

The Development of Processing and Enhancement of GI Product Standards of Yam Bean in Communities of Maha Sarakham Province for E-Marketplace Platforms

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Abstract

Background and Aim: Developing and Improving GI Product Standards of Yam Bean from the Community in Maha Sarakham Province for E-Marketplace Platforms It aims to improve the product's value and reliability. Raising standards will result in products of higher quality and uniqueness, allowing them to compete in a highly competitive market. Bringing products to the online marketplace platform also allows the community to reach a larger audience both domestically and internationally, which benefits the local economy.

Materials and Methods: The sample: includes people living in the Mueang District area of Maha Sarakham Province, several 195 people, and was obtained using the formula of Yamane (1973). Questionnaires are one type of research tool. Data collection involves gathering data from Primary data collection entails collecting information from a research sample group using questionnaires. Data analysis comprises data analysis: This entails quantitative data analysis, in which data collected from questionnaires is analyzed using statistical research. Statistics utilized in the research: Include a ready-made descriptive statistics program with percentage mean and standard deviation.

Results: (1) To investigate and assess the social capital potential of the GI yam bean farmers' group in the community of Ban Wang Chot Huai Toei Sub-district Kud Rang District Maha Sarakham Province. The researchers discovered that 1.1 Cultivation Area: The farmers in this community primarily cultivate yam beans in the Ban Wang Chot area, utilizing their land efficiently with sustainable agricultural practices.





1.2 Group Formation: Farmers have formed groups to support and develop yam bean cultivation in the area, facilitating knowledge exchange and collaborative purchasing of agricultural inputs and equipment. 1.3 Advantages of Group Membership: Being a member of a group increases access to important resources such as agricultural promotion projects, research participation, and access to new markets. 1.4 Community Relations: These farmer groups play an important role in fostering good relationships within the community by sharing their experiences and agricultural knowledge with neighboring communities. 1.5 Skill and Knowledge Development: Group membership promotes the development of agricultural skills and knowledge, resulting in increased farming efficiency and personal development. (2) Developing and improving GI product standards for yam beans in Maha Sarakham Province communities for e-marketplace platforms. Overall, it is of a high standard. (3) To assess the impact of developing GI yam bean product standardization on farmers in the community of Ban Wang Chot Huai Toei Sub-district Kud Rang District Maha Sarakham Province. Overall, it performs at the highest level.

Conclusion: The findings highlight the high social capital of GI yam bean farmers in Ban Wang Chot, where efficient land use, group collaboration, and community relations improve agricultural practices. The creation and improvement of GI product standards for yam beans has greatly benefited the community, resulting in high performance in e-marketplace integration and overall farmer success.

Keywords: Development and Enhancement; Yam Bean GI

Introduction

Yam beans (*Pachyrhizus erosus*) are grown in central Thailand's Saraburi, Chonburi, and Samut Sakhon provinces, as well as the northeastern region's Maha Sarakham, Nong Khai, Khon Kaen, and Nakhon Phanom (Kwanmuang, 2017). Maha Sarakham is the province with the largest yam bean cultivation area in the northeastern region, covering 8,364 rai (Laoken, 2012). Yam beans grown in Maha Sarakham are known for their sweet, crunchy, and delicious flavor (Agricultural Technology, 2022).

Yam beans are a nutrient-dense food that is especially beneficial for people with chronic illnesses like diabetes and hypertension. They can help lower blood sugar levels and provide long-term health benefits, particularly for diabetics and people with hypertension. Yam beans





have a low glycemic index and are high in fiber, which helps to keep blood sugar levels stable. Yam beans are also good for the digestive system because of their high fiber content, which is beneficial for diabetics or those who control their blood sugar levels. Consuming fiber-rich foods stimulates the digestive process. Yam beans contain inulin, a type of fiber that promotes bowel movements, improves intestinal function, and prevents constipation. If the community recognizes the importance of alternative carbohydrate sources, yam beans can be an excellent source of energy and fiber, particularly for people with diabetes and hypertension.

