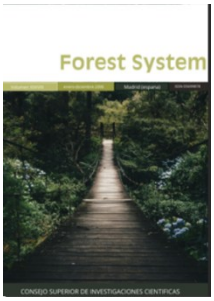


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# Agricultural Extension Approaches for Off-season Durian Production for Export of Farmers in Nakhon Si Thammarat Province, Thailand

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## Abstract

The objectives of this research are to study: (1) the social and economic conditions of farmers (2) the conditions of Off-season durian production for export (3) the factors affecting the approaches to promoting Off-season durian production for export among farmers in Nakhon Si Thammarat Province (4) agricultural extension approaches for Off-season durian production for export in Nakhon Si Thammarat Province, The population and sample group for this research consist of durian farmers in Nakhon Si Thammarat Province, specifically from Tha Sala District, Sichon District, and Nopphitam District, totaling 3,254 households. The sample was selected using purposive sampling. The sample size was determined using Taro Yamane's formula with an acceptable margin of error of 0.05, resulting in a sample of 360 participants. Data was collected using an interview questionnaire with a reliability coefficient of 0.921, measured by Cronbach's alpha. The data were analyzed using descriptive statistics to determine frequency, percentage, mean, minimum, maximum, and standard deviation. Additionally, multiple regression analysis was performed using the enter method. The study found that most farmers were male, with an average age of 52.88 years. They completed primary education (Grade 6) and had an average of 10.43 years of durian farming experience, with 4.58 years specifically in durian production for export. The average household size was 3.88 members, with 2.07 household laborers and an additional 1.61 hired workers on average. Farmers had an average durian plantation size of 11.73 rai and sold their produce at an average price of 136.03 THB per kilogram. Their average income from durian production was 3,331,907.64 million THB. Additionally, 48.1% of farmers had taken out loans. Regarding information sources, 40.1% of farmers primarily received information on durian production technology for export from fellow farmers within the province. On average, they contacted government agricultural extension officers 0.81 times per year and private sector agricultural advisors 3.18 times per year. They consulted with export business operators and attended export-oriented durian training programs about once per year. However, 79.4% of farmers had never participated in field studies related to durian export production, and 83.9% were not members of agricultural organizations. Key factors influencing Off-season durian production for export in Nakhon Si Thammarat Province included the export price of durians, household loans, access to information on durian production technology, contact with government agricultural officers,

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and training experience in durian production for export. These factors were found to be significant at the 0.05 level.

**Keywords:** Off-season durian, Export, Farmers, Nakhon Si Thammarat Province, Agricultural Extension Approaches.

## Introduction

Thailand is considered one of the world's leading producers and exporters of durian. It ranks as the number one durian-exporting country globally. (Department of Internal Trade, Ministry of Commerce, 2024) Thailand's durian exports were valued at 1.464.74 billion USD, accounting for 75.22% of the global fresh durian export market. The volume and value of Thai fresh durian exports have increased significantly compared to 530,226 tons exported in 2020, reflecting the growing global demand for fresh durian each year, which aligns with the increasing export volume. Thailand's primary export market for durian is the People's Republic of China (Trade Policy and Strategy Office, 2021). To meet the rising demand, the country has expanded its durian cultivation area. In 2021, the total harvested area reached 837,290 rai, marking a 5.83%

increase from 2020. Additionally, the expansion of durian plantations, replacing other crops, led to a total production volume of 1,283,593 tons in 2021, representing a 15.44% increase from 2020. This growth is attributed to Thailand's favorable climate conditions for durian flowering and fruiting, as well as the attractive market price, which has encouraged farmers to invest more in maintaining their durian orchards (Department of Trade Negotiations, 2021). The southern region of Thailand is the country's largest durian-producing area. The top three provinces with the highest number of durian-growing households are: Nakhon Si Thammarat - 39,123 households, Chumphon - 29,972 households, Surat Thani - 18,230 households (Department of Agricultural Extension, 2021).

