STRATEGIC MANAGEMENT OF TALAS BENENG (*Xanthosoma undipes*) AGROFORESTRY IN CIAMIS REGENCY, INDONESIA

Suhartono[1], Dwiko Budi Permadi[2*], Sanudin[3]

[1]Research Center for Ecology and Ethnobiology, Badan Riset dan Inovasi Nasional,
Jl. Raya Jakarta-Bogor Km. 46, Cibinong, Bogor, Indonesia 16911
[2]Faculty of Forestry, Universitas Gadjah Mada, Jl. Agro No. 1 Bulaksumur Yogyakarta, Indonesia 55281*
[3]Research Center for Population, Badan Riset dan Inovasi Nasional,
Jl. Jenderal Gatot Subroto No 10, Jakarta, Indonesia 12710

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STRATEGIC MANAGEMENT OF *TALAS BENENG* (*Xanthosoma undipes*) AGROFORESTRY IN CIAMIS REGENCY, INDONESIA. Recently, the Indonesian government has sought to secure food production from forestlands by implementing agroforestry in rural areas. *Talas beneng* or tall elephant ear plant (*Xanthosoma undipes*) is a potential species for agroforestry that produces medicinal tubers and leaves. It has high productivity and export opportunities, but its management strategy under community forestland needs to be more widely studied. In Ciamis Regency, *talas beneng* has been cultivated for the last two years, but the progress has not been significant. This study aimed to formulate strategic management for improving its business model by identifying internal and external factors. Two groups of farmers in Ciamis Regency were chosen as the case study. Observation and in-depth interviews with farming group leaders as key informants were employed to gather the existing model business. Internal and external factors were analyzed using a business model canvas (BMC) framework, SWOT analysis and quantitative strategic planning matrix (QSPM). Results show that the market channels between the two groups of *talas beneng* producers are slightly different. SWOT analysis shows that both groups have positions in which product development and market penetration are required as strategies to improve future management. Specific strategies that need to be prioritized include 1) improving farming intensification, 2) improving *talas beneng* product competitiveness, and 3) expanding the business partnership to access market information better.

Keywords: Business Model Canvas, product development, market penetration, SWOT, QSPM

*MANAJEMEN STRATEGIS AGROFORESTRI TALAS BENENG DI KABUPATEN CIAMIS, INDONESIA. Saat ini, pemerintah Indonesia berusaha manambahkan produksi pangan dari kawasan hutan dengan menerapkan agroforestri di pedesaan. Talas beneng (*Xanthosoma undipes*) merupakan jenis potensial untuk agroforestri yang menghasilkan umbi dan daun. Jenis ini memiliki produktivitas dan peluang ekspor yang tinggi, tetapi strategi pengelolaannya secara agroforestri belum dipelajari secara luas. Di Kabupaten Ciamis, talas beneng telah dibudidayakan dalam dua tahun terakhir, namun perkembangannya belum signifikan. Studi ini bertujuan merumuskan manajemen strategis untuk meningkatkan model bisnisnya dengan mengidentifikasi faktor internal dan eksternal. Dua kelompok petani di Kabupaten Ciamis dipilih sebagai studi kasus. Observasi dan wawancara mendalam dengan ketua kelompok tani sebagai informan kunci digunakan untuk mengumpulkan model bisnis yang ada. Faktor internal dan eksternal dianalisis menggunakan kerangka kerja business model canvas (BMC), analisis SWOT dan analisis Quantitative Strategic Planning Matrix (QSPM). Hasil menunjukkan bahwa alur pemasaran antara kedua kelompok produsen talas beneng sedikit berbeda. Analisis SWOT menunjukkan bahwa kedua kelompok tersebut memiliki posisi bisnis di mana pengembangan produk dan penetrasi pasar diperlukan sebagai strategi utama untuk meningkatkan pengelolaannya jangka panjang. Strategi khusus yang layak mendapat prioritas antara lain 1) meningkatkan intensifikasi usahatani; 2) meningkatkan daya saing produk talas beneng; dan 3) memperluas kemitraan bisnis untuk akses informasi pasar yang lebih baik.*

Kata kunci: Model Bisnis Canvas, pengembangan produk, penetrasi pasar, SWOT, QSPM

*Corresponding author: dbpermadi@ugm.ac.id

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I. INTRODUCTION

The three main challenges in realizing food availability in many countries include limited agricultural land, declining land carrying capacity, and increasing population (García-Oliveira et al., 2022; Winara et al., 2022). In Indonesia, the government has sought several solutions to address this problem when dealing with limited agricultural land, one of them being the distribution of 4.1 million ha of forest area land for agrarian reform and 12.7 ha of forest area land for social forestry programs (Ministry of Environment and Forestry, 2020). This policy will have an effect in the longer term. While in short and medium terms, the government is also encouraging the intensive use of private forestland through agroforestry cropping patterns to increase food production and generate rural income. Agroforestry is an effective, efficient, and sustainable land-use pattern to help increase food production and reduce the negative impacts of climate change on agricultural productivity (Papa et al., 2020; van Noordwijk et al., 2021; Winara et al., 2022).

