Manufacturing Practice (GMP) and phytosanitary certificates for eastern fruit exporters to the world market.

## RESEARCH METHODS

The research involved quantitative and qualitative research using an interview schedule, conducted in Chantaburi province with a total sample population of 3,069 durian farmers in The hamai sub-district, Chantaburi province (Provincial Agricultural Extension Office, 2016).

### Data Collection and questionnaire structure

Data were collected from durian farmers using simple random sampling by using name lists of durian farmer registration. The sample size was derived using the Taro Yamane calculation formula with a sampling error set at 95% and consisted of 354 sample sizes.



The interview schedule validity was tested using three specialists, and the reliability using Cronbach's Alpha Coefficient was acceptable at 0.813 (Cronbach, 1951).

**Data Analysis** The data analysis utilized both descriptive and inferential statistics consisting of frequency, percentage, mean, standard deviation, minimum, maximum, and chi-square to test the hypotheses of demographic and economic factors. The durian cultivation technique factors were based on GAP factors.

The content of the interview schedule consisted of a rating scale for the durian planting technique where 1= Yes and 0= No. Part 2 of the survey involving each respondent's practices of GAP used a scale of 3= Always, 2= Sometimes and 1 = Never (Likert, 1967).

## RESULTS AND DISCUSSIONS

### Demographic and economic factors of durian farmers

The durian farmers were mostly male (62.4%), aged over 50 years (35.6%), and had attained an educational level of lower secondary school to upper secondary school (34.7%). The number of household members was 1-4 (68.4%), with group membership (79.4%). These results were as also reported by Reantong et al. (2018) studied extension guidelines for durian production by farmers in the Tha Sae district, Chumphon province, the results found that most of the farmers was male with an average age of 48.02 years old and graduated from junior high school. The average household members were 2.96 people with the labour from the household the average of 1.84 people and hired labor of 1.63 people, the experience in durian planting of more than 15

### Durian cultivation technique factors

The overall practices of durian cultivation were at a high level (mean = 0.87), the highest mean value being for planting area selection followed by postharvest handling area, and post-planting care (mean =0.99, mean = 0.95, and mean = 0.94, respectively). For pest management, the farmers know the practices of using pesticides that are available in the local market, as shown in Table 1.

**Table 1: Mean, standard deviation and level of practices of durian cultivation techniques(n=354)**

Durian cultivation technique factor	$\bar{x}$	S.D.	Level of practices
1. Area selection	0.82	.095	High
2. Cultivation plan	0.71	.286	High
3. Planting area selection	0.99	.082	High
4. Cultivation methods	0.88	.231	High
5. Shading	0.89	.210	High
6. Post planting care	0.94	.136	High
7. Pest management	0.81	.812	High
8 .Post-harvest handling area	0.95	.172	High
Overall	0.87	.734	High

Low = 0.33–0.00, Moderate = 0.66–0.34, High = 1.00–0.67

years (37.3%). The durian production cost was 80-1,600 baht/ha/year (40.1%), and the durian price and high income depend on demand, supply and the middleman, the income from durian selling was 800-6,400 baht/ha/year) the online market is becoming the platform for the durian market. This allows farmers all over Thailand access but this can affect supply and demand which can cause oversupply and a decrease in the profits in the durian markets, the area under durian was 0.8-1.6 ha (43.5%) and they used their own money for durian planting (67.2%) similar to the results reported by Radchanui (2016) studied the pattern and potential (*Durio Zibethinus*) production in Tumbon Saikhao, Pattani province the result found that durian garden plantation was 472 rai, 15%, durian and forestry plantation was 2,207 rai, 73%, durian and jungle fruits plantation was 293 rai, 10% was the durian. The total of *Durio Zibethinus* potential productions the in community was 1,744 tons/year. The net return of each pattern included different agro-ecosystem distributes in the forest, mountain plateau, and walkway along the canal near the waterfall and hill areas were 58,688, 10,275, 24,550, 39,326 baht/rai/year respectively.

Furthermore, 4M's in the durian management were: 1) man - the durian farm owner should oversee production themselves and teach the workers properly so that damage including pre-harvest and post-harvest is reduced to maintain the quality of the durian. 2) money - the cost of the durian plantation is labour, chemical material and the depreciation of farm equipment. 3) management- this consist of disease control and the pruning of the durian tree and necessary for production and quality control and 4) material- the depreciation of farm machinery, device, springer, and oil.

