

Utilization of Baion Plants *Pandanus Tectorius* to Increase Economic Value and Competitiveness of Local MSMEs

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Abstract

The Baion plant (*Pandanus tectorius*) is known as a thriving plant and as a natural resource that has many benefits. People in various regions, including Humbang Hasundutan Regency, have used these plant parts for various purposes, such as handicraft raw materials, food, and cultural products. However, maximum utilization is still not fully realized, so further research is needed to explore this potential. This effort is expected to be a solution to increase local MSME income, reduce dependence on imported materials, and preserve local wisdom. The purpose of this research is to explore the potential of Baion plants in supporting the development of MSMEs, as well as identify factors that affect the successful implementation of the use of Baion plants. This research method uses qualitative and quantitative approaches through surveys, product manufacturing experiments, and MSME training. SWOT analysis is used to evaluate market opportunities, while organoleptic tests are applied to Baion-based food products. The survey method is used to collect preliminary data from respondents, either through questionnaires or interviews, to understand market preferences and needs. On the other hand, product manufacturing experiments are carried out to evaluate variations in formulas and production methods, especially in Baion-based food products, through organoleptic tests to assess sensory quality (taste, aroma, texture, and appearance). In addition, MSME training is held to improve the ability of producers in product development and marketing. In evaluating market potential, a SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis is carried out which functions to find out the strengths, weaknesses, opportunities, and threats of a business.

Introduction

Humbang Hasundutan Regency in North Sumatra Province is known to have an abundant wealth of natural resources, one of which is the Baion plant (*Pandanus tectorius*). This plant has been used for generations by local people as a basic ingredient in traditional woven crafts such as mats, bags, and hats (Hanafy et al., 2024; Berutu et al., 2024). However, its use is still traditional and has not been worked on optimally to increase economic added value, especially in supporting Micro, Small, and Medium Enterprises (MSMEs) which are the backbone of the regional economy (Ibrahim et al., 2020; Siallagan et al., 2024). The potential of this plant has also been identified in previous research as an alternative raw material in the production of bioethanol and other high-value products (Ministry of Cooperatives and SMEs, 2022).

The development of MSMEs in Humbang Hasundutan Regency still faces various challenges such as low product innovation, limited technical skills training, lack of market access, and lack of creative use of local resources (Siallagan, 2025; Thomson et al., 2006). In fact, Baion plants have great prospects as raw materials for export-oriented creative industries. Derivative

products of this plant such as essential oils, flour from the fruit, to artistic crafts, have great potential to be developed. More than that, the existence of this plant also has ecological benefits, such as functioning as an erosion barrier and tsunami disaster mitigation, so that its use can support the principles of sustainable development (Matondang & Rahayu, 2021; Stuart & Eleanor, 2018).

Experience from other regions in Indonesia such as Bali, Jombang, and Sulawesi shows that *Pandanus tectorius* can be processed into a superior commodity with high economic value. Research in 2023 reveals that pandan weaving crafts have national and global markets that are still wide open (Zuriyah et al., 2023). Meanwhile, other research states that pandan duri has the potential to be the main raw material for the weaving industry and has been used to compile popular scientific books as public education (Wardaningsih, 2023). This proves that pandan processing can have a significant impact on local economic growth if managed in an innovative and integrated manner (Charli & Suharno, 2025; Hutauruk et al., 2025; Chen et al., 2024).

In the context of MSMEs, the use of Baion plants in Humbang Hasundutan Regency is still not optimally cultivated (Sinurat et al., 2024; Adha et al., 2025; Samosir et al., 2025). Based on the results of initial observations and interviews, MSME actors generally have not received technical training, access to business assistance, as well as capital and marketing support. This causes Baion-based products to lose competition in the domestic and international markets. The integration model between education, product development, and marketing innovation that has been implemented in Cupak Jombang Tourism Village, through the collaborative MBKM scheme, can be used as a reference in strengthening local MSMEs (Kustiwi, 2023; Kurniadi et al., 2024; Wikansari et al., 2024).

The urgency of this research lies in the need to explore the use of Baion as a strategy to increase the economic value and competitiveness of MSMEs in Humbang Hasundutan. With training-based development, product innovation, and business models involving local communities, it is hoped that the economic potential of this plant can be maximized. In addition to creating new jobs, the sustainable use of Baion will also help preserve the environment and reduce dependence on imported raw materials (Mufliadi et al., 2024; Dhayal et al., Nazir et al., 2025). This research is also expected to be able to make a theoretical and practical contribution to the development of a creative economy based on local resources (Lubis, 2024; Fitria, 2025; Nicholls et al., 2024).