Nakhon Si Thammarat is the province with the highest number of durian -growing households in southern Thailand. This is due to its favorable geographical and climatic conditions, which are highly suitable for durian cultivation. These conditions enable the production of high-quality durian as a key economic crop, meeting market demands both domestically and internationally. The province's unique ability to grow and harvest durian yearround allows for increased exports during both in-season and Off-season periods. This, in turn, enhances the value of agricultural products, increases farmers' income, and improves their overall quality of life. The main durian-growing areas in Nakhon Si Thammarat are Tha Sala District - 12,823 rai, Sichon District - 12,267 rai, Nopphitam District - 10,789 rai. Most farmers in the province prefer Off-season durian production, which helps boost their earnings and ensures a steady supply for the export market. (Nakhon Si Thammarat Provincial Commerce Office, 2024)

Off-season durian production remains a challenge for many farmers due to a lack of knowledge and expertise. Naturally, durian flowers and bears fruit between March and August, a period when market prices tend to be lower due to an abundant supply. In contrast, Off-season durian production, which yields fruit between October and February, commands higher market prices because fewer varieties of durian and other fruits are available during this time, while consumer demand remains relatively stable. To take advantage of higher prices, farmers attempt to control the flowering period of their durian trees. (Department of Agricultural Extension, 2023) However, many lack the necessary technical knowledge to effectively manage Off-season


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production. Common issues include the overuse of pesticides, chemical fertilizers, and plant hormones, as well as high production costs that do not always yield a proportional return on investment. The lack of proper cultivation techniques and scientific knowledge further hinders their success. Recognizing these challenges, this study aims to explore strategies for enhancing Off-season durian production for export in Nakhon Si Thammarat province. The objectives of the research are as follows: (1) the social and economic conditions of farmers (2) the conditions of Off-season durian production for export (3) the factors affecting the approaches to promoting Off-season durian production for export among farmers in Nakhon Si Thammarat Province (4) agricultural extension approaches for Off-season durian production for export in Nakhon Si Thammarat Province,

**Table 1:** Durian Production Data in Southern Thailand.

| Province | Farmer household | Area (rai) |
|---|---|---|
| Krabi | 1,060 | 5,052.06 |
| Chumphon | 29,972 | 296,867.46 |
| Trang | 4,830 | 13,454.39 |
| Nakhon Si Thammarat | 39,123 | 187,053.33 |
| Narathiwat | 8,885 | 29,689.42 |
| Pattani | 5,313 | 6,867.23 |
| Phang Nga | 1,979 | 11,820.74 |
| Phatthalung | 10,819 | 30,619.52 |
| Phuket | 546 | 1,740.26 |
| Yala | 7,971 | 32,051.95 |
| Ranong | 6,666 | 60,661.96 |
| Songkhla | 11,847 | 27,673.53 |
| Satun | 2,688 | 8,204.84 |
| Surat Thani | 18,230 | 129,195.08 |

**Source:** Department of Agricultural Extension, 2024

## Research Methodology

The population used in this research study consists of durian farmers in Nakhon Si Thammarat province, including those in Tha Sala, Sichon, and Nopphitam districts, with a total of 360 participants. The sample size was determined using Taro Yamane's formula, with a confidence level of 95% and an allowable margin of error of 0.05. The total number of durian farming households in Nakhon Si Thammarat province is 3,254, and purposive sampling was used to select participants. The researcher employed a semi-structured interview method, which included both close-ended and open-ended questions, to address the research objectives. The statistical analysis used in the study consists of (1) Descriptive Statistics - used to summarize key characteristics of the data, including personal background, economic aspects, social aspects, and durian production conditions. The descriptive statistics applied include mean, frequency,


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percentage, minimum, maximum, and standard deviation. (2) Inferential Statistics - used to analyze the relationship between independent and dependent variables. Multiple Regression Analysis (Enter Method) was used to examine the relationship between independent variables (personal background, economic aspects, social aspects, and durian production conditions) and the dependent variable, which is the approach to Off-season durian production for export among farmers in Nakhon Si Thammarat province.

## Results and Discussion

### 1. The social and economic conditions of farmers

The study found that 89.4% of the respondents were male, with an average age of 52.88 years. Among the farmers, 26.9% had completed primary education (Grade 6). The farmers had an average of 10.43 years of experience in durian production and 4.58 years of experience in durian production for export. The average household size was 3.88 members, with 2.07 household laborers and an average of 1.61 hired workers. The average durian plantation size was 17.74 rai. Additionally, 51.9% of the farmers did not take loans from financial sources. Regarding information on Off-season durian production for export, 40.1% of farmers received information from fellow farmers within the province. Farmers contacted government agricultural extension officers up to 15 times per year, while private sector agricultural officers were contacted up to 10 times per year. Furthermore, 90.6% of the farmers had never attended training on durian production for export, and 79.4% had never participated in study visits related to durian production for export.