### Farmers' implementation of Good Agricultural Practices

Gap Standards is important that durian farmers and middlemen adhere to GAP standards as China will check imported agriculture products to these standards. China is very strict about the correct copyright licensing.

Overall, the farmers' implementation of GAP for durian was at a high level (mean = 2.49). When individual aspects were considered, durian cultivation had the highest score for harvesting and post-harvesting followed by hazardous management, and storage and product transportation, with mean values of 2.87, 2.82, and 2.53, respectively. The post-harvest and transportation should be scheduled so that harvesting 80-90% before ripe, can be delivered to maintain a delicious taste. In addition, planting area and data recording level of practising were at the moderate level, similar to Khaiman et al. (2016) factors influencing farmer's decision making in Good Agricultural Practices (GAP) of durian in Chanthaburi province. The results showed that most respondents were knowledgeable and practised GAP was at a good level. The current results were also similar to Mankeb et al. (2013) on the adoption of GAP by durian farmers in Koh Samui district, Surat Thani province, Thailand which was at the high level for variety, pruning and canopy control, post-harvest management, transportation, orchard hygiene, and environmental management. On the other hand, those farmers had adoption at a low level for plantation area, watering, fertilizing, supporting tree flowering, inducing flower setting, fruiting development and quality fruit, and data recording.

For data recording level of practising was at a moderate level similar to Amekawa, Y. et al., 2017 stated that record-keeping is a requirement of compliance for MyGAP certification. In the case of GlobalGAP, farms applying for certification are most likely to fail if record keeping has not been practised properly even when all the other requirements have been met. This is not the case with MyGAP where record-keeping comprises only part of many compliance criteria upon which the decisions of the DoA on certification are to be made. The quality management, the durian market will be sustainable only if the quality is maintained. The consumers must be satisfied. As shown in Table 2.

**Table 2: Mean, standard deviation and level of practices of individual aspects of durian cultivation (n=354)**

GAP standard of durian	$\bar{x}$	S.D.	Level of Practice
1. Water resources	2.47	.358	High
2. Planting area	2.19	.491	Moderate
3. Hazardous management	2.82	.229	High
4. Storage and product transport	2.53	.371	High
5. Data recording	2.25	.679	Moderate
6. Non-pest product	2.35	.490	High
7. Product management	2.43	.700	High
8. Harvesting and Post harvesting	2.87	.296	High
Overall practices	2.49	1.785	High

Low = 0.33–0.00, Moderate = 0.66–0.34, High = 1.00–0.67

Table 3 shows the relationship between demographic and economic factors and GAP practising and shows that age, marital status, and group members were related to hazardous management at the .05 level of significance and durian cultivation experience was related to storage and product transport at the same level. Age and marital status were both related with data recording at the .01 and 0.05 levels of significance, respectively. Area for durian planting was related to product management at the 0.05 level of significance as was durian cultivation experience with harvesting and post-harvesting.