The formulation of the problem studied in this study includes three main things: (1) What are the economic potentials that can be obtained from the use of Baion plants (*Pandanus tectorius*) in Humbang Hasundutan Regency? (2) How can the use of Baion plants increase the competitiveness of local MSMEs? and (3) What are the challenges faced in the development of Baion plant-based products for MSMEs? These three formulations are the basis for the preparation of the right strategy and approach in supporting the development of MSMEs based on local potential.

The approach used in this study includes three main strategies: identification of local resource potential, economic feasibility analysis, and development of inclusive business models (Heriyati et al., 2024; Mohammed et al., 2024; Heriyati et al., 2024). The operational strategies that will be implemented include counseling and training for MSME actors, research and product development, as well as continuous monitoring and evaluation. Through this approach, it is hoped that there will be a transformation from the traditional use of Baion plants to creative industry-based utilization that supports increasing community income and the sustainability of local resources.

Methods

The research method used in this study is a combination of qualitative and quantitative approaches. The qualitative approach was carried out through in-depth interviews with MSME actors, farmers, and local communities to explore a comprehensive understanding of the use of the Baion plant (*Pandanus tectorius*). This approach aims to find out how these plants are processed, used, and how they contribute to the economic life of the surrounding community. Meanwhile, a quantitative approach is applied through surveys and questionnaire dissemination to obtain measurable data related to the use and income generated from *Pandanus tectorius*-based products. This quantitative method is also used to measure consumer perception and market potential for the product.

Data collection in this study was carried out through several main techniques, namely in-depth interviews, participatory observations, surveys/questionnaires, and documentation studies. Interviews were conducted with MSME actors, Baion farmers, local governments, and consumers to obtain relevant contextual information. Participatory observation is used to directly understand the production and processing process of Baion plants as well as the challenges and opportunities in their development. The survey was conducted to obtain quantitative data on consumer perception of Baion-based products and the competitiveness of local MSMEs. Meanwhile, the documentation study was used to access secondary data such as government policies, MSME statistics, and literature related to the economic potential of *Pandanus tectorius*. To ensure the validity of the data, this study applies validity and objectivity through triangulation of sources, techniques, and theories. Data analysis was carried out qualitatively through screening of field findings and documents, as well as quantitatively by processing questionnaire results, including SWOT analysis to assess the strengths, weaknesses, opportunities, and threats of Baion product development.

Results and Discussion

The Potential of Baion Plants as a Local Economic Resource

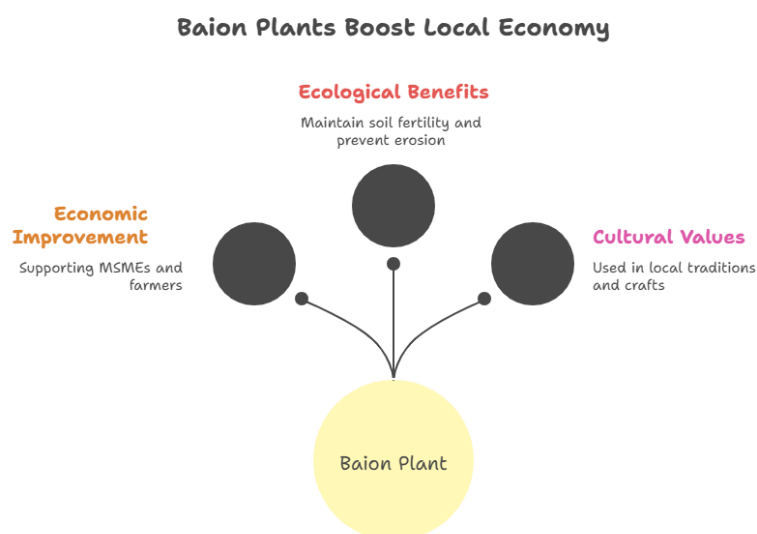


Figure 1. Baion Plants Boost Local Economy

Baion (*Pandanus tectorius*) plants grow naturally and abundantly in the Humbang Hasundutan Regency area, especially in areas with fertile soil conditions and humid tropical climates. Based on the results of observations and in-depth interviews with the local community, it is known

that the community has long known this plant as part of their daily lives. The leaves are used for traditional weaving, while the fruit is often processed into a local snack or beverage mix. This utilization shows that the Baion plant not only grows wild, but has also become part of the household economic system in certain villages.

In an interview with a local farmer, it was mentioned that this plant is very easy to care for and does not require special treatment. This makes it very suitable for sustainable development by rural communities. In addition to its economic value, the community also recognizes the ecological benefits of the Baion plant in maintaining soil fertility and preventing erosion on hillsides. Cultural value also arises from the use of this plant in local traditions and crafts that are passed down from generation to generation.