Currently, agroforestry not only produces food for subsistence purposes (Achmad et al., 2022) but has also shifted into agricultural business activities (Parthiban et al., 2022; Syaifudin, 2020). *Talas beneng* (*Xanthosoma undipes*) is one of the superior national varieties of tubers being developed to strengthen food security and commercial purposes (Budiarto & Rahayuningsih, 2017). It also has a common name, called the "tall elephant's ear" plant as its leaves are quite big enough like an elephant's ear. Along with being adaptive to shaded environments (Rusbana et al., 2016), *talas beneng* also has high tuber productivity (Susilawati et al., 2021), sufficient nutritional content, economic value (Hermita et al., 2017; Rostianti et al., 2018), and export opportunity (Maulana, 2020; Wiyanto, 2021). Its demand is increasing along with the development of its use for food (Fatmawaty et al., 2019).

In Indonesia, *talas beneng* tubers are widely cultivated in Pandeglang Regency, Banten Province and have penetrated various West Java Province regions, including the Ciamis Regency. Ciamis Regency represents regions in which the size of small-scale community forests has been significantly developed in West Java Province (Siarudin et al., 2022). The private land for agroforestry in Ciamis covers an area of 20,866.47 ha (Statistics Ciamis, 2022), potentially supporting the development of *talas beneng* agroforestry cultivation. In this regency, it has been cultivated just recently, for the last two years, but the progress has yet to be widely studied.

Some research has been conducted on *talas beneng*, especially concerning tuber postharvest products, such as modified *talas* starch (Yuliani & Herawati, 2022), talas starch nanoparticle (Agustina et al., 2022), talas flour quality (Putri et al., 2021), talas amylographies (Pamela et al., 2019), *nata de talas beneng* (Maulani & Hakiki, 2018), and talas brownie cake (Haliza et al., 2017). Moreover, a few studies also have been performed on cultivation and nurseries (Maulina et al., 2022; Sari et al., 2019), phytochemical analysis of talas leaves (Fatmawaty et al., 2019), and the economic value of using talas leaves (Astuti, 2022). Information on the results of *talas beneng* research as a business is still limited. For example, research on market chains, business strategies, internal and external factors influencing *talas beneng* farming using agroforestry patterns.

The strategic management theory approach can be applied to bridge this research gap on the business model of Agroforestry *talas beneng*. It is also needed to formulate, implement, and re-evaluate farming to make it more profitable and sustainable. Information on internal and external farming environments is needed (David, 2011). Strengths, Weaknesses, Opportunities, and Threats (SWOT) is an analysis commonly used to formulate strategies that maximize strengths and opportunities but simultaneously minimize weaknesses and threats (Setyorini & Santoso, 2017). A business unit can use the business model canvas (BMC) framework to identify

internal and external factors. BMC discusses business from nine aspects: customer segments, customer relationships, channels, value propositions, revenue streams, key activities, key partners, key resources, and cost structures (Osterwalder & Pigneur, 2015; Herawati et al., 2019; Rastryana, 2021).

Several research cases have used the BMC approach to studying small-scale farming. Rahayu (2019) studied the dragon fruit business strategy with the BMC approach, yielding several alternative strategies, including developing markets, increasing product competitiveness, increasing human resource capacity, increasing partnerships, and increasing business capital. Maftahah et al. (2022) explored mushroom cultivation, resulting in recommendations for an aggressive strategy with a new design for its canvas business model. Other studies have concluded that the digital marketing strategy for cut roses using the BMC approach increases business profits during pandemics (Manalu & Utami, 2021). Our study aimed to formulate strategic management for developing *talas beneng* farming based on the canvas business model framework, internal and external environmental conditions, and the current farm position. The results were expected to become references for farmers and related stakeholders, especially local government and market players for developing more profitable and sustainable *talas beneng* farming.