**Table 3: Relationship between demographic and economic factors with GAP durian cultivation**

Demographic factors and economic factors		Good Agricultural Practices (GAP) factors							
		Water resources	Planting area	Hazardous management	Storage and product transport	Data recording	Non pest product	Product management	Harvesting and Post harvesting
Sex	$\chi^2$	0.001	0.609	0.224	0.904	0.153	0.926	0.339	0.104
	P-value	.534 <sup>b</sup>	.255 <sup>b</sup>	.401 <sup>b</sup>	.211 <sup>b</sup>	.389 <sup>b</sup>	.199 <sup>b</sup>	.318 <sup>b</sup>	.448 <sup>b</sup>
Age	$\chi^2$	4.451	1.817	6.563	0.804	15.387	0.002	0.439	3.619
	P-value	.108	.403	.038*	.669	.000**	.999	.803	.164
Marital Status	$\chi^2$	0.668	0.945	4.235	0.191	3.821	0.003	0.744	0.895
	P-value	.242 <sup>b</sup>	.201 <sup>b</sup>	.027b*	.175 <sup>b</sup>	.033 <sup>b*</sup>	.527 <sup>b</sup>	.229 <sup>b</sup>	.229 <sup>b</sup>
Educational Level	$\chi^2$	1.109	0.092	0.447	1.031	2.562	2.269	0.848	1.031
	P-value	.574	.955	.800	.597	.278	.322	.654	.597
Number in family	$\chi^2$	0.000	2.421	0.035	0.041	0.074	0.164	0.538	0.076
	P-value	.544 <sup>b</sup>	.075 <sup>b</sup>	.502 <sup>b</sup>	.484 <sup>b</sup>	.439 <sup>b</sup>	.396 <sup>b</sup>	.268 <sup>b</sup>	.472 <sup>b</sup>
Group member	$\chi^2$	1.493	0.671	7.228	0.176	1.779	0.515	0.175	0.025
	P-value	.138 <sup>b</sup>	.248 <sup>b</sup>	.011 <sup>b*</sup>	.395 <sup>b</sup>	.115 <sup>b</sup>	.280 <sup>b</sup>	.389 <sup>b</sup>	.509 <sup>b</sup>
Durian cultivation experience	$\chi^2$	3.693	3.301	2.361	7.642	2.981	3.590	4.991	6.190
	P-value	.158	.192	.307	.022*	.225	.166	.082	.045*
Cost of durian cultivation	$\chi^2$	4.772	1.646	2.373	.457	0.208	2.422	3.536	0.303
	P-value	.092	.439	.305	.796	.901	.298	.171	.859
Income	$\chi^2$	2.053	4.672	0.797	0.928	2.013	5.535	4.449	0.162
	P-value	.358	.097	.671	.629	.365	.063	.108	.922
Area under durian	$\chi^2$	3.799	2.103	0.255	2.765	2.978	2.563	6.519	1.696
	P-value	.150	.349	.880	.251	.226	.278	.038*	.428
Source of funds	$\chi^2$	1.312	3.038	0.843	0.252	0.033	0.005	0.399	1.133
	P-value	.151 <sup>b</sup>	.054 <sup>b</sup>	.237 <sup>b</sup>	.359 <sup>b</sup>	.474 <sup>b</sup>	.519 <sup>b</sup>	.303 <sup>b</sup>	.189 <sup>b</sup>

<sup>b</sup> = Fisher’s Exact Test; \* significant at 0.05 level; \*\*significant at 0.01 level.

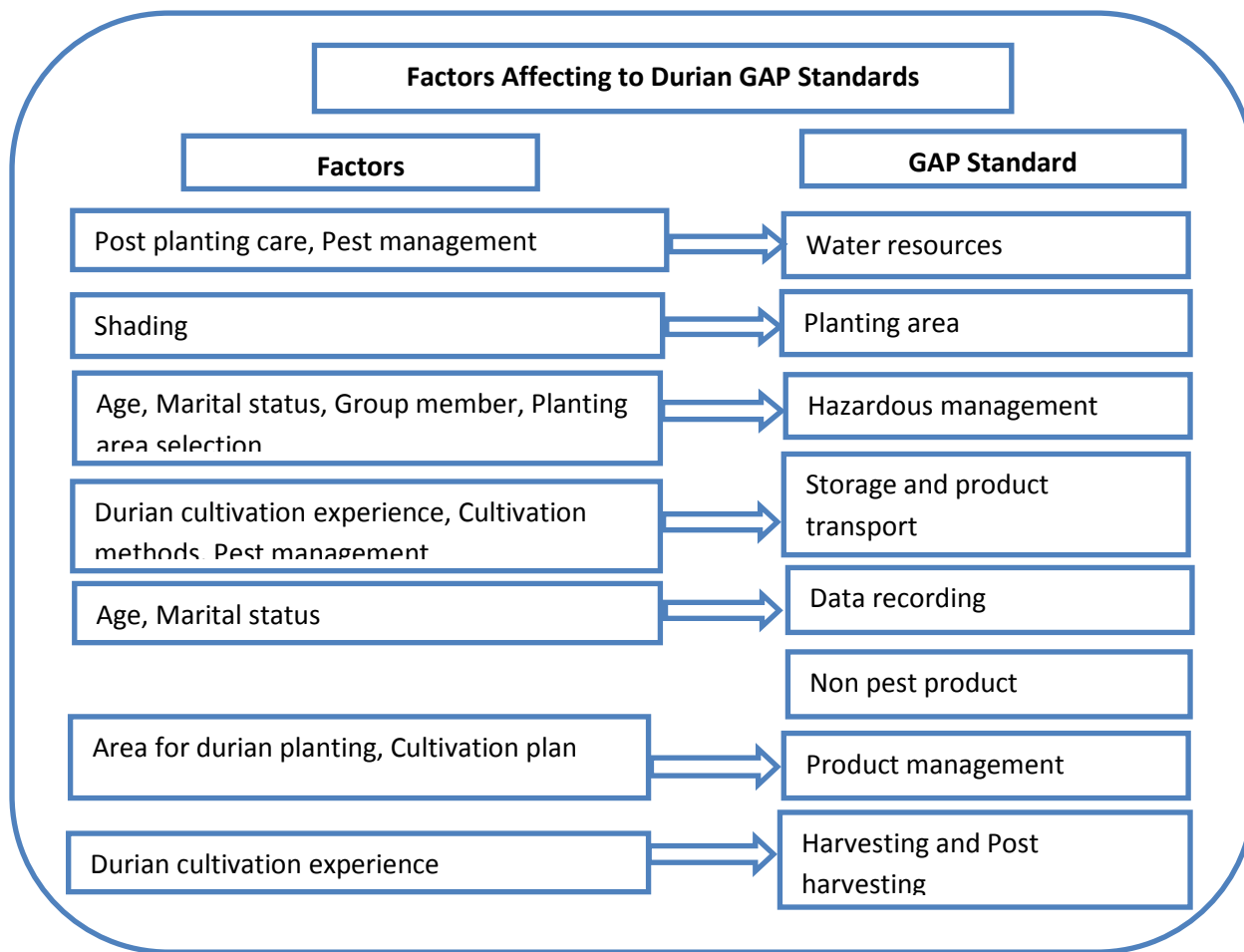
Table 4 presents the relationship between durian cultivation technique factors and the practices of GAP and indicates that post-planting care and pest management were related to water resources at the .05 level of significance. Shading was related to the planting area at the .01 level of significance. Cultivation method and pest management were related to storage and product transport at the .05 level of significance and shading was related to non-pest productst at the same level. Cultivation plan was more strongly related to product management at the .01 level of significance, similar to the current study regarding durian cultivation experience, cultivation methods and pest management were related to storage and product transport as was also reported by Mankeb et al. (2013) where factors significantly (p <0.01) affecting the adoption of GAP were knowledge on GAP, contact with other farmers, cost of durian farming, and GAP training experience. the reported that GAP

