

The Analysis of the Impact of Effective Farm Management on the Success and Sustainability of Organic Vegetable Farmers in Chiang Mai Province

Dongmei Wang¹, Pawinee Areesrisom², Weena Nilawonk³ and Snit Sitti⁴

Received: 11 October 2025; **Revised:** 30 October 2025; **Accepted:** 01 November 2025

Abstract

This study aims to examine the conditions, challenges, and obstacles in the production of chemical-free vegetables among farmers in Chiang Mai province. Additionally, it analyzes the impact of effective farm management on the success and sustainability of farmers' livelihoods. A mixed-methods research approach was employed. The quantitative study collected data from 400 targeted farmers through questionnaires, with statistical analysis including mean, standard deviation, and multiple regression. The qualitative study involved in-depth interviews and focus group discussions with 25 chemical-free vegetable farmers in Chiang Mai, followed by a descriptive analysis.

The findings indicate that: (1) Farmers face production challenges such as unpredictable weather conditions, resource shortages, and complex certification processes. Additionally, market-related issues and high production costs remain significant obstacles. (2) In terms of farm management, the most influential factor is production, reflecting farmers' confidence in their skills and knowledge. Meanwhile, financial and investment aspects remain moderate due to cost constraints and limited funding sources. Regarding success and sustainability, farmers demonstrate strong social relationships and effective farm management. However, career advancement is constrained by financial limitations and limited opportunities for business expansion. The study highlights the need for government and private sector support in infrastructure development, market system improvement, and enhanced

^{1 2 3 4} Resources Management and Development, Faculty of Agricultural Production, Maejo University, Chiangmai Province, Thailand

Corresponding Author, E-mail: mju6501535006@mju.ac.th

cooperation among farmers to increase production efficiency, reduce costs, and promote the long-term sustainability of chemical-free vegetable farming.

Keywords: Chemical-free Vegetables; Farm Management; Success and Sustainability

Introduction

Thailand has a long history of agriculture, with farming being the primary occupation of the Thai people since ancient times. This reflects the agricultural sector's significance in the Thai way of life. Although the country has transitioned into an industrial economy, with increasing production in the industrial and service sectors, agriculture remains a vital contributor to national income, particularly through the production and export of agricultural goods (Jongmeesuk, 2019). Thailand's geographical conditions are highly suitable for agriculture, especially in the northern region, where the climate and soil are favorable for cultivating various crops, particularly vegetables. Chiang Mai province is one of the most important areas for vegetable production, as it possesses high-quality arable land ideal for farming (Tananchai, 2022). Furthermore, the province has strong market expansion potential both domestically and internationally. Chiang Mai's vegetables are recognized for their high quality and are in demand in both local and global markets, reinforcing the agricultural sector's role in driving the province's and the nation's economy as a whole.

In the modern era, the growing demand for safe and environmentally friendly food has driven the adoption of chemical-free vegetable production, aligning with the philosophy of the sufficiency economy. This approach emphasizes the optimal use of available resources, minimizes chemical inputs, and fosters ecological sustainability. Chemical-free vegetable production not only reduces health risks for consumers but also benefits the environment by maintaining ecological balance and minimizing toxic contamination in nature (Chantararat, 2024). However, farmers engaged in chemical-free vegetable production in Chiang Mai province face significant challenges in farm management. The production process is complex and requires efficient management of limited resources, including production planning, product quality control, investment and financial management, and risk management related to natural disasters and market fluctuations. Additionally, intense market competition from both independent farmers and private companies operating under contract

farming models has made success and sustainability in farming increasingly dependent on effective farm management. Therefore, farm management efficiency plays a crucial role in determining the productivity and income of farmers. Effective management helps reduce production costs, increase yields and product value, and ensure the long-term sustainability of farming livelihoods. Various factors, such as efficiency in production management, investment, finance, and risk management, are essential in enabling farmers to achieve success in their profession and remain competitive in the market (Setthasakko & Tongsir, 2023)

