

Innovation of Nipah Salt as an Alternative to Sea Salt in Supporting the Economy of the Bengkalis Coastal Region

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Abstract

This study explores the innovation of Nipah salt as an alternative to polluted sea salt and its potential to enhance the coastal economy of Bengkalis Regency. Using a descriptive qualitative approach through observations, interviews, and SWOT analysis, the research identifies the strengths, weaknesses, opportunities, and threats in developing Nipah salt. The findings indicate that Nipah salt production is simple, environmentally friendly, and can be conducted throughout the year, offering significant economic benefits for coastal communities. The abundance of Nipah palm sap within mangrove ecosystems provides a sustainable raw material that does not require large-scale land use. Community empowerment and training programs have improved local capacities in processing, packaging, and marketing, leading to increased income and economic diversification. This innovation aligns with blue economy principles, integrating ecological preservation with social and economic growth. Although challenges such as limited technology and mangrove degradation persist, Nipah salt has strong potential to become a distinctive regional product that supports sustainable livelihoods and strengthens the Bengkalis coastal economy.

Keywords: *Nipah salt, blue economy, sustainability, coastal economy, innovation.*

1. INTRODUCTION

Salt is a strategic commodity that is very important in everyday life, the food, pharmaceutical, and preservation industries. However, in Indonesia, the quality of local salt still often does not meet standards: for example, NaCl content, iodine content, contaminants, and the content of impurities (such as heavy metals) are often below the national standard (SNI). Various studies show that traditional methods of salt production clearly affect quality, and there are efforts to use technologies such as geomembranes and filtration systems to improve quality. For example, in a study in East Aceh (2024), the local salt production method using geomembranes was compared with boiling and a combination of the two, resulting in the geomembrane method having salt quality closer to the SNI standard.

In addition, alternative development of non-conventional salt sources has begun to emerge, triggered by the problem of sea salt contamination (e.g., sea salt contaminated by microplastics, heavy metals) and the instability of sea salt production due to climate change, weather, abrasion, and coastal ecosystem degradation. One alternative that is starting to be noticed is nipah salt (salt derived from the nipah plant, for example from the fronds or other parts), which has long been known in several areas in Sumatra, Kalimantan, and Papua as traditional salt / apong salt / attap salt. The development of nipah salt is in line with the concept of the blue economy, which integrates marine-based development with sustainable environmental management, providing new opportunities for employment and increased food production (Khoiriyah, 2024)

Bengkalis Regency, Riau Province, boasts a fairly extensive mangrove ecosystem and a natural habitat for nipah palms. Data shows that of the total mangrove area in Riau Province of approximately 224,895 hectares (2021), Bengkalis Regency accounts for approximately 26,757 hectares of existing mangroves. Furthermore, Bengkalis has the potential for mangrove rehabilitation, covering approximately 1,628 hectares. In the coastal and small

island area plan (RZP3K) of Bengkalis Regency, there is a coastline length of ± 498.7 km which is used for coastal zones and small islands one potential that can be developed is the utilization of nipah salt resources. Nipah (*Nypa fruticans*) is a palm plant that thrives in tidal areas and has the potential as a source of low-sodium salt. Nipah salt can be extracted from the trunk and fronds through a simple process and has the potential as an alternative salt consumption for people with hypertension. The use of Nipah salt can also support the economy of coastal communities through the development of small and medium industries. In addition, this strategy can empower coastal communities by improving local skills in the production and processing of nipah salt, in line with efforts to optimize the economy based on local natural resources (Disman et al., 2023) (Nasution et al., 2022).



Figure 1. Nipah Salt

Previous research on nipah salt has tended to focus on its chemical aspects and health benefits. A major limitation is the lack of research integrating economic, social, and environmental aspects into nipah salt resource management. Furthermore, no research has specifically addressed the potential of nipah salt as a substitute for polluted sea salt and its impact on the coastal economy, particularly in Bengkalis. This research will address this gap by providing a comprehensive analysis of sustainable nipah salt resource management strategies. This research will integrate economic, social, and environmental aspects into nipah salt management and provide practical recommendations for the development of the nipah salt industry in Bengkalis. Therefore, this research is expected to make a significant contribution to the development of science and the improvement of the welfare of coastal communities

2. REVIEW OF LITERATURE

As a basis for developing this research, various previous studies have provided a strong theoretical and empirical foundation regarding the potential, challenges, and strategies for managing nipah salt resources in supporting the coastal economy. The following literature review summarizes relevant research findings, covering aspects of nipah salt's potential as an alternative to polluted sea salt, environmental challenges, community-based management strategies, the role of the local economy, and the importance of technological innovation in its development.