adoption constraints were high consisting of input costs, lack of demand in the domestic market and low prices including no bargaining power, lower confidence by substituting organic substances for a chemical substance, lack of continuing GAP promotion by extension officer, no response or feedback information on soil analysis from extension officer, and decreased quality of durian production.

**Table 4: Relationship between durian cultivation technique factors and the practices of GAP for durian cultivation**

Durian cultivation technique factors		Good Agricultural Practices (GAP) factors							
		Water resources	Planting area	Hazardous management	Storage and product transport	Data recording	Non pest product	Product management	Harvesting and Post harvesting
Area selection	$\chi^2$	0.010	1.004	1.733	0.157	0.063	0.701	0.631	0.472
	p-value	.649 <sup>b</sup>	.307 <sup>b</sup>	.273 <sup>b</sup>	.539 <sup>b</sup>	.590 <sup>b</sup>	.362 <sup>b</sup>	.396 <sup>b</sup>	.642 <sup>b</sup>
Cultivation plan	$\chi^2$	1.665	1.297	0.542	0.596	2.947	0.673	6.376	0.895
	p-value	.120 <sup>b</sup>	.157 <sup>b</sup>	.316 <sup>b</sup>	.266 <sup>b</sup>	.055 <sup>b</sup>	.243 <sup>b</sup>	.008 <sup>b***</sup>	.229 <sup>b</sup>
Planting area selection	$\chi^2$	2.097	0.028	1.165	1.110	0.060	0.562	2.680	1.002
	p-value	0.130 <sup>b</sup>	.555 <sup>b</sup>	.033 <sup>b*</sup>	.247 <sup>b</sup>	.536 <sup>b</sup>	.359 <sup>b</sup>	.095 <sup>b</sup>	.281 <sup>b</sup>
Cultivation methods	$\chi^2$	0.000	0.419	1.698	4.842	0.234	0.786	0.010	0.346
	p-value	.541 <sup>b</sup>	.303 <sup>b</sup>	.144 <sup>b</sup>	.023 <sup>b*</sup>	.362 <sup>b</sup>	.228 <sup>b</sup>	.509 <sup>b</sup>	.342 <sup>b</sup>
Shading	$\chi^2$	0.133	7.333	0.754	2.568	2.719	3.619	0.300	0.402
	p-value	.406 <sup>b</sup>	.006 <sup>b***</sup>	.257 <sup>b</sup>	.078 <sup>b</sup>	.063 <sup>b</sup>	.037 <sup>b*</sup>	.338 <sup>b</sup>	.326 <sup>b</sup>
Post planting care	$\chi^2$	5.615	0.150	0.419	1.775	0.030	0.202	0.044	0.592
	p-value	.023 <sup>b*</sup>	.576 <sup>b</sup>	.671 <sup>b</sup>	.212 <sup>b</sup>	.616 <sup>b</sup>	.489 <sup>b</sup>	.600 <sup>b</sup>	.574 <sup>b</sup>
Pest management	$\chi^2$	4.320	0.057	1.636	4.486	0.123	2.480	0.184	0.468
	p-value	.032 <sup>b*</sup>	.494 <sup>b</sup>	.188 <sup>b</sup>	.042 <sup>b*</sup>	.456 <sup>b</sup>	.088 <sup>b</sup>	.425 <sup>b</sup>	.349 <sup>b</sup>
Postharvest handling area	$\chi^2$	0.229	1.791	0.937	0.748	0.534	0.066	0.003	1.325
	p-value	.430 <sup>b</sup>	.159 <sup>b</sup>	.412 <sup>b</sup>	.299 <sup>b</sup>	.334 <sup>b</sup>	.546 <sup>b</sup>	.595 <sup>b</sup>	.291 <sup>b</sup>