Yam beans are considered an important economic crop for the local community in Maha Sarakham province. They have been registered as a prominent local identity crop and a geographical indication (GI) product of Maha Sarakham province. Yam beans are cultivated in the Borabue and Kut Rang districts, producing over 4 million kilograms annually. This cultivation generates a net income of more than 5,000 baht per rai for farmers. Farmers can grow yam beans three times a year. The first crop is planted at the beginning of the rainy season, between May and June, yielding an average of 10 tons per rai. The second crop is planted at the end of the rainy season, between September and October, yielding 5-6 tons per rai. The third crop is planted in the dry season, between January and February, yielding an average of 4-5 tons per rai. Yam beans take about 90-120 days from planting to harvest (Agricultural Service and Technology Transfer Center, Borabue Subdistrict, 2021)

However, from preliminary data collection by the research team in collaboration with a group of 50 yam bean farmers in Kut Rang District, Maha Sarakham Province, using questionnaires, it was found that the farmers reflected several issues: (1) The yam bean harvest reaches the market simultaneously, leading to an oversupply that affects selling prices and the lack of a diverse market to absorb the produce, resulting in a significant surplus of about 65%. (2) The selling price of yam beans is low and does not align with production costs, accounting for 25%. (3) There is a lack of variety in yam bean product processing, making up 7%. (4) The soil used for cultivation has deteriorated due to the prolonged use of chemical fertilizers, accounting for 3%.

Moreover, an analysis of the causes and impacts of these problems revealed: (1) Yam beans are harvested seasonally in large quantities, leading to market oversupply and spoilage, as yam beans can only be stored for up to 2 weeks. (2) The selling price of yam beans is low due to simultaneous market entry, and farmers lack planning in production management and market risk





management. For example, currently, if selling yam beans directly from the field to middlemen, they sell for 8-10 baht per kilogram, but if sold independently at roadside stalls or by mobile vendors in different communities, the price can be 20-30 baht per kilogram. (3) There is still a lack of variety in yam bean product processing, limited mainly to selling yam beans and seeds.

From these issues and limitations, it is essential to find ways to develop and elevate the GI yam bean products of farmers in Maha Sarakham Province. This will contribute to the local economy and support the yam bean farmer community in alignment with the Maha Sarakham Provincial Development Plan for 2023-2027. This plan focuses on promoting and developing agricultural production to generate income for farmers by applying knowledge in management, production systems with appropriate innovation and technology (Smart Farming), and creating an online marketplace platform (e-Marketplace). These strategies aim to enhance business operations, increase productivity, and improve market competitiveness, making yam bean products more valuable. The integration of agricultural science, social science, and information technology, along with collaboration with external agencies such as the Maha Sarakham Provincial Land Reform Office, the Maha Sarakham Provincial Agriculture Office, and the Borabue District Agriculture Office, is also essential.

Therefore, disseminating and transferring this knowledge to farmers will help elevate the GI yam bean products of Maha Sarakham communities to the online marketplace (E-marketplace). Developing distribution channels and supporting GI yam beans through accessible innovation and technology will foster the development and enhancement of the supply chain, achieving the Sustainable Development Goals (SDGs). This will include upgrading and processing GI yam bean products to new international standards, continuously promoting the local economy, and ensuring sustainability.

Objectives

1. To study and analyze the social capital potential of the GI yam bean farmers' group in the community of Ban Wang Chot Huai Toei Sub-district Kud Rang District Maha Sarakham Province
2. To The Development of Processing and Enhancement of GI Product Standards of Yam Bean in Communities of Maha Sarakham Province for E-Marketplace Platforms





3. To evaluate the impact of developing the GI yam bean products' standardization for the farmers in the community of Ban Wang Chot Huai Toei Sub-district Kud Rang District Maha Sarakham Province

Literary Review

1. Yam Bean

Yam Bean is a vegetable plant that resembles green beans. Its roots are edible, with a crisp texture and a sweet, fragrant taste. It is popularly used as an ingredient in various dishes. The parts of the plant that are not used for food are often used to improve soil in agriculture. Its scientific name is *Pachyrhizus erosus* or Mexican turnip.

