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The Model of Creative Agriculture Among Farmers in Chiang Mai City

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This study investigated agricultural practices among farmers in Chiang Mai City, focusing on the determinants of creative agriculture and formulating a model to enhance such practices within the city, a regionally significant economic hub in Thailand. A mixed-methods research design was employed, incorporating both quantitative and qualitative approaches. The quantitative sample comprised 400 farmers selected via a two-stage random sampling technique, while the qualitative component involved 30 key informants. Data collection instruments included structured questionnaires and semi-structured interview guidelines. Analytical procedures encompassed descriptive statistics, chi-square correlation analysis, and thematic content analysis. The results revealed that the majority of respondents were male, with a mean age of 44 years. Most participants were married, had attained primary-level education, and resided within extended family households. They engaged in a variety of agricultural occupations within their communities and had accrued a minimum of five years of farming experience. While most were members of community-based agricultural groups, only a minority had benefited from formal agricultural knowledge promotion initiatives. Several factors were found to be significantly associated with creative agriculture among farmers in Chiang Mai City. These included age, household composition, number of agricultural labourers, size of cultivated land, affiliation with agricultural organisations or groups, farming-related indebtedness, participation in community activities, and agricultural practices. Based on these findings, a creative agriculture development model was proposed, comprising three primary components: (1) cultivating agricultural consciousness, (2) designing and implementing alternative agricultural methods, and (3) leveraging media and information technology in agricultural processes. It is therefore recommended that local governmental bodies in Chiang Mai City actively promote farmers' access to agricultural information to enhance their adaptability and resilience. Furthermore, efforts should be made to encourage diversification of farming practices, foster innovation in agricultural product processing, and improve market accessibility through the integration of digital technologies for the effective promotion and communication of agricultural products to consumers.

Keywords: Model of Creative Agriculture, Creative Agriculture, Farmers, Agriculture Development.

Introduction

Agriculture remains a foundational livelihood across all regions of Thailand, largely attributable to the nation's advantageous geographical characteristics. A considerable segment of the Thai population is either directly engaged in farming or possesses ancestral connections to agricultural activities. Over time, Thailand's agricultural landscape has undergone notable transformation, progressing from subsistence methods such as hunting and gathering to mechanised farming and technology-oriented practices, as categorised by development phases from Thailand 1.0 to Thailand 3.0. In particular, the Thailand 4.0 policy represents a comprehensive national strategy aimed at revolutionising the conventional agricultural sector through the integration of innovation, advanced technologies, and indigenous knowledge. This policy seeks to elevate the value and quality of agricultural outputs while ensuring safety for both producers and consumers (Meechoovet & Siriwato, 2023).

Chiang Mai City, the largest metropolitan area in Northern Thailand and the second largest nationally, is a prominent agricultural hub with over 182,740 farming households. The city is distinguished by its historical significance, unique Lanna cultural heritage, and diverse agricultural productivity. Its fertile land—spanning over 12 million rai—supports the cultivation of both tropical and temperate crops. In response to shifting developmental priorities, recent provincial strategies have promoted sustainable agriculture, value-added product processing, and enhanced product quality as key measures for bolstering competitiveness and increasing farmers' incomes. Chiang Mai also benefits from a dynamic agricultural marketplace, inclusive of organic goods markets, farmers' markets, and agritourism sites. Nonetheless, several structural challenges remain, including an ageing farming population, reduced labour force engagement, dependence on traditional agricultural techniques characterised by elevated production costs and constrained pricing control, as well as increasingly unpredictable climatic conditions (Malik et al., 2022). Consequently, a growing number of farmers are diversifying into non-agricultural occupations.

Creative agriculture emerges as an innovative paradigm that underscores the role of individual creativity in

farming. This approach incorporates artistic expression, cultural identity, and ritual practices into the conceptualisation and execution of agricultural activities or outputs. Beyond basic production, creative agriculture encompasses the management and strategic use of both existing and novel materials to design and refine agricultural products, thereby fostering added value that accrues benefits for both producers and consumers. This aligns with the notion of an external economy, wherein the perceived value of an innovation is determined by its popularity, leading to enhanced product value under conditions of high demand. In this context, value is not rooted in scarcity but in social appeal. Technological advancements play a pivotal role in augmenting this value while simultaneously preserving and promoting cultural heritage (Abiri et al., 2023). Creative agriculture further complements the overarching aims of Thailand's agricultural reform efforts, which aspire to empower farmers by aligning agricultural practices with regional capacities through the application of technology and innovation (Jansuwan & Zander, 2021).