The overall factors affecting durian GAP were post-planting care, Pest management had the relationship with water resources, shading had the relationship with planting area, age, marital status, group member, planting area selection had a relationship with hazardous management, durian cultivation experience, cultivation methods, pest management had the relationship with storage and product transport, age, marital status had the relationship with data recording and non-pest product, area for durian planting, cultivation plan had the relationship with product management and durian cultivation experience had the relationship with harvesting and post-harvesting is shown in Figure 1



**Figure 1 Factors affecting using durian GAP standard**

**CONCLUSION AND RECOMMENDATION**

Based on the study found that almost all durian farmers implement the GAP standard. Regarding effectiveness in improving the GAP level of practices, the durian farmers should keep data records. factors affecting GAP implementation by durian farmers in Chanthaburi province, Thailand, it is recommended that the government sector and related organizations should deliver durian GAP standards as a policy and provide appropriate information and support to the durian farmers regarding planting area, data recording for high production, income, and opportunities for export. In addition, pest management was related to water resources and storage and product; thus, transport information on storage and product transport and harvesting and post-harvesting affected the take up of GAP. Consequently, GAP training and improved advisory procedures are necessary to encourage durian farmers to develop their techniques and cultivation planning continuously to guarantee the quality of their durian product to the world market for sustainable marketing and durian farmers’ quality of life.

Chinese business has more financial potential and markets than Thai people. Thai farmers have more potential in the supply chain due to the high

production of durian. However, the business structure still makes Thai exportation still dependent on the expertise of China. The gap between Thai agricultural production and China business is regulations, production, and the lack of information about market and price which sometimes depends on foreign investment for the money.

At present Thai government policy attempt to emphasise large agricultural land plots, but this is not suitable for all farmers who have more potential and knowledge in marketing, cooperation, negotiation, and customs for the new markets especially the China market to reduce the export barriers and reach directly to the consumers. Thus, the Thai government should provide a policy that should protect the stability of the durian market, control the middleman from China, and commercial competition for reducing the equal market between Thailand and other countries. In terms of the government sector, private sectors and farmers should develop and add value to durian products by researching with academic institutions. Farmers should cooperate to control the market and negotiate prices that affect the income of the farmers. A market mechanism for fairness of durian agriculture and durian industry and durian sustainable growth market.



Moreover, durian is widely known as the “king of Thai fruits”. Durian exportation has always been in high demand and has a large market despite many competitors in the region. If farmers follow GAP, they can continuously export and stay strong in this market. The government sector should provide knowledge about production data recording, agricultural business management by using digital technology, faster storage and transportation processes, and efficient harvest and post-harvest innovations. This not only helps with transportation but also maintains the fruit quality and the export market in demand. Furthermore, in the domestic market, farmers should collaborate in terms of business integration, selling and processing to develop channels for the online market platform. This will enable them to sell more varieties of durians directly to the consumer, and thus will omit the middleman from the process. The farmer will be able to set a specific price and earn more money all year round. This will overall aid in developing competition, a sustainable durian market, a better quality of living, and the continuous growth of the domestic and international market.

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