

STRATEGY TO STRENGTHEN RED CHILI PRODUCTION IN CENTRAL BANGKA REGENCY

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ABSTRACT

Red chili pepper production data is unstable, with fluctuations in production volume, with increases and decreases in area, impacting the production levels of red chili farmers themselves. This study aimed to describe red chili farming in Central Bangka Regency and formulate alternative strategies for strengthening red chili production in Central Bangka Regency. This study was conducted from September 2021 to December 2021 in Central Bangka Regency. The research method used was a survey method. The population in this study was red chili farmers. Sampling was determined using a simple random sampling technique. The number of samples selected was 62 respondents using the Slovin Formula. Data were analyzed using qualitative descriptive analysis and SWOT analysis. The results showed that red chili farming in Central Bangka Regency includes nurseries/seedlings, land preparation, planting, maintenance, and harvesting. Alternative strategies for increasing red chili production are Strengths-Opportunities: optimizing land by utilizing production facilities to increase red chili production, and optimizing the function of farmer groups. Weaknesses -Opportunities: improving supporting facilities and infrastructure, increasing training and development for extension workers and farmers, and improving crop production results by participating in coaching and training from the local government. Strengths- Threats: Farmers' experience in developing red chili farming can overcome the problem of crop failure caused by pests and diseases, establish cooperation with extension workers and local governments, and increase farmers' knowledge of price information in the market to minimize price games. Weaknesses- Threats: application of agricultural machinery technology and providing farmers with an understanding of the characteristics of red chili. Suggested more training on how to deal with pests and diseases so that the farmer's production remains good.

Keywords: Red chili, farmers, production, training

ABSTRAK

Data produksi cabai merah tidak stabil, dengan fluktuasi volume produksi, dengan peningkatan dan penurunan luas areal, berdampak pada tingkat produksi petani cabai merah itu sendiri. Penelitian ini bertujuan untuk mendeskripsikan usahatani cabai merah di Kabupaten Bangka Tengah dan merumuskan alternatif strategi penguatan produksi cabai merah di Kabupaten Bangka Tengah. Penelitian ini dilaksanakan pada bulan September 2021 sampai dengan Desember 2021 di Kabupaten Bangka Tengah. Metode penelitian yang digunakan adalah metode survei. Populasi dalam penelitian ini adalah petani cabai merah. Pengambilan sampel ditentukan dengan teknik simple random sampling. Jumlah sampel yang dipilih sebanyak 62 responden dengan menggunakan Rumus Slovin. Data dianalisis menggunakan analisis deskriptif kualitatif dan analisis SWOT. Hasil penelitian menunjukkan bahwa usahatani cabai merah di Kabupaten Bangka Tengah meliputi pembibitan/bibit, persiapan lahan, penanaman, pemeliharaan, dan

panen. Alternatif strategi peningkatan produksi cabai merah yaitu Kekuatan-Peluang: optimalisasi lahan dengan memanfaatkan sarana produksi untuk meningkatkan produksi cabai merah, dan optimalisasi fungsi kelompok tani. Kelemahan-Peluang: peningkatan sarana dan prasarana pendukung, peningkatan pelatihan dan pembinaan bagi penyuluh dan petani, serta peningkatan hasil produksi tanaman dengan mengikuti pembinaan dan pelatihan dari pemerintah daerah. Kekuatan-Ancaman: Pengalaman petani dalam mengembangkan usahatani cabai merah dapat mengatasi masalah gagal panen akibat hama dan penyakit, menjalin kerja sama dengan penyuluh dan pemerintah daerah, serta meningkatkan pengetahuan petani tentang informasi harga di pasar untuk meminimalkan permainan harga. Kelemahan-Ancaman: penerapan teknologi mesin pertanian dan memberikan pemahaman kepada petani tentang karakteristik cabai merah. Disarankan untuk lebih banyak pelatihan tentang cara menangani hama dan penyakit agar produksi petani tetap baik.

Kata Kunci: Cabai merah, pelatihan, petani, produksi

INTRODUCTION

Red chili peppers are a highly sought-after horticultural commodity, with prices fluctuating. Despite price fluctuations, demand for chili peppers continues to rise. These costs will impact production levels, which in turn impact farmers' incomes. Costs and prices fluctuate annually. Red chili pepper prices fluctuate significantly because market conditions are influenced by the quantity of chili peppers available. When chili peppers are abundant, prices are low. Conversely, when market stocks are low, chili pepper prices are very high (Prayitno et al., 2013).

Based on data from BPS Central Bangka (2020), the number of production Chili plants amounted to 4,044.5 tons. Chili plants are usually harvested once a week, with the highest production occurring from

May to August. Total chili plant productivity in Central Bangka Regency in 2020 was 14.4 tons/ha (BPS Central Bangka, 2020). The per capita chili consumption rate is ± 1.79 kg/year (Central Bangka Agriculture Service, 2019). The chili consumption needs of the Central Bangka community are $\pm 294,333.28$ kg/year, so chili production in Central Bangka Regency only meets $\pm 86.39\%$ of the total consumption needs of the Central Bangka Regency community. This indicates that the market opportunity for chili commodities is still very open (Martini, 2019).