In developing nations, innovation serves as a vital mechanism for transforming ideas into viable products and services, refining production processes, entering new markets, and attracting diverse consumer bases. Within an environment marked by constant transformation, the capacity to generate ideas that yield socio-economic value is inherently linked to innovation (Rayamajhee, Storr, & Bohara, 2022). This study posits that creative agriculture constitutes a strategic response that resonates with both Chiang Mai's developmental agenda and national initiatives aimed at fostering technological uptake among farmers. By harnessing cultural capital and local wisdom, this model facilitates the creation of competitive agricultural commodities and services, leading to increased income for farming communities. Furthermore, creative agriculture provides a pathway for mitigating risks associated with traditional farming, including the adverse effects of climate change, disease outbreaks, economic volatility, media influences, technological disruption, and shifts in agricultural contexts (Gai & Yang, 2023; Opolot et al., 2018; Seerasarn, Miller, & Wanaset, 2020; Ulvenblad et al., 2020). Given these pressures, innovation and creativity have become critical components for ensuring resilience and adaptability in the agricultural sector (Waheed, Ayodele, & Issah, 2020).

Accordingly, this research seeks to examine the factors significantly associated with creative agricultural practices among farmers in Chiang Mai City and to propose viable models for advancing such practices. The overarching objective is to develop strategies that support farmers in achieving sustainable livelihoods and enduring economic security within an increasingly complex agricultural environment.

Research Objectives

1. To examine agricultural practices among farmers in Chiang Mai City.
2. To explore the factors influencing creative agriculture among farmers in Chiang Mai City.
3. To develop a model for creative agriculture tailored to farmers in Chiang Mai City.

Literature Review

Creative agriculture is fundamentally rooted in innovative farming, integrating creativity into agricultural processes to distinguish them from traditional practices (Rayamajhee et al., 2022). This model of agriculture merges farming activities with artistic, cultural, and ritualistic elements, thereby expanding the role of farmers beyond mere production into management and value creation (Prada-Segura & Medina-Roncancio, 2023; Sigauke, 2020). It may involve the repurposing of existing materials alongside the incorporation of new resources to enhance the quality and appeal of agricultural goods. Significantly, creative agriculture emphasises value addition, catering to both producers and consumers in what is termed an "external economy". Here, the worth of a product is determined by its popularity rather than its scarcity. Consequently, high demand for an innovative and effective product enhances its value (Adro & Fernandes, 2022). Technological integration not only contributes to this value enhancement but also aids in preserving agricultural traditions.

The realisation of creative agriculture depends on the possession of positive skill sets and intrinsic creativity among farmers. These may include cultivation expertise, a commitment to quality, and proficiency in using agricultural tools. Much of this expertise emerges from interpersonal knowledge sharing among farmers (Simonton, 2003), ultimately fostering novel agricultural developments. Nonetheless, barriers persist, as some farmers are reluctant to embrace new farming methods or develop novel products (Quan et al., 2024). Moreover, having a supportive team or mentor system can encourage farmers to engage in creative practices, as collaborative environments tend to stimulate innovation (Kavi et al., 2018; Msoffe & Ngulube, 2016). In the current knowledge-based economy and society, knowledge functions as a crucial asset for driving innovation across various sectors, including agriculture, which is subject to rapid global transformation (Waheed et al., 2020). Farmers must not only keep pace with these changes but also adopt information and communication technologies (ICTs) to enhance production efficiency and marketing capabilities (Kanjina, 2021). However, the Thai agricultural sector continues to face challenges, particularly regarding low productivity and income levels. These issues are often linked to insufficient knowledge and limited market awareness among farmers, affecting their ability to plan and execute quality, environmentally sustainable production strategies.