### 2. The conditions of Off-season durian production for export

2.1 Regarding durian production, the study found that 97.6% of farmers grew the Monthong durian variety. 55.3% of farmers began preparing land for durian planting around the year 2012. Additionally, 87.5% of farmers engaged in Off-season durian cultivation, with an average of 251.81 trees per farm, following a planting distance of 8×8 meters. Regarding water sources, 39.5% of farmers used groundwater from boreholes, and 91.9% irrigated their durian trees in the morning. In terms of fertilization, 98.1% of farmers used chemical fertilizers. 79.2% of farmers pruned branches and shaped the tree canopy once per year, while 57.5% prepared three leaf flush cycles per year for durian production. Additionally, 86.4% of farmers pruned flowers and fruits to ensure the quality met market demands. For fruit selection and harvesting decisions, 98.4% of farmers determined harvest time based on counting the days from the flowering date.

2.2 Regarding pest and disease control in durian cultivation, the study found that thrips were the most common pest outbreak, followed by red mites in durian plantations in Nakhon Si Thammarat. Farmers who experienced pest infestations primarily relied on chemical pesticides for pest control, as they considered biological control methods too slow to be effective. For diseases, Phytophthora was the most prevalent, followed by root rot and stem rot. Farmers facing disease outbreaks predominantly used chemical treatments, specifically three groups of pesticides: organophosphates, carbamates, and pyrethroids, to control the spread of these diseases.


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### 3. The factors affecting the approaches to promoting Off-season durian production for export among farmers in Nakhon Si Thammarat Province

3.1 The study on factors influencing the approach to Off-season durian production for export among farmers in Nakhon Si Thammarat utilized Multiple Regression Analysis to identify the relationships between multiple independent variables and a dependent variable. This analysis aimed to determine whether the independent variables had a positive or negative correlation with the dependent variable and to what extent the relationship existed. The research employed SPSS (Statistical Package for the Social Sciences) for data analysis. In this study, the researcher selected 14 independent variables for examination to assess their influence on the approach to Off-season durian production for export.

**Table 2:** Mean and Standard Deviation of Variables Used in the Analysis

| Variable | Mean | Standard Deviation |
|---|---|---|
| 1. Gender (0=female, 1=male) | 0.89 | 0.308 |
| 2. Age (number of years) | 52.81 | 11.205 |
| 3. Education level (number of years) | 11.24 | 6.815 |
| 4. Durian production experience (number of years) | 10.43 | 7.514 |
| 5. Land holding size (rai) | 17.74 | 15.391 |
| 6. Export product prices (THB) | 136.03 | 63.177 |
| 7. Income from export of products (THB) | 3,341,188.72 | 7,261,546.682 |
| 8. Loan Household (0=no Loan, Loan=1) | 0.49 | 0.501 |
| 9. Receiving information about durian production technology for export (Number of channels) | 2.40 | 1.236 |
| 10. Contacting government officials (times/year) | 0.81 | 1.800 |
| 11. Contacting private sector officials (times/year) | 3.18 | 4.233 |
| 12. Training experience in durian production for export (times/year) | 0.46 | 1.307 |
| 13. Experience in observing durian production for export (times/year) | 0.14 | 0.492 |
| 14. Contact with durian export entrepreneurs (times/year) | 0.94 | 0.521 |

3.2 Results of Multiple Regression Analysis: Factors Influencing the Approach to Off-season Durian Production for Export Among Farmers in Nakhon Si Thammarat Province

The Multiple Regression Analysis using the Enter Method, which included 14 independent variables, revealed an F-value of 28.421 with a significance level (sig.) of 0.00. The Multiple Coefficient of Determination ($R^2$) was 0.536, indicating that 53.6% of the variance in the dependent variable-the approach to Off-season durian production for export among farmers in Nakhon Si Thammarat-could be explained by the independent variables. Among the 14 independent variables, five showed a statistically significant positive relationship with the dependent variable at a 0.05 significance level or lower. These variables include Export price,


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Household borrowing, Access to information on durian production technology for export, Communication with government officials, Training experience in durian production for export.