The word "Jicama" comes from the language of the Maya, which means "bean plant." This might refer to the root, which resembles beans in some aspects of its appearance. In Thai, Jicama is also known as "Kwang Tung" or the ingredient made from Jicama is called "Tub Tao," which is used in some dishes and is known for its digestive properties.

The importance of yam bean, also known as jicama, lies in its nutritional value and culinary versatility. It is rich in fiber, low in calories, and a good source of vitamin C and potassium. In cuisine, yam bean is prized for its crunchy texture and mild, slightly sweet flavor. It can be eaten raw, added to salads, or used as a refreshing snack.

From a health perspective, yam bean offers various benefits. Its high fiber content supports digestive health, while its low glycemic index makes it suitable for people with diabetes. Additionally, the potassium in yam bean can help regulate blood pressure.

Culturally, yam bean plays a significant role in many cuisines, particularly in Southeast Asia and Latin America, where it is a staple ingredient in many traditional dishes. Its adaptability to different culinary styles and its nutritional benefits make it a valuable addition to a balanced diet.

2. Development and Enhancement

Development and enhancement of products is a crucial process to increase their value and meet market demands, thereby enhancing competitiveness. The concept of development can stem from analyzing the needs of target groups, market surveys, and studying industry trends to adapt or develop products that are suitable for market conditions and customer needs both now and in the future.





Product development also involves introducing innovations and new technologies into the production process. This can help reduce costs, improve quality, and increase efficiency in production. For example, using automation or digital technology for marketing and selling products online can enhance efficiency in promoting products and services.

Furthermore, product development must consider environmental and sustainability dimensions to ensure sustainable production for the future. This includes using environmentally friendly materials, designing products with a long life cycle, and managing or disposing of products to reduce waste generated during production and use

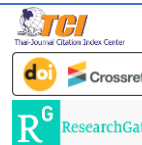
3. GI Product

Geographical Indication (GI) products are valuable assets that reflect the unique characteristics and heritage of a specific geographic region. These products are typically deeply rooted in local traditions, culture, and expertise, making them distinct from similar products produced elsewhere. The GI designation not only protects the product from imitation or misuse but also helps preserve traditional knowledge and craftsmanship. Additionally, GI products often carry a reputation for quality and authenticity, which can enhance their market appeal and value.

One of the key benefits of GI products is their contribution to local economies and communities. The production of GI products often involves a network of small-scale producers, farmers, and artisans, providing them with sustainable livelihoods and preserving traditional practices. Furthermore, GI products can boost tourism by attracting visitors interested in experiencing the unique qualities of the region's products firsthand. This can create additional economic opportunities for local businesses and contribute to the overall development of the area.

In terms of market competitiveness, GI products have a competitive edge due to their unique characteristics and reputation. The GI designation serves as a form of intellectual property protection, preventing unauthorized use of the product's name or branding. This protection helps maintain the quality and authenticity of the product, giving consumers confidence in their purchase. Moreover, GI products often command premium prices in the market, reflecting their superior quality and the cultural significance associated with their origin.





4. E-Marketplace Platforms

E-marketplace platforms are online platforms that facilitate the buying and selling of goods and services. These platforms provide a virtual space for sellers to showcase their products and for buyers to browse and purchase items from a wide range of sellers. E-marketplaces have become increasingly popular due to their convenience, accessibility, and ability to connect buyers and sellers from around the world. They offer a variety of features such as product listings, secure payment options, and customer reviews, which help facilitate transactions and build trust between buyers and sellers.

One of the key advantages of e-marketplace platforms is their ability to reach a large audience of potential customers. These platforms are accessible 24/7, allowing sellers to reach customers across different time zones and regions. This increased reach can lead to higher sales and revenue for sellers, as well as greater convenience for buyers who can shop anytime, anywhere. Additionally, e-marketplaces often provide tools and resources to help sellers market their products effectively, such as advertising options, analytics, and customer relationship management tools.