1. The potential of the nipah palm (*Nypa fruticans*) as an alternative salt source has received special attention due to its low sodium content and safety for health. (Muslimin & Marpaung, 2024) stated that synthetic salt from nipah palm fronds has a sodium content that can be a healthy salt solution, which is highly relevant to supporting the health of coastal communities. The nipah salt production process, which takes place using the evaporation method of nipah palm juice in a sustainable

- and environmentally friendly manner, makes it a potential commodity for development in the coastal area of Bengkalis (Raida Agustina et al., 2024).
2. The main challenges faced in sea salt production in coastal areas are pollution from waste and ecosystem damage, which impact salt quality. (Hasaruddin, 2021) explains that this pollution opens up opportunities to develop alternative, cleaner salt sources, such as nipah salt. As (Ibrahim, 2025) notes, this nipah salt alternative not only provides a solution to sea salt pollution but also protects the health of coastal communities from the risk of contamination.
 3. Nipah salt resource management strategies must prioritize the principles of sustainability and community empowerment. (Ramah et al., 2023) emphasized the importance of community-based management with environmentally friendly production techniques to maintain the sustainability of this resource. Community empowerment through nipah agro-industry training, as noted by (Sugandi Afandi et al., 2023), can significantly increase product added value and economic development in coastal areas.
 4. Nipah salt plays a strategic role in strengthening the local economy on the coast of Bengkalis by creating new business opportunities and diversifying products. Research by (Suriawanto et al., 2022) highlights that with proper management and innovation, nipah salt production can increase community income and reduce dependence on polluted sea salt. This is consistent with regional development policies that prioritize natural resource optimization and community welfare (DJP KRL KKP Team, 2024).
 5. Technology and innovation are key factors in improving the quality and quantity of nipah salt production. (Muslimin. Marpaung, 2024) demonstrated that modern crystallization and processing technology can produce high-quality nipah salt that meets food standards. (| & Maisarah, 2024) added that this innovation must be implemented while protecting the nipah habitat to ensure sustainable production and preserve the coastal environment.

3. METHOD

This study uses a qualitative descriptive approach aimed at describing and analyzing in-depth strategies for managing nipah salt resources as an alternative to polluted sea salt to support the coastal economy of Bengkalis. This approach was chosen because the research focuses on understanding the social, economic, and environmental conditions of coastal communities involved in nipah management. The theoretical framework used is the theory of sustainable natural resource management and local economic theory, which serves as the basis for assessing the extent to which nipah salt potential can be managed efficiently and sustainably to improve the welfare of coastal communities.

This research was conducted in the coastal area of Bengkalis Regency, Riau Province, which is one of the areas with great potential for nipah palms and has a community that depends on coastal resources for its livelihood. The research location was determined purposively, namely by considering areas with high levels of sea salt pollution and the potential for abundant nipah sap production. The equipment and materials used included interview guidelines, recording devices, documentation cameras, observation sheets, and research materials in the form of nipah sap samples and secondary data such as salt production reports, regional policies, and coastal economic statistics. If necessary, simple laboratory equipment such as a refractometer and a drying oven were also used to measure the salt content of processed nipah palms as a comparison with sea salt.

The research procedure was carried out through three main stages: preparation, data collection, and analysis. In the preparation stage, researchers conducted a literature review and identified research locations based on potential and existing problems. Data collection was conducted through direct observation of the nipah palm processing process and in-depth

interviews with nipah palm farmers, business actors, and local government officials involved in coastal resource management. Furthermore, data analysis was carried out using the Miles and Huberman model, which includes data reduction, data presentation, and conclusion drawing. To strengthen the analysis results, a SWOT analysis was also used to identify strengths, weaknesses, opportunities, and threats in nipah palm salt development. The research results were then verified through triangulation of sources and methods, ensuring that the findings obtained have high validity and can be used as a basis for formulating strategies for sustainable nipah palm salt resource management in the coastal area of Bengkalis.

4. RESULT & DISCUSSION

Nipah Salt Innovation Potential

The research results show that innovative Nipah salt production in the coastal area of Bengkalis has great potential as an alternative to sea salt, which is currently heavily polluted by industrial waste, microplastics, and climate change. Based on observations and interviews with traditional salt processors in Banten and Bukit Batu Districts, it was discovered that the Nipah salt production process is carried out using a simple method that is easy for coastal communities to implement. This process involves tapping the sap from the Nipah tree trunk, filtering to remove natural impurities, and then boiling until the salt crystals form a brownish-white color with a smooth texture and a mild taste.

This stage is not dependent on weather conditions like sea salt production, so it can be carried out year-round. At each stage, the community is trained to apply principles of cleanliness and energy efficiency to ensure the salt produced maintains good quality and high economic value. Community education activities include training on processing Nipah sap into salt, product packaging, and marketing strategies. This training serves as a means of empowering coastal communities to develop the skills to process local resources into high-value products.

From an economic perspective, research shows that Nipah salt cultivation has the potential to become a new source of income for coastal communities. With an average productivity of 15 liters of sap per tree per day and a salt yield of 15–20%, a craftsman can produce approximately 2–3 kg of Nipah salt per day. If sold at Rp 25,000–Rp 30,000 per kilogram, as it is considered a healthy natural product, the daily income can reach Rp 75,000–Rp 90,000. This is significantly higher than traditional sea salt production, which relies on the dry season and requires extensive drying land.

The Nipah salt innovation also strengthens the local economy by involving community business groups (KUB) consisting of coastal residents, including women, in the production and packaging stages. The Bengkalis community, previously dependent on marine catches, now has a new, diversified source of income. This program aligns with **blue economy** principles, which emphasize the sustainable use of coastal resources without damaging the mangrove environment where the Nipah plant grows.

The SWOT analysis shows that the main strengths of Nipah salt development are the abundant availability of raw materials, a simple production process, and the potential for high sales value in the niche market (natural and healthy products). Weaknesses lie in the limited availability of modern drying equipment and limited access to broader markets. Significant opportunities arise from the increasing trend in consumption of natural products and support