Chiang Mai province serves as a key vegetable production hub in northern Thailand, making the efficiency of farm management a critical issue. Many farmers operate on small plots with limited labor and resources, highlighting the need for effective strategies to enhance productivity and sustainability. Understanding the impact of efficient farm management on farmers' success and long-term viability is essential for identifying approaches that improve product quality, reduce costs, and strengthen market stability. Moreover, such insights can help farmers adapt to changing conditions and develop into competitive agricultural entrepreneurs in an era of rapid transformation. Therefore, this study aims to analyze the impact of effective farm management on the success and sustainability of chemical-free vegetable farmers in Chiang Mai. The findings will provide valuable information for shaping policies and practical guidelines that contribute to the sustainable development of the agricultural sector, both at the local and national levels.

Research Objectives

1. To study the conditions and obstacles in the production of chemical-free vegetables among farmers in Chiang Mai province
2. To analyze the impact of effective farm management on the success and sustainability of the livelihoods of chemical-free vegetable farmers in Chiang Mai province

Research Methodology

This study is a participatory action research driven by a collaborative learning process (Action Learning), combining both quantitative and qualitative research approaches to obtain comprehensive data. The research process is outlined as follows:

1. Population and Sample

The study focuses on farmers who cultivate chemical-free vegetables in Chiang Mai province, a large and unspecified population. To obtain an appropriate sample, the researcher applied W.G. Cochran's (1953) formula for populations with an unknown size, setting a confidence level of 95% and a margin of error of $\pm 5\%$. This resulted in a sample size of 400 participants. The sample was selected specifically from farmers cultivating chemical-free vegetables in the target area to ensure that the data accurately reflects the context of chemical-free farming. For the qualitative research, the sample comprised 25 farmers with experience in cultivating chemical-free vegetables from various areas in Chiang Mai.

2. Data Collection Tools

This research employed a questionnaire divided into three sections: Section 1: Conditions, problems, and obstacles in the production of chemical-free vegetables, which surveyed basic information about organic farming in Chiang Mai province. Section 2: The impact of farm management on the success of farmers, using multiple-choice questions covering production, investment, finance, and risks to analyze the relationship between farm management efficiency and farmers' success. **Section 3:** Success in farmers' livelihoods, measuring factors related to work, interpersonal relationships, finance, and career advancement using multiple-choice questions. The measurement scale used a 5-point rating scale: 1 = Very low, 2 = Low, 3 = Moderate, 4 = High, 5 = Very high.

Instrument Quality Check

The questionnaire was reviewed by the advisor and pre-tested with a sample group of 30 individuals to determine the reliability using Cronbach's Alpha coefficient, which should be ≥ 0.7 according to Nunnally's (1959) criteria. The reliability test using SPSS resulted in values ranging from 0.888 to 0.921, which are considered appropriate and reliable. For the qualitative research, in-depth interviews and focus group discussions were conducted to gather detailed information about the conditions, challenges, and obstacles in the production of chemical-free vegetables in Chiang Mai province.

3. Data Collection

The data collection process was conducted in five steps as follows: 1) The sample group was determined, consisting of 400 farmers who grow chemical-free vegetables in Chiang Mai province. 2) Coordination was made with the Chiang Mai

Provincial Agricultural Office and District Agricultural Offices to request assistance from farmers for data collection. 3) An online questionnaire was distributed through Google Form by sending the link or QR code for farmers to complete the survey. 4) The purpose of the research was explained to both the farmers and the staff to ensure their understanding of the guidelines for answering the questionnaire. 5) The data was reviewed and analyzed by selecting complete questionnaires, which were then analyzed using SPSS for Windows. The data collection took place between May 1–31, 2023, through an online system to ensure comprehensive and accurate data.

4. Data Analysis

This research utilized quantitative data obtained from questionnaires, which were analyzed and presented in tabular format. Statistical methods were used to explain various variables. For Objective 1: To examine the conditions and challenges in the production of chemical-free vegetables by farmers in Chiang Mai province, data on the conditions and issues related to production were analyzed, along with document analysis to discuss relevant concepts and methodologies. Interviews and focus group discussions were conducted and analyzed descriptively. For Objective 2: To analyze the impact of effective farm management on the success and sustainability of farmers' livelihoods, statistical methods such as frequency, percentage, mean, and standard deviation were used to analyze the level of farm management efficiency and career success.