E-marketplace platforms also play a role in fostering competition and innovation in the market. By providing a platform for small and medium-sized businesses to sell their products alongside larger retailers, e-marketplaces create a level playing field where businesses can compete based on the quality and value of their products, rather than their size or budget. This competition can drive businesses to innovate and improve their products and services, ultimately benefiting consumers with better choices and lower prices.

Methodology

This research is Quantitative Research The research method is as follows.

1. Population and sample groups in the research include:

1.1. The population: includes people living in Ban Wang Chot community, Huai Toei Subdistrict, Kut Rang District, Maha Sarakham Province, totaling 379 people.

1.2 The sample group: includes people living in the Mueang District area Maha Sarakham Province, number of 195 people, came from using the formula of Yamane (1973) by setting the sampling error equal to 0.05.



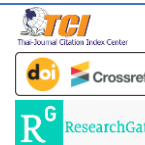


2. Research tools include: The questionnaire consists of part 1: the general status of the respondents. It is like a survey, part 2. The objective questionnaire is 1) To study and analyze the social capital potential of the GI yam bean farmers' group in the community of Ban Wang Chot Huai Toei Sub-district Kud Rang District Maha Sarakham Province 2) To develop the GI yam bean products in the community of Ban Wang Chot Huai Toei Sub-district Kud Rang District, Maha Sarakham Province ready for sale on the e-Marketplace platform and 3) To evaluate the impact of developing the GI yam bean products' standardization for the farmers in the community of Ban Wang Chot Huai Toei Sub-district Kud Rang District Maha Sarakham Province is a 5-level rating scale and part 3, comments and other suggestions, is open-ended. (Open Ended) as well as the researcher taking the questionnaire to find out the quality of the tool, namely 1) brought the questionnaire to the consultant and proceeded to improve it according to the recommendations. 2) brought the revised questionnaire to present to 3 experts to Check the consistency of the content by looking for the consistency of the objectives with the questions (Index of Item–Objective Congruence: IOC) (Saiyasak & Angkanakul, (2000). It was found that the IOC value was between 0.80–1.00. and 3) testing the instrument with a non-sample population of 30 sets. The evaluation results had discriminatory power between 0.25–0.75 and the reliability of the questionnaire was determined using Cronbach's method (1951; Cited in Srisa-at, 2015), which the confidence evaluation results have a confidence value of 0.95.

3. Data collection includes collecting data from Primary data collection involves gathering information through questionnaires from a sample group for the research. The sample consists of 195 residents living in Mueang District, Maha Sarakham Province, determined using Taro Yamane's formula (1973) with a sampling error of 0.05.

4. Data analysis includes data analysis: This involves quantitative data analysis, where the data collected from the questionnaires are analyzed using statistical research

5. Statistics used in the research: include a ready-made descriptive statistics program consisting of percentage mean and standard deviation



Results

The results are as follows:

1. To study and analyze the social capital potential of the GI yam bean farmers' group in the community of Ban Wang Chot Huai Toei Sub-district Kud Rang District Maha Sarakham Province

The research results found that to study and analyze the social capital potential of yam bean farmers' groups in Ban Wang Chot Huai Toei Sub-district Kut Rang District Maha Sarakham Province.

1.1 Cultivation Area: The farmers in this community predominantly cultivate yam beans in the Ban Wang Chot area utilizing their land efficiently with sustainable agricultural practices.

1.2 Group Formation: Farmers have formed groups to support and develop yam bean cultivation in the area facilitating knowledge exchange and collective purchasing of agricultural inputs and equipment.

1.3 Benefits of Group Membership: Being part of a group enhances access to important resources such as agricultural promotion projects research participation and access to new markets.

1.4 Community Relations: These farmer groups play a vital role in fostering good relationships within the community sharing experiences and agricultural knowledge with neighboring communities.

1.5 Skill and Knowledge Development: Group membership contributes to the development of agricultural skills and knowledge leading to improved farming efficiency and personal development.

Studying the social capital potential of yam bean farmers' groups in Ban Wang Chot Huai Toei Sub-district Kut Rang District Maha Sarakham Province helps to understand the importance and effectiveness of these groups in agricultural and community development.