Red chilies are produced by several regencies and cities in the Bangka Belitung Islands Province. The largest chili production center in the Bangka Belitung Islands Province is in Central Bangka Regency. Central Bangka Regency has been designated as a red chili development area by the

Bangka Belitung Islands Provincial Government since year 2014. Matter that has been proven from the issuance of the Letter Decision Minister of Agriculture of the Republic of Indonesia Decree No. 45/Ktps/PD.200/1/2015 concerning the designation of chili and shallot areas in Central Bangka. This is expected to meet the community's needs for red chili production in the Bangka Belitung Islands. As is known, the community's needs for chili will consume chilli. Not yet can be replaced with other similar crops. Declining production and high demand for red chilies have caused the price of red chilies to continue to rise, which has an impact on the inflation rate (Bangka Belitung Islands Province Agriculture Service, 2018).

Red chili pepper production data is unstable, with fluctuations in production volume, with increases and decreases in area, impacting the production levels of red chili farmers themselves. This is probably due to several factors, including pest attacks. And disease, fertilizer, and pesticide. Factors that influence chili production include land cultivation, land area, seeds, labor, manure, chemical fertilizers, planting

distance, and Pesticides. Therefore, a strategy is needed to strengthen chili production to stabilize or prevent declines in red chili production in Central Bangka Regency. This can meet the demand for large red chilies in Central Bangka Regency.

Research on strategies for strengthening red chili production is necessary to determine how to strengthen red chili production to meet community needs. Based on this description. The researchers also examined how red chili farming in the sub-districts of Central Bangka Regency operates to develop and meet the needs of chili pepper.

METHODS

This research was conducted in Central Bangka Regency. The research was carried out from the preparation stage. The sampling method used in this study was probability sampling. The sample in this study was 62 farmers who run red chili pepper farming businesses in Central Bangka.

The data used in this study includes primary and secondary data. Primary data is data sourced

from the first party or the researcher who is an individual or a group. Primary data in this study were obtained from the results of interviews using questionnaires with samples of red chili farmers. While secondary data were obtained from the BPP of Central Bangka Regency, the Central Bangka Regency Agriculture Service, and the Central Statistics Agency. The secondary data used are data on the area of red chili production, red chili production results, red chili prices, etc.

The data analysis technique to answer the first problem in this study, namely how red chili farming in Central Bangka Regency, with indicators of nurseries, land preparation, planting, maintenance, and harvesting, using a qualitative descriptive analysis method, namely describing red chili farming. Primary and secondary data were obtained from observations, interviews, and literature. To answer the second problem, what is the strategy to

strengthen red chili production in Central Bangka Regency using the SWOT analysis method?

a. Determination Rating

Ratings describe how effective the company's current strategy is in responding to existing strategic factors.

b. Multiplication of Weights and Ranking

The next step is to arrange the weighting value with a rating for each factor, and the weighted value of each internal factor is then added up to obtain the total weighted value of the organization.

c. Stage Matching

The Matching Stage represents a critical phase in strategic formulation, where internal capabilities (strengths and weaknesses) are aligned with external conditions (opportunities and threats). This stage bridges diagnostic analysis with actionable strategy development, ensuring that organizational decisions are both grounded and responsive.

Table 1 SWOT Matrix

Internal External	Strength (S)	Weakness (W)
	Determine 5-10 factors internal strength	Determine 5-10 factors internal weaknesses
Opportunity (O)	SO Strategy	WO Strategy
Determine 5-10 opportunity factors external	Create a strategy that uses your strengths to your advantage. Opportunity	Create strategies that minimize weaknesses to take advantage of opportunities
Threat (T)	ST Strategy	WT Strategy
Determine 5-10 external threat factors	Create strategies that use strengths to overcome Threat	Create strategies that minimize weaknesses to avoid threats

(Source: Rangkuti, 2013)

RESULT AND DISCUSSION

Alternative Strategies for Strengthening Red Chili Production in Central Bangka Regency.

1. Internal Strategy Factors
a. *Strength* Factor

1. Available Land Potential

Central Bangka Regency spans 212,676.3 ha, with 44,543.92 ha of undeveloped land still available for agricultural expansion. The dominant soil type is Podsollic Association, characterized by acidic pH (<5) and low nutrient retention, which presents both constraints and opportunities for chili cultivation. A study by Subiksa et al. (2019) highlights the feasibility of chili cultivation on tin-mined and degraded lands in Bangka Island.

Despite challenges like quartz sand dominance and poor fertility, chili remains a profitable crop due to its high market value and adaptability when supported by proper soil amendments. The authors emphasize that chili requires well-drained soils and nutrient-rich conditions, which can be achieved through organic matter enrichment, liming, and integrated fertilization strategies.

Of the total land, 26,057.81 ha is already designated as plantation land, suggesting existing infrastructure and farmer familiarity with perennial crop management. According to Agustina et al. (2022), the actual productivity of red chili in Central Bangka is below its genetic

potential, indicating that both land use optimization and agronomic improvements are needed to meet market demand. The combination of available undeveloped land, existing plantation infrastructure, and suboptimal current productivity points to a clear opportunity for expanding chili cultivation into underutilized areas, improving soil conditions through targeted interventions, and enhancing farmer capacity in managing chili on marginal soils.

2. Farmers Already Use Plastic Mulch

Most farmers in Central Bangka Regency have adopted plastic mulch technology. Plastic mulching has several purposes and benefits for red chili farming: increasing yields, saving water, and preventing pests. This can help farmers cultivate red chilies more easily.

Plastic mulch helps regulate soil temperature, retain moisture, and suppress weed competition—creating optimal conditions for chili growth. According to Samudra et al. (2023), biodegradable polypropylene

mulch significantly improved the growth of red chili (*Capsicum annuum* L.), especially in marginal soils. Mulching reduces nutrient leaching and enhances root zone stability, leading to higher fruit set and yield.

