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Determinants of good agricultural practices intention adoption by small and micro community enterprises in thailand: crop production category

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ABSTRACT
In this study, the researchers wanted to find out what makes small and micro community enterprises (SMCEs) in crop production want to adopt GAP. The research survey involved 290 SMCEs in Sakhon Nakhon, Thailand, in collection using a structured questionnaire. A total of 13 variables were used for the analysis: gender, age, education, experience in group management, the person with the most influence on the decision to enter GAP standards, attitude toward accepting GAP standards in production, attitude toward accepting GAP standards in terms of health and the environment, SMCE's income, product variety, farm size, number of agricultural knowledge trainings for group members in the past year, number of agricultural news stories received by group members from personal media in the past year, and membership in other agricultural groups. The results showed that 57% of SMCEs expressed a high intention to adopt GAP standards. The statistically significant determinants of the intention to adopt GAP standards include male group leaders, attitudes toward GAP production, decision-making influencers, product variety, and memberships in other agricultural groups. The finding provides insightful information for policymakers and government extension agents in developing agricultural production standards for SMCEs. Fostering confidence and empowering them to make decisions, along with promoting farmer group networks, enables farmers to connect, collaborate, and exchange knowledge, information, and news, ultimately elevating agricultural product standards to a competitive level and fostering sustainability in the agricultural system.

Contribution/Originality: This paper used binary logistic regression modeling to examine the determinants of GAP intention adoption among small and micro-community enterprises (SMCE) in agriculture. This research finding could enhance our fundamental understanding and serve as a foundation for developing policies to enhance agricultural production standards.

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1. INTRODUCTION

Concerns about consumption are growing in the modern world. This impacts the health, quality, and safety standards of consumer products. This ultimately affects the population's quality of life and ability to produce food. It is in this context that good agricultural practices (GAP) were born. GAP is a set of practices that addresses environmental, economic, and social sustainability for on-farm processes. In 1997, European supermarket chains and their major suppliers, representing all stages of the supply chain in Europe's fruit and vegetable sector, initiated the development of GAP as a private sector standard. Since then, it has changed into a privately run on-farm accreditation program that aims to offer a worldwide system for checking fruits and vegetables based on GAP implementation to keep up with its growing reach around the world. GLOBALG.A.P., a private sector body that sets voluntary certification standards and procedures for good agricultural practices, operated the scheme. It aims to increase consumers' confidence in food safety (Food and Agriculture Organization of the United Nations, 2016). GAP in ASEAN: In 2006, the member countries of GAP (Good Agricultural Practices) collaborated to develop the ASEAN GAP as a unified standard. This standard aims to harmonize national GAP programs within the ASEAN region, enhance consumer safety of fruit and vegetables, ensure natural resource sustainability, and facilitate fruit and vegetable trade regionally and internationally (ASEAN Australia Development Cooperation Program, 2006).

GAP in Thailand: In 2004, Thailand's government declared food safety a national agenda item. The Ministry of Agriculture began using Q-GAP standards as a tool to regulate and promote agricultural products. Standards must be met to guarantee consumer safety and protection and avoid harm to farmers or businesses, agricultural trade, or the nation's economy. In 2006, Thailand collaborated with ASEAN countries to establish the ASEAN GAP; in 2008, Thailand had the Agricultural Product Standards Act govern the certification of agricultural product standards, mandating that GAP standards adhere to this law.

The government has a policy to encourage Thai farmers to develop their potential by promoting agriculture to form groups into small and medium-sized community enterprises (SMCEs). The policy aims to enhance farmers' knowledge and skills in production, processing, marketing, group management, and leadership to raise the standards of agricultural production (Community Enterprise Promotion Division, 2019). The Community Enterprise Promotion Division (2023) divides SMCEs into 6 service categories and 18 product categories, with the majority falling under the crop production category. In 2023, in Thailand, there were 83,553 SMCE groups and 604 SMCE networks (Department of Agricultural Extension News Center, 2024).