Based on field findings, Baion is considered a multifunctional plant whose potential has not been fully explored. Many MSME actors and farmers do not know innovative ways to process Baion into high-value-added products. Therefore, the development of Baion's potential is considered very relevant as a strategy for community economic empowerment, especially in the context of strengthening MSMEs based on local resources.

Innovation Strategy and Capacity Building of MSMEs

One of the main focuses of MSME development in Humbang Hasundutan Regency is to encourage the innovation of Baion plant-based products. In several interviews with local artisans, they mentioned that innovation is needed so that products are not monotonous and able to compete in markets outside the region. One form of innovation that has begun to be introduced is the use of natural dyes to beautify woven products, as well as more modern designs to attract young consumers.

In addition, the diversification of food products from Baion fruit is also an important topic in this study. MSME actors expressed their interest in processing Baion fruit into products such as jams, healthy drinks, and food additives, but were still limited to processing knowledge and production tools. Therefore, technical training and support of semi-mechanical tools are an urgent need to increase their production capacity.

The marketing aspect is also a strategic point in strengthening MSMEs. Some business actors admitted that they still rely on conventional promotional methods such as direct sales in traditional markets. Knowledge about digital marketing is still very minimal, so e-commerce and social media training is very important so that Baion's products can reach consumers outside the region. This approach is in line with today's marketing trends that are increasingly shifting to digital platforms.

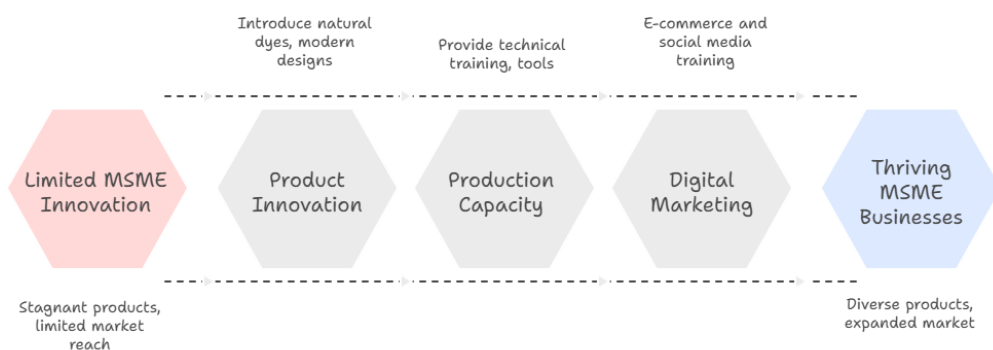


Figure 2. Empowering MSMEs through Innovation

Obstacles in Product Management and Development

Although the potential of the Baion plant is very promising, MSME actors face a number of obstacles in the production and development process. One of the main problems is the availability of raw materials that are not always stable throughout the year. Some artisans state that the erratic harvest season makes it difficult for them to obtain sufficient quantities of Baion leaves for sustainable production.

On the other hand, the processing process that is still traditional is also an obstacle in itself. Interviews with small entrepreneurs show that most of the work is done manually, from leaf drying to the weaving process. This takes time and effort, and limits the number of products that can be produced. Business actors hope that there will be simple but efficient production tools, so that handicrafts and processed food products can increase significantly.

Another problem that often arises is the limitation in marketing products. The lack of a distribution network and modern marketing skills means that Baion's products are only known locally. Some MSMEs do not even have their own trademarks or attractive packaging, which is one of the important requirements to penetrate a wider market.

Market Response to Baion-Based Products

Despite the challenges, Baion-based products have been quite well received in the local market. In conversations with some consumers, they expressed an interest in the uniqueness and traditional value of Baion's handicraft products. Woven bags, mats, and containers are considered to have a distinctive appearance and are suitable for decorative and functional purposes.

Baion-based food products also received positive responses, especially because of their unique taste and natural ingredients. A housewife who tasted Baion fruit jam stated that its taste and aroma reminded her of childhood snacks, thus bringing out nostalgic value. Emotional sentiments like this are important capital to build consumer loyalty to local products.

In terms of marketing, several MSME players stated that when they started introducing Baion products in exhibition activities or village bazaars, consumer responses tended to be enthusiastic. This proves that even though it has not been widespread, the potential for Baion products to be developed and accepted by the market is still wide open, especially when accompanied by quality improvement and design innovation.