In areas like Central Bangka with acidic Podsollic soils and low water retention, mulching plays a critical role in minimizing evaporation. Studies show that plastic mulch can reduce water loss by up to 30–50%, making it ideal for regions with sandy or degraded soils. Plastic mulch creates a physical barrier that disrupts pest movement and reduces soil-borne disease incidence. Research by Salama & Geyer (2023) highlights how silver-colored mulch can repel aphid vectors and reduce viral infections in chili crops. This reduces the need for chemical pesticides, lowering input costs and improving environmental sustainability. The fact that most farmers have already adopted this technology means: There's existing local knowledge and infrastructure. Extension efforts can focus on

optimization rather than introduction. Farmers are better positioned to scale up production and respond to market demand efficiently.

3. Farmer Institutions

Farmer institutions in Central Bangka Regency are a strength in developing red chili farming. According to the head of the GAPOKTAN (Farmers' Association) and extension workers in Central Bangka Regency, farmer groups in Central Bangka Regency have made efforts to develop red chili farming, as evidenced by their participation in planning and cultivating red chili. Farmer groups such as GAPOKTAN facilitate participatory planning, enabling farmers to align on cropping calendars, input procurement, and market strategies. Their involvement in red chili cultivation planning reflects bottom-up ownership, which is critical for sustainability and responsiveness to local conditions. Extension workers collaborating with farmer groups ensure that technical innovation like plastic mulch, fertigation, or pest

control are effectively disseminated and adopted. According to Agustina et al. (2022), farmer institutions in Central Bangka have played a key role in red chili productivity improvement efforts, despite challenges in reaching genetic yield potential.

4. Farmers' Experience in Utilizing and Developing Red Chili Farming Businesses

The experience of farmers in utilizing and developing red chili farming businesses that have been repeatedly carried out has made farmers quite capable in carrying out red chili farming, because on average, farmers have been carrying out red chili farming for more than 3 years; therefore, farmers in Central Bangka Regency have been able to utilize and develop red chili farming businesses.

5. Availability of Production Facilities

Production facilities are an input in the red chili farming process. Access to these facilities will influence farmers' ability to farm red chilies. Conversely, if these facilities are difficult to access or obtain, the cultivation process will be

hampered. Production facilities for red chili cultivation are available from agricultural stores and farmer groups in Central Bangka Regency. Furthermore, the government provides assistance with production facilities to farmers and farmer groups, ensuring the availability of these facilities is a driving force for increasing red chili production. GAPOKTAN structures often serve as aggregators, helping smallholders access better prices, reduce transaction costs, and negotiate with buyers. In South Bangka, the Sinar Baru GAPOKTAN expanded chili farming among 14 farmer groups with 350 members, supported by PT Timah, showing how institutional support can scale production and improve farmer welfare.

Organized farmer groups are more likely to adopt new technologies, participate in pilot programs, and engage in value chain upgrading. Their structured format allows for monitoring, evaluation, and feedback loops, which are essential for iterative improvement in agribusiness contexts.

6. Use of Superior Seeds

In Central Bangka Regency, farmers are already using high-quality seeds, primarily lolai, lado, krisna, and cikajos. These seeds are more resistant to disease and pests and easier to care for. These varieties are known for enhanced resistance to common pests and diseases, such as *Phytophthora* root rot and viral infections. This reduces the need for chemical interventions, lowering input costs and environmental impact, while improving crop reliability. Varieties like *Krisna* and *Cikajos* are bred for ease of care, including uniform growth, predictable flowering, and tolerance to local soil conditions. Farmers already familiar with these varieties can optimize planting schedules, irrigation, and fertilization, leading to higher operational efficiency. These seeds often produce uniform fruit size and color, which enhances marketability and price premiums. According to PT Tani Murni Indonesia, varieties like *Red Krisna* and *Red Sabel* are favored for their

high yield potential and adaptability to lowland tropical climates.

The fact that farmers are already using these varieties means: There's existing seed distribution infrastructure. Extension services can focus on advanced agronomic practices rather than basic seed introduction. The region is ready for scaling up production and linking to broader supply chains. In areas with acidic Podzolic soils, disease-resistant and stress-tolerant varieties like *Lolai* and *Cikajos* perform better than generic seeds. This aligns with findings from Subiksa et al. (2019), who emphasized the importance of resilient cultivars for chili farming on degraded or tin-mined lands.

b. Weakness Factor

1. Limited Capital Capacity

Capital is crucial for red chili farming. Limited capital is a common problem for almost all farmers. This situation prevents farmers from increasing their production scale. Limited capital makes it difficult for farmers to manage their farms, let alone expand their agricultural land. Red chili

farming is capital-intensive—requiring inputs like quality seeds, mulch, irrigation systems, pest control, and labor. Without sufficient capital, farmers cannot adopt improved technologies or expand cultivation. Subiksa et al. (2019) emphasize that chili cultivation on marginal lands requires high investment in soil amelioration and fertigation systems, which are often unaffordable for smallholders.

2. Relatively Low Production

Relatively low production significantly impacts demand for red chilies. Several factors contribute to production failure, including sudden hot weather accompanied by heavy rain, which can cause mold to grow rapidly, an unfavorable climate for red chili farming, and pests and diseases that attack red chili plants. Farmers in Central Bangka Regency must immediately address these issues to prevent crop failure and reduce red chili yields.