In Sakon Nakhon province, there were 1,052 SMCEs in the crop production category. The Sakon Nakhon Provincial Agricultural and Cooperative Office reports that agricultural areas in Sakon Nakhon province, cultivation year 2022-2023, total 1,197,389.40 acres and account for 50.46 percent of the total area. It has 1,830.35 acres of GAP-certified land (Sakon Nakhon Provincial Agricultural and Cooperative Office, 2023). The aforementioned report reveals that only 0.15 percent of the total agricultural area adheres to GAP standards. The government sector has implemented various policies to encourage farmers to enhance their production standards, such as encouraging SMCEs to produce agricultural products in accordance with GAP standards, with the aim of enhancing the competitiveness of the agriculture sector. Despite years of promotion of SMCEs in Sakon Nakhon province, there are still only a few farmers who have received GAP certification. Extending SMCEs for GAP certification is a challenge for government agencies. Farmers will accept extensions for a variety of reasons, including personal factors, business factors, and supporting factors. Understanding the factors that make it challenging to promote farmers will help government agricultural extension officers come up with effective ways to do it. This could be done by selecting SMCEs with factors that influence GAP compliance to promote them as model community enterprises and then scaling up the results to other community enterprises. The research by Dessart, Barreiro-Hurlé, and Van Bavel (2019) found that farmers were more likely to use sustainable methods when most of the other farmers in their area did the same and when they followed the advice of people in their community who supported the change.

Therefore, this research aimed to determine the factors influencing SMCEs' intention to adopt GAP standards for their crop production. This paper used binary logistic regression as its data analysis strategy. From a practical perspective, it enables policymakers, extension agents, and marketers to leverage the strategies for sustainable agricultural development.

2. RESEARCH METHOD

2.1. Research Location

The research was conducted in Sakon Nakhon province, which is located in the northeastern part of Thailand (Figure 1). Sakon Nakhon province is primarily an agricultural city, with agricultural land occupying more than 50% of its total area. Agriculture produces various goods, including rice, rubber, cassava, sugarcane, medicinal herbs, vegetables, and fruits. The government has established policies to encourage farmers to form SMCE to strengthen production and marketing. The GAP standards have been implemented to enhance agricultural product quality and standards to meet global market requirements (Sakon Nakhon Provincial Agricultural and Cooperative Office, 2023).

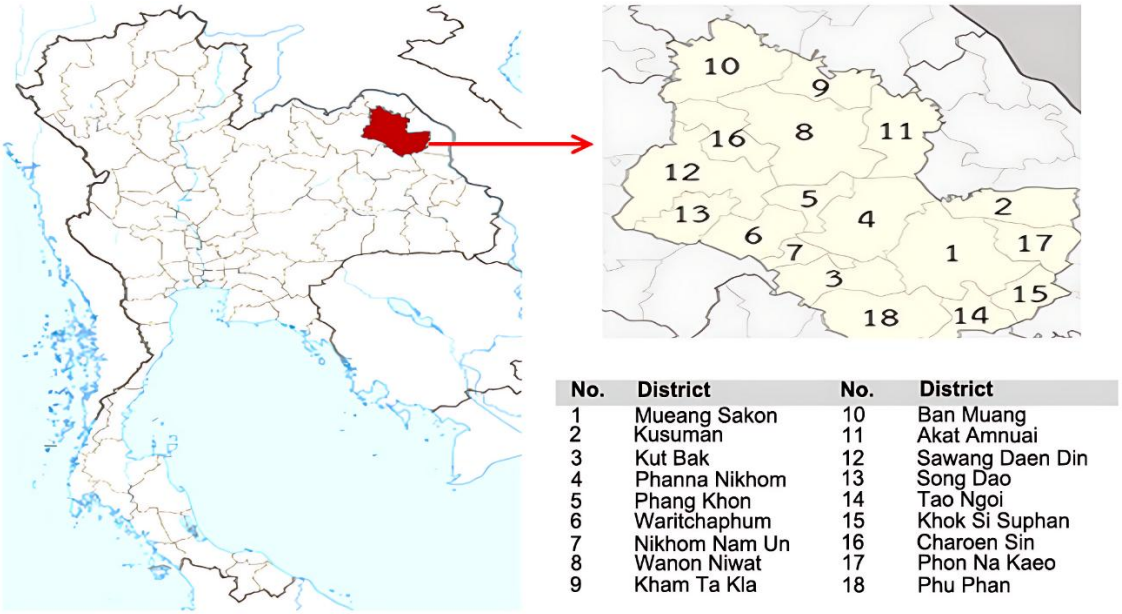

Figure 1. The map of the research location, Sakon Nakhon province, Thailand.
Source: NordNordWest (2024).

2.2. The Sample and Data Collection

The population of 1,052 SMCEs in the category of crop production in Sakon Nakhon province was targeted for this research (Community Enterprise Promotion Division, 2023). The sample size of 290 SMCE groups was determined by using Taro Yamane's formula (Yamane, 1973) at the confidence level of 95%. The multistage sampling method was employed to select the sample. Next, determine the number of samples based on the population proportion in each district. Finally, respondents were selected using simple random sampling. Table 1 displays the number of samples distributed in each district. Data were collected in 2024.