Results

The researcher conducted a study on the impact of effective farm management on the success and sustainability of chemical-free vegetable farmers in Chiang Mai province. The findings can be summarized according to the study objectives as follows:

Section 1 : Demographic Information of Farmers, The study found that chemical-free vegetable farmers in Chiang Mai exhibited the following characteristics, Gender: The majority were male (61.3%), followed by female (38.7%), indicating that men still play a primary role in chemical-free agriculture. Age: Most farmers were between 61-70 years old (36.7%) and 51-60 years old (32.5%), indicating that a large proportion of farmers in the area are elderly, which may affect the adoption of new technologies in the future. Education Level: Most farmers had completed primary education (44.5%), which may reflect the educational context during a time when

access to education was more limited. Household Size: The majority of farmers had 2 members (42.0%) or 3 members (38.8%) in their households, suggesting that most farmers in the area live in small households.

Section 2: Objective 1 - Conditions and Obstacles in the Production of Chemical-Free Vegetables by Farmers in Chiang Mai Province, The results of the analysis can be summarized in the following table.

Issue	Description
Production Issues	Climate and Environment: Farmers are facing issues related to climate variability, which affects plant growth, such as high temperatures in the summer and heavy rainfall during the rainy season. These conditions result in reduced yields and lower quality products. Farmers are required to invest heavily in improving the environment but are still unable to fully resolve these issues. Resource Scarcity: The shortage of water during the dry season and the limited agricultural land force farmers to confront higher production costs. Certification Standards: The certification process for GAP standards presents a major obstacle, particularly due to the complex understanding of requirements and procedures, as well as the issue of soil contamination from chemicals used in the past.
Marketing Issues	Marketing Channels: The market for pesticide-free vegetables in Chiang Mai is still quite limited, often found only in urban areas and tourist destinations, making it difficult for farmers to access the market. Furthermore, the price of pesticide-free vegetables is typically not much different from regular vegetables, causing consumers to hesitate in making a purchase. Transportation and Distribution: Farmers face high transportation costs and the challenge of properly storing vegetables that require careful handling, resulting in a decline in quality during transportation. Lack of Production Planning: The imbalance between demand and supply in the market causes fluctuations in vegetable prices. Farmers lack proper production planning to meet market demand.

Issue	Description
Cost Issues	Seed Costs: High-quality seeds need to be imported from abroad, resulting in higher prices. Additionally, farmers are unable to select seeds that are resistant to diseases and pests on their own, leading to increased production costs. High Production Costs: The production of pesticide-free vegetables requires advanced technology and investment in clean and safe agricultural systems, which significantly raises production costs.
Problem Solving and Recommendations	Government Support: Farmers require government support in the development of infrastructure, such as irrigation systems and training on compliance with GAP standards. Market System Development: There should be the development of open and fair marketing channels, including creating awareness among consumers about pesticide-free vegetables. Collaboration Building: The formation of farmer groups to enhance bargaining power and facilitate easier access to funding sources.

Table 1 Conditions and Obstacles in the Production of Pesticide-Free Vegetables

The research findings highlight the challenges and obstacles encountered across various sectors, reflecting the impact of climate change, resource scarcity, and limited access to capital, as well as labor-related issues that affect production efficiency. Therefore, farmers need to integrate cooperation from both the public and private sectors to develop modern support systems, reduce costs, and enhance the sustainable production of chemical-free vegetables in the future.

Section 3: Objective 2 - Analysis of the Impact of Efficient Farm Management on the Success and Sustainability of Organic Vegetable Farming in Chiang Mai Province. In summary, the analysis results can be summarized as follows in the table below.