Low yields reduce supply, limit income, and weaken bargaining power in the market. Climate volatility (heat, rain) and

pest outbreaks exacerbate this. Empirical data: Agustina et al. (2022) found that chili productivity in Central Bangka is far below its genetic potential (200–220 quintals/ha), indicating agronomic inefficiencies.

3. Road access is not good

Road access is one of the most essential infrastructures needed by farmers for their farming activities. In Central Bangka Regency, many roads leading to agricultural land are inadequate, and plantations are located far from their homes. During the rainy season, farmers experience some difficulties due to slippery roads. The roads consist of footpaths and yellow dirt, as some farmers' land is located far from residential areas or in forests.

Inadequate infrastructure increases transport costs, delays market access, and leads to post-harvest losses—especially for perishable crops like chili. Farmers report difficulty accessing remote plots, especially during the rainy season, which affects labor mobility and timely harvesting.

4. Chilies are a perishable commodity

Red chilies are a commodity that easily spoils or rots if stored for too long. To minimize damage to red chilies, farmers immediately sell their harvest to collectors or markets. Without cold storage or rapid distribution systems, chilies spoil quickly, leading to economic losses and market volatility. The lack of post-harvest handling infrastructure limits farmers' ability to time sales or reach distant markets.

5. Use of Technology is Still Lacking.

In Central Bangka Regency, many farmers still lack technology and still cultivate red chilies traditionally. This is due to a lack of capital and limited knowledge of the technology. Due to this lack of technology, guidance and training from agricultural extension workers is essential. Traditional practices hinder productivity, pest control, and climate resilience. Lack of mechanization and digital tools reduces efficiency. Farmers need targeted training and access to affordable technologies, but limited

capital and knowledge restrict adoption.

6. There is no further processing of red chili production results.

Currently, only one farming family in Central Bangka Regency processes red chilies further. They sell their red chilies fresh. Processing red chilies into other products, such as chili sauce, shredded chili, and other products, can supplement their income. The only farming family capable of operating a red chili processing industry is one that processes red chilies into products such as shredded chili and chili candy.

Selling only fresh chilies exposes farmers to price fluctuations and spoilage risks. Value-added products (e.g., chili sauce, flakes) offer higher margins and longer shelf life. Only one farming family engages in processing, indicating a missed opportunity for MSME development and income diversification.

2. External Strategy Factors

a. *Opportunity* Factor

1. High Demand for Red Chilies

During field observations, researchers observed high demand for red chilies in Central Bangka Regency, both for the local market and for export. This growing demand presents an opportunity for farmers to continue improving their red chili cultivation in an effort to increase their income. Demand—both local and export—is a key driver of agribusiness viability. When demand outpaces supply, it creates room for production expansion, price stability, and investment justification. Local markets in Koba, Namang, and Pangkalan Baru often experience chili shortages, especially during peak seasons. Export potential to neighboring provinces or even Singapore and Malaysia (via Bangka port) adds further incentive for scaling up.

2. The selling price is quite high

Chilli Red chilies are a horticultural commodity that people cannot live without in their daily lives. Even though the price of red chilies is high, people will still buy them for their daily needs. High chili

prices occur during major holidays such as Eid al-Fitr and New Year, as Bangka Belitung itself has many major holidays, such as Eid al-Fitr, Eid al-Adha, Maulid Nabi, and others. This presents an opportunity for red chili farmers to increase their production. Red chilies are a price-inelastic staple—consumers buy them even when prices rise. This ensures consistent market pull and profit margins, especially during festive seasons. Prices can spike from IDR 30,000/kg to over IDR 100,000/kg during Eid or New Year. Farmers who can time their harvests or use protected cultivation (e.g., shade nets) to extend the season can capture these premiums.

3. Government Support

The development of red chili peppers in Central Bangka Regency has received attention from the Department of Agriculture, a strategic factor that is crucial for creating conditions for other strategic factors that can provide optimal support for the development of red chili farming. Agricultural extension workers have been

provided with information on how to manage pests and diseases that attack red chili plants. Support from both the central and regional governments is also evident. The policies received by red chili farmers to support the development of red chili farming include government assistance in the form of facilities and infrastructure, seeds, and fertilizer.

Institutional backing reduces risk and enhances farmer capacity. Support in the form of input subsidies, training, and infrastructure creates an enabling environment for agribusiness growth. The Department of Agriculture provides free seeds, fertilizers, and pest control kits, while extension workers conduct field schools on integrated pest management (IPM) and climate-smart practices.

4. Featured Commodities

Red chilies are a potential horticultural commodity with high economic value and the potential for further development. That is proven from the issuance of Letter Decision Minister of Agriculture of the

Republic of Indonesia No 45/Ktps/PD.200/1/2015 concerning the determination of chili and shallot areas in Central Bangka. Red chili has high potential in the food menu; although needed in small quantities, it is consumed daily by the community. In Central Bangka Regency itself, red chili farming is widely developed with the aim of providing added value for farmers to meet their daily needs. Central Bangka is eligible for KUR (Kredit Usaha Rakyat) schemes, pilot demonstration plots, and public-private partnerships for chili value chain development.

5. Advances in Innovation and Technology

Innovations and technologies developed in Central Bangka Regency include red chili cultivation techniques, the use of more modern agricultural tools and machinery, superior seeds, and pest and disease control, enabling effective and efficient operations. These advances in innovation and technology are expected to improve the quality and quantity of red chili farming.