Table 1. Distribution of the population and sample within each district.

District	Target population	Proportionate	Sample	District	Target population	Proportionate	Sample
Mueang Sakon	203	0.19	56	Akat Amnuai	33	0.03	9
Kusuman	33	0.03	9	Sawang Daen Din	125	0.12	35
Kut Bak	41	0.04	11	Song Dao	40	0.04	11
Phanna Nikhom	37	0.03	10	Tao Ngoi	51	0.05	14
Phang Khon	133	0.13	37	Khok Si Suphan	32	0.03	9
Waritchaphum	72	0.07	20	Charoen Sin	30	0.03	8
Nikhom Nam Un	26	0.02	7	Phon Na Kaeo	46	0.04	13
Wanon Niwat	59	0.06	16	Phu Phan	29	0.03	8
Kham Ta Kla	23	0.02	6	Total	1,052	1.00	290
Ban Muang	39	0.04	11				

Source: Community enterprise promotion division, (2023).

2.3. Research Instrument

The research employed a structured questionnaire as the primary data collection tool. The questionnaire was developed using secondary data from past literature reviews related to the field of research and primary data from in-depth interviews with SMCEs to gain insight and information needed to develop the questions. Before beginning the main data collection, we conducted a pretest to evaluate the validity and reliability of the instruments. Three experts were asked to judge the content validity, and thirty SMCEs who were not in the sample were asked to use Cronbach's alpha to test the reliability. The results showed that the index of item objective congruence (IOC) was 0.97, indicating the questions or contents used in this questionnaire were valid. For reliability analysis, Cronbach's alpha coefficient value was 0.95, indicating the instrument was reliable.

2.4. Analysis Method

This research conducted several statistical analyses to address its objectives. We used descriptive statistics like frequency, mean, and percentage to show the types of people who run SMCEs, the business information and help they get, and their level of intention. The binary logistic regression analysis was used to find out what factors made SMCE leaders want to adopt GAP standards, while the factor analysis was used to find out how SMCE leaders felt about adopting GAP standards. We used the Statistical Package for Social Science (SPSS) Program version 29 to analyze the data in this research. The variables used in the research were described in Table 2.

Table 2. Independent variables: measurement and working hypothesis.

Variables	Measurement/Code	Symbols	Expected sign.	Reference
Determinants of the personality of the SMCE's leader				
$ß_1$: Gender	1 =Male 0 =Female	Gender	+ve	Bajgain, Tiwari, Joshi, Shah, and Shrestha (2024); Chelang'a, Kariuki, Obare, and Otieno (2023) and PK, Zoumbé, Hamadé, and Adama (2023).
$ß_2$: Age	Age (Years)	Age	+ve	Chelang'a et al. (2023); Serebrennikov, Thorne, Kallas, and McCarthy (2020) and Ogisi and Begho (2023).
$ß_3$: Education	Years of schooling (Years)	Educ	+ve	Chelang'a et al. (2023); Serebrennikov et al. (2020) and Cherotich and Kaur (2023).
$ß_4$: Experience in group management	Experience (Years)	Exper	+ve	Chelang'a et al. (2023) and Connor et al. (2020)
$ß_5$: The person who has the most influence on the decision to enter GAP standards	1 =Themselves 0 =Other persons	Influe	+ve	Tey et al. (2015)
$ß_6$:Attitude towards accepting GAP standards in production	Level of positive attitude (Unit)	ATT1	+ve-/ve	Rathakrishnan et al. (2022); Supapunt, Intanu, and Chaikampun (2021) and Malkanthi, Thenuwara, and Weerasinghe (2021).
$ß_7$:Attitude towards accepting GAP standards in terms of health and environment	Level of positive attitude (Unit)	ATT2	+ve	Vapa Tankosić et al. (2023)
Determinants of business				
$ß_8$:SMCE's income	Income (Dollars/Month)	Income	+ve	Abadi, Sujianto, and Miftah (2023) and Laosutsan, Shivakoti, and Soni (2019).
$ß_9$:Product variety	1 =More than one type of product 0 =One type of product	PROD_V	+ve	Connor et al. (2020) and PK et al. (2023).
$ß_{10}$:Farm size	Farm size (Acres)	Farm_S	+ve-/ve	Adhikari and Thapa (2023); Ogisi and Begho (2023) and Connor et al. (2020)
Determinants of supporting				
$ß_{11}$:Number of agricultural knowledge trainings of group members in the past year	Participation in training (Number of trainings)	Train	+ve	Chelang'a et al. (2023); Mgomezulu, Machira, Edriss, and Pangapanga-Phiri (2023) and Zakaria, Azumah, Appiah-Twumasi, and Dagunga (2020).
$ß_{12}$: Number of receiving agricultural news from personal media of group members in the past year	Receiving agricultural news (Number of receiving)	News	+ve	Mgomezulu et al. (2023); Akomdo et al. (2023); Nawi et al. (2023) and Nawi et al. (2023)
$ß_{13}$:Membership in other agricultural groups	1 =Yes 0 =No	Other _G	+ve	Mutyasira, Hoag, and Pendell (2018) and Jourdain, Srisopaporn, Perret, and Shivakoti (2017).