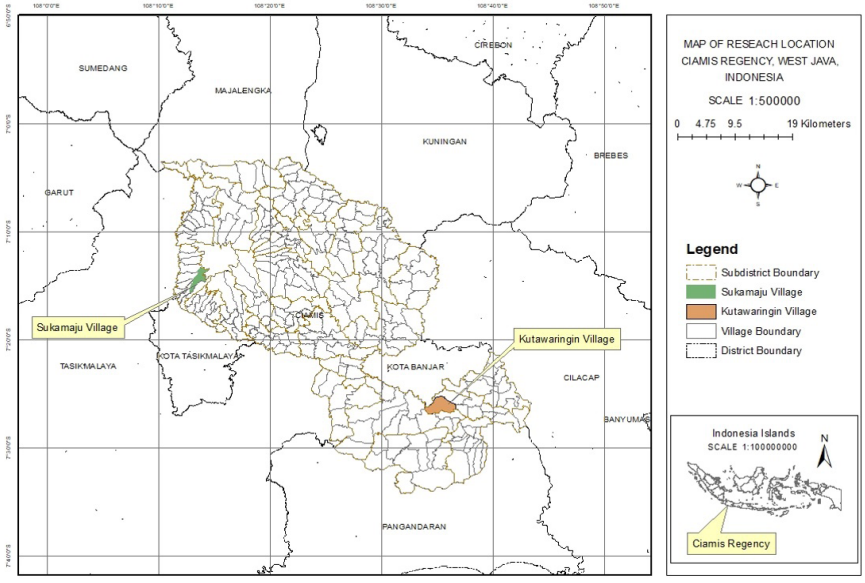
II. MATERIAL AND METHOD

A. Study Site

This research was conducted from May to August 2022 using a case study approach to *talas beneng* farming in the community forest in Sukamaju Village and Kutawaringin Village, Ciamis Regency. These two locations were chosen because *talas beneng* is available in this area. The development of taro farming in both locations began when several farmers collectively ordered taro seeds from 2019-2020. Farmers utilize community forestland by planting *talas beneng* between trees, fruit trees, and plantation crops. Currently, there are 51 *talas* farmers in both villages.

B. Data Collection Methods

The first stage of research data collection involved direct observation of the phenomenon of *talas beneng* farming and preliminary interviews with collectors, members of the Indonesian *talas beneng* Farmers Association (Pertabenindo), taro leaf choppers, and farming



Source: RBI Map 2019

Figure 1. Map of the study site

group chairs to identify the main issues and gain an understanding of the business. The main data collection comprised nine BMC aspects: customer segments, value propositions, channels, customer relationships, revenue streams, key activities, key resources, key partners, and cost structures. The nine aspects were classified into internal and external factors. Each factor was weighted and rated, including the relative attractiveness of the strategy to internal and external factors. The stages of data collection in this study were as follows.

1. BMC data collection was conducted through open-ended in-depth interviews with two key informants (farming group chairs). Furthermore, the classification is carried out into internal and external factors as well as the formulation of a strategy based on the SWOT analysis,
2. Assessment of the weight and rating of internal and external factors was carried out by filling out a questionnaire by two chairs and five administrators of *talas beneng* farming group, and
3. The attractiveness score of each strategy for internal and external factors was assessed by filling out a questionnaire with two farming group chairs, one manager of a village-owned enterprise that cultivates *talas beneng*, three researchers who investigated *talas beneng*, two academics, and three forestry officers.

The operational definitions and measurement methods for BMC variables are presented in Table 1.

C. Data Analysis

Farming business model data were analyzed descriptively, starting by reducing the data, presenting and finally concluding it so that a list of SWOT could be compiled. Furthermore, formulating the strategic management was arranged through three data processing stages, namely, the input stage (data with the internal factor evaluation [IFE] matrix and external factor evaluation [EFE] put into the matrix), the matching stage (building the internal–external [IE] matrix and SWOT matrix), and decision stage (applying the Quantitative Strategic Planning Matrix [QSPM]) (David, 2011). Each stage is explained in the following paragraphs.

Input stage

Evaluating internal and external factors begins with compiling a list of internal and external factors of taro farming, followed by weighting and rating. The weight indicates how important a factor influences taro farming

Table 1. Operational definitions and measuring methods of BMC variables

BMC variable	Definition	Measuring method/question
Customer segments	Talas beneng consumers who want to reach	Who and where are the current consumers of *talas beneng* and what are their characteristics?
Value propositions	*Talas beneng* products with economic values	What value products are offered to *talas beneng* consumers?
Channels	Media to inform *talas beneng* products to consumers	What channels to reach consumers, how, and which channels are most efficient?
Customer relationships	Types of relationships with consumers	What types of relationships do consumers expect and what types have been built?
Revenue streams	Income sources from t*alas beneng* farming	How much cost (in general) are the *talas beneng* products and how much does it contribute to farm income?
Key resources	Main resources needed for *talas beneng* farming	What are the main resources needed to run *talas beneng* farming?
Key activities	Main activities of *talas beneng* farming	What are the key activities to run *talas beneng* farming?
Key partnerships	Main partners who support *talas beneng* farming	Who is the *talas beneng* business partners?
Cost structures	All costs to run *talas beneng* farming	What are the most essential costs in the *talas beneng* farming business?

