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# Optimizing Location for Downstream Industry on Remote Island Products

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**Abstract**

This research aims to select the most optimal and efficient location for frozen banana fritter production to support efforts in optimizing downstreaming of leading commodity industries of Kepulauan Mentawai Regency. The research evaluates potential sites in Padang City and Kepulauan Mentawai Regency, employing the Economic Analysis method with the Brown-Gibson model, combining quantitative and qualitative approaches. Factors influencing frozen banana fritter production and site selection are examined through market surveys and interviews with relevant experts and stakeholders. The findings highlight Padang City as the ideal production site. This research holds significance in enhancing the local economy, especially in Kepulauan Mentawai Regency, classified as a 3T area in West Sumatra province. The results provide valuable insights for stakeholders in choosing suitable production sites for frozen banana fritters, contributing to economic improvement in the region.

Keywords: Location Theory, Location Selection, Downstream Productin, Brown-Gibson, Frozen Banana



## 1. Introduction

Kabupaten Kepulauan Mentawai is a regency in West Sumatra Province, forming an archipelago located outside the territory of Sumatra Island. Its isolation from other regions on Sumatra Island by the sea makes maritime transportation the primary connection between Kepulauan Mentawai Regency and other areas on Sumatra Island. The challenging geographic accessibility is one of the factors categorizing Kepulauan Mentawai Regency as a 3T region, particularly in the context of the local economy [1]. Moreover, Kepulauan Mentawai Regency has the highest percentage of poverty among other districts/cities in West Sumatra Province, reaching 15.37%.

However, Kepulauan Mentawai Regency holds significant potential in various sectors, particularly in agriculture, which could yield substantial results with efforts to utilize these resources through optimal management and downstream industries. One of these potentials is the banana commodity, identified as the leading superior commodity (KPJU) with the highest potential score compared to other commodities in Kepulauan Mentawai Regency, reaching a production figure of 4,000 tons annually. With the abundant supply available, it would be unfortunate if the production process were to halt only at the upstream sector. Hence, there is a necessity for optimal industrial downstreaming efforts to increase the value of products. This is expected to drive economic growth within the community of Kepulauan Mentawai Regency.

The local community in Sikakap District has initiated efforts to optimize the downstream production of banana-based products, specifically banana fritters. They have established several local enterprises dedicated to producing frozen banana fritter products [2]. This product is a frozen snack that needs to be kept at a cold temperature to maintain its freshness. Therefore, proper storage is crucial to preserve the product's quality.

The geographical barrier between Kepulauan Mentawai Regency and Padang City, the target market area, poses challenges in product preservation. The products need to be stored in thermos containers and require approximately 4 hours if transported by fast boats. However, during stormy weather and rough seas, the products must be transported in portable refrigeration units using sea transportation, which takes up to 12 hours, incurring additional costs based on the quantity of products being transported.

This situation raises questions about the efficiency of both the production and distribution processes. Despite the challenges in distribution, the production location in Kepulauan Mentawai has the advantage of proximity to raw material sources, allowing the acquisition of banana raw materials at a lower cost. Conversely, if the production is done closer to the market area (in Padang City), the challenges in distributing the finished products would be reduced significantly due to the shorter distance between the factory and the market. However, the cost of banana raw materials becomes higher compared to sourcing them from the original location. Furthermore, the differences in geographical and economic conditions between these two locations are suspected to cause variations in production factors and costs, such as distribution ease, raw material costs,

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energy prices, wages, labor accessibility, and so on.

Asserts that optimizing production location is crucial as location factors significantly impact a company's sustainability. Therefore, to drive downstreaming efforts in producing industrial products from leading commodities and enhance the local economy in Kepulauan Mentawai Regency, research is essential to identify the most optimal and efficient location. This research aims to provide valuable information for those interested in establishing businesses in this sector [3]. The majority of existing location theories are constrained by assumptions that cannot be applied to the specific case examined in this research. For instance, the Weber location theory assumes factors other than distance and transportation costs to be constant. Moreover, the production location choices in this study are limited to two points, both separated by the sea. This means production locations can only be established in these two locations and not in the areas between them [4] [5].