Analysis of the Impact of Farm Management	$\bar{X}$	S.D.	Level
1. Production-related	3.62	0.889	Very
2. Investment Sector	3.17	0.990	Moderate
3. Financial Aspect	3.31	1.011	Moderate
4. Risk-related	3.32	1.043	Moderate
Total	3.39	0.938	Moderate

Table 2 Levels of Impact Analysis of Farm Management

From the research findings table, it can be concluded that: 1) In terms of production, it is reflected that the farmers' high assessment of production efficiency indicates confidence in their knowledge and skills in producing chemical-free vegetables, which may be the result of accumulated agricultural experience and knowledge support from various agencies. 2) In terms of risk, the average score for risk is relatively lower, reflecting that farmers manage risks at a fairly good level, but they still have concerns about various risk factors, such as weather conditions, diseases and pests, or market fluctuations. 3) In terms of finances, the average financial score is at a moderately high level, which may reflect issues in managing income and expenses, working capital, and controlling production costs. 4) In terms of investment, the low average score for investment, though still in the moderate range, may reflect concerns regarding investment decisions in equipment, tools, or business expansion, as well as access to funding sources.

For the analysis of success and sustainability in the careers of organic vegetable farmers in Chiang Mai Province, an overall summary at a high level is provided. The analysis results can be summarized in the following table.

Success and Sustainability in the Profession of Organic Vegetable Farmers	$\bar{X}$	S.D.	Level
1. Work-related	3.40	1.090	Very
2. Interpersonal Relationships	4.05	0.760	Very
3. Financial Aspect	3.23	0.960	Moderate
4. Aspect of Progress	3.28	0.924	Moderate
Total	3.49	0.934	Very

Table 3 Levels of Success and Sustainability in the Careers of Pesticide-Free Vegetable Farmers.

The results of this research reflect the following: 1) Interpersonal Relationships: It shows that farmers have been highly successful in building networks and fostering good relationships with others. There is consistent exchange of knowledge and experiences, and they are recognized by the community as producers of safe food. 2) Work Management: It shows that farmers possess satisfactory skills in farm management. They are able to control production quality according to standards, continuously developing skills and knowledge, and adapting flexibly to various situations. 3) Progress: It reflects that farmers have moderate opportunities

for development and expansion of their businesses. They are able to improve production methods for greater efficiency and apply technology in farming, supported by the growing market demand for organic agricultural products. 4) Finance: It highlights challenges in financial management, both in terms of cost and return management, as well as dealing with income uncertainty caused by external factors. This reflects the need for additional support in funding and financial management.

Discussion

Based on the research findings on the analysis of the impact of efficient farm management on the success and sustainability of organic vegetable farming in Chiang Mai Province, the following key points for discussion can be drawn.

1. The production of pesticide-free vegetables in Chiang Mai faces three main issues: (1) The fluctuating environment and climate, which affect production planning, in line with the research by Thongtawat (2008) that emphasizes the management of production factors and product quality, as well as the research by Souksomphan, et al. (2023) that points out how climate change impacts both the quantity and quality of produce. (2) Water shortages during the dry season, leading to discontinuous production and insufficient market supply, as evidenced by Kulsuwan and Siriwan (2022), who found that inadequate irrigation systems are a major barrier. (3) The complex certification process, which imposes a burden on farmers, especially small-scale ones who lack the knowledge and resources to comply with regulations. Regarding the market, despite the increasing demand for pesticide-free vegetables, there are still limitations in accessing consumers and distribution channels, which are mostly concentrated in urban areas and specialty stores, leaving many consumers without access to the products. This aligns with the concept of Phaengsrisarn, et al. (2024), which states that the perceived value of products influences purchasing behavior. Additionally, high production costs result in higher product prices, leading some farmers to revert to using chemicals to reduce costs. Key cost issues include seed costs, irrigation systems, labor, and farm adjustments to meet standards, all of which pose obstacles to farmers' sustainability. Therefore, the sustainable development of organic agriculture in Chiang Mai requires cooperation between the government, private sector, and farmers in infrastructure development, water

resource management, market system improvements, and support for farmers to adapt to economic and environmental changes effectively.