Technology plays a pivotal role in modern agricultural markets, facilitating online access to both raw and processed products (Quan et al., 2024). Additionally, digital platforms such as Twitter, WhatsApp, and Facebook allow farmers to create customer service channels, swiftly resolve issues, and share information (Lee & Suzuki, 2020; Mills et al., 2019). Technological adoption in agriculture may also require expert consultation to optimise implementation across farming

practices. Creative agriculture extends beyond mere innovation; it also involves applying accumulated knowledge derived from expertise, social networks, cultural capital, and local wisdom. These resources support farming, marketing, and management activities. Consumer safety and product quality, central to human capital, reflect the depth of knowledge and skills that farmers integrate into their operations—often in relation to their income levels (Plaiphum & Tansuchat, 2023). Unlike conventional agriculture, creative farming leverages culturally significant practices to generate added value. The utilisation of local wisdom can take several forms: maintaining traditional practices, adapting technical methods, or altering the components and structures of indigenous knowledge (Pratita, Irham, & Mulyo, 2019). Such practices represent essential cultural capital applicable in agricultural innovation.

Ultimately, creative agriculture fosters both efficiency and responsiveness, addressing evolving consumer demands. It adapts continuously to global agricultural dynamics, including shifts in food market structures and consumer preferences for safety and environmentally responsible farming (Hong, Tian, & Wang, 2023; Zscheischler et al., 2022). Thus, this approach contributes to the establishment of a sustainable food production system that is both innovative and consumer-oriented. Through the integration of advanced technologies, artistic elements, and design principles, creative agriculture stimulates innovation within the sector. Farmers, possessing entrepreneurial competencies and a wealth of experiential knowledge, are the key agents in this transformative process.

Research Methodology

Research Design

This study adopts a mixed-methods design, integrating both quantitative and qualitative approaches. The quantitative component investigates the agricultural practices of farmers and identifies the factors associated with the adoption of creative agriculture in Chiang Mai City. Concurrently, the qualitative component is employed to construct a conceptual model for creative agriculture tailored to the context of farmers in Chiang Mai City. The methodological framework for the study is presented as follows:

Participants and Sampling

For the quantitative phase of this research, the target population comprised 181,371 agricultural households within Chiang Mai City. A sample of 400 household heads was determined using Yamane's formula. A two-stage random sampling technique was adopted. The inclusion criteria required participants to: (1) have a minimum of five years' experience in agricultural activities, including crop cultivation, livestock farming, and/or freshwater fishing; (2) be aged 18 years or older; (3) be in good physical health; (4) possess literacy in Thai (reading and/or writing); and (5) express a willingness to participate and provide information. The qualitative phase was conducted in Mae Taeng District of Chiang Mai City, involving farmers who exhibited a strong dedication to agriculture, particularly in organic farming and the processing of agricultural products through the application of local wisdom. These individuals were also recipients of ongoing knowledge support from both local and external organisations. A purposive sampling strategy was employed, resulting in a sample of 30 participants.

Research Instruments

In the quantitative phase of the study, data were collected using a structured questionnaire consisting of four sections: (1) demographic characteristics; (2) socio-economic status and land ownership; (3) farming practices; and (4) aspects of creative agriculture. The questionnaire included both open- and closed-ended items. To ensure reliability, the instrument was reviewed by subject matter experts and subsequently piloted with a group of 30 farmers possessing similar attributes to the primary sample. The responses from the pilot study were employed to compute the reliability coefficient using Cronbach's alpha, which yielded a value of 0.93, indicating a high level of internal consistency (Cronbach & Shavelson, 2004). For the qualitative component, data were gathered through in-depth interviews guided by a series of open-ended questions. These interviews were conducted with the selected target group and aimed to contribute to the formulation of a creative agriculture model tailored to farmers in Chiang Mai City.

Research Ethics

This study was carried out in accordance with the principles of respect for human dignity and received ethical approval from the Maejo University Human Ethics Committee (approval code: MJUIRB No. HS 099/66).

Data Analysis

In the quantitative component of this study, data analysis commenced with the coding of validated questionnaire responses, followed by processing using software tailored for the analysis of social science research data. Descriptive and inferential statistical methods were applied, including frequency distribution, percentage, mean, standard deviation, and cross-tabulation to examine variable relationships, with Chi-square tests employed to determine statistical significance. The results were presented in tabular format. For the qualitative component, content analysis was employed. Audio-recorded interviews were transcribed verbatim and segmented by individual participants. The transcripts were verified for accuracy, then coded and thematically organised. This process incorporated data from literature reviews, empirical studies, and relevant theoretical frameworks to ensure alignment with the research objectives.

Results

The results of the study are presented across three key dimensions: (1) demographic attributes, socio-economic attributes, landholdings, and agricultural practices of farmers; (2) factors associated with creative agriculture among farmers in Chiang Mai City; and (3) the proposed model of creative agriculture for farmers in Chiang Mai City. The findings are outlined as follows:

Demographic Attributes, Socio-Economic Attributes, Farmers' Holdings and Agricultural Practice of the Farmers

Table 1: Percentage of the Demographic Attributes, Socio-Economic Attributes, Farmers' Holdings and Agricultural Practice of the Sample Group.

Profile of the Samples	Cont.(n=400)	Percent
Gender		
Male	220	55.0
Females	180	45.0
Total	**400**	**100.0**
Age		
18-39 Years	48	12.0
40-49 Years	123	30.8
50-59 Years	192	48.0
Over 60 Years	37	9.2
Total	**400**	**100.0**
Min=18, Mean=44, Max=80		
Status		
Single	40	10.5
Married	322	80.5
Widowed/Divorced/ Separated	38	9.0
Total	**400**	**100.0**
Education		
Lower than Elementary School	17	4.3
Elementary School	169	49.0
Secondary School/Vocational or Higher Vocational Certificate	125	31.3
Bachelor's Degree and Higher	62	15.4
Total	**400**	**100.0**
A Number of Household Members		
Less than 4 People	187	46.8
5-8 people	205	51.2
More than 6 People	8	2.0
Total	**400**	**100.0**
Min=1, Mean=4, Max=12		
Farmers' Holding		
Less than 4 Rai	102	25.5
4-12 Rai	179	44.8
Over 12 Rai	119	29.7
Total	**400**	**100.0**
Min=0.2 Ngan, Mean=8, Max= 45 Rai		
A Number of Household Workforce		
1-4 People	322	80.5
Over 4 People	78	19.5
Total	**400**	**100.0**
Min=1, Mean=3.2, Max=20		
An Annual Income (Year)		
Less than 500,000 Baht	314	78.5
Over 500,000 Baht	86	21.5
Total	**400**	**100.0**
Min=5,000, Mean=748,620, Max=5,000,000		
Farming Experience		
Less 5 Years	125	31.3
5-10 Years	116	29.0
10-20 Years	109	27.3
Over 20 Years	50	12.4
Total	**400**	**100.0**
Min=1, Mean=11, Max=40		
Agricultural Group/Organization Membership		
Membership of Agricultural Group/Organization	264	66.0
No Membership of Agricultural Group/Organization	136	34.0
Total	**400**	**100.0**
Receiving Promotion		
No	346	86.5
Yes	54	13.5
Total	**400**	**100.0**
Debt		
No Debt Burden	111	27.8
Having Debt Burden	289	72.2
Total	**400**	**100.0**
Social Activities		
No Participation	29	7.2
Seldom Participation in Social Activities	171	42.8
Always Participation in Social Activities	200	50.0
Total	**400**	**100.0**
Agricultural Practice of the Farmers		
High	165	41.2
Middle	181	45.3
Low	54	13.5
Total	**400**	**100.0**
Adaptation and Appropriate Operational Method		
Production Management		
High	198	49.5
Middle	162	40.5
Low	40	10.0
Total	**400**	**100.0**

The study revealed that more than half of the respondents were male (55.0%), with nearly half falling within the age range of 50-59 years (48.0%), followed by those aged 40-49 years (30.8%). The average age of the participants was 44 years. Most of the respondents (80.5%) were married, and 49.0% had completed only elementary education. Approximately half of the households had between 5 and 8 members (51.2%). In terms of agricultural activities, respondents were involved in a variety of practices such as rice cultivation, orchard management, vegetable farming, ornamental plant cultivation, and animal husbandry. About 44.8% of the participants owned

between 4 and 12 rai of farmland, while 29.7% held 12 rai or more, with the size of the farmland ranging from 2 ngan to 45 rai. Most respondents (80.5%) had between 1 and 4 household workers. The majority (78.5%) reported earning an annual income of 500,000 baht from their agricultural activities.

Regarding farming experience, respondents had an average of 11 years of experience in agriculture. However, 31.3% of them had less than 5 years of experience, while 29.0% had between 5 and 10 years of experience. A large proportion of respondents (66.0%) were members of agricultural groups or organisations. Despite this, 86.5% of the participants stated that they had not received any agricultural knowledge support or promotion. In terms of financial status, respondents indicated that they obtained capital from various sources, including personal savings, funds, agricultural savings groups, the Bank for Agriculture and Agricultural Cooperatives (BAAC), general banks, and agricultural credit. Over half of the respondents (72.2%) reported having a debt burden. Furthermore, half of the respondents (50.0%) frequently engaged in social activities. With regard to agricultural practices, the majority of respondents demonstrated a moderate level of agricultural activity (45.3%), followed by those exhibiting a high level (41.2%) and a low level (13.5%). When it came to adopting appropriate operational methods for production management, half of the respondents (49.5%) performed at a high level, while 40.5% were at a moderate level, and 10.0% were at a low level. The findings are further elaborated in Table 1.

Factors Related to Creative Agriculture Among Farmers in Chiang Mai City

The study found significant correlations between demographic, economic, and social factors and the engagement in creative agriculture among farmers in Chiang Mai City, at the 0.1 and 0.5 significance levels. Specifically, age, household size, household labour, farmland size, membership in agricultural groups/ organizations, agricultural debt, agricultural extension services, and participation in social activities were all associated with the level of creative agriculture. Younger farmers, aged 18 to 39, demonstrated a higher involvement in creative agriculture, with 54.2% of this group participating in creative agricultural practices, compared to older age groups. Households with more than eight family members also showed a greater proportion of creative agriculture, at 62.2%, which was higher than households with fewer members.

Table 2: Percentage of Creative Agriculture Adoption Among Farmers in Chiang Mai City Classified by Demographic Attributes, Socio-Economic Attributes, Farmers' Holdings, and Agricultural Practice.

Demographic Attributes, Socio-Economic Attributes, Farmers' Holdings and Agricultural Practice	Creative Agriculture of Famer in Chiang Mai City			X^2	P-Value
	Low (Percent)	Medium (Percent)	High (Percent)		
Age					
18-39 Years	2.1	43.8	54.2	13.826	0.032*
40- 49 Years	17.9	46.3	35.8		
50-59 Years	16.7	50.5	32.8		
60 Years and Over	21.6	35.1	43.2		
Members Living in the Household					
Less than 4 People	11.2	47.6	41.2	10.067	0.039*
5 – 8 People	20.5	46.8	32.7		
More than 8 People	0.0	37.5	62.5		
Number of Workers in the Household					
1-4 People	18.6	48.4	32.9	17.768	0.010*
More than 4 People	3.8	41.0	55.1		
Number of Agricultural Areas					
Less than 4 Rai	24.5	43.1	32.4	13.954	0.007*
4- 12 Rai	15.1	51.4	33.5		
More than 12 Rai or More	9.2	43.7	47.1		
Membership in Groups/Organizations Related to Agriculture					
No Member	3.7	44.1	52.2	31.809	0.001*
Member	22.0	48.5	29.5		
Debt Burden Arising from Farming					
Have Debt	19.0	49.5	31.5	17.765	0.001*
Not Debt	7.2	40.5	52.3		
Promotion of Agriculture					
Promoted	9.3	42.6	48.1	3.918	0.014*
Not Promoted	16.8	47.7	35.5		
Participating in Social Activities					
Not	3.4	51.7	44.8	24.382	0.001*
Sometimes	22.8	52.0	25.1		
Always	11.5	42.0	46.5		
Desired Farmer Practices					
Low	38.9	59.3	1.9	91.577	0.001*
Medium	22.1	49.7	28.2		
High	1.2	40.0	58.8		
Farmers' Operations in Management and Production Management					
Low	57.5	42.5	0.0	111.350	0.001*
Medium	21.0	54.9	24.1		
High	3.0	41.4	55.6		

In terms of household labour, farmers with more than four household members engaged in agricultural labour exhibited a higher level of creative agriculture, with 55.1% of these households involved in creative agricultural practices. Similarly, farmers who cultivated more than 12 rai of land displayed a higher level of creative agriculture, with 47.1% engaging in such practices, compared to farmers with smaller plots of land. Interestingly, farmers who were not members of

agricultural groups or organizations showed a higher proportion of high-level creative agriculture, at 52.2%, when compared to those involved in such groups. Additionally, farmers who were free from agricultural debt showed a greater proportion of high-level creative agriculture, with 52.3% of debt-free farmers involved in creative practices, compared to their debt-burdened counterparts.

Farmers who received agricultural support exhibited a higher level of creative agriculture, with 48.1% of this group participating in creative agricultural activities. Furthermore, farmers who regularly participated in social activities were more likely to engage in creative agriculture, with 46.5% of these farmers demonstrating high levels of creative agricultural practices compared to those who participated less frequently in social activities. Moreover, farmers who employed desirable farming practices showed a higher level of creative agriculture, with 58.8% of these farmers engaging in creative agricultural activities. Similarly, farmers who applied effective operational practices in production management were also more likely to practice creative agriculture, with 55.6% demonstrating such practices. The results revealed that farmers who demonstrated high levels of desirable farming and operational practices were significantly correlated with creative agriculture at a statistical level of 0.1. These findings are summarised in Table 2.

The Development of Creative Agriculture Models for Farmers in Chiang Mai City

In the study focused on the development of creative agriculture models for farmers in Chiang Mai City, the researcher carried out fieldwork to better understand the challenges faced by local farmers. This fieldwork involved engaging in direct conversations, conducting in-depth interviews with targeted groups of farmers, and observing agricultural activities in the region. Through these methods, a model for creative agriculture tailored to the farmers in Chiang Mai City was developed. The model is presented in Figure 1, which illustrates the proposed approach for fostering creative agricultural practices among the region's farmers.

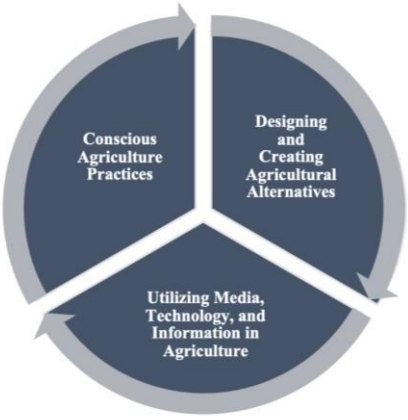

Figure 1: The Model of Creative Agriculture of Famer in Chiang Mai City.

Conscious Agriculture Practices

Conscious agricultural practices are designed to equip farmers with essential agricultural knowledge to enhance their resilience and foster sustainable farming. By encouraging the acquisition of information and promoting the exchange of knowledge and skills among farmers, these practices aim to create a platform that supports the sharing of expertise and the improvement of agricultural capabilities. This approach is particularly crucial in addressing challenges posed by climate change. Farmers are provided with opportunities to engage with experts who possess specialized agricultural knowledge and skills, facilitating valuable learning experiences. Additionally, farmers are encouraged to participate in on-site inspections of farmland, both inside and outside greenhouses, managed by relevant institutions. Such exposure to diverse learning platforms allows farmers to practically apply newly acquired knowledge to their own agricultural practices, thereby enhancing the sustainability and effectiveness of their operations.

Designing and Creating Agricultural Alternatives

The design and development of agricultural alternatives aim to offer farmers a range of viable options, such as intercropping, livestock farming, and diversifying agricultural product processing. These alternatives are intended to broaden the scope of farming practices beyond traditional community-focused products, allowing farmers to explore interests that differ from their current agricultural routines. By expanding the variety of products available for sale, farmers are provided with more channels for marketing their goods. Furthermore, they gain insights into how local agricultural products can be processed into other marketable items, enhancing value-added opportunities. While many farmers possess the skills to produce and process agricultural products, these items often remain standard, without differentiation from conventional offerings. Therefore, it is essential for farmers to assess which alternatives align with their circumstances and sustainability needs. In this regard, farmers may benefit from acquiring additional knowledge and skills through training programs. Such training, combined with practical experience, enables them to effectively implement innovative approaches in their agricultural practices, thereby fostering the survival and growth of their agricultural enterprises.

Utilizing Media, Technology, and Information in Agriculture

The use of media and information technology in agriculture aims to promote and communicate agricultural products to consumers. While these technologies are crucial for reaching consumers, many farmers have not yet fully embraced them. Most continue to sell fresh produce in markets, with some using Facebook to share product photos. To enhance their marketing, farmers need knowledge in basic photography and video editing. However, there are challenges, as many farmers, especially the elderly, face limitations in using advanced technologies or selling products on online platforms beyond basic mobile phone functions. The innovative agriculture development model for farmers in

Chiang Mai City incorporates three approaches: conscious farming practices, the design and creation of agricultural alternatives, and the use of media, technology, and information in agriculture. The researcher tested these models with 30 farmers and found significant improvements in their knowledge post-training at the 0.05 level. The average post-training score was 107.00 (SD = 11.44), compared to the pre-training score of 51.83 (SD = 11.84). All three models showed higher average scores, with the most notable improvements in farming with awareness (24.5 points) and designing agricultural alternatives (22.2 points). Farmers reported being able to implement these practices independently, from planning to achieving better outcomes. However, when it comes to integrating information technology into farming, farmers may require support from family members or those skilled in media and technology.

Discussion

The analysis of factors related to creative agriculture among farmers in Chiang Mai City reveals significant connections between demographic factors, farmers' holding and farming characteristics, and practical farming factors. Specifically, young farmers and expanding family sizes were found to be strongly associated with higher levels of creative agriculture. Younger farmers are more likely to adopt technological media and innovative agricultural practices, differing from traditional methods. This finding aligns with studies by Folitse et al. (2018) and Minkoua Nzie, C, and Azinwi Ngum (2018), which indicate that aging farmers are less likely to embrace new technologies due to the challenges of adapting to rapid changes in agriculture. Kanjina (2021) also notes that social media may not be a key source of agricultural information for farmers in developing countries, suggesting that a gradual adoption process, supported by relevant institutions, would be more beneficial in the long term. Additionally, the ongoing decline in the agricultural workforce, coupled with an aging farming population, has contributed to labour shortages in agriculture. However, larger family households can provide support by offering additional labour and knowledge, helping farmers navigate these challenges.

The characteristic factors of holding and farming primarily relate to the nature of agriculture, including the number of workers in the household, the size of agricultural areas, membership in agricultural groups or organisations, debt burdens from farming, agricultural promotion, and participation in social activities. Promoting agriculture enhances farmers' skills, knowledge, and practices in addressing climate change and improving their understanding of crop cultivation. Agriculture must adapt to changes and find ways to ensure self-preservation in a dynamic environment. Agricultural extension services, including training, education, and knowledge exchange with agricultural scholars, have been shown to improve farming practices. Regular training is essential for farmers to stay updated and improve their agricultural practices.

The number of household labourers plays a crucial role in the long-term viability of farms. This aligns with findings from the Food and Agriculture Organization (FAO), which states that family labour is a key unit in driving agricultural activities and helps preserve agrarian culture. Similarly, research by Kavi et al. (2018) shows that most farmers share agricultural knowledge with friends, neighbours, or family members. Agricultural practice factors include the farmer's desired practices and their operations in management and production. Farmers must integrate accumulated knowledge into their agricultural practices, create management plans, and adopt modern technologies. This is consistent with the findings of Zscheischler et al. (2022) and Hong et al. (2023), which highlight the importance of continuous agricultural development planning for achieving success in farming. This also aligns with the mission of agricultural extension services, which aim to promote "smart farming" by incorporating technology into production and marketing, enabling farmers to remain competitive.

Farmers must apply appropriate agricultural technologies, as technology and innovation play a crucial role in job creation, income generation, and enhancing sustainable quality of life. This is supported by Cheng et al. (2024), who found that digital skills are vital for entrepreneurial farmers, contributing to rural economic recovery. Farmers skilled in modern technology can effectively use online social media to engage with consumers. However, research by Choruma et al. (2024) points out that while the use of digital technology in agriculture has advantages—such as better market access, improved decision-making, and increased income for small-scale farmers—it also presents challenges, including unequal access to equipment, low digital literacy, and limitations in internet connectivity.

The creative agricultural model among farmers in Chiang Mai City comprises three main components: adaptive agricultural practices, the design and creation of alternatives in agriculture, and the utilisation of media and information technology in farming. In an era where technology plays a significant role in daily life and the distribution of information, farmers must integrate technology with their agricultural practices to facilitate consumer access to their products. By using online media platforms such as Facebook and Line to upload photos or videos of their agricultural products, farmers can enhance visibility and awareness of their produce. This aligns with the research of Lee and Suzuki (2020) and Mills et al. (2019), who found that technology is instrumental in making agricultural products more accessible to the community through online sales, processed agricultural products, and providing additional channels for customers to purchase and receive services via online platforms, as well as to access information on consumer behaviours (Ghosh, Chakraborty, & Law, 2018). As farmers gain knowledge and understanding of new technologies, they will realise the benefits of using these tools (Quan et al., 2024). Additionally, government agencies should support investors who are willing to purchase agricultural products from local farmers at reasonable prices. Beyond modern communication technologies, local wisdom is considered a vital form of technology for farmers. It represents a body of knowledge accumulated over time and inherently accessible to farmers, who can utilise it at any point and further develop it through exchanges or knowledge support from relevant agencies. Local wisdom can be applied to create innovative products that distinguish

themselves from existing offerings. Farmers can use local knowledge and culturally valuable practices to generate added value. This application may involve imitating traditional methods or maintaining their original form. Furthermore, the use of local wisdom may include adapting techniques and methods or modifying the characteristics, components, or structure of local wisdom to create a new form of this knowledge (Adro & Fernandes, 2022).

In conclusion, the concept of creative agriculture among farmers in Chiang Mai City is a key initiative integrated into the Chiang Mai development plan for the years 2023-2027. This aligns with the strategic direction for sustainable development in northern Thailand. Farmers in the northern region face several challenges, including a decline in agricultural landholding, an agricultural system that does not ensure food security, an inequitable education system that fails to meet local needs, a lack of development in community economies based on ecological and cultural resources, and persistently high levels of PM pollution. Strategic development should focus on land-use management, creating innovations for food security and sustainable agriculture, educational management for learning and career opportunities, community-supported economic management, welfare, and the promotion of participation in forest fire and air pollution management. Therefore, enhancing farmers' knowledge and encouraging them to apply this knowledge, along with their accumulated wisdom, to their agricultural practices, will drive the shift towards creative agriculture in Chiang Mai City. Plaiphum and Tansuchat (2023) assert that in the era of a knowledge-based society and economy, knowledge is a critical asset and a vital factor in fostering innovations that drive economic, social, political, and cultural development, enabling competitiveness in a rapidly changing world. Local wisdom serves as an intellectual resource and foundation for the creative economy, which relies on the generation of goods and services from knowledge bases and creative ideas derived from intellectual capital, including expertise, analytical skills, inspiration, job satisfaction, and the use of intellectual property linked to cultural foundations, societal knowledge, and modern technology and innovation. Furthermore, research by Rayamajhee et al. (2022) demonstrates that farmers' innovative capabilities can create a competitive advantage by applying innovations to improve efficiency and quality in their operations or products. Innovations in agriculture may include forms such as integrated farming, new theory agriculture, sustainable agriculture, and creative agriculture.

Conclusion

The model of creative agriculture among farmers in Chiang Mai City involves several factors, including farmers' demographic characteristics, the attributes of their holdings and farming practices, and various agricultural practices. Younger farmers, particularly those living in extended families, tend to exhibit greater creativity due to their better adaptation to technology compared to older farmers. Living in extended families provides a platform for the exchange of ideas and mutual support in experimenting with different farming methods. The ageing farmer population is a significant issue in regions like Thailand, as it directly impacts agricultural labour and may consequently affect the country's gross domestic product (GDP). Regarding the characteristics of farming holdings and practices, key elements include the size of agricultural areas, membership in agricultural groups or organisations, debt burden resulting from farming activities, agricultural promotions, participation in social activities, preferred farming practices, and farmers' operational and production management skills. Successful farmers demonstrate strong management skills and the ability to apply modern technologies to improve their practices. This includes utilising media, agricultural technologies, and expanding distribution channels through online platforms. Simultaneously, farmers must focus on developing essential skills, knowledge, entrepreneurship, and familiarity with modern farming tools. These are crucial for fostering agricultural innovation and ensuring sustainability. The creative agriculture approach in Chiang Mai Province serves as a strategy that enables farmers to create a path to self-reliance. This approach aligns with the Chiang Mai Provincial Development Plan for 2023-2027, which seeks to empower farmers to become self-sufficient through cultural ecology and resource management, in line with sustainable development goals. Promoting creativity among farmers through the integration of knowledge, wisdom, and cultural practices, while incorporating modern technology in agriculture, processing, and the production of innovative agricultural products and services, will contribute to economic recovery, social well-being, and sustainability in the agricultural sector. This, in turn, will enhance competitiveness in the ever-evolving agricultural landscape.

Recommendations

1. The implementation of the creative agricultural model employed by farmers in Chiang Mai Province in other regions necessitates a thorough consideration of the local context, conditions, components, and the potential of farmers in those areas.
2. Relevant agencies should provide support for the creative agricultural practices of farmers, both broadly and in specific innovative forms, in order to motivate farmers to develop agricultural products in novel ways and ensure long-term stability in agricultural production.
3. Farmers should be encouraged to adopt and utilise modern technologies in their agricultural practices, as well as to engage in the online distribution of agricultural products.

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