The Bid-Rent Theories model group cannot be applied to this research as the model assumes factors other than bid-rent and land-rent to remain constant [25]. However, in both researched locations, there are assumptions of differences in other factors such as raw material prices, energy costs, workforce accessibility and quality, and so on. Discrepancies in prices can be attributed to geographical and infrastructural disparities between Kepulauan Mentawai Regency, an isolated archipelago, and Padang City, situated on the mainland, impacting transportation costs. Goods imported to Mentawai incur higher transportation expenses due to difficult access, limited transportation routes, relying on potentially more expensive sea transport, which may be less efficient than the more commonly used land transportation in mainland areas like Padang [24]. Furthermore, variations in supply and demand levels in both locations can influence product prices. If there's high demand for specific goods in Kepulauan Mentawai with limited supply, it can lead to price increases. Conversely, if the supply of goods is abundant in Padang and demand is not particularly high, prices might tend to be lower [23].

The concepts that rely on factors such as purchasing power and consumer preferences, like the Reilly's Law of Gravitational Attraction model, also cannot be applied. This model selects locations based on spatial pull between two consumer populations. However, in the examined case, there is only one consumer population area, which is Padang City. Hence, it can be concluded that the location theories discussed above cannot be directly applied to this study. This is due to the assumptions within these theories that do not align with the conditions of the researched case. For instance, assumptions about constant factors such as distance, transportation costs, bid-rent, and land-rent are not applicable due to differences in factors such as raw material prices, energy costs, workforce accessibility, influenced by distinct geographical and economic conditions in the two studied locations. Therefore, this research requires a specific location approach that takes these variables into account.

In determining the most appropriate method for industrial location selection, various analytical approaches have been proposed in previous studies. Analyzed the location of a cocofiber agro-industry in Padang Pariaman Regency using the gravity location model, which considers the distance between the production site and raw material sources [6]. However, this approach focuses primarily on spatial proximity and transportation cost minimization, rendering it less effective when non-spatial factors such as energy accessibility, labor quality, and regulatory conditions play a critical role in location decisions. Similarly, Adopted the factor rating method in determining the location of a Virgin Coconut Oil (VCO) factory in East Java [7]. This method assigns scores to several relevant criteria such as availability of raw materials, marketing reach, utilities, and social conditions but its subjectivity limits its ability to capture real cost differentials between locations.

Factors influencing industrial location can generally be classified into two groups: cost factors and non-cost factors [8] [9]. Cost factors include measurable variables such as raw material prices, wages, transportation, and energy costs, while non-cost factors encompass qualitative elements such as market accessibility, institutional support, and labor quality [10]. To overcome the limitations of subjective scoring systems, hybrid quantitative–qualitative frameworks have been developed to integrate both tangible and intangible decision criteria. Among these, the Brown Gibson model has received significant attention for its capacity to incorporate both objective and subjective factors into a single composite index [11] [12]. Recent studies have confirmed its robustness for complex industrial decision-making. For instance, [13] applied a hybrid sustainability-based model integrating Brown Gibson principles and multi-criteria decision analysis (MCDA) to optimize facility locations under supply-chain constraints, showing that combining economic and qualitative indicators yields more realistic outcomes. Utilized a modified Brown Gibson model coupled with RETScreen software to determine optimal photovoltaic plant locations, illustrating the model's flexibility for integrating quantitative energy cost analysis and environmental criteria [14]. Further demonstrated that integrating production-cost analysis with qualitative assessment of logistical access and energy reliability improves decision accuracy in the steel industry's location selection [15].

Comparative evidence from other models also supports the hybrid approach. Employed a GIS-based multicriteria system for industrial site selection in West Java, highlighting the need to balance regulatory, infrastructural, and environmental considerations [16]. Similarly, an MCDM-AHP framework to determine solar power plant locations in Vietnam, integrating quantitative resource indicators with stakeholder judgments [17]. These approaches share conceptual

proximity with the Brown–Gibson model, which distinguishes itself through explicit weighting between objective and subjective components [18] [19].

Therefore, the Brown Gibson model emerges as an analytically comprehensive and adaptable method for industrial location analysis, particularly in contexts where economic cost differentials coexist with significant non-cost variations such as regulatory environments, infrastructure disparities, and social acceptance. Its structure, which assigns relative importance to each factor through a systematic weighting mechanism, enables a balanced and empirically grounded evaluation. As demonstrated across multiple applications in sustainable manufacturing, logistics, and agro-industry [20] [21] [22] this model offers a holistic framework suitable for evaluating both economic efficiency and developmental feasibility making it the preferred methodological choice for analyzing optimal locations in geographically constrained or developing-region industries such as the frozen banana fritter case examined in this study.