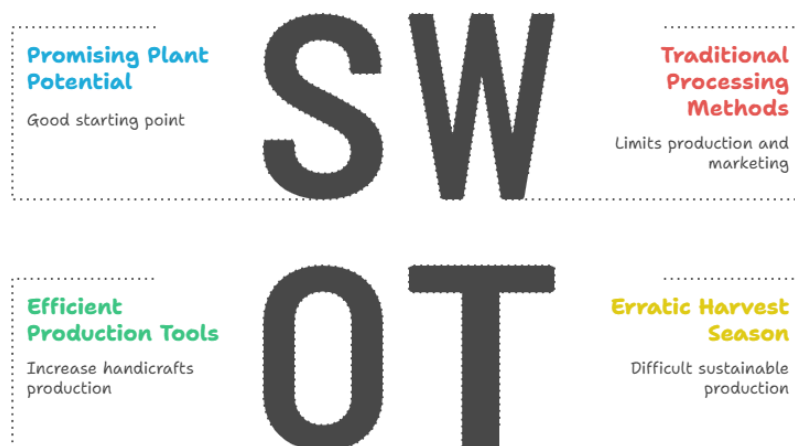


Figure 3. Baion Plant MSME Challenges

Pandanus tectorius, commonly known as Baion or screw pine, is a small member of the Pandanaceae family that adapts to tropical coastal and littoral habitats, especially in Southeast Asia, the Pacific Islands, and Northern Australia. This species contains a morphology that contains long and growing leaves, as well as growth forms that can reach heights of up to 14 meters (Agustika et al., 2020; Owolabi et al., 2018). Its geographic distribution extends from the East Coast of Africa to the Pacific Islands and parts of Australia, demonstrating the ability of this species to grow in a variety of ecological environments (Agustika et al., 2020; Gallaher et al., 2016).

The Baion plant has extensive traditional benefits, such as the use of its leaves to produce hand products such as carpets, hats, and ropes, which contribute to local life (Owolabi et al., 2018). Research on fruit-based products from the fruit also has significant commercial potential, especially in the context of marketing food products, jam drinks and other food products produced from the fruit (Nanda et al., 2023). In addition, Baion's potential in local raw material research and development is very significant.

To increase the competitiveness of Baion plant-based MSMEs, an innovative strategy is needed that cuts product development and capacity building through training. Product innovation can break the natural dyeing technique on woven crafts, while training in the use of semi-mechanical tools is needed to improve production efficiency and product quality. Digital marketing, including e-commerce and social media platforms, is essential for expanding the market term and promoting products effectively.

The potential of Baion plant-based MSMEs in Humbang Hasundutan Regency is very significant, although there are several challenges such as dependence on the harvest season, limited capital in production development, and marketing. However, this potential development can be overcome by utilizing natural and organic resources, as well as government support through the People's Business Credit (KUR) program.

Natural resource-based economic development is very important in the context of sustainable development in developing countries. Natural resources have a complex relationship with economic growth which is influenced by governance, infrastructure, and community participation factors. The development of the creative economy can be a promising solution in supporting significant economic growth.

Increasing the competitiveness of MSMEs in Indonesia is very important in the context of local economic development. The strategy to increase the competitiveness of MSMEs involves product innovation, branding, and marketing. Product innovation, strong branding, and effective marketing are needed to increase the competitiveness of MSMEs and expand the market term.

To optimize the utilization and increase the economic value and competitiveness of MSMEs in Humbang Hasundutan Regency, a sustainable strategy is needed. It calls for short-term recommendations, resource optimization, and collaboration with the tourism sector to increase potential and support existing weaknesses.

Conclusion

This study revealed that the Baion plant (*Pandanus tectorius*) has great potential to increase the economic value and competitiveness of local MSMEs in Humbang Hasundutan Regency. Through the use of various plant parts leaves for woven crafts, fruits for processed food, and roots for herbal products MSMEs can create high-value-added products that are competitive in regional and national markets. The results of the market trial showed a positive response from consumers to Baion-based products, with an organoleptic score of 4/5 for food products and an

acceptance rate of 75% for woven crafts. However, challenges such as unstable availability of raw materials, traditional processing technologies, and limitations of digital marketing still need to be addressed.

The proposed development strategies include product innovation (e.g. natural coloring and food diversification), technical training to increase production capacity, as well as strengthening marketing through e-commerce and collaboration with the tourism sector. Government and academic support in the provision of infrastructure, product certification, and advanced research is also key to success.

More broadly, the use of Baion is in line with the Sustainable Development Goals (SDGs), especially point 8 (Decent Work) and point 12 (Sustainable Consumption), by creating inclusive jobs and promoting the responsible use of natural resources. With the implementation of a holistic strategy, Baion plants can become a sustainable driver of the local economy as well as preserving Batak cultural wisdom.

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