**Table 3:** Multiple Regression Analysis of Factors Influencing the Approach to Off-season Durian Production for Export Among Farmers in Nakhon Si Thammarat Province

| Variable | Regression coefficient (b) | T-Test | Significant |
|---|---|---|---|
| 1. Gender | -0.241** | -2.238 | 0.026 |
| 2. Age | 0.005 | 1.217 | 0.225 |
| 3. Education level | 0.007 | 0.941 | 0.347 |
| 4. Durian production experience | 0.009* | 1.730 | 0.085 |
| 5. Land holding size | 0.000 | 0.107 | 0.915 |
| 6. Export product prices | 0.002*** | 3.717 | 0.000 |
| 7. Income from export of products | -5.159 | -0.960 | 0.338 |
| 8. Loan Household | 0.250*** | 3.584 | 0.000 |
| 9. Receiving information about durian production technology for export | 0.266*** | 7.056 | 0.000 |
| 10. Contacting government officials | 0.108*** | 4.384 | 0.000 |
| 11. Contacting private sector officials | 0.000 | 0.021 | 0.983 |
| 12. Training experience in durian production for export | 0.093*** | 2.882 | 0.004 |
| 13. Experience in observing durian production for export | 0.116 | 1.352 | 0.177 |
| 14. Contact with durian export entrepreneurs | 0.037 | 0.473 | 0.637 |
| **R = 0.732 $R^2$= 0.536 SEE = 0.588 F = 28.421 Sig of F = 0.000** | | | |

## 4. Agricultural extension approaches for Off-season durian production for export in Nakhon Si Thammarat Province

4.1 The gender of farmers was found to have a statistically significant negative relationship with good farm management at the 0.05 significance level. This suggests that while female farmers are increasingly common, agriculture in Thailand remains largely a household - based occupation, with family members providing support. Women often have distinct roles within the household, typically managing domestic tasks and household accounting, rather than participating in on-farm labor. As a result, gender-based support programs could help enhance farm management, particularly by encouraging female farmers to take on greater roles in farm operations, especially in household financial management.


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4.2 The export price of durian was found to have a statistically significant positive relationship with the promotion of Off-season durian production for export in Nakhon Si Thammarat at the 0.05 significance level. Farmers who sell their produce at higher prices tend to improve the quality of their durian production. Therefore, to enhance the pricing strategy, government agencies should provide guidance on durian production standards to ensure export quality products. Additionally, efforts should be made to improve the entire production chain, enabling farmers to compete effectively in the market.

4.3 Household borrowing among farmers was found to have a statistically significant positive relationship with the promotion of Off-season durian production for export in Nakhon Si Thammarat at the 0.05 significance level. Farmers take out loans primarily to improve their production processes and meet export quality standards. However, the high production costs, including rising prices of fertilizers, chemicals, and hormones, pose financial challenges. Therefore, support for household borrowing should include strategic financial planning to help farmers manage production costs effectively and ensure sustainable farm operations.

4.4 Access to information among farmers was found to have a statistically significant positive relationship with the promotion of Off-season durian production for export in Nakhon Si Thammarat at the 0.05 significance level. Farmers actively seek and follow durian production related information from various sources, including social media platforms (Facebook, LINE, YouTube), television, academic documents (guidelines, research papers, export production manuals), agricultural extension officers, and fellow durian-exporting farmers. Therefore, efforts to enhance information access should focus on improving farmers' ability to access technology and updated agricultural knowledge. Additionally, regular updates on best practices and export standards should be provided to ensure farmers receive accurate and timely information for improving production quality.

4.5 Contact between farmers and government officials was found to have a statistically significant positive relationship with the promotion of Off-season durian production for export in Nakhon Si Thammarat at the 0.05 significance level. Farmers who engage with government officials tend to improve their durian production processes for export. Therefore, efforts to enhance farmer-government interaction should focus on deploying knowledgeable and experienced officials to provide effective on-farm training and guidance. Regular meetings and knowledge-sharing sessions should be encouraged to ensure farmers can apply best practices to their farms efficiently.