success. Meanwhile, the rating shows how well an organization responds to internal and external factors. The weight value starts from a scale of 5 (very important) to a scale of 1 (very unimportant), whereas the rating value starts from a scale of 4 (very good) to a scale of 1 (not good) (Rangkuti, 2016). This study's weight and rating values were obtained from the interview of two heads and five administrators/movers of taro farming groups. The next stage was to multiply the relative weight by rating to obtain the total score of IFE and EFE matrices.

Matching stage

Two data processing steps are taken in the matching stage: preparing the IE matrix and the SWOT matrix. The IE matrix aims to see the strategic position of *Talas beneng* farming in the matrix, which is arranged based on two key dimensions, namely, the total IFE score on the X axis, the total EFE score on the Y axis. It comprises nine cells that are grouped into three major sections with different strategy implications (Table 2).

a) Cells I, II, and IV are the grow and build categories. The main strategies supporting this position are backward integration, forward integration, horizontal integration, market penetration, market development, and product development.
b) Cells III, V, and VII are the hold and maintain categories. The main strategies supporting this position are market penetration and product development.
c) Cells VI, VIII, and IX are the harvest or divest categories. The main strategies supporting this position are retrenchment and divestment.

The SWOT matrix aims to develop alternative strategies based on a logic that maximizes strengths and opportunities while minimizing existing weaknesses and threats to support the main strategies for developing taro farming. The stages of compiling the SWOT matrix are as follows: 1) compiling a list of taro farming SWOT, 2) compiling a strength–opportunity (S–O) strategy based on matching strength and opportunity factors, 3) compiling a weakness–opportunity (W–O) strategy based on matching weakness and opportunity factors, 4) compiling a strength–threat (S–T) strategy based on matching strength and threat factors, and 5) compiling a weakness–threat (W–T) strategy based on matching weakness and threat factors.

Decision stage

After compiling several alternative functional strategies based on the SWOT matrix, priority strategy selection was carried out through the QSPM approach with the following steps: 1) listing internal and external factors in the left column of the QSPM; 2) assigning a weight value to each factor as in the IFE and EFE matrices; 3) compiling a list of strategic alternatives on the top row; 4) giving attractiveness score (AS), which indicates the relative attractiveness of each factor to alternative strategies with a value of 1 (not attractive), 2 (rather interesting), 3 (quite interesting), 4 (very interesting); and 5) calculating the total attractiveness score by multiplying the weight against the AS value. In

Table 2. Internal–external matrix for SWOT analysis

	I / E	Internal factor		
		Strong 3–4	Medium 2–2.9	Weak 1–1.9
External factor	High 3–4	I	II	III
	Medium 2–2.9	IV	V	VI
	Low 1–1.9	VII	VIII	IX

Source: (David, 2011)

this study, an assessment of the attractiveness of alternative strategies for internal and external factors was carried out by informants comprising two *talas beneng* farming group heads, a *talas beneng* business manager in a Badan Usaha Milik Desa enterprise, three researchers from the National Research and Innovation Agency, two academics from the Galuh University, two forestry practitioners from the West Java Forestry Department, and a forestry practitioner from the Center of Standard and Instrument Implementation of Environmental and Forestry Ciamis.

III. RESULTS AND DISCUSSION

A. Business Model Canvas of Talas beneng

Talas beneng is cultivated to produce leaves and tubers. However, only leaves have been produced and marketed in the research locations. Although the target consumers of both groups refer to wholesalers/exporters, a slight difference exists between the two *talas beneng* business groups in implementing their business models. Farming group 1 (Sukamaju Village) processes talas leaves into dried chopped leaves and sells them to wholesalers/exporters. Farming group 2 (Kutawaringin Village) sells wet talas leaves to collectors who produce dried chopped leaves and sell them to wholesalers/exporters. However, this difference has affected the other aspects of BMC between the two groups. An overview of the complete business model implementation by the two farming groups is presented in Table 3.