Note: +ve is the expectation for the positive relationship, and -ve is the expectation for the negative relationship.

The logistic regression model illustrates the correlation between a dependent variable and a predictor variable (Vanichbuncha, 2017).

$$Log\ (odds)\ =\ ln\left(\frac{Pr(y=1)}{Pr(y=0)}\right) \quad (1)$$

Represented in the form of a linear regression equation as follows:

$$Log\ (odds)\ =\ ß_0\ +\ ß_1X_1\ +\ ß_2X_2\ +\ldots+\ ß_nX_n \quad (2)$$

The study model's formula is represented as the following equation:

$$Y\ =\ ß_0\ +\ ß_1GENDER\ +\ ß_2AGE\ +\ ß_3EDUC\ +\ ß_4EXPER\ +\ ß_5INFLUE\ +\ ß_6ATT_1\ +\ ß_7ATT_2\ +\ ß_8INCOME\ +\ ß_9PROD_V\ +\ ß_{10}FARM_S\ +\ ß_{11}TRAIN\ +\ ß_{12}NEWS\ +\ ß_{13}OTHER\_G \quad (3)$$

Where Y refers to the intention to adopt GAP standards; Y = 1 referred to the SMCEs having the intention to adopt GAP standards, and Y = 0 referred to the SMCEs having no intention to adopt GAP standards, while β_0, β_1, β_2, …, β_{13} referred to coefficients showing the influence of independent variables on the dependent variable.

3. RESULTS AND DISCUSSION

3.1. Demographic Profile of SMCE's Leader

Table 3 shows the demographic profile of SMCE's leader. It revealed that the majority of the respondents were female (59.31%), with an age range between 51 to 60 years old (45.52%). It is indicating that they were entering the elderly group, which is consistent with Puey Ungphakorn Institute for Economic Research (2019) which reported that the proportion of elderly workers in Thailand's agricultural sector has been increasing. The majority of respondents had secondary education (50.69%), with experience between 6 to 10 years in managing SMCE groups. Group members were found to have the highest influence on their decision to enter the GAP standards, followed by themselves, government agencies, and neighbors who had achieved the GAP standards, respectively.

Table 3. Demographic profile of SMCE's leader.

Variables	Classification	Frequency	Percent (%)
Gender	Male	118	40.69
	Female	172	59.31
Ages	20 – 30 years	2	0.69
	21 – 40 years	27	9.31
	41 – 50 years	88	30.34
	51 – 60 years	132	45.52
	Over 60 years	41	14.14
Education	Less than secondary school	79	27.27
	Secondary school	147	50.69
	Vocational certificate/Diploma	27	9.31
	Bachelor's degree	29	10.00
	Master's degree	8	2.76
Experience in group management	1 – 5 years	53	18.28
	6 – 10 years	147	50.69
	11 – 15 years	66	22.76
	16 – 20 years	20	6.90
	Over 20 years	4	1.37
The person who has the most influence on the decision to enter GAP standards	Themselves	63	21.72
	Group members	169	58.28
	Government agencies	38	13.10
	Neighbors who had achieved GAP standards	20	6.90

Source: Survey data (2023–2024).