## 2. Research Method

This study integrates exploratory quantitative analysis with a deductive approach. Exploratory quantitative analysis is employed to identify and measure the values of both quantitative and qualitative factors that determine the selection of frozen banana fritter production locations. The deductive approach is utilized to draw conclusions regarding the best production location after comparing and calculating the research findings.

The study's population encompasses all traders and entrepreneurs involved in the production factors of frozen banana fritters in Padang City and Kepulauan Mentawai Regency. The research sample consists of selected traders and entrepreneurs engaged in frozen banana fritter production factors in both areas, particularly those operating in the primary markets of these regions, chosen for their representation of the overall market dynamics in the respective areas.

The variables employed in this study are categorized into two types: quantitative variables and qualitative variables. Quantitative variables encompass all production cost components necessary for producing frozen banana fritters in Padang City and Kepulauan Mentawai Regency. These production costs are divided into fixed costs and variable costs. Fixed costs are expenses that a company must incur regardless of its output, such as employee salaries, land and building rent, property taxes, and so forth. Variable costs, on the other hand, are expenses that fluctuate based on the quantity or scale of production, including raw material prices, energy costs, electricity expenses, water charges, transportation costs, and similar expenditures. Qualitative variables encompass various qualitative factors that can influence frozen banana fritter production in Padang City and Kepulauan Mentawai Regency, such as the community's reception toward establishing new factories, the local climate, regulations, and other relevant factors, as perceived important by business entities and relevant experts. These qualitative factors will be assessed and scored. The higher the score assigned to a particular factor in one location, the higher the likelihood of choosing that location based on that specific factor.

The specific details regarding the variables used in this research will be thoroughly examined in the subsequent phase. This will entail engaging in interviews with experts, including academics, industry professionals, and representatives from relevant organizations, as well as stakeholders in the business sector. These interviews will focus on both qualitative and quantitative factors that play a role in the decision-making process for choosing locations for frozen banana fritter production. The costs associated with production, including fixed and variable expenses, were obtained through interviews conducted with relevant business actors. Qualitative data, such as factors influencing frozen banana fritter businesses, were gathered through interviews with industry operators.

The research utilizes the Economic Analysis method employing the Brown-Gibson model, following the approach taken in studies conducted by [11] [12]. This model combines quantitative and qualitative elements in the process of selecting production sites. In this framework, quantitative elements are denoted as objective factors ($OF_i$) as their assessment relies on real values and remains uninfluenced by subjective viewpoints. Conversely, qualitative aspects are labeled subjective factors ($SF_i$) due to the fact that their evaluation is derived from the opinions, understanding, and experiences of experts and relevant business professionals.

The initial phase requires the identification of individual objective factors ($OF_i$) and subjective factors ($SF_i$). Then, objective factor data is gathered by computing and aggregating the entire production costs (Total Cost) necessary for producing a specific quantity of frozen banana fritters in the two observed locations. Following the acquisition of Total Cost data from both sites, the subsequent step involves calculating Performance Measurements for the objective factors ($OF_i$).

$$OF_i = \left[C_i \sum \left(\frac{1}{C_i}\right)\right]^{-1};$$

$$\sum OF_i = 1$$

Notes:
$OF$ = Objective Factor
$i$ = Location $i$
$C$ = Total Cost

The process of determining the values for subjective factors ($SF_i$) involves assigning priority ratings to each factor, referred to as the Relative Importance Index ($w_j$). This index is calculated after identifying the factors, and its formula is as follows.

$$w_j = \left(\frac{SoP_j}{\sum SoP_j}\right)$$

Notes:
$w$ = Relative Importance Index
$j$ = Subjective Factor $j$
$SoP$ = Sum of Preference, the total points for pairwise comparison per factor

Following the acquisition of values for each location ($R_{ij}$) and Relative Importance Index ($w_j$), the subsequent process involves establishing scores for each subjective factor ($SF_i$) every location, utilizing the formula provided.

$$SF_i = \sum R_{ij}.w_j\,;$$

$$\sum SF_i = 1$$

The final step in selecting the best location according to the Brown-Gibson approach involves calculating the Location Preference Measurement ($LPM_i$) This is achieved by employing the following formula after obtaining the values for each subjective factor per location.

$$LPM_i = k.OF_i + (1-k).SF_i;$$

$$0 < k < 1;$$

$$\sum LPM_i = 1$$

Notes:
$LPM$ = Location Preference Measurement
$i$ = Location $i$
$OF$ = Objective Factor
$SF$ = Subjective Factor
$k$ = Weight of the Objective Factor
$1-k$ = Weight of the Overall Subjective Factors

The allocation of weights for $k$ and $(1-k)$ in the objective factor $OF_i$ and subjective factors $SF_i$ is crucial for determining the priority ranking between these factors. If the objective factor $OF_i$ holds $n$ times more significance than the subjective factors $SF_i$, the value of $k$ will be $n$ times higher than $(1-k)$. The specific value of $k$ is derived from interviews with experts and industry professionals, considering their preferences and practical experiences in the field.