Information about *talas beneng* is disseminated to consumers and the public through social media and agricultural fairs. Proceeds from the sales of dry chopped and wet taro leaves are the main income sources for *talas beneng* farming. The main general activities of *talas beneng* farming are plantation, maintenance, leaf harvesting, leaf processing, and marketing. These activities differ slightly from those of farming groups in Kutawaringin Village who do not carry out postharvest activities because they sell wet taro leaves directly to collectors. The relationships between groups and consumers are carried out personally through direct and contract sales. To develop their business, farming groups in Sukamaju Village have Received Support from the village government and private companies from Semarang, Central Java. However, farming groups in Kutawaringin Village have yet to formally cooperate in developing their business. Some main farming activities that require direct

Table 3. BMC implementation of Talas beneng farming with agroforestry patterns by farmers

No.	BMC aspect	Farming group Sukamaju Village	Farming group Kutawaringin Village
1	*Customer segments*	Wholesalers/exporters	Collectors/choppers of taro leaves
2	*Value propositions*	Dried chopped taro leaves, taro tubers	Wet taro leaves, taro tubers
3	*Channels*	Private/direct, social media	Private/direct, agriculture fairs
4	*Customer relationships*	Direct sales, sales by contract	Direct sales
5	*Revenue streams*	Sales of dried chopped taro leaves, taro tubers	Sales of wet taro leaves, taro tubers
6	*Key resources*	Land, labor, farming tools, postharvest technology, farming capital, farming group institutions	Land, labor, farming tools, farming capital
7	*Key activities*	Plantation, maintenance, harvesting, processing, marketing	Plantation, maintenance, harvesting, marketing
8	*Key partners*	Village governments, private companies, production input providers	Production input providers
9	*Cost structures*	Direct costs (land tax, seed, chopper machine, postharvest infrastructure, postharvest labor) and indirect costs (family labor for planting and harvesting)	Direct costs (land tax, seed) and indirect costs (family labor for planting and harvesting)

costs include seed procurement, postharvest facility, postharvest labor, and land tax.

B. Internal and External Factors of *Talas beneng* Farming

The results of the SWOT analysis assessment of the nine BMC aspects of *talas beneng* farming reveal internal and external factors that affect the current *talas beneng* farming, as presented in the SWOT matrix in Table 4.

Farmers cultivate *talas beneng* as an intercrop among annual crops on community forestland. The potential for community forests in Ciamis Regency is extensive, as 20,866.47 ha spread over 27 subdistricts (Statistics Ciamis, 2022), making it a production factor potential for *talas beneng* development. It is also supported by the labor production factors available and simple cultivation methods. The number of farmers in Ciamis has reached 133,109 people (Ciamis Local Government, 2019). Farmers can cultivate *talas beneng* only with simple farming tools such as hoes, scrapers, and sickles. The production potential of up to 40 kg/stem at >2 years allows farmers to earn additional income. Moreover, the availability of chopper machines owned by farming groups and partners (collectors) is one of the supports for increasing the added value of *talas beneng* cultivation.

The low awareness among farmers regarding the maintenance of plants and limited product diversification are two causes of farming productivity at the research location needing to be more optimal. The limited farmer capital to buy seeds, which are expensive, and limited cooperation also significantly affect taro development. It is exacerbated by the farming management implementation that can be more optimal. The high demand for *talas beneng* leaves supported by the available marketing channels is still the main attraction for *talas beneng* farming. The revenue potential of *talas beneng* farming is relatively high because leaves have economic value in addition to producing large tubers. *Talas beneng* farming productivity increases with the opportunity to increase the added value from tuber processing. The weights of *talas beneng* tubers reach 2.4–15 kg in 8–12 months with potential revenue of IDR 20 million/ha per year (Susilawati et al., 2021). Government and private support and facilitation are needed to optimize these potentials and opportunities.

The impacts of similar businesses, such as Nampu taro (Halmonela javanica) and Kajar taro (Colocasia gigantea), are felt by *talas beneng* farming groups because both types can be used as substitutes for *Talas beneng* leaves. Access to market information is also an obstacle experienced by *talas beneng* farming groups. These groups have no strong bargaining position in determining selling prices. Plant-disturbing organisms and rainy season factors are also obstacles to *talas beneng* farming. Wild boar is a potential threat to *talas beneng* plants far from settlements. By contrast, rainy weather factors can reduce the quality of dry chopped taro leaves because the drying of leaves can be improved.

Table 4. Internal and external factors of talas beneng farming with agroforestry patterns

Strengths	Weaknesses
1. Sufficient land available	1. Limited product diversification
2. Sufficient labor available	2. Low intensification
3. Farmer equipment available	3. Limited capital
4. High production potential	4. Less partnership
5. Postharvest technology available	5. Poor farming management
Opportunities	**Threats**
1. High market demand	1. Beneng taro leaf substitution product
2. Marketing channel available	2. Limited access and market information
3. High-income potential	3. Monopoly selling price by trader
4. Non-leaf utilization potential	4. Plant-disturbing organism
5. Government/Private support	5. Rainy weather

C. *Talas Beneng* Farming Position

The responses of farming groups in utilizing strengths and minimizing existing weaknesses are in the average category, as shown by the total IFE matrix score of 2.76 in Figure 2.