3.2. Business Information and Support Received

Table 4 shows the business information and support that SMCEs have received. The majority of SMCEs earned between $901 and $1,200 per month, with an average income of $1,168. SMCEs had more than one product type (61.38%). Their farm sizes ranged between 11 to 15 acres (37.24%). SMCE's members attended agricultural knowledge training with government agencies 3 to 4 times per year (54.14%). The training contained information on improving the quality of agricultural production and the added value of products, product standards, marketing, and online sales. SMCE's members received agricultural news through personal media once a year (26.55%), typically from agricultural extension agents, researchers, and village headmen. Approximately 57.93% of SMCE members have memberships in other agricultural groups, such as organic rice farming groups, cassava farming groups, and vegetable farmer groups. This is in line with the Thai government's policy to support the role of agricultural institutions (cooperatives/farmer groups/community enterprises) as farmer business units to support the efficiency of farm management in order to reduce costs and add value to farmers' products (Office of the National Economic and Social Development Council, 2023).

Table 4. Business information and support received of SMCEs.

Variables	Classification	Frequency	Percent (%)
SMCE's income	Less than 600 $/month	65	22.42
	601 – 900 $/month	59	20.34
	901 – 1,200 $/month	88	30.34
	1,201 – 1,500 $/month	39	13.45
	Over 1,500 $/month	39	13.45
Product variety	1 item	112	38.62
	Over 2 items	178	61.38
Farm size	Less than 6 acres	41	14.14
	6 – 10 acres	65	22.42
	11 – 15 acres	108	37.24
	16 – 20 acres	44	15.17
	Over 20 acres	32	11.03
Number of agricultural knowledge trainings of group members in the past year	Never	51	17.58
	1 – 2 times	57	19.66
	3 – 4 times	157	54.14
	5 – 6 times	23	7.93
	Over 6 times	2	0.69
Number of receiving agricultural news from personal media of group members in the past year	Never	50	17.24
	1 times	77	26.55
	2 times	55	18.97
	3 times	63	21.72
	Over 3 times	45	15.52
Membership in other agricultural groups	Yes	168	57.93
	No	122	42.07

Source: Survey data (2023–2024).

3.3. Attitudes Towards Adoption of GAP Standards

Factor analysis was performed to identify the attitudes of SMCE's leader towards the adoption of GAP standards. The KMO test, which gave a good result of 0.95, was used to see if the sample size was right and if the statement items chosen were good for factor analysis. Bartlett's Test of Sphericity also showed statistically significant results with a p-value of 0.00 and a chi-square value of 3,265.29, which confirmed that the statement items were relevant for the factor analysis (see Table 5).

Table 5. KMO and Bartlett's test.

Test	Value
Kaiser-Meyer-Olkin measure of sampling adequacy.	0.95
Bartlett's test of sphericity	
Approx. chi-square	3,265.29
df	136
Sig.	0.00

The result of factor analysis is presented in Table 6. Two factors were found based on how the SMCE leaders felt about adopting GAP standards. These were their "attitudes toward GAP production" and "attitudes towards health and the environment." These items yielded convergent validity, with factor loading at 0.5 or higher. Collectively explained, these two factors explained 61.12% of the difference in SMCEs' plans to adopt GAP standards. We used Cronbach's alpha to assess the reliability of the factors. All statement items yielded coefficients over 0.60, indicating reliability is acceptable (Hair, Black, Babin, & Anderson, 2010).

The first factor, known as attitude towards GAP production, comprises five sub-variables that serve as measurements of this factor. This factor seems to have factor loadings above 0.6, ranging from 0.63 to 0.79, with an eigenvalue of 9.25 and a total variance explained by 54.428%. This suggests that it plays a major role in determining whether or not SMCE leaders will adopt GAP standards. The Cronbach's alpha was 0.91, representing high internal consistency. The sub-variables in this factor were "I think the GAP system is simple to implement" (0.79) and "I believe that members of the group have sufficient knowledge and understanding about GAP standard crop production." (0.76), "I think that producing crops according to GAP standards produces quality products that are safe from chemical contamination, pathogens, and pests." (0.74), "I think that producing crops according to GAP standards creates sustainability in the agricultural production system" (0.72), and "I believe that products with GAP certification can create confidence for consumers." (0.63).

The second factor was attitudes towards health and the environment, comprising four sub-variables with a total variance of 6.69% and eigenvalues of 1.14. The factor loadings ranged from 0.71 to 0.81, indicating that attitudes toward health and the environment could influence SMCE leaders' intentions to adopt GAP standards. The Cronbach's Alpha was 0.85. The sub-variables in this factor were "I think that producing crops according to GAP standards creates

sustainability in the environmental system" (0.81), "I think that producing crops according to GAP standards can help preserve the environment, both water sources and planting areas" (0.72), "I think that producing crops according to GAP standards makes farmers healthier" (0.71), and "I think GAP-certified products are safe for consumers" (0.71).