2. Based on the research findings regarding the impact of efficient farm management on the success and sustainability of organic vegetable farming careers in Chiang Mai province, it can be analyzed that several factors contribute to the success and sustainability of farmers' careers, which can be presented in the following points: 1) Production: The research findings indicate that farmers place the highest importance on production, reflecting confidence in their accumulated knowledge and skills, as well as support from various agencies. This is consistent with the study by Intaraprajob, et al. (2022), which states that having sufficient knowledge about organic farming helps increase quality yields and reduce reliance on chemicals, leading to career stability. 2) Risk: Risk management was found to be at a moderate level, indicating that farmers have a good approach to managing risks but still face uncontrollable external factors such as weather, pests, and market fluctuations. This supports the research of Nikornpittaya, et al. (2024), which indicates that farmers who plan and use appropriate technologies can better reduce risks from natural disasters and market volatility. 3) Finance: The research findings reflect challenges in managing income, expenses, working capital, and cost control. This is in line with the research of Banjertsak Sanhapuckdee, et al. (2024), which identified financial issues as a major obstacle for agricultural businesses, especially for small-scale farmers who lack financial support, with limited access to credit remaining a significant constraint. 4) Investment: The lowest average in this area reflects farmers' concerns about expanding their businesses and accessing financial resources. This corresponds with the research of Samakketkarnpol (2023), which suggests that farmers lacking financial support from the government or financial institutions tend to hesitate when it comes to investing to improve production efficiency.

Regarding the success and sustainability of farmers' careers:

1. Interpersonal Relationships: The study shows that farmers are able to establish strong social networks, which aligns with the research of Wassana, et al. (2024) highlighting the importance of networks and support from farmer groups or cooperatives, which helps enhance career and market development opportunities. 2) Work: Farmers continue to develop their knowledge and production skills, which aligns with the research of Pimonratnakan and Jadesadalug (2019) on Competitive Advantage, which argues that skill development and adaptability are crucial factors

for gaining a competitive edge in agriculture. 3) Progress: Although at a moderate level, this indicates that farmers have the potential to develop and expand their businesses if provided with further support. This aligns with the research of Chancheaw (2024), which suggests that technological support and access to effective markets can increase growth opportunities for small-scale farmers. 4) Finance: Financial issues remain a key obstacle to the sustainability of farmers' careers, supporting the research of Techasombooranakit (2025), who proposed that farmers need appropriate financial support programs, such as low-interest loan funds or financial management training, to enhance economic stability.

In conclusion, this research highlights key factors influencing the success and sustainability of organic vegetable farmers in Chiang Mai province, which align with previous studies on effective farm management, risk management, finance, and investment. It was found that social relationships and knowledge development are important factors that support farmers' success. However, financial and investment challenges remain the main issues that need to be addressed through support measures from both the public and private sectors to promote stability and sustainability in agriculture.

New Knowledge

The research titled “The Analysis of the Impact of Effective Farm Management on the Success and Sustainability of Organic Vegetable Farmers in Chiang Mai Province” demonstrates that effective farm management plays a crucial role in determining both the success and long-term sustainability of chemical-free vegetable farmers. Among the management dimensions, production efficiency emerged as the most influential factor, reflecting farmers’ confidence in their knowledge, experience, and skills often strengthened through institutional and governmental support. Meanwhile, risk management practices, though moderately effective, reveal farmers’ adaptive capacities to external threats such as climate variability, pest outbreaks, and market fluctuations. However, financial and investment constraints remain major barriers, limiting technological advancement, business expansion, and innovation in organic farming systems. The study highlights the importance of strengthening infrastructure, improving market mechanisms, and fostering knowledge-based networks to enhance productivity, reduce costs, and ensure sustainable livelihoods for organic farmers in the region.

