



Knowledge, Attitude, and Practices (KAP) of Large-Scale Longan Farmers and Their Challenges in Export Production in Lamphun, Thailand

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Abstract

Background and Aims: This study investigates the current state of longan production for international markets, focusing on pathways to enhance long-term socio-economic sustainability. It also examines the knowledge, attitudes, and practices (KAP) and significant challenges related to production management faced by large-scale farmer collectives in Lamphun Province.

Methodology: The study employed a mixed-methods approach. Qualitative data was gathered via interviews with key informants, while quantitative data was collected from farmer samples using questionnaires. All data were subsequently analyzed using descriptive statistics.

Results: Findings reveal Lamphun Province has a high production capacity, exceeding the national average yield, though output is declining slightly. Fresh longan dominates export value, but this market is overly reliant on China. Farmers possess moderate to high knowledge, particularly in chemical safety, yet lack a deep understanding of GAP regulations and post-harvest processes. While attitudes toward group development are highly positive and practices (especially chemical use) are strong, record-keeping is the weakest area. Major obstacles include reliance on middlemen, causing price instability, high production costs, skilled labor shortages, and poor post-harvest management.

Conclusion: The research concludes that despite farmers' positive outlooks and operational readiness, advancing their sustainable competitiveness requires interventions. Specifically, they need enhanced technical knowledge (particularly in comprehensive GAP standards and environmental management and effective solutions to address structural problems. The findings provide clear practical and policy implications, pointing to the need for market restructuring to improve farmer livelihoods and for practical, targeted extension programs to close specific knowledge gaps.

Keywords: Longan; Production Management; Export; Large-Scale Farmer Groups; Lamphun Province; Sustainable Agriculture; Policy Implications





Introduction

Longan (*Dimocarpus longan* Lour.) stands as one of Thailand's most vital economic fruits, playing a substantial role in driving the agricultural economy and generating immense export revenue annually. This prominence is central to national agricultural strategies, including the Bio-Circular-Green (BCG) Economy Model and the Large-Scale Farming Policy, which aim to enhance sustainable competitiveness and add value to agricultural products. Thailand is recognized as one of the world's largest producers and exporters of longan, with the People's Republic of China being the primary export market, demonstrating consistent and robust demand (Office of Agricultural Economics, 2023). This export success is bolstered by the ASEAN-China Free Trade Agreement (ACFTA), which has reduced tariff barriers and fostered Chinese consumer confidence (Department of Trade Negotiations, 2009).

Among all cultivation areas, Lamphun Province is renowned as the "Capital of Longan." Its suitable topography and climate, combined with inherited wisdom, result in longan of outstanding quality. Data from 2024 confirms this strong production potential, showing Lamphun's average yield at 1,003 kilograms per rai, significantly higher than the national average (Office of Agricultural Economics, 2027). This production is increasingly channeled through large-scale farmer groups which, numbering over 1,100 members in the province, are the primary organizational structure for implementing export-oriented policies and quality standards.

However, beneath this potential, farmers are grappling with multifaceted challenges that impact their sustainability. The most significant structural issue is price volatility and market dependency on China. The majority of farmers remain reliant on middlemen or packing houses ("Lhong"), which often have ties to capital from China (Wang, 2022). This structural imbalance limits farmers' bargaining power, often forcing them to accept prices set by intermediaries or buyers (Pingali, 2012). This structural dependency undermines the sustainable livelihoods of farmers, placing them in a precarious economic position. It creates a tension with both modern goals of sustainable development, as championed by the BCG model, and traditional cultural values. Within this context, Buddhist Dharmic principles, such as Right Livelihood (*Sammā-ājīva*) and the Middle Path (*Majjhimā paṭipadā*), offer a relevant indigenous ethical framework for evaluating and guiding agricultural practices toward greater balance and long-term sustainability, a dimension often overlooked in purely economic analyses.

Beyond market challenges, farmers also face numerous production complexities. Although the government's Large-Scale Farming Policy is designed to improve efficiency and reduce costs, many producers still lack the technical expertise required to meet international standards. For export-oriented farming, it is essential to understand and implement Good Agricultural Practice





(GAP), ensure proper post-harvest handling, and maintain accurate data for product traceability—an increasingly vital condition for access to global markets (Manos & Manikas, 2010). A lack of understanding in these areas results in produce failing to meet standards, leading to economic damage.