Table 6. Attitudes toward the adoption of GAP standards.

Attitudes	Factor loadings
Attitudes towards GAP production	
1 .I think GAP system is simple to implement.	0.79
2 .I think that members of group have sufficient knowledge and understanding about GAP standard crop production.	0.76
3 .I think that producing crops according to GAP standards produces quality products that are safe from chemical contamination, pathogens, and pests.	0.74
4 .I think that producing crops according to GAP standards creates sustainability in the agricultural production system.	0.72
5 .I think that products with GAP certification can create confidence for consumers.	0.63
Eigenvalues	9.25
Percentage of variance explained	54.43
Cronbach's Alpha	0.91
Attitudes towards health and the environment	
1 .I think that producing crops according to GAP standards creates sustainability in the environmental system.	0.81
2 .I think that producing crops according to GAP standards can help preserve the environment, both water sources and planting areas.	0.72
3 .I think that producing crops according to GAP standards makes farmers healthier.	0.71
4 .I think GAP certified products are safe for consumers.	0.71
Eigenvalues	1.14
Percentage of variance explained	6.69
Cronbach's alpha	0.85
Cumulative percentage	61.12

According to the statements described in Table 6, Figure 2 depicted the SMCE leaders' attitude towards intention to adopt GAP standards. The findings revealed that approximately 91.80% of respondents believe that products with GAP certification could create the consumers' confidence in purchasing GAP products. From health and environmental perspectives, about 92% believe that the GAP products are safe for consumers. This indicates that farmers place importance on producing products with regard to consumer needs, which is consistent with the results of the study by Ji and Lee (2022) who reported that consumers who experienced food safety incidents were more likely to purchase GAP-certified products. Therefore, it is necessary to produce GAP products that meet consumer needs.

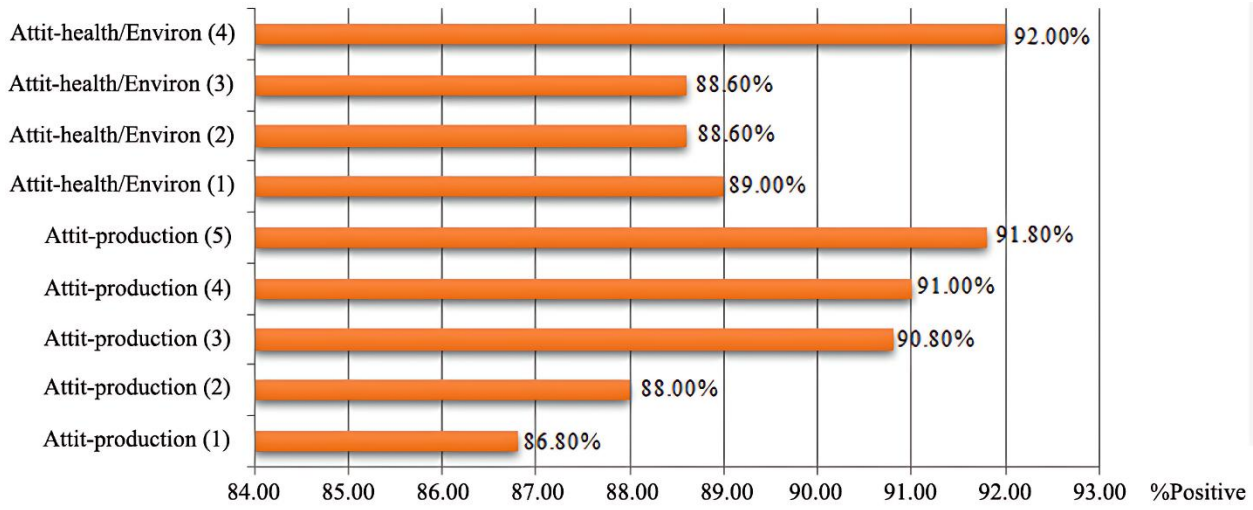

Figure 2. Attitude towards the intention to adopt of GAP standards.

3.4. Determinants of SMCE's Intention towards Adoption of GAP Standards

Figure 3 draws the intention level towards adoption of GAP standards by the SMCE's leader. It shows that about 57% of SMCEs indicated they had an intention towards adoption of GAP standards, while 43% of SMCEs indicated they had no intention towards adoption of GAP standards.