Synthesizing the research findings reveals that farmers' success and sustainability stem from an integrated approach encompassing production management, risk control, financial planning, and investment decision-making guided by the conceptual framework of Sustainable Agriculture and the Sufficiency Economy Philosophy. This integration promotes the efficient use of resources, minimizes dependence on external inputs, and builds strong social networks that support collective learning and resilience. The study contributes to the development of a conceptual model for Integrated Farm Management, which can be utilized to strengthen the competitiveness of small-scale organic farmers in the safe agricultural market. Furthermore, the research offers valuable insights for policymakers and practitioners to design targeted interventions, such as low-interest credit schemes, crop insurance programs, and community-based organic learning centers to advance agricultural self-reliance and sustainability in the long term.

Conclusion and Suggestion

The study on the impact of managing pesticide-free vegetable farms in Chiang Mai revealed that farmers face key challenges such as unpredictable weather, water shortages, limited access to financial resources, difficulties in obtaining GAP certification, and high transportation costs. However, effective farm management has positive effects on production and the sustainability of the occupation, with farmers demonstrating good control over production quality and the ability to build relationships with others. Despite these strengths, there are still issues with financial management and limited investment in production equipment. Support from both the government and private sectors is necessary to improve efficiency and reduce production costs for pesticide-free vegetables. Based on the findings, the researcher offers recommendations in three areas: policy recommendations, practical recommendations, and suggestions for future research.

1. Policy Recommendations: The following policy recommendations can be implemented to promote sustainable agriculture; 1) Enhance Access to Knowledge and Technology: Support access to agricultural knowledge and technology, such as through government-led training programs and the establishment of community-based organic agriculture learning centers. 2) Improve Financial Support: Enhance financial assistance by promoting low-interest loans for farmers and providing crop insurance. 3) Develop Infrastructure and Logistics: Invest in infrastructure and logistics

systems, for example, by supporting farmers' markets and improving transportation networks. 4) Promote Farmer Cooperatives: Encourage the formation of farmer groups, such as establishing agricultural cooperatives and online platforms to connect farmers with consumers.

2. Operational Recommendations: Based on the research findings and the proposed application model, the following operational recommendations can be used to develop management strategies for farms cultivating pesticide-free vegetables; 1) For Farmers: Use these guidelines to improve farm management practices, enhance production efficiency, and reduce risks. 2) For Government/Private Sector Organizations: Utilize these recommendations to promote and support farmers through training programs, financial assistance, and market network development. 3) For Researchers/Educational Institutions: Adopt this model as a basis for further studies on sustainable agricultural development.

3. Recommendations for Future Research: This study suggests the following avenues for future research to expand current knowledge; 1) Compare the success factors and challenges faced by small-scale organic farmers with those experienced by industrial-scale farmers. 2) Investigate consumer behavior to determine which factors such as quality, price, or origin influence the decision to purchase pesticide-free agricultural products. 3) Examine self-sufficiency farming models and strategies that enable farmers to sustain their livelihoods with minimal dependence on external markets.

References

- Chancheaw, S., Chutikarnkulnsiri, K., Sonklin, C., Parichatnon, S., Parichatnon, K. and Loatong, P. (2024). Study of Beef Production and Marketing to Upgrade to High Value Agriculture. *Administrative Journal for Local Development*, 3(2), 71-86.
- Chantararat, B., Suppakritsuwankul, N., Panumram, P. & Phetjamroensuk, S. (2024). Factors Affecting the Sustainable Development of Integrated Agriculture under the Sufficiency Economy Approach Ban Sai Ngam Community, Nikhom Subdistrict, Satuk District, Buriram Province. *Disciplinary Journal Buriram Rajabhat University*, 8(1), 123-135.
- Cochran, W.G. (1953). *Sampling Techniques*. New York: John Wiley and Sons, Inc.