Adoption of modern tools and techniques enhances productivity, efficiency, and resilience—critical for competing in volatile markets. Farmers are beginning to use motorized sprayers, drip irrigation, and improved seed varieties like Krisna and Cikajos. Some groups are experimenting with biochar and compost to improve acidic Podzolic soils.

The cultivation technology applied in Central Bangka Regency includes water machines for watering, *hand sprayers* for spraying fertilizer, and other machine tools for carrying out the cultivation process.

b. Threat Factors (*Threats*)

1. Pest and Disease Attacks

Pests in red chili peppers pose a serious threat to farmers in Central Bangka Regency. This has resulted in decreased productivity. One common problem in red chili cultivation is curled leaves, a result of attacks by pests. Fruit flies also infest red chili peppers, which cause rotting, watery fruit, and ultimately, dropping or dropping before harvest.

Chili plants are sensitive to temperature and moisture fluctuations. Central Bangka's tropical climate—with rainfall ranging from 11.8 to 370.3 mm/month—creates erratic growing conditions. Sudden downpours followed by dry spells cause soil nutrient leaching, fungal outbreaks, and flower drop. Ideal chili growth requires daytime temperatures of 25–27°C, which are often exceeded. Climate stress leads to inconsistent yields, increased disease pressure, and higher input costs for irrigation and soil conditioning.

2. Unpredictable Weather Conditions

Central Bangka Regency has a tropical A climate, which tends toward dry and humid climates. Temperatures vary between 25 ° C and 29 ° C. Monthly rainfall in Central Bangka Regency ranges from 11.8 to 370.3 mm per month. The ideal temperature for red chili growth is 25-27 ° C during the day and 18-20 ° C at night.

3. The Price of Red Chilies Fluctuates Highly

Red chilies are a commodity with fluctuating prices, so at certain times, such as during the main harvest, the price of red chilies will fall. When conducting a review of red chili prices in Central Bangka Regency, researchers observed highly fluctuating prices, with the lowest price ever being below IDR 10,000/kg and the highest price being IDR 80,000/kg in 2021. The impact of frequent price fluctuations is felt by farmers. Red chili farmers' incomes become uncertain, and they often experience losses. Price volatility poses a threat to red chili farmers in Central Bangka Regency.

Price volatility undermines income stability and discourages investment. Prices in Central Bangka have ranged from <IDR 10,000/kg to >IDR 80,000/kg, especially around holidays. Farmers may earn profits one season and suffer losses the next. Without storage or processing options, they are forced to sell at low prices during gluts. Income uncertainty leads to financial vulnerability, reduced reinvestment

in farms, and potential exit from chili farming altogether.

4. Competition with Other Regions

As a center for red chili cultivation, Central Bangka Regency is responsible for production, which has become a program to contribute to the national supply of red chili. The quality of the red chili is a key factor attracting traders to purchase red chili from Central Bangka Regency. Many farmers have complained about disease in their crops, resulting in a decline in the quality and quantity of red chili production. Meanwhile, other red chili-producing areas, such as Bangka Regency and areas outside Bangka Belitung, surround Central Bangka Regency.

Neighboring regions like Bangka Regency and provinces outside Bangka Belitung offer higher-quality or more consistent supply, attracting traders away from Central Bangka. Traders bypass Central Bangka due to disease-related quality issues, while other regions benefit from better infrastructure or branding. Central

Bangka loses market share, and farmers face lower prices and reduced demand, despite being part of a national supply program.

Internal and External Evaluation

1. Internal Evaluation Factors (IFE)

To formulate effective strategies for increasing red chili production in Central Bangka Regency, it is essential to first assess the internal conditions that shape the performance and potential of local farming systems. The Internal Factor Evaluation (IFE) Matrix serves as a diagnostic tool to systematically identify and weigh key strengths and weaknesses within the agribusiness environment.

This evaluation focuses on factors such as: Farm-level resource availability and management practices; Technical capacity and access to agricultural inputs; Organizational support, extension services, and farmer networks; Post-harvest handling, marketing channels, and value addition potential

By assigning weighted scores to each factor, the IFE Matrix provides a composite view of internal readiness and constraints. This structured insight supports strategic planning, capacity building, and targeted interventions aimed at enhancing productivity and resilience in red chili farming. The following table presents the IFE Matrix developed for Central Bangka Regency:

Table 2. Internal Factor Evaluation Matrix for Increasing Red Chili Farming in Central Bangka Regency

Internal factors	Weight (a)	Rating (b)	Score (axb)
Strength			
Land availability	0.09	4	0.36
Farmer institutions	0.08	3	0.27
Farmers have used plastic mulch	0.08	3	0.24
Farmers' Experience in Utilizing and Developing Red Chili Farming Businesses	0.09	4	0.36
Availability of production facilities	0.09	4	0.36
Use of superior seeds	0.08	3	0.27
Total score	0.53		1.86
Weakness			
Limited Capital Capacity	0.08	2	0.16
Production is relatively low	0.08	2	0.16
Road access is not good	0.08	2	0.16
The use of technology is still lacking	0.08	3	0.24
Red chilies are a perishable commodity	0.07	2	0.14
further processing of the red chili production results.	0.08	2	0.16
Total score	0.47		1.02
Total score	1.00		2.88

(Source: Primary Data Processing, 2022)

The main strengths of increasing red chili farming in Central Bangka Regency are land availability, farmer experience in utilizing and developing red chili farming, and the availability of production facilities. The main weakness of increasing red chili farming is the perishability of red chili.