2. To The Development of Processing and Enhancement of GI Product Standards of Yam Bean in Communities of Maha Sarakham Province for E-Marketplace Platforms



The research results found that The Development of Processing and Enhancement of GI Product Standards of Yam Bean in Communities of Maha Sarakham Province for E-Marketplace Platforms The researcher can classify according to Table 1 as follows:

Table 1 Mean and Standard Deviation of Yam Bean GI products in Ban Wang Chot community

yam Bean GI products in Ban Wang Chot community		Level of Opinion			
		\bar{x}	S.D.	Interpretation	Rank
		of results			
1	Honey Yam bean bar soap products	4.20	0.38	Hight	4
2	yam bean milk liquid soap products	4.44	0.42	Hight	1
3	pickled yam bean products	4.32	0.44	Hight	3
4	yam bean kimchi products	4.01	0.38	Hight	5
5	yam bean Sato products	4.43	0.45	Hight	2
6	yam bean milk pudding products	4.00	0.34	Hight	6
7	yam bean salad (Som Tam) products	3.85	0.32	Hight	8
8	yam bean face mask or face pack powder products	3.92	0.41	Hight	7
Total		4.19	0.40	Hight	

From Table 1, it was found that The Development of Processing and Enhancement of GI Product Standards of Yam Bean in Communities of Maha Sarakham Province for E-Marketplace Platforms Overall, it is at a high level ($\bar{x} = 4.19$, S.D. = 0.40) And when considering each aspect individually, sorted from the highest to the lowest average, they are: 1) yam bean milk liquid soap products ($\bar{x} = 4.44$, S.D. = 0.42) 2) yam bean Sato products ($\bar{x} = 4.43$, S.D. = 0.45) 3) pickled yam bean products ($\bar{x} = 4.32$, S.D. = 0.44) 4) honey yam bean bar soap products ($\bar{x} = 4.20$, S.D. = 0.38) 5) yam bean kimchi products ($\bar{x} = 4.01$, S.D. = 0.40) 6) yam bean milk pudding products ($\bar{x} = 4.00$, S.D. = 0.34) 7) yam bean face mask or face pack powder products ($\bar{x} = 3.92$, S.D. = 0.41) and 8) yam bean salad (Som Tam) products ($\bar{x} = 3.85$, S.D. = 0.32) respectively.