- Intaraprajob, I., Chanphong, S., Photisuwanpanya, T. & Phalapol, C. (2022). The Development of Safe Agriculture of Ban Na Fai Organic Vegetable Growing Group Muang District, Chaiyaphum Province. *Journal of Modern Learning Development*, 7(1), 357-371.
- Jongmeesuk, T., Worapreda, P., Tossamas, P. & Posing, P. (2019). Fertilizer Policy with Ways of Conservative Rice Cultivation. *Journal of Humanities & Social Sciences (JHUSOC)*, 17(1), 253-272.
- Kulsuwan, S. & Siriwan, L. (2022). Project evaluation of Namngao weir (Banpantai) and irrigation system of Pongtao Subdistrict, Ngao District, Lampang Province. *Journal of MCU Buddhapanya Review*, 7(4), 42–53.
- Nikornpittaya, K., Apichottanakun, R., Passako, J., Wongprieu, S., Khaiyanan, P. & Sawadthaworn, P. (2024). Financial Planning of Organic Vegetable Farmer in Maha Sarakham Province. *Neuarj neu Academic and Research Journal*. 15(1), 58-70.
- Nunnally, J. G., Jr. (1959). *Test and Measurement Assessment and Prediction*. NewYork: McGraw - Hill.
- Phaengsrisarn, N., Maithongdee, N., Nakabhop, C., Watcharasorn, W. & Singthongchai, M. (2024). Economic Value and Competitiveness of Jasmine Growers in Kao Liao District, Nakhon Sawan Province. *Journal of Academic for Public and Private Management*. 6(2), 48-62.
- Pimonratnakan, S. & Jadesadalug, V. (2019). Factors affecting innovation management that result in marketing success and competitive advantage for agricultural operators, leading to organizational performance. *Journal of Humanities and Social Sciences Thonburi University*, 13(3), 120-132.
- Samakketkarnpol, S. (2023). Creating an entity-relationship diagram for the database prototype in developing an information system to solve financial problems of rice farmers, based on the knowledge of model farmers in Uthai Thani Province. *Research Community and Social Development Journal*, 17(3), 43–56.
- Sanhapuckdee, B., et al. (2019). *The Large Agricultural Land Plot Program and The Context of Snakeskin Gourami (Trichogaster Pectorolls) Farmers in Samut Prakan Province* (Research report), Huachiew Chalermprakiet University.

- Setthasakko, W. & Tongsiri, C. (2023). Comparative Agricultural Costs, Profitability and Break-even Point of Agrochemical, Pesticide Residue-free and Organic Vegetable Farming. *Journal of Liberal Arts and Management Science Kasetsart University*, 10(1), 72-91.
- Souksomphan, T., Mahawan, N. & Wanitlerthanasarn, C. (2023). Impacts and Adaptations of Rice Farmers from Climate Change: Case Study: Ban Sai Community, Muangxone, Huaphan Province, Lao PDR. *Journal of Social Sciences and Modern Integrated Sciences*. 4 (1),54-64.
- Tananchai, T., Srihagao, L., Boonyarittanon, N. & Raungdessuwon, S. (2022). Cost Management Guidelines for Pproduction of Hydroponic Vegetables by a Community Enterprise Group: Ccase Study of Cultivation with Participative Action of Organic Vegetable Enterprise Group at Yang Noeng Subdistrict, Saraphi District, Chiang Mai Province. *Journal of Humanities and Social Sciences Mahasarakham University*, 41(2), 30-47.
- Techasombooranakit, T., Chuaythanee, P. & Thitipasitthikorn, P. (2025). Empowerment of sugarcane farmers to achieve sustainable self-reliance: a group of debtors from the Kanchanaburi Farmers Rehabilitation and Development Fund. *Journal of Social Science and Cultural*, 9(1), 153-162.
- Thongtawat, R. (2008). The Management Strategy of Production Factors of the Gems and Jewelry Industry in Mae Sot District, Tak. *The Golden Teak: Humanity and Social Science Journal*, 14(1), 95-115.
- Wassana, P., Tanamool, V., Saengsanga, T. & Viriya, P. (2024). Networking Development for Soft Dough Stage Hom Mali Rice Production to Intelligent Agricultural System and Smart Farmer by Pracharath Agricultural Cooperative Approaches in Nakhon Ratchasima. *Research Community and Social Development Journal*, 18(4), 547–566.