Central Bangka’s agroecological zones offer suitable land for chili cultivation, particularly for varieties like curly red chili. This availability reduces entry barriers for scaling production and enables spatial expansion without immediate land-use conflicts. Local farmers possess tacit knowledge and adaptive practices honed through years of chili cultivation. This experiential capital enhances responsiveness to pests, climate variability, and market shifts—

critical for sustaining productivity. It also facilitates peer-to-peer learning and participatory extension models. Access to inputs such as seeds, fertilizers, irrigation tools, and basic mechanization supports consistent yield. If facilities include nurseries, drying units, or storage sheds, they also contribute to post-harvest efficiency and quality control. These strengths suggest that Central Bangka has a solid foundation for intensification and value chain development, especially if paired with strategic training and market access.

Red chili is highly perishable due to its high moisture content and thin skin, making it vulnerable to spoilage, fungal infection, and mechanical damage. Without adequate cold chain infrastructure, drying facilities, or timely market access, post-harvest losses can be significant – sometimes exceeding 30%. This perishability also limits transport radius and market flexibility, especially for smallholders. From a strategic standpoint, this weakness calls for: Investment in post-harvest technologies (e.g., solar dryers, cold

storage); Development of processing units (e.g., chili powder, paste) to extend shelf life; Strengthening logistics and aggregation systems to reduce time-to-market

The juxtaposition of strong production potential with post-harvest vulnerability suggests a need for vertical integration and value chain resilience. Strengths can be leveraged to overcome perishability through: Cooperative models for shared storage and transport; Training modules on harvest timing, grading, and packaging; Policy advocacy for infrastructure support and MSME incentives

2. External Evaluation Factors (EFE)

Strategic planning for agribusiness development must account not only for internal capabilities but also for the external forces that shape opportunity and risk. The External Factor Evaluation (EFE) Matrix provides a systematic framework to assess the influence of macroeconomic trends, policy environments, market dynamics, and ecological conditions on red chili farming in Central Bangka Regency.

The following table presents the EFE Matrix, highlighting key external drivers and constraints that influence the scalability and sustainability of red chili production in the region:

Table 2Evaluation Matrix Analysis of External Factors for Increasing Red Chili Farming in Central Bangka Regency.

External Factors	Weight (a)	Rating (b)	Score (Axb)
Opportunity			
The demand for red chilies is quite high	0.12	4	0.48
There is government support	0.1	3	0.3
The selling price is quite high	0.11	4	0.44
superior commodities	0.11	3	0.33
Advances in innovation and technology	0.11	3	0.33
Total Score			1.88
Threat			
Pest and disease attacks	0.12	4	0.48
Climate change and weather	0.12	4	0.48
Unstable price fluctuations	0.11	3	0.33
Competition with other regions	0.1	3	0.3
Total Score			1.59
Total Score	1.00		3.47

(Source: processed primary data, 2022)

The main opportunity is the high demand for chilies. Meanwhile, the main threats are pest and disease attacks, as well as climate and weather changes. Consumer Preference & Culinary Integration Red chili is a staple in Indonesian cuisine, driving consistent demand across household, foodservice, and processing sectors. Price Elasticity & Seasonal Premiums Demand spikes during festive seasons and periods of supply shortage, offering price premiums for timely and quality harvests. Potential for MSME Diversification: High demand opens pathways for product diversification—dried chili,

chili paste, chili oil—creating value-added opportunities for smallholders and processors. Strategic Leverage: This opportunity supports investment in scaling production, improving post-harvest handling, and developing branded chili products for regional and national markets.

Common threats include *anthracnose*, *fruit borers*, and *leaf curl virus*, which can drastically reduce yield and quality. Limited access to integrated pest management (IPM) and resistant varieties exacerbates vulnerability. Irregular rainfall,

temperature extremes, and shifting seasons disrupt planting schedules and flowering cycles. Increased risk of crop failure or reduced productivity due to droughts or unseasonal rains.

Promote climate-resilient practices: mulching, drip irrigation, and adaptive planting calendars. Strengthen farmer access to early warning systems and agro-climatic advisories. Invest in IPM training, biological controls, and disease-resistant seed varieties. The high demand offers a compelling growth trajectory, but only if threats are proactively managed. This calls for a resilience-building strategy that integrates: Extension services and farmer field schools, Climate-smart agronomy and pest surveillance,

Market-driven production planning and aggregation models

Alternative Strategies for ncreasing Red Chili Production in Central Bangka Regency

To formulate effective and context-sensitive strategies for enhancing red chili production in Central Bangka Regency, it is essential to integrate both internal and external evaluations into a coherent strategic framework. The SWOT Matrix serves as a synthesis tool that combines findings from the Internal Factor Evaluation (IFE) and External Factor Evaluation (EFE) matrices, enabling stakeholders to identify strategic alternatives that are both feasible and impactful. The following table presents the SWOT Matrix, outlining alternative strategies derived from the intersection of key internal and external factors:

Table 4. SWOT Matrix for Increasing Red Chili Production in Central Bangka Regency.

Internal External	Strength (S)	Weakness (W)
	1. Land availability 2. Farmer institutions 3. Already using plastic mulch 4. Farmers' experience in utilizing and developing red chili farming businesses 5. Availability of production facilities 6. Use of superior seeds	1. Limited capital capacity 2. relatively low production 3. Road access is not good 4. The use of technology is still lacking. 5. Red chilies are a perishable commodity 6. There is no further processing of the red chili production results.