Farmer optimism about the high production potential, leaf processing technology availability, and community forestland availability are the main strengths of *talas beneng* farming. Meanwhile, low farming intensification, limited product diversification, and limited farmer capital are the main areas for improvement in *talas beneng* farming development. Farmers can obtain additional income because of the high potential for *talas beneng* production, supported by adequate postharvest technology and sufficient land availability. The yield of taro tubers reaches 17.500 kg per ha with an average tuber weight of 40 kg/stem at >2 years (Agricultural Research Agency, 2016). Leaf processing technology availability and land adequacy are capital to increase the added value of *talas beneng* farming. Postharvest technology is quite helpful in adopting agricultural businesses (Mariyono, 2019). Meanwhile, land area determines income level (Nopitasari et al., 2019) and positively affects production, profit, efficiency, and farming sustainability (Arimbawa & Widanta, 2017; Benedetti et al., 2019; Ren et al., 2019).

Less intensive cultivation, low product diversification, and limited farmer capital cause *talas beneng* farming production and development to be less than optimal. Intensification is crucial to increase farming productivity (Mariyono, 2019) and labor absorption (Achmad et al., 2015). Opportunities to increase business productivity are still possible by increasing the variety of products harvested. Besides leaf products, the main tubers and mini tubers of *talas beneng* also have economic value (Susilawati et al., 2021). Thus, additional production input capital is needed, which is sufficient to increase farming income (Hermawan, 2019).

Apart from strengths and weaknesses, *talas beneng* farming has main opportunities and threats. The responses of farming groups in managing their opportunities and potential threats are in the moderate category, as shown by the total EFE matrix score of 2.93 in Figure 3.

Talas leaf demand, marketing channel availability, and the potential to increase added value from other leaf products are the main opportunities in *talas beneng* farming. Meanwhile, farmer limitations in accessing market information, the monopoly in selling prices by traders, and rainy weather factors are the main obstacles to its development. Market demand can influence farmers' selection of commodities (Setyaningrum & Banowati, 2020) and technology (Wardana & Alzarliani, 2019). The *talas beneng* business is increasingly attractive with the availability of institutions and marketing channels and opportunities to increase added value from tuber processing. However, the limitations of farming groups in accessing market information, the low bargaining positions of farmers in determining selling prices, and the weather factors during the rainy season are also obstacles in the current *talas beneng* farming development. In the digital era,

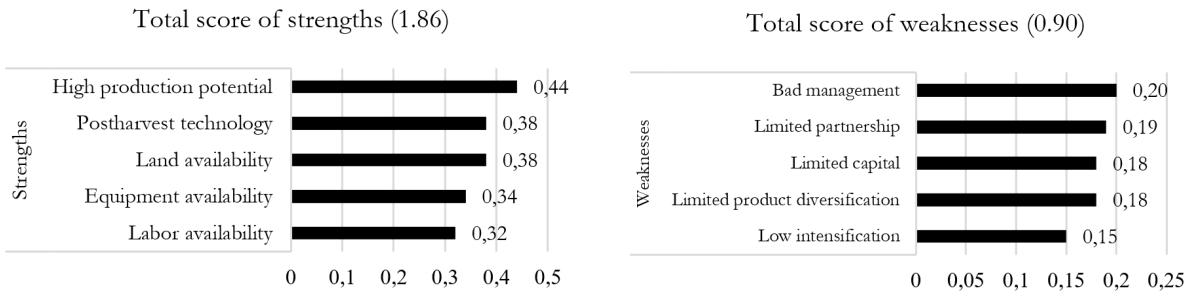


Figure 2. IFE matrix assessment of *Talas beneng* farming with agroforestry patterns