This situation reveals a significant "Gap" between the farmers' production potential and the actual requirements of the export market. To sustainably elevate competitiveness, it is essential to understand the human element—the farmers. The study of the Knowledge, Attitude, and Practice (KAP) Model is an effective tool for analyzing these human factors (Liao et al., 2022). However, to deepen the behavioral explanation of decision-making, this study also integrates the Theory of Planned Behavior (TPB) (Ajzen, 1991). The TPB complements the KAP model by incorporating factors like subjective norms and perceived behavioral control, which are crucial for understanding why farmers may or may not translate their knowledge and positive attitudes into consistent practice.

Therefore, to comprehensively understand this complex interplay of policy, market structure, and human behavior, this research is of critical importance. It focuses on a comprehensive analysis of the longan-for-export production situation in Lamphun Province, coupled with an assessment of the knowledge, attitudes, practices, and problems that farmers within the large-scale farming system are facing. The knowledge derived from this research will serve as crucial foundational data, offering a clear rationale for intervention. It aims to contribute directly to agricultural policy development by identifying specific gaps in the Large-Scale Farming initiative, enhance sustainable competitiveness by providing actionable strategies for farmers and agencies, and advance academic understanding by applying a dual KAP-TPB framework to analyze farmer decision-making in the context of export-oriented agriculture and ethical sustainability.

Objectives

1. To investigate the situation of longan production for export among the large-scale farmer groups in Lamphun Province.
2. To examine the knowledge, attitudes, and practices (KAP), as well as the problems and obstacles in the production management of longan for export among the large-scale longan farmer groups in Lamphun Province.

Methodology

This study utilized a mixed-methods research design, employing a Convergent Parallel Design. Qualitative and quantitative data were collected concurrently to address the two research objectives. The data were then integrated during the analysis phase to provide a comprehensive

understanding. The data collection and analysis processes were organized into two corresponding parts. Data collection for both parts was conducted between May and August 2024.

Part 1: Study of the Longan Production for Export Situation (Objective 1). This section employed a Qualitative Research approach to gather in-depth insights into the overall production landscape and current conditions in the area. The procedure was as follows:

1) Key Informants: A total of 6 key informants were selected, divided into three groups: 1.1) Farmer Leaders: Four presidents of large-scale longan farmer groups; 1.2) Agricultural Sage: One farmer renowned for extensive experience and high expertise in export-quality longan production; and 1.3) Expert: One distinguished expert specializing in the production management of longan for export. This interview data was analyzed in conjunction with statistical records collected and compiled by the Department of Agricultural Extension.

2) Sampling Method: Purposive Sampling was used to select the large-scale group presidents. Snowball Sampling was subsequently used, based on recommendations from the initial group, to identify and select the agricultural sage and the expert.

3) Research Instrument: An Unstructured Interview format was utilized. The researcher prepared a broad framework of questions, allowing for flexibility and the ability to probe for deep, comprehensive information.

4) Data Quality Assurance: The technique of Data Triangulation, specifically using different data sources, was applied. Information obtained from all three informant groups was compared to verify consistency and enhance the credibility of the data.

5) Data Analysis: The qualitative data from the interviews underwent Content Analysis. The process involved transcribing interview data, which was then systematically organized and coded. This information was classified according to predefined themes derived from the research objectives and synthesized to summarize the situation of longan production for export.

Part 2: Study of Knowledge, Attitudes, Practices, and Problems/Obstacles (Objective

2) This section was conducted as Quantitative Research, utilizing a Survey Research design to measure and collect data from a large sample of farmers. The steps were as follows:

1. Population and Sample

1.1 Population: The target population consisted of all longan farmers participating in the large-scale farming project across the 8 districts of Lamphun Province. **1.2 Sampling:** A Multi-Stage Sampling technique was employed. This involved randomly selecting 4 districts, followed by the random selection of sub-districts within those districts. The sample size was calculated using Taro Yamane's formula at a 95% confidence level, which determined a required sample of 300 participants. Finally, proportional random sampling was used to select farmers based on the population distribution in the chosen areas. The calculation was as follows:

$$n = N / (1 + Ne^2)$$

Where: n = required sample size N = population size e = margin of error (0.05) Substituting values: $n = 1193 / (1 + 1,193(0.05)^2)$ $n = 299.56$ $n \approx 300$

2. Research Instrument: A Questionnaire was used, divided into distinct sections: personal data, information reception, a knowledge test, an attitude assessment (5-level rating scale), a practice assessment (5-level rating scale), and open-ended questions regarding problems and obstacles.