Opportunity (O) 1. High demand for red chilies 2. There is government support 3. The selling price is quite high 4. Superior commodities 5. Advances in innovation and technology	1. Optimizing land to utilize production facilities to increase red chili production. (S1, S2, S6, O1, O3) 2. Optimizing the function of farmer groups. (S2, O2, O5)	1. Improve supporting facilities and infrastructure. (W3, W4, O1, O2, O4, O5). 2. Improve training and development for agricultural extension workers and farmers. (W4, O2, O5) 3. Improve crop yields by participating in coaching and training provided by the local government. (W2, W5, O2, O4)
Threat (T) 1. Pest and disease attacks 2. Climate and weather changes 3. Unstable price fluctuations 4. Competition with other regions	1. Farmers' experience in developing red chili farming can overcome the problem of crop failure caused by pests and diseases. (S4, T1) 2. Establish cooperation with other professional institutions. (S2, S5, S6, T1) 3. Increase farmers' knowledge of market price information to minimize price manipulation. (W4, T3, T4)	1. Application of agricultural machinery technology (W2, W4, T5) 2. Provide farmers with an understanding of the characteristics of red chilies (W2, W5, T1)

(Source: Primary data processing, 2022)

Strengths-Opportunities (SO) Strategy

a. Land Optimization by Utilizing Production Facilities to Increase Red Chili Production

Land optimization strategy by utilizing production facilities to increase red chili production, namely utilizing land availability and the potential for developing red chili farming, namely: 1) intensification and extensification through government programs such as the red chili area development program in Central Bangka Regency to increase the availability of red chili and prioritize on new land. 2) Utilizing production facility assistance from the government,

such as seeds, fertilizers, pesticides, and agricultural machinery obtained through proposal submissions by farmer groups and GAPOKTAN.

b. Optimizing the Function of Farmer Groups

The strategy to optimize the function of farmer groups can be carried out with the following steps: 1) Coaching farmer groups in Central Bangka Regency to increase cooperation and exchange or share information in an effort to increase red chili production. Provide training on red chili cultivation, and provide training on how to handle harvest and post-harvest. In addition,

coaching can be carried out to improve organizational management through agricultural extension activities aimed at strengthening or supporting red chili farming development activities with community growth and empowerment efforts. This activity can increase cooperation between members and between groups. 2) Developing partnerships between farmer groups and between farmer groups and government institutions such as agricultural research centers, educational institutions, and companies providing agricultural production facilities.

Establishing a marketing network by optimizing the function of farmer groups, one of which is assisting farmers in marketing red chilies. It is hoped that these groups will then open up marketing networks for farmers. This aims to increase business volume and collaboration across various activities to improve efficiency and effectiveness.

Weaknesses-Opportunities (WO) **Strategy**

a. Improving Supporting Facilities and Infrastructure

The strategy to improve supporting facilities and infrastructure can be carried out with the following

steps: Provision of sufficient agricultural tools and machinery by the regional government or the central government, one of which is a tractor and farmers do not have to wait long to queue for the use of these agricultural tools and machinery, provision of fertilizer and seeds so that farmers do not rely too much on subsidized fertilizer. Construction of roads to agricultural land in Central Bangka Regency that can be used by all farmers. Construction of roads to agricultural land to make it easier for farmers to carry out red chili farming.

b. Improving Farmer Training and Development

The strategy involves increasing training and development for farmers, namely: providing direction, motivation, and information on the importance of cultivating red chilies and the correct methods or techniques for cultivating red chilies through agricultural extension activities that directly impact farmers by meeting farmers directly in their red chili fields, and are carried out regularly. This extension can be carried out in various methods, such as seminars, discussions, or through direct visits or training to farmers' fields.

Conducting field school activities for farmers continuously, this farmer school is intended to provide knowledge for farmers to overcome problems faced in farming, such as field schools for controlling pests and plant diseases.

- c. Improve crop production results by participating in coaching and training from the local government.

Improve crop production results by participating in coaching and training from the local government, conducting extension program training for farmers to improve farming habits that have been passed down from generation to generation and limited knowledge of simple farming procedures.

Strength-Threats (ST) Strategy

- a. Farmers' experience in developing red chili farming can overcome crop failure problems caused by pests and diseases. (S4, T1)

Farmers have years of experience, and most grow red chili peppers every year. Leveraging their experience in developing red chili peppers can address crop failures caused by pests and diseases. Farmers can learn from their previous experiences how to manage plant diseases, such as curly leaf spot, and how to control pests to prevent future

crop failures. They also learn about the fertilizers and pesticides used, as well as the dosages.

- b. Establish cooperation with agricultural extension workers and local government

To overcome the threat of developing red chili farming to increase chili production in Central Bangka Regency against unpredictable weather changes and pest and disease attacks on red chilies as well as increasing prices of production inputs, a strategy can be implemented to establish cooperation with agricultural extension workers and the government which can reduce the threat of increasing prices of production inputs such as fertilizers and pesticides as well as providing subsidized fertilizers so that farmers can develop their farming businesses without being hampered by the high costs of red chili farming and providing training to farmers on how to deal with pests and diseases in red chilies.

- c. Increasing Farmers' Knowledge of Price Information in the Market to Minimize Price Games in the Market

Strategies to increase farmers' knowledge of market price information and minimize price manipulation include observing the current price of red chilies directly in the market, or checking the National Strategic Food Price Information Center (PIHPS), and

reading or viewing news reports about the current price of red chilies. This allows farmers to understand the current price of red chilies, as they often fluctuate.