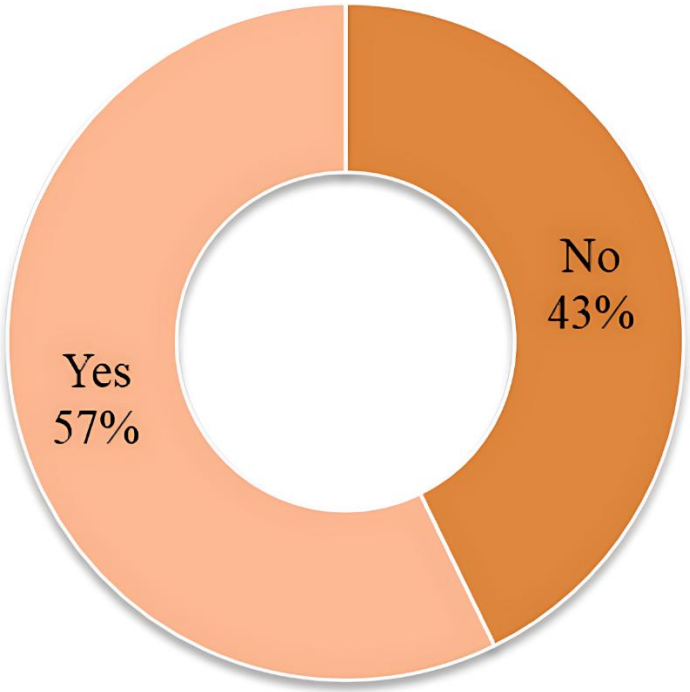

Figure 3. SMCE's intention toward adoption of GAP standards.

The binary logistic regression analysis was employed to investigate the factors determining the SMCE leaders' intention to adopt GAP standards in crop production. The goodness of fit of the model was assessed using the Hosmer and Lemeshow test, which is a model test using chi-square statistics to see if the created logistic model can provide a predicted probability of event occurrence consistent with the actual event occurrence measured from the collected data. If the chi-square test result is not significant, it indicates that the obtained logistic model is acceptable, as the predicted value and the actual value do not differ. Table 7 shows that the chi-square value is 12.82 and indicates no significance at a p-value over 0.05. This result suggests that the model fits the analysis.

Table 7. Hosmer and Lemeshow test.

Test	Chi-Square	df	Sig.
Goodness of fit	12.82	8	0.118

Table 8 shows the results of the binary logistic regression analysis. The results showed that five things—gender, people who make decisions, attitude toward GAP production, variety of products, and membership in other agricultural groups—had a big effect on the SMCE leaders' decision to adopt GAP standards for the community enterprise groups. The following explanation and discussion can shed light on these results:

In terms of gender, gender was significantly affected by the SMCEs' intention towards adoption of the GAP standard ($\beta = 0.744$, $p < 0.05$). The findings emphasized that male SMCE leaders were 2.104 times more likely to have the intention to adopt the GAP standard. It indicates that male SMCE leaders possess the authority to decide on crucial family affairs. Hence, being the head of the household increases the likelihood of adopting GAP because these individuals tend to have more decision-making power and responsibility for farm outcomes. The finding is consistent with PK et al. (2023), which emphasized that male farmers were more likely to adopt GAP. Chelang'a et al. (2023) also observed that there was a positive correlation between gender and the adoption of GLOBALG.A.P. as men primarily make production decisions in households. Similarly, Bajgain et al. (2024) conducted research in western Nepal; the gender of orchard owners influenced the intensity of GAP adoption, suggesting that male orchard owners contribute to higher GAP adoption rates.

In terms of decision-making influencers ($\beta = 0.718$, $p < 0.05$), SMCE's leaders who make decisions independently were 2.051 times more likely to have the intention to adopt GAP standards than SMCE's leaders who rely on others, such as group members, government officials, or neighboring farmers, to influence their decisions. This finding corresponds with Tey et al. (2015) who concluded that farmers or producers are leaders in the use of GAP standards. Their personal values, such as the desire for a better life and financial improvement, have a significant influence on their decisions.

In terms of attitudes towards GAP production ($\beta = 0.792$, $p < 0.05$), SMCE's leaders with a favorable attitude towards GAP standards or production were 2.207 times more likely to have the intention to adopt GAP standards in their production.

The result is consistent with the study of Supapunt et al. (2021) which concluded that attitudes towards GAP vegetable production led to farmers adopting GAP at a higher level. Rathakrishnan et al. (2022) also pointed out that farmers with the right attitudes and beliefs will be able to adopt sustainable agricultural practices, and they were more likely to do so on their farms. However, despite having positive attitudes toward GAP, most farmers may not be willing

to take the risk of adopting these practices due to various issues, including a lack of necessary production factors, capital, suitable land conditions, and a lack of understanding or awareness of the need (Malkanthi et al., 2021; Wintschnig, 2021).