## 3. Result and Discussion

Below are the results of the objective factors derived from the calculation and aggregation of the total production costs (Total Cost) necessary for producing frozen banana fritters in both observed locations over a span of four monthly production cycles, yielding a total output of 240 units. Next Objective Factor Scoring per Alternative Location on Table 1.

Table 1. Objective Factor Scoring per Alternative Location

| Location | Total Cost | $C_i$ | $1/C_i$ | $OF_i$ |
|---|---|---|---|---|
| Kab. Kepulauan Mentawai | Rp3.160.000 | 3.160 | 0,000316 | 0,592784 |
| Kota Padang | Rp4.600.000 | 4.600 | 0,000217 | 0,407216 |
| Total | | | 0,000534 | 1 |

The table indicates that the total production cost in Kepulauan Mentawai is lower compared to Padang. Consequently, Kepulauan Mentawai's objective factor surpasses that of Padang.

The next step involves calculating the subjective factors ($SF_i$) at both alternative locations, obtained from evaluations by relevant experts during the interview process.

Table 2. Relative Importance Index Assessment per Subjective Factor

| Subjective Factor ($j$) | Sum of Preference | Relative Importance Index |
|---|---|---|
| Regulations | 0 | 0 |
| Labor Access | 5 | 0,185185185 |
| Access to Main Raw Materials | 6 | 0,222222222 |
| Energy Access | 4 | 0,148148148 |
| Transportation Convenience | 5 | 0,185185185 |
| Access to Supporting Raw Materials | 6 | 0,222222222 |
| Information Access | 1 | 0,037037037 |
| Total | 27 | 1 |

Subsequently, the next stage involves determining the site ranking scores for each alternative location, evaluated by 7 experts.

Table 3. Site Ranking Assessment per Alternative Location

Regulations

| Location ($i$) | Pairwise Comparison Response (per responden) | | | | | | | Total | Site Ranking |
|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | |
| Kepulauan Mentawai | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0,142857 |
| Padang | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 6 | 0,857143 |
| Total | | | | | | | | 7 | 1 |

Labor Access

| Location ($i$) | Pairwise Comparison Response (per responden) | | | | | | | Total | Site Ranking |
|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | |
| Kepulauan Mentawai | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 3 | 0,375 |
| Padang | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 5 | 0,625 |
| Total | | | | | | | | 8 | 1 |

Access to Main Raw Materials

| Location ($i$) | Pairwise Comparison Response (per responden) | | | | | | | Total | Site Ranking |
|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | |
| Kepulauan Mentawai | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 5 | 0,714286 |
| Padang | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 2 | 0,285714 |
| Total | | | | | | | | 7 | 1 |

Energy Access

| Location ($i$) | Pairwise Comparison Response (per responden) | | | | | | | Total | Site Ranking |
|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | |
| Kepulauan Mentawai | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Padang | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 7 | 1 |
| Total | | | | | | | | 7 | 1 |

Transportation Convenience

| Lokasi ($i$) | Pairwise Comparison Response (per responden) | | | | | | | Total | Site Ranking |
|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | |
| Kepulauan Mentawai | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Padang | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 7 | 1 |
| Total | | | | | | | | 7 | 1 |

Access to Supporting Raw Materials

| Location ($i$) | Pairwise Comparison Response (per responden) | | | | | | | Total | Site Ranking |
|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | |
| Kepulauan Mentawai | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Padang | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 7 | 1 |
| Total | | | | | | | | 7 | 1 |

Information Access

| Location ($i$) | Pairwise Comparison Response (per responden) | | | | | | | Total | Site Ranking |
|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | |
| Kepulauan Mentawai | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Padang | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 7 | 1 |
| Total | | | | | | | | 7 | 1 |

Once the values for each location ($R_{ij}$) and Relative Importance Index ($w_j$) are obtained, the next step is to assign scores to each subjective factor($SF_i$) at each location.