Weaknesses-Threats (WT) Strategy

a. Application of Agricultural Machinery Technology

Farmers in Central Bangka Regency generally still use traditional or manual technology for red chili farming, particularly for soil loosening. Hoes are still used for loosening the soil. Consequently, yields are less than optimal. One possible approach is to provide training to farmers on the application of recommended agricultural technologies that can increase red chili production. This training is expected to increase farmers' knowledge of red chili farming, enabling them to adopt technology and innovations to develop red chili farming in Central Bangka Regency. By embedding technology training into the broader agribusiness development strategy, Central Bangka can: Boost productivity from current averages (~8.6 tons/ha) toward genetic potential (12–20 tons/ha); Reduce vulnerability to climate and pest shocks; Empower MSMEs to engage

in higher-value segments of the chili supply chain

b. Provide farmers with an understanding of the characteristics of red chilies

To minimize crop failure, red chili commodities that are easily damaged and attacked by pests and diseases need to be given training to farmers on how to control pests and diseases in red chili plants in Central Bangka Regency and maximize the ability of farmers in cultivating red chilies on how to select superior seeds, planting, harvesting, post-harvesting, and how to package after harvest to reduce damage to red chilies.

1. Integrated Pest and Disease Management (IPDM)

To address the vulnerability of red chili to pests and diseases like *anthracnose*, *fruit borers*, and *leaf curl virus*, farmers need structured training in: Early detection and diagnosis using visual symptom guides and field checklists; Biological control methods (e.g., *Trichoderma*, neem extracts) and reduced reliance on chemical pesticides; Crop rotation and sanitation practices to break pest cycles; Use of resistant varieties and

proper spacing to reduce disease spread; Community-based surveillance and reporting systems to manage outbreaks collectively. This module would include field demonstrations, visual aids, and participatory learning sessions.

2. Seed Selection and Nursery Management

Superior seed selection is foundational to productivity and resilience. Training should cover: Criteria for selecting high-yield, disease-resistant varieties; Seed treatment protocols to prevent seed-borne infections; Nursery establishment techniques, including media preparation, watering schedules, and transplanting timing; Record-keeping and traceability to monitor seed performance. This builds farmer confidence and reduces variability in crop outcomes.

3. Good Agricultural Practices (GAP) in Cultivation

Farmers should be equipped with stepwise guidance on: Land preparation and soil health management (e.g., organic amendments, pH balancing); Optimal planting density and

staking methods to improve airflow and reduce fungal pressure; Fertilization schedules based on crop stage and soil tests; and Irrigation management using drip systems or mulching to conserve moisture and reduce disease risk. These practices enhance both yield and quality.

4. Harvesting and Post-Harvest Handling

Red chili's perishability demands precision in harvesting and handling: Harvest timing based on maturity indicators to avoid premature or overripe picking; Gentle handling and sorting to minimize bruising and microbial contamination; Use of clean containers and shaded areas during collection and transport; Basic drying or cooling techniques to extend shelf life; Training should include hands-on sessions and low-cost innovations like solar dryers or evaporative coolers.

5. Packaging and Market Preparation

To reduce post-harvest losses and improve marketability: Packaging materials that allow ventilation and protect against

crushing; Labeling and grading systems to meet buyer specifications; Linkages to local aggregators or cooperatives for bulk handling and price negotiation; Digital marketing and traceability tools for MSME branding and consumer trust. This component supports value chain integration and income stability.

A successful rollout would involve: Modular training sessions delivered through farmer field schools or extension agents; Visual infographics and bilingual manuals tailored to local literacy levels; Demonstration plots and peer mentoring to reinforce adoption; Monitoring and evaluation rubrics to track learning outcomes and behavior change; Stakeholder collaboration with local government, universities, and agribusiness MSMEs. This approach not only reduces crop failure but also builds farmer capacity, improves product quality, and strengthens supply chain resilience

CONCLUSION

1. Seeding is done by soaking the seeds in hot water and leaving them

overnight. The seeds used by red chili farmers are lolay, cikajos, trisna, and lado. Land preparation is then carried out using a tractor and manually using a hoe. Planting is carried out in the morning using a zigzag and straight planting system. Maintenance includes weeding, replanting if any red chili plants have died, watering, and fertilizing. Finally, harvesting is carried out approximately 100 days after planting, harvesting in the morning.

2. Alternative strategies to increase red chili farming production in Central Bangka Regency: 1. Strength-Opportunity Strategy is: a) Optimizing Land by Utilizing Production Facilities to Increase Red Chili Production, b) Optimizing the Function of Farmer Groups. 2) Weaknesses-Opportunities Strategy: a) Improving Supporting Facilities and Infrastructure, b) Improving Training and Development of Human Resources for Civil Servants and Farmers, c) Improving crop production results by participating in coaching and training from the local government. 3. Strength-Threats Strategy: a) Farmers' Experience in Developing Red Chili Farming Businesses can overcome crop

Failure Problems Caused by Pests and Diseases, b) Establishing cooperation with other professional institutions, c) Increasing Farmers' Knowledge of Price Information in the Market to Minimize Price Games in the Market. 4) (Weaknesses-Threats Strategy: a) Implementation of Agricultural Machinery Technology, b. Providing an understanding of the characteristics of red chilies to farmers.

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