4.6 Experience in training on durian production for export was found to have a statistically significant positive relationship with the promotion of Off-season durian production for export in Nakhon Si Thammarat at the 0.05 significance level. Farmers who have undergone training in durian production for export tend to enhance their production processes, leading to better promotion and development of Off-season durian production. Therefore, training programs should be expanded by relevant organizations, facilitating knowledge exchange between officials and farmers both within the province and nearby areas. These programs should focus on sharing experiences, addressing challenges, and implementing


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## Research Outcomes

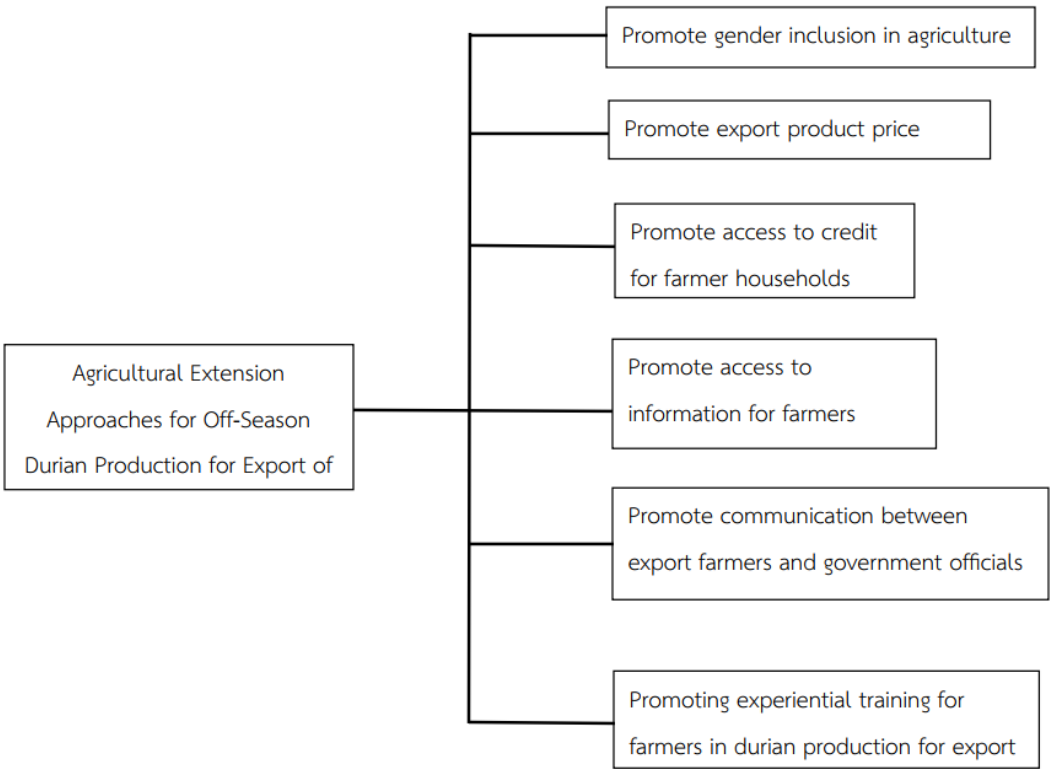


**Figure 1:** Agricultural Extension Approaches for Off-season Durian Production for Export

## Conclusion and Recommendations

Currently, farmers are increasingly interested in growing durians instead of other crops such as rubber, oil palm, and other fruit trees. Durian cultivation includes both seasonal and Off-season production due to the rising demand for durian in both domestic and international markets, along with increasing durian prices. As a result, farmers have expanded their cultivation areas beyond the traditional regions of the East and South to all parts of Thailand, leading to a continuous increase in durian production. However, some farmers focus on mass production without prioritizing quality. Additionally, unpredictable weather conditions contribute to production issues, such as diseases and pests affecting durian before and after harvest. These factors lead to higher production costs, lower-than-expected yields, and quality that does not meet market demands. Furthermore, many farmers lack the necessary knowledge and expertise to produce durian that meets export quality standards. Therefore, this research aims to analyze the factors influencing the promotion of Off-season durian production for export in Nakhon Si Thammarat province, which is recognized for its high efficiency in durian production in terms of both quantity and quality, meeting global market standards. The study selected a sample group of 360 durian farmers using purposive sampling. A multiple regression analysis (Enter Method) was conducted, revealing five positive factors that influence the promotion of Off-season durian production for export: The price of exported durian, Household loan accessibility, Access to information, Communication with government officials, Experience in training related to durian production for export. Conversely, one negative factor was identified: the gender of the farmer.


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While female farmers are increasingly common, agriculture in Thailand remains a household-based profession where family members contribute. Women are often assigned distinct roles, primarily managing household tasks and bookkeeping, which reduces their involvement in farm labor.

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