Table 4. Subjective Factor Scoring ($SF_i$) per Alternative Location

| Location ($i$) | Kepulauan Mentawai | Padang | Total |
|---|---|---|---|
| $SF_i$ | 0.228174603 | 0.771825397 | 1 |

The table illustrates that Padang City has higher subjective factor scores compared to Mentawai Islands Regency. Therefore, the choice of the production site in Padang City outperforms Mentawai Islands Regency in terms of subjective factors overall. The assessments of objective and subjective factors yield different results. The objective factor assessment favors Mentawai Islands Regency as the best production location, whereas the subjective factor assessment favors Padang City. Therefore, there is a need for a formula that can accommodate both assessments to reach a definitive conclusion. This formula involves calculating the Location Preference Measurement ($LPM_i$) incorporating weight values to assess the priority scale between the objective factor weight ($k$) and subjective factor weight ($1-k$).

Table 5. Location Preference Measurement ($LPM_i$) Scoring per Alternative Location

| Location ($i$) | $OF_i$ | $SF_i$ | $k$ | 1-$k$ | $LPM_i$ |
|---|---|---|---|---|---|
| Kepulauan Mentawai | 0.59 | 0.228 | 0.5286 | 0.4714 | 0.421 |
| Padang | 0.41 | 0.772 | 0.5286 | 0.4714 | 0.579 |
| Total | | | | | 1 |

Source: interview with relevant experts, processed

Based on a comprehensive assessment of objective and subjective factors conducted to determine the Location Preference Measurement values for evaluating the optimal location for frozen banana fritters production between Padang City and Kepulauan Mentawai Regency, it was found that Padang City is the optimal location. This study involved evaluating both subjective and objective factors that significantly impact the industry. One of the subjective factors considered was regulations. Padang City was deemed superior in this aspect due to its supportive regulatory policies that facilitate the operations of the frozen banana fritters industry. Additionally, labor availability is another crucial subjective factor favoring Padang City. The presence of a higher-quality and trained workforce makes Padang City a favorable choice.

On the other hand, Kepulauan Mentawai stands out due to its convenient access to Mentawai bananas, the main raw material. This accessibility gives it a competitive edge in selecting a production location. Moreover, this advantage aligns with the objective factor being evaluated, which is the total production cost. Kepulauan Mentawai leads in this aspect, indicating that the overall production costs are lower than those in Padang. This objective factor holds significant weight in business decisions as it directly influences the company's profitability.

However, energy access and transportation convenience also play pivotal roles in location assessment. Padang is regarded superior in terms of energy access, indicating a stable and guaranteed energy supply in this location. Transportation convenience is another advantage of Padang, boasting excellent transportation infrastructure that enables efficient and timely product distribution. Furthermore, access to supporting raw materials is a crucial consideration. Padang excels in this aspect, offering good access to various supporting raw materials required for the production of frozen banana fritters. Equally important, access to information is also assessed in this study. Padang is deemed superior in terms of information access, indicating the availability of adequate data and knowledge for the frozen banana fritters industry. Accurate and relevant information is crucial for making informed and effective business decisions.

Considering all the subjective and objective factors assessed, the conclusion drawn is that Padang is a superior location for producing frozen banana fritters compared to Kepulauan Mentawai. While Kepulauan Mentawai has advantages in accessing Mentawai bananas as the main raw material and lower overall production costs, subjective factors such as supportive regulations, access to high-quality labor, stable energy supply, efficient transportation, as well as access to supporting raw materials and adequate information make Padang a more optimal choice for establishing the frozen banana fritters industry. This decision carries significant implications for optimizing production processes, enhancing operational efficiency, and ensuring long-term business sustainability.

The decision to choose Padang as the location for producing frozen banana fritters has significant implications for the downstream industry of Mentawai bananas in Kepulauan Mentawai Regency. Firstly, the high population density and large market in Padang offer a substantial potential local market. With a dense population, the demand for processed food products, including frozen banana fritters, is likely to be high. Producing near this significant market allows producers to respond to local demand efficiently and swiftly, creating a responsive supply chain. Consequently, local industry players in Kepulauan Mentawai can design various processed banana products, align with market

trends, and create a unique product identity, enhancing the competitiveness of local products in both national and international markets.