In terms of product variety, it significantly and positively affected the SMCE leaders' intention to adopt the GAP standard ($\beta = 0.916$, $p < 0.01$).

The leaders of SMCEs, who perceived more than one type of product variety, were 2.499 times more likely to intend to adopt GAP standards. To remain competitive, SMCEs attempt to differentiate and improve products by adopting new practices into their production processes. The finding is supported by the study of Connor et al. (2020) which suggested that successful adoption of new practices requires consideration of limiting factors such as growing multiple crops per year, while PK et al. (2023) conclude that the potential for increased income from mixed cropping can motivate farmers to adopt GAP.

In terms of membership in other agricultural groups ($\beta = 0.867$, $p < 0.01$), the SMCE leaders with membership in other agricultural groups exhibited a significant and positive effect on their intention to adopt GAP standards, indicating that the SMCEs with their memberships in other agricultural groups were 2.379 times more likely to have the intention to adopt GAP standards.

This is consistent with the study by Mutyasira et al. (2018) which reported that membership in farmer organizations is an important factor in farmers' decision-making to adopt sustainable agricultural practices. Membership in farmer associations and groups is an important factor in the implementation of GAP standards because these organizations support and facilitate the sharing of information and resources (Jourdain et al., 2017).

Table 8. Results of binary logistic regression analysis of determinants of intention to adopt GAP standards.

Variables	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
							Lower	Upper
Gender	0.744	0.298	6.216	1	0.013*	2.104	1.172	3.776
Age	-0.014	0.020	0.511	1	0.475	0.986	0.948	1.025
Educ	-0.15	0.045	0.112	1	0.738	0.985	0.902	1.076
Exper	0.004	0.033	0.016	1	0.900	1.004	0.942	1.071
Influe	0.718	0.345	4.329	1	0.037*	2.051	1.043	4.036
ATT1	0.792	0.365	4.701	1	0.030*	2.207	1.079	4.514
ATT2	-0.318	0.413	0.594	1	0.441	0.728	0.324	1.633
Income	-0.028	0.015	3.486	1	0.062	0.972	0.943	1.001
PROD_V	0.916	0.318	8.305	1	0.004**	2.499	1.340	4.659
Farm_S	0.010	0.006	2.583	1	0.108	1.010	0.998	1.023
Train	-0.095	0.106	0.808	1	0.369	0.909	0.738	1.119
News	-0.099	0.097	1.050	1	0.305	0.906	0.749	1.095
Other _G	0.867	0.314	7.603	1	0.006**	2.379	1.285	4.405
Constant	-1.822	2.112	0.744	1	0.388	0.162		

Note: *significant at p <0.05; **significant at p<0.01.

4. CONCLUSION

The researchers investigated the intentions of SMCE leaders toward the adoption of GAP standards for crop production. The binary logistic regression analysis indicated that the intention of SMCEs to adopt GAP standards was affected by the gender of their leaders, their attitude toward GAP standards, the number of people who had a say in the decision, the variety of their products, and their membership in other agricultural groups. The findings also emphasized that male SMCE leaders indicate a higher intention to adopt GAP production standards than females, who tended to have important decision-making power in family matters and were responsible for the farm productions. SMCE leaders who made independent decisions had a higher intention to enter GAP production than SMCE leaders who were influenced by others' decisions.

The intention to enter GAP production was positively correlated with the positive attitudes of SMCE leaders, as these attitudes in turn influenced their practices. SMCEs with memberships in other agricultural groups were found to be more likely to comply with GAP production standards because they gained support and agricultural information from those groups.

Based on the results, the government should promote the development of GAP standards for SMCEs. To encourage a good attitude, SMCEs need to know and understand GAP standards for crop production. They should also stress the benefits of getting GAP certification, like higher selling prices and access to high-end markets like modern trade or foreign markets, especially for male SMCE leaders. Implementing programs and training sessions could encourage and enable them to comply with GAP standards for crop production effectively. And the government should promote the farmer group network, which can foster connectivity and collaboration, facilitating the exchange and transfer of knowledge, information, and news, and thereby enhancing Thailand's agricultural sustainability and market competitiveness.

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Transparency: The authors state that the manuscript is honest, truthful, and transparent, that no key aspects of the investigation have been omitted, and that any differences from the study as planned have been clarified. This study followed all writing ethics.
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