Product Examples

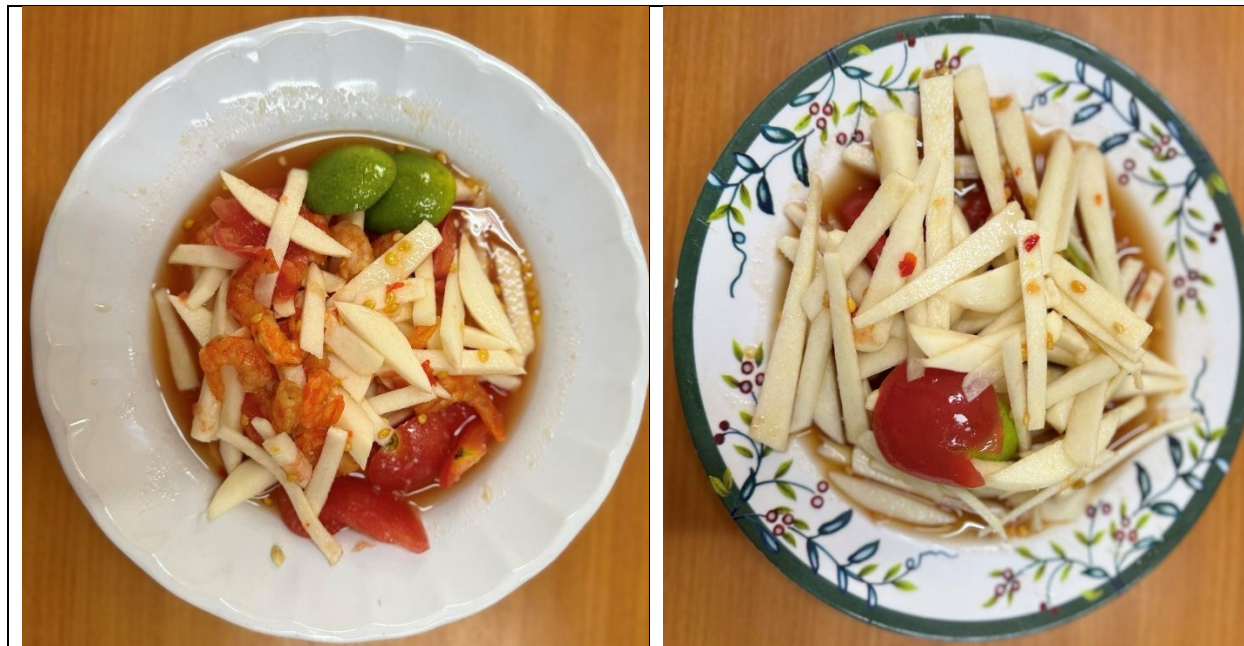


Figure 1 Yam Bean Salad (Warit Rasri, 2024)



Figure 2 Pickled Yam Bean (Warit Rasri, 2024)



Figure 3 Yam Bean Kimchi (Warit Rasri, 2024)



Figure 4 Yam Bean Liquid Soap (Warit Rasri, 2024)



Figure 5 Yam Bean Bar Soap (Warit Rasri, 2024)



Figure 6 Yam Bean Sato (Warit Rasri, 2024)

3. To evaluate the impact of developing the GI yam bean products' standardization for the farmers in the community of Ban Wang Chot Huai Toei Sub-district Kud Rang District Maha Sarakham Province

The research results found that evaluate the impact of developing the GI yam bean products' standardization for the farmers in the community of Ban Wang Chot Huai Toei Sub-district Kud Rang District Maha Sarakham Province The researcher can classify according to Table 2 as follows:

Table 2 Mean and standard deviation of the evaluations

Evaluation Criteria		Level of Opinion			
		\bar{x}	S.D.	Interpretation of results	Rank
1	The products are innovative	4.72	0.38	a lot	2
2	The products are diverse	4.60	0.47	a lot	5
3	The products are suitable for sale on e-marketplace platforms	4.74	0.45	a lot	1
4	The products are affordable and can be purchased by people in the community	4.53	0.36	a lot	6
5	The products have low production costs	4.64	0.41	a lot	4
6	The products are in demand by the market or consumers	4.70	0.48	a lot	3
7	The products have attractive and appealing packaging	4.40	0.42	a lot	7
Total		4.62	0.42	the most	

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Conclusion

The results of the research were as follows:

1. To study and analyze the social capital potential of the GI yam bean farmers' group in the community of Ban Wang Chot Huai Toei Sub-district Kud Rang District Maha Sarakham Province

The research results found that to study and analyze the social capital potential of yam bean farmers' groups in Ban Wang Chot Huai Toei Sub-district Kut Rang District Maha Sarakham Province.

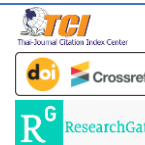
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Studying the social capital potential of yam bean farmers' groups in Ban Wang Chot Huai Toei Sub-district Kut Rang District Maha Sarakham Province helps to understand the importance and effectiveness of these groups in agricultural and community development.

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and can be purchased by people in the community ($\bar{x} = 4.53$, S.D. = 0.36) 7) The products have attractive and appealing packaging ($\bar{x} = 4.40$, S.D. = 0.42) respectively.