Secondly, Padang boasts excellent logistical infrastructure. Being the economic and transportation hub in West Sumatra, Padang enjoys convenient access to ports, highways, and airports. This is crucial for the distribution of perishable food products like frozen banana fritters, which require special handling during transportation to maintain temperature and product quality. The presence of reliable transportation infrastructure enables producers to supply their products to both local and regional markets more easily, ensuring product freshness throughout the journey. Additionally, by selecting Padang as the distribution center for frozen banana fritters, there is an opportunity to develop an efficient and extensive distribution network. Frozen banana fritters can be distributed to various markets and stores in major cities across Indonesia. This not only enhances the market penetration of frozen banana fritters but also opens avenues to introduce other processed Mentawai banana products to consumers in different regions. In other words, through a strategic distribution center, the marketing potential of Mentawai banana products can be significantly expanded.

Thirdly, Padang has access to the latest technology and knowledge. Being an economic hub in West Sumatra, Padang attracts experts, researchers, and innovators from various fields, including food technology and food processing. The presence of universities and research institutions in the city creates an environment conducive to innovation and product development. In the context of frozen banana fritters production, efficient packaging and cooling technologies, as well as environmentally friendly production methods, can be more readily accessed in Padang. Lastly, the presence of skilled labor in Padang is a crucial factor. As an educational and training hub, Padang produces trained workforce in fields related to production and the food industry. Therefore, producers in Padang have access to high-quality human resources, enabling the production of frozen banana fritters to meet high-quality standards.

## 4. Conclusion

In conclusion, this research underscores the significant challenges faced by Kepulauan Mentawai Regency, despite its substantial potential in the agricultural sector, especially in commodities like bananas. Challenges include economic disparities, limited infrastructure, and insufficient access to human resources and technology. Despite the abundant supply of Mentawai bananas, the region's industrial downstreaming remains limited, with most products being sold in raw form. Nevertheless, the study highlights the substantial potential for downstreaming industries, particularly in the production of frozen banana fritters. Based on the assessment of both objective and subjective factors, Padang City is considered the optimal location for the production of frozen banana fritters compared to Kepulauan Mentawai Regency. Despite Kepulauan Mentawai's advantages in accessing Mentawai banana raw materials and lower total production costs, subjective factors such as supportive regulations, access to skilled labor, stable energy infrastructure, efficient transportation, as well as availability of supporting raw materials and adequate information, make Padang the optimal choice. This decision has positive implications for optimizing production, enhancing operational efficiency, and ensuring the long-term sustainability of the business. The decision to choose Padang as the location for producing frozen banana fritters has significant implications for efforts to boost the local economy of Kepulauan Mentawai Regency, which is considered a disadvantaged region. Firstly, the high population density and large market in Padang create significant opportunities in the local market. Local industries in Kepulauan Mentawai can design unique processed banana products, aligning with market trends, thereby enhancing the competitiveness of local products in both national and international markets. Secondly, Padang's robust logistical infrastructure allows for efficient product distribution both locally and regionally, creating opportunities for the development of an extensive distribution network. Frozen banana fritters and other processed Mentawai banana products can be introduced to consumers in various regions, increasing market penetration and expanding the potential market for these products. Lastly, Padang's access to cutting-edge technology and skilled labor creates an environment conducive to innovation and product development. Consequently, Kepulauan Mentawai Regency has the opportunity to optimize its local economic potential through collaboration with the frozen banana fritters industry in Padang, fostering sustainable economic growth and enhancing the well-being of the local community. Based on the research findings and conclusions presented, there are several recommendations that can be made to various stakeholders involved. For businesses in Kepulauan Mentawai Regency, it is advisable to establish partnerships with the frozen banana fritters industry in Padang. This collaboration could involve a sustainable supply of Mentawai bananas as raw materials and the enhancement of product value through innovative processing methods. Entrepreneurs are also encouraged to explore the potential of both local and national markets through product diversification in processed banana products. For the government and relevant institutions, it is essential to take steps to improve infrastructure and accessibility in Kepulauan Mentawai Regency, particularly in transportation and energy, to support the success of downstreaming this industry. Subsidies and assistance to small and medium-sized enterprises in the form of training, equipment, and technology can provide the necessary boost. Furthermore, promoting and marketing local products are crucial to raise consumer awareness about Mentawai bananas. In this regard, collaboration with educational and research institutions can help identify effective marketing strategies. All stakeholders, including academics and

researchers, are encouraged to continue supporting further research focusing on Mentawai banana product innovation and downstream industry development strategies in this region. With strong collaboration between the business sector, government, and academia, downstreaming the Mentawai banana industry can become a driving force for sustainable and inclusive local economic growth.

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