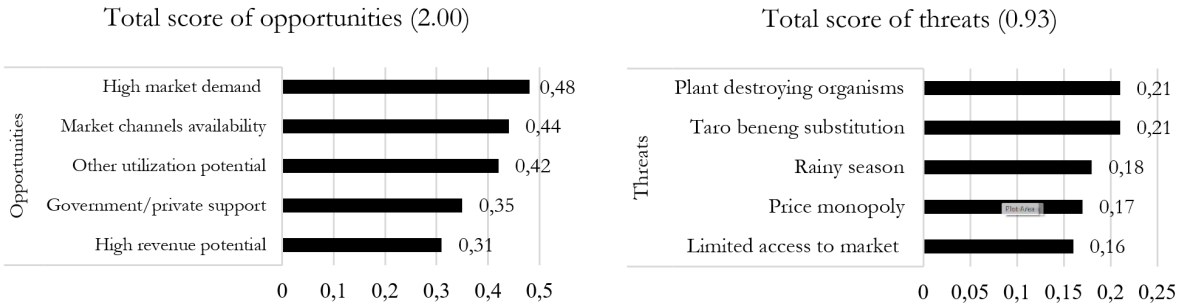


Figure 3. EFE matrix assessment of *Talas beneng* farming with agroforestry patterns

easy access to market information significantly affects agricultural business performance (Andriani et al., 2019; Isman, 2022) and farmer income (Syairozi, 2020). Price monopoly practices are also detrimental because farmers tend to obtain unfair prices (Sukri et al., 2018). Additionally, the rain factor is often the cause of decreased product quality due to drying problems (Apriliawan et al., 2018).

The evaluation results of internal and external factors show that *talas beneng* farming have more strengths than weaknesses and more significant opportunities than threats. Based on the IE position matrix, *talas beneng* farming in Ciamis Regency is in Cell V with a total score of IFE 2.75 and EFE 2.94. It is in the hold and maintained category. The main strategies recommended in this condition are market penetration and product development (David, 2011).

D. Formulating Strategic Management

It is suggested the main strategic management of both farmer groups should increase market penetration and product development in the near future. To support the main strategy in the current farming position, several alternative functional strategies were arranged by matching the strengths, weaknesses, opportunities, and threats through the SWOT matrix approach, as presented in Table 5.

The S–O strategy uses land, labor, agricultural equipment, processing technology, available market channels, and government/private support to increase taro farming productivity. Agricultural extensification and government/private facilitation can be alternative strategies to increase farming productivity. Meanwhile, the W–O strategy is formulated to reduce product diversification, farming intensification, working capital, partnership, and farming management weaknesses to gain better market opportunities. Increasing product diversity, farming intensification, increasing working capital, and expanding partnerships can be considered as alternative strategies to gain better market opportunities.

The S–T strategy is formulated to reduce the negative impacts of similar business development, price monopoly, pest disturbance, and weather factors that potentially threaten *talas beneng* farming sustainability. Optimizing available land, production, labor, equipment, and processing technology is an alternative strategy to reduce threat impact. Meanwhile, the W–T strategy is a defensive way to reduce internal weaknesses and external threats. Increasing product competitiveness, expanding partnerships, and improving farm management can be alternative strategies to minimize plant-destroying organisms and weather factors.

Three priority strategies are worth considering to support the main strategy for developing *talas beneng* farming in the Ciamis Regency based on the QSPM assessment. These strategies are: 1) improving farming intensification, increasing farming capital, and cooperating with the government/private sector; 2) improving *Talas beneng* product competitiveness; and 3) improving access to

Table 5. SWOT matrix of *Talas beneng* farming with agroforestry patterns

EFE \ IFE	**Strengths (S)** Sufficient land available, adequate labor available, farming equipment available, high production potential, and processing technology available	**Weaknesses (W)** Limited product diversification, low intensification, limited capital, partnership, and poor management
Opportunities (O) High market demand, marketing channel available, high potential revenue, utilization potential other than leaves, and government/ private support	S–O Strategy (1) Farming extensification to increase production and sales; (2) Seeking government/private support for business development to increase production and sales;	W–O Strategy (3) Increasing product diversification to obtain better market opportunity; (4) Improving farming intensification, capital and government/private cooperation; (5) Government/Private facilitation to improve farming management;
Threats (T) Talas beneng substitution, limited access, market information, selling price monopoly, plant-destroying organism, and rainy season	S–T Strategy (6) Optimizing land and production potential to obtain better market opportunity, (7) Optimizing resources and technology to overcome plant-destroying organisms (OPT) and the rainy season	W–T Strategy (8) Improving farming competitiveness to obtain better market opportunities; (9) Expanding partnerships to better access market information; and (10) Improving farm management to overcome OPT and rainy season