3. Instrument Quality Check: This involved a two-step verification process: **3.1 Content Validity:** The questionnaire was submitted to a panel of 5 experts for review. The panel included: 1) an academic in agricultural extension, 2) an expert in longan production (horticultural scientist), 3) an expert in agricultural marketing (focused on exports), 4) an operational-level agricultural extension officer (from the Lamphun area), and 5) a researcher specializing in agricultural economics. The Index of Item-Objective Congruence (IOC) was calculated, yielding an average of 0.82, indicating high content validity. **3.2 Reliability:** The questionnaire was administered in a try-out with 30 farmers who were not part of the final sample. Cronbach's Alpha Coefficient was calculated for the entire instrument, resulting in a reliability score of 0.80, which is considered highly reliable.

4. Data Analysis: All data were analyzed using Descriptive Statistics. **4.1 General data:** Analyzed using frequency and percentage. **4.2 Knowledge:** Responses were scored (Correct=1, Incorrect=0), and a mean score was calculated. Farmers were then categorized into three levels: low, moderate, and high knowledge. **4.3 Attitude and Practice:** Analyzed using mean ($\bar{x}$) and standard deviation (SD). The results were interpreted based on a 5-level criteria scale. **4.4 Problems and Obstacles:** Data from open-ended questions were analyzed and categorized according to the themes identified.

The interpretation of mean scores for attitude and practice was based on the following criteria, adapted from Boonchom Sisaat (2016)

Table 1 Criteria for Interpreting Mean Score

Mean Range	Interpretation (Agreement/Readiness/Practice Level)
4.51 - 5.00	Highest
3.51 - 4.50	High
2.51 - 3.50	Moderate
1.51 - 2.50	Low
1.00 - 1.50	Lowest



Results

1. Situation of Longan Production and Exports

The findings regarding the production and export situation of large-scale farmer groups in Lamphun Province are divided into three main parts, utilizing statistical data from government agencies supplemented with in-depth insights from interviews with experts and lead farmers.

Part 1: The Overall Situation of Longan Production in Thailand

Statistical Data: According to data from the Office of Agricultural Extension and Development Region 6 in 2024, Thailand has a total longan harvesting area of over 1.64 million rai, producing 1.42 million tons, with a national average yield of 864 kg/rai. The Northern region remains the largest production base. When analyzed by province, the top 5 producers are Chiang Mai, Lamphun, Chanthaburi, Chiang Rai, and Phayao. Notably, Chanthaburi has the highest yield per rai in the country at 1,356 kg/rai, reflecting highly efficient production technology and orchard management.

Table 2 Total Area, Harvested Area, Production, and Yield per Harvested Area by Country and Region, 2024

Total/Region	Total Area (Rai)	Harvested Area (Rai)	Production (Tons)	Yield per Harvested Area (kg/Rai)
Total Country	1,662,899	1,644,559	1,420,292	140
North	1,271,965	1,256,112	962,827	767
Northeast	31,131	30,257	13,333	441
Central	359,445	357,915	443,992	1,240
South	358	275	140	509

Source: Office of Agricultural Economics (2024)

Supporting Interview Data: Interviews with experts provided additional context, explaining that the higher yields per rai in the Central and Eastern regions, compared to the traditional Northern production base, result from investment in modern irrigation systems, intensive orchard management for off-season production, and the rapid adoption of new technologies. These factors enable them to meet export market demands year-round.

Part 2: The Longan Production Situation in Lamphun Province

Statistical Data: Lamphun Province is the second-largest longan producer in the country, with 349,381 rai of harvested area and a total output of 350,591 tons in 2024. Lamphun's strength lies in its high production efficiency, boasting an average yield of 1,003 kg/rai, which is significantly

above the national average. However, when compared to the previous year (2023), both total production and yield per rai show a slight downward trend, decreasing by -0.58% and -1.67%, respectively.

Table 3 Total Area, Harvested Area, Production, and Yield per Harvested Area for the Top 5 Longan-Producing Provinces, 2024

Province	Total Area (Rai)	Harvested Area (Rai)	Production (Tons)	Yield per Harvested Area (kg/Rai)
1. Chiang Mai	448,801	447,039	425,240	951
2. Lamphun	362,202	349,381	350,591	1,003
3. Chanthaburi	258,262	257,374	349,071	1,356
4. Chiang Rai	230,799	230,749	64,419	279
5. Phayao	93,205	92,684	33,994	367

Source: Office of Agricultural Economics (2024)

Table 4 Longan Production in Lamphun Province, 2023 / 2024

Longan	2023	2024	Difference (%)
Total Area (Rai)	363,626	362,202	-0.39
Harvested Area (Rai)	345,830	349,381	+1.03
Production (Tons)	352,644	350,591	- 0.58
Yield per Harvested Area (kg/Rai)	1,020	1,003	-1.67

Source: Office of Agricultural Economics (2024)

Supporting Interview Data: Lead farmers and experts explained that the slight decrease in production is a result of weather volatility and rising production factor costs, causing some farmers to reduce investment in orchard maintenance. Furthermore, production in Lamphun is still predominantly the "E-Dor" variety (95%), as it is preferred by markets for both fresh consumption and processing. Farmers in the area place significant emphasis on water resource management, often digging storage ponds and investing in mini-sprinkler systems to ensure precise irrigation, especially for off-season production.

Part 3: The Situation of Thai Longan Exports

Statistical Data: In 2024, the total export value of Thai longan and its products reached 28.657 billion Baht, a clear increase from the previous year. "Fresh longan" remains the primary driver, accounting for 19.697 billion Baht in export value. Meanwhile, the processed longan market

showed interesting trends: "dried longan" experienced dramatic value growth of 18.30%, suggesting a higher price per unit, possibly due to better quality or successful penetration of premium markets. Conversely, the market for "frozen longan" contracted severely in both volume and value.

Table 5: Export Value of Longan, 2023 to 2024

Item	2023		2024	
	Quantity (kilograms)	Value (baht)	Quantity (kilograms)	Value (baht)
Longan and Products	541,247,600	23,960,461,346	662,036,699	28,657,722,197
Fresh Longan	421,606,573	16,492,184,337	527,926,577	19,697,581,095
Frozen Longan	97,180	17,506,918	39,624	5,681,082
Longan in Airtight Containers	11,243,997	851,535,778	15,369,377	1,148,221,899
Dried Longan	108,299,850	6,599,234,313	118,701,121	7,806,238,121

Source: Office of Agricultural Economics (2024)

Supporting Interview Data: Export specialists noted that the Chinese market continues to define the direction of the Thai longan industry. However, competition from neighboring countries is intensifying, compelling exporters to focus more on quality and safety in line with international standards. The contraction of the frozen longan market may be due to shifts in consumer preferences in destination markets and logistical complexities. The growth of dried longan highlights an opportunity for value addition, which farmer groups should consider more seriously to reduce reliance on the fresh longan market alone.

2. Farmer Knowledge, Attitudes, and Practices (KAP)

The findings in this section are derived from a quantitative analysis of questionnaire data from 300 farmers, integrated with qualitative data from interviews with experts and lead farmers for explanatory analysis. The results are presented in 4 parts.

Part 1: Personal, Economic, and Social Characteristics of Farmers Analysis of the 300 farmer samples reveals a clear profile of members in Lamphun's large-scale longan groups. The majority are male (58.67%), are in the older age bracket (average age 60.93 years), and most have completed primary education or lower (56.67%). Economically, their main income derives from longan cultivation, averaging 213,551.67 Baht/year, though incomes vary widely. Most (98.3%) use their own capital for production and farm their own land (96.0%), with an average farm size of 10.06 rai. Labor primarily comes from the household (90.3%), supplemented by occasional hired

labor (61.3%). A majority (63.0%) choose to produce both in-season and off-season longan to mitigate price risks. Socially, these farmers are highly experienced, with an average of 27.48 years in longan farming, and have been members of the large-scale group for an average of 7.85 years. They are active in self-development, attending agricultural training (avg. 1.83 times/year) and receiving information (avg. 18.65 times/year). Notably, the most frequently accessed information source is online media (avg. 6.75 times/year), which significantly surpasses information from government officials or traditional media.

Part 2: Knowledge of Large-Scale Longan Farmer Group Members. Results from the 15-item knowledge test show that the majority of farmers possess a moderate (55.0%) to high (45.0%) level of knowledge regarding export production management, with an average score of 10.30. No farmers were classified in the low-knowledge level. Analyzing specific items reveals clear strengths: farmers have an excellent understanding of issues directly related to safety, such as selecting safe water sources (99.00% correct), the importance of safe production under GAP standards (98.70% correct), and proper chemical storage (97.30% correct). Weaknesses emerged in technical details and specific GAP regulations, such as the management of agricultural waste materials (only 8.70% correct), the correct method for washing chemical containers (27.30% correct), and details regarding the certification body and validity period of GAP certificates.

Table 6 Data on Knowledge Level of Production Management and Factors for Export-Quality Longan

Knowledge Level	Number of Farmers	Percentage
High Knowledge Level	135	45.00
Moderate Knowledge Level	165	55.00
Low Knowledge Level	0	0
$\bar{x}$ = 10.30 Min-Max = 6 – 14 SD = 1.608		

Part 3: Attitudes of Large-Scale Longan Farmer Groups Farmers expressed highly positive attitudes toward production management for export, with an overall mean score at the high agreement level (Overall $\bar{x}$ = 4.13 out of 5). The majority (57.0%) were at the "high agreement" level, and another 28.70% were at the "highest agreement" level. The attitude item with the highest score was the belief that joining the large-scale group is beneficial for learning the processes and methods to manage orchards for quality ($\bar{x}$ = 4.33). This was followed by attitudes toward production planning aligned with market needs and toward reducing production costs. This indicates that farmers' primary motivations for grouping are production development and economic benefits.

**Table 7** Data on Opinions regarding Attitudes toward Production Management of Longan for Export

Attitudes toward production management...	Highest	High	Moderate	Low	Lowest	Mean	Interpretation
1. Joining the large-scale longan group for collective production	99 (33.00)	143 (47.70)	41 (13.70)	3 (1.00)	14 (4.70)	4.03 [0.963]	High
2. Joining... to increase longan production yield	99 (33.00)	170 (56.70)	27 (9.00)	2 (0.70)	2 (0.70)	4.20 [0.682]	High
3. Joining... to learn methods for reducing production costs	113 (37.70)	149 (49.70)	36 (12.00)	2 (0.70)	0 (0.00)	4.24 [0.682]	High
4. Joining... to learn the steps and methods for quality orchard management	123 (41.00)	155 (51.70)	22 (7.30)	0 (0.00)	0 (0.00)	4.33 [0.609]	High
5. Joining... to ensure production meets standards	109 (36.30)	157 (52.30)	23 (11.00)	1 (0.30)	0 (0.00)	4.24 [0.653]	High
6. Joining... to plan production in alignment with market demand	104 (34.70)	172 (57.30)	24 (8.00)	0 (0.00)	0 (0.00)	4.26 [0.597]	High
7. Joining... to ensure longan size meets market demand	106 (35.30)	154 (51.30)	36 (12.00)	2 (0.70)	2 (0.70)	4.20 [0.722]	High
8. Joining... to negotiate prices with middlemen	119 (39.70)	119 (39.70)	40 (13.30)	4 (1.30)	18 (6.00)	4.05 [1.060]	High
9. Joining... to collectively sell with a guaranteed market	110 (36.70)	116 (38.70)	53 (17.70)	3 (1.00)	18 (6.00)	3.99 [1.061]	High
10. Joining... to gain social acceptance	78 (26.00)	122 (40.70)	69 (23.00)	7 (2.30)	24 (8.00)	3.74 [1.114]	High
Overall	86 (28.70)	171 (57.00)	40 (13.30)	3 (1.00)	0 (0.00)	4.13 [0.64]	High

Note: 1. Values in () are percentages of the 300 samples. 2. Values in [] are Standard Deviation.

Part 4: Practices of Large-Scale Longan Farmer Groups The overall practice of farmers in export production management was at a high level (Overall $\bar{x} = 3.95$). The best-performing practice, consistent with their knowledge and attitudes, was the correct and appropriate use of pesticides, which achieved the highest mean score of 4.29. This demonstrates that farmers prioritize safety and have effectively translated this knowledge into practice. The practice requiring the most improvement was data recording, which had the lowest mean score at 3.70. Although still in the "high" range, it is clearly the weakest aspect. This low level of practice in recording reflects a significant gap in the full implementation of GAP standards, particularly concerning traceability, which is a cornerstone of modern exports.

Table 8 Level of Practice in Longan Production for Export

Practice in Longan Production for Export	$\bar{x}$	SD	Practice Level
Regarding the longan variety used	3.94	.77	High Practice
Regarding the cultivation site	3.90	.61	High Practice
Regarding planting	3.81	.69	High Practice
Regarding care and maintenance in the longan orchard for export	4.00	.56	High Practice
Regarding the correct and appropriate use of pesticides	4.29	.49	High Practice
Regarding harvesting and post-harvest practices	4.00	.68	High Practice
Regarding data recording	3.70	.75	High Practice
Total	3.95	.50	High Practice

5. Problems and Obstacles in Longan Production for Export

Quantitative Data: The questionnaire revealed that a vast majority of farmers (87.3%) experience problems and obstacles in producing longan for export. These can be summarized into 4 main areas, which were confirmed and further detailed by interviews with experts and farmers:

1) Distribution Channels and Price: This was the most frequently cited problem. Interviews confirmed that most farmers must rely on middlemen or "Lhong" (packing houses) as their primary sales channel. This results in a lack of bargaining power, forcing them to accept volatile and



suppressed prices, especially during peak harvest season. Furthermore, issues of non-transparent grading, weight deductions, and delayed payments were identified.

2) Harvesting and Transportation: Interviews highlighted that the main issue stems from unskilled labor. Workers often use improper harvesting techniques, such as pulling the fruit clusters, which causes bruising and damage. Other issues include harvesting at suboptimal ripeness and over-packing produce into containers, leading to rapid quality degradation before reaching the destination.

3) Production Costs and Capital: Lead farmers stated in interviews that the costs of production factors, especially fertilizers and chemicals, are continuously rising. This runs counter to the uncertain selling prices, causing many farmers to face shortages of working capital needed for full orchard maintenance. Access to formal credit systems is also difficult, forcing some to rely on informal loans with high interest rates.

4) Labor: This is a significant structural problem. Interviews revealed that the agricultural sector is facing a severe labor shortage, particularly during the harvest period which requires a large workforce in a short time. This has driven labor wages higher, yet the quality of the workforce often does not match the cost; workers may be unskilled and lack responsibility, resulting in produce damage and increased costs for the farmer.

Discussion

The research findings reveal the complexity of the longan-for-export industry in Lamphun Province. The following key academic issues emerge from this analysis and warrant discussion:

1. The Attitude-Practice Gap and Smart Farmer Policy: The findings clearly indicate that farmers possess highly positive attitudes regarding production development. Nevertheless, their actual practice in critical areas, notably data recording, remains deficient. This phenomenon aligns with the "Intention-Behavior Gap" (Ajzen, 1991) and highlights a disconnect with the goals of Thailand's Smart Farmer Development Program, which emphasizes data-driven agriculture. Barriers such as task complexity or a lack of perceived short-term returns (Feder & Umali, 1993) indicate that mere promotion is insufficient. More actionable recommendations are required, such as the development of user-friendly GAP recording applications specifically designed for an aging farmer demographic, to bridge this crucial gap.

2. Knowledge Deficits as a Barrier to the BCG Economy Model: While farmers demonstrate good knowledge of immediate safety issues like pesticide application, their understanding of specific technical GAP requirements remains a significant weakness. This knowledge gap regarding tasks like agricultural waste management or proper chemical container rinsing directly results in incomplete standard implementation. This deficiency is a primary barrier to achieving sustainable





agriculture and fulfilling the objectives of Thailand's Bio-Circular-Green (BCG) Economy Model. The 'Green' component of the BCG model demands balanced resource use and environmental responsibility, which is unattainable without a comprehensive understanding and application of these specific GAP details, a point reinforced by Thammakhunkaew et al. (2021).

3. Structural Problems and the Need for Ethical Livelihood: The research underscores that the most significant barriers are structural problems embedded in the market. The heavy reliance on middlemen (Lhong) disincentivizes farmers from investing in quality, as they lack assurance of fair returns. This market structure, characterized by weak bargaining power and price instability, can be analyzed through the lens of Buddhist ethical principles. The situation challenges the concept of Right Livelihood, which advocates ethical and socially responsible commerce. This unfair mechanism, documented by Wang (2022) and Kmonpetch & Jitpong (2021), combined with rising costs and labor shortages, pushes farmers away from the Middle Path of balanced and sustainable investment.

4. Efficacy and Future of the Large-Scale Farming Policy: The positive attitudes toward collectivization reflect partial success for the Large-Scale Farming Policy. However, the findings explicitly show the policy has not yet resolved the fundamental market structure problems. To maximize policy relevance and effectiveness, support must extend beyond mere collectivization. Farmer groups must be empowered with actionable strategies to enhance their bargaining power and market access. This includes developing entrepreneurial capabilities, such as establishing farmer-led packing facilities or launching collective branding initiatives. This transition from farmer groups to entrepreneurial entities, as supported by Nammontri et al. (2023), is essential for them to gain control over their economic destiny.

In summary, elevating Lamphun's longan industry necessitates a holistic approach that integrates policy relevance, technological solutions, and ethical considerations. It must move beyond knowledge transfer to address the structural and ethical market imbalances, aligning with Buddhist principles of fair commerce. This requires leveraging national strategies like the Large-Scale Farming Policy and Smart Farmer Development Program to empower farmers with actionable tools (e.g., GAP applications) and entrepreneurial models (e.g., collective branding and packing facilities). Ultimately, this integrated approach is essential to enhance competitiveness and ensure the industry's alignment with the national BCG framework for long-term agricultural resilience and sustainability.

Recommendation

This research has clearly identified the strengths (e.g., positive attitudes, safety knowledge) and weaknesses (e.g., data recording, in-depth GAP knowledge, structural problems) of the large-





scale farmer groups in Lamphun Province. Consequently, the following recommendations are proposed for practical application

1. Recommendations for Extension Agencies (e.g., the Department of Agricultural Extension)

1.1 Refocus training content to target specific weaknesses: The research clearly indicates that while farmers possess excellent knowledge regarding safety and chemical use, they lack an understanding of specific technical GAP requirements, such as waste management or container rinsing. Extension agencies should, therefore, curtail training on general principles and instead prioritize practical, hands-on workshops that address these identified knowledge gaps, including proper post-harvest handling techniques to minimize damage.

1.2 Develop data recording tools centered on elderly users: The most significant challenge in practice is "data recording," which is the heart of traceability. Given that the average farmer is of advanced age (60.93 years), the public sector should support the development of highly user-friendly applications or forms specifically designed for this aging demographic. This will reduce the burden and complexity associated with GAP compliance.

1.3 Utilize "Online Media" as a primary channel for technical communication: A key finding was that the farmer sample (despite their high average age) accesses information most frequently via online media. This presents a crucial opportunity for extension agencies to leverage these channels (such as LINE Groups, Facebook, or YouTube) to disseminate the specific technical information that is currently lacking (e.g., detailed GAP requirements, post-harvest management) rather than relying solely on traditional media.

2. Recommendations for Large-Scale Farmer Groups

2.1 Leverage attitudinal strengths to overcome practical weaknesses: Farmers possess an exceptionally positive attitude toward collaboration and development within the group. The groups should harness this collective strength to establish an internal Peer Support system aimed specifically at improving "data recording." This could involve pairing tech-literate members with those who are less comfortable or formally making data submission as part of the group's operational agreements to elevate overall compliance.

2.2 Create value-added products to reduce dependency on the fresh longan market: The primary challenge identified is the reliance on middlemen (Lhong) and the Chinese market for fresh longan. Concurrently, the study's findings indicated that the "dried longan" market is experiencing dramatic growth in value. Farmer groups should strongly consider diverting a portion of their produce into processing, such as dried products or other value-added goods, under a collective brand. This would create marketing alternatives and mitigate the risks associated with fresh longan price volatility.





3. Recommendations for Future Research

3.1 Conduct action research to develop data recording innovations: Addressing the significant challenge of data recording, future Action Research projects are recommended. This research should focus on co-designing and field-testing tools (such as mobile applications) in collaboration with elderly farmer groups to identify a truly practical and sustainable model for implementation.

3.2 Conduct a comparative study on the success factors of Chanthaburi Province: This study found that Chanthaburi Province achieves a significantly higher yield per rai than Lamphun (1,356 kg/rai vs. 1,003 kg/rai), a difference linked to the use of modern irrigation technology. A comparative investigation into the management factors (including technology, orchard management, and marketing strategies) between farmers in Chanthaburi and Lamphun is warranted. The goal should be to extract key lessons from Chanthaburi's success that can be adapted to improve production efficiency in Lamphun.

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