Discussion

Developing and enhancing the GI product standards of Yam Bean from communities in Maha Sarakham Province for e-marketplace platforms is crucial for increasing the value and competitiveness of these products. By developing unique and high-quality standards, the products can better meet customer needs and market demands, enhancing their marketability and reputation. This process involves creating standards that are distinctive and of high quality to cater to specialized markets and customer requirements, thus boosting access to global markets and creating a stable and broad customer base. Consistent with the research it can benefit from existing studies. Utilizing knowledge management factors and implementing a digital-based marketing information system (Pinandhito et al., 2023) can enhance the quality and reach of Yam Bean products. Additionally, incorporating the use of e-commerce training and online trading platforms for community enterprises (Chienwattanasook et al., 2023) can further support the expansion of sales channels. To ensure adherence to standards, introducing mechanisms for supervision and punishment in the agricultural product cluster can promote compliance and development (Li & Chen, 2013). By integrating these insights and strategies, the Yam Bean GI product standards can be effectively developed and promoted on e-marketplace platforms, contributing to the growth of the local economy in Maha Sarakham Province.

Chaemchamrus et al (2022) The study on Upgrading and Increasing Value of Souvenir Products in Tourist Attractions; Experience the Charm of the Old City Lifestyle, Phra Nakhon Si Ayutthaya Province found that: There are four types of distinctive souvenir products: food, utensils and ornaments, clothing and accessories, and herbal products. The most common purchasing behavior among tourists is based on the product's characteristics, reflecting the locality's uniqueness, and its artistic and aesthetic value. The development and enhancement of souvenir products focus on the iconic Pla Ta Pien (Mud Carp) of Phra Nakhon Si Ayutthaya, involving the creation of new products using the S-F-U-P-C Model. This has resulted in five new products: 1.





Odorless Mud Carp fish, 2. Mud Carp jewelry, 3. Mud Carp lantern, 4. Thai fabric with Mud Carp pattern, and 5. Painted fabric bags.

Artitkawin et al (2019) researched developing the value of products, highlighting the importance of maintaining their unique identity. They emphasized that the product's storytelling should be clear and concise. Tourists prefer souvenirs that are well-designed, appropriately sized, and practical. The researchers enhanced functionality and ensured alignment with Ruthamnong (2019) who found that community products, when tasty and appropriately sized and priced, sell better. This aligns with Mawufemor's (2019) research, which indicated that tourists prioritize souvenirs that are well-designed and created with artistic skills and creativity. Vasheghani-Farahani (2014) found that the perception of product value is a significant variable influencing the purchasing behavior of tourists towards souvenirs. This perception leads to an increase in the quantity of souvenir purchases by tourists, thereby generating more revenue for tourist destinations.

Recommendation

1. Market Analysis: Conduct a comprehensive market analysis to understand the demand for Yam Bean products, including consumer preferences, market trends, and competitor analysis. This will help identify opportunities for product development and market positioning.

2. Product Development: Explore innovative ways to enhance the quality and value of Yam Bean products, such as improving packaging, introducing new product variants, or developing value-added products. Consider incorporating local flavors or traditional recipes to cater to specific market segments.

3. E-Marketplace Integration: Evaluate the feasibility of integrating Yam Bean products into existing e-marketplace platforms or developing a dedicated platform for these products. Consider factors such as platform usability, transaction security, and marketing capabilities to maximize reach and sales.

4. Community Engagement: Involve Yam Bean farmers and local communities in the development process to ensure their needs and perspectives are considered. This could include training programs, capacity-building initiatives, or cooperative marketing efforts to empower local producers and enhance product quality.





5. Certification and Standards: Work towards obtaining GI certification for Yam Bean products, which can help increase their value and marketability. Develop and enforce standards for product quality, packaging, and labeling to maintain consistency and consumer trust.

6. Sustainability Practices: Incorporate sustainable practices into Yam Bean production, such as organic farming methods or waste reduction strategies. Highlighting these practices can enhance the product's appeal to environmentally conscious consumers.

7. Consumer Awareness: Implement strategies to raise awareness about the benefits and uniqueness of GI-certified Yam Bean products among consumers. This could include promotional campaigns, product demonstrations, or collaborations with influencers or chefs.

8. Evaluation and Feedback: Continuously evaluate the impact of your efforts on product development and market penetration. Gather feedback from consumers, farmers, and other stakeholders to identify areas for improvement and refine your strategies accordingly.

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