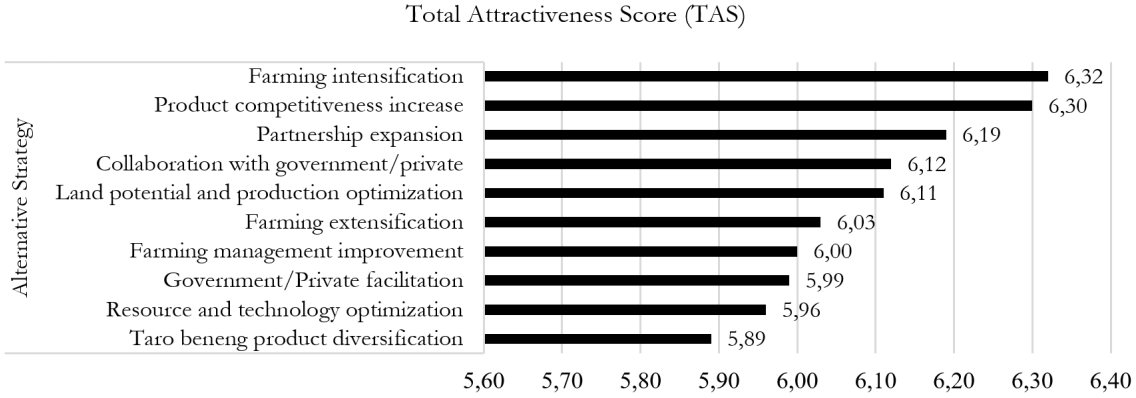


Figure 4. QSPM assessment of the *Talas beneng* farming strategy

market information through government/ private facilitation, as illustrated in Figure 4.

First, one of the causes of low productivity is that farmers need to take care of plants more intensively. Thus, farming intensification supported by capital and government/private facilitation is needed to increase business productivity. This strategy supports the main strategy (product development). Farming intensification affects increased production, income, and labor productivity (Emran et al., 2021; Gathala et al., 2021; Xie et al., 2019). Capital facilitation and cooperation by the government/private sector are expected to improve *talas beneng* farming intensification. It is in line with several research results that place intensification strategy, easy access to capital, and increased cooperation as priority strategies for overcoming farming problems (Fikri et al., 2019; Halimah et al., 2020; Rahayu et al., 2020).

Second, improving product competitiveness is necessary for developing *talas beneng* farming

in the Ciamis Regency. Competitiveness shows how superior *talas beneng* products are so that consumers like them. Strategies to increase *talas beneng* product quality and quantity are needed to support the main strategy (market penetration). Such a strategy has been widely used and made a priority in various studies on farming strategy development, as described in previous research results (Ariyanti & Suryantini, 2019; Malik et al., 2018).

Third, improving cooperation with the government/private sector and expanding access to market information are needed to support the main product development strategies and market penetration. The government has become a potential institution as a facilitator of counseling and capacity building for farming groups (Atuahene-Gima & Amuzu, 2019). Meanwhile, the private sector can support production supply facilities and crop sales. The more comprehensive the business partnership, the more it minimizes business risk and increases the profit potential (Osterwalder & Pigneur, 2015).

Furthermore, the selected priority strategy is expected to support the main strategy and strengthen the current farming position to be further profitable and sustainable. *Talas beneng* farming intensification supported by capital, networking, product competitiveness, and adequate access to market information is expected to increase *talas beneng* value proposition, providing solutions for consumers and contributing significantly to farming income.

IV. CONCLUSION AND RECOMMENDATION

The BMC analysis shows the *talas beneng* farmers in Ciamis regency can be distinguished into two groups based on product and market channel types. The first group (Sukamaju Village) sells dry chopped taro leaves directly to wholesalers/exporters. In contrast, the second group (Kutawaringin Village) sells wet taro leaves directly to collectors who produce dried chopped taro leaves for sale to wholesalers/exporters. IFE and EFE matrices show that the *talas beneng* farming position in both groups is in Cell V (medium), indicating the hold and maintained categories with the two main strategies: product development and market penetration.

The SWOT analysis results in 10 alternative strategies based on matching internal and external factors that make it possible to support the main strategies in the current position of *talas beneng* farming. Based on the QSPM, three of 10 strategies should be prioritized, namely, 1) strategies to improve farming intensification; 2) strategies to increase product competitiveness; and 3) strategies to expand the business partnership.

This research suggests improving *talas beneng* technology intensification with agroforestry patterns and forming cooperation that benefits the farmers. The government of Ciamis Regency and related parties can help strengthen farming group institutions, facilitate capital, and improve farming management skills to ensure farming sustainability. Farmer groups are advised to increase production to supply *talas beneng* demand by optimizing resources, improving intensification, implementing better farming management, and expanding cooperation with the government and or market players. In the near future, local government and market players should have a road map to enhance the adoption of *talas beneng* as an understorey plant grown in the community forest areas outside the research areas. It has potentially improved the farmers' income and rural economic development while keeping the community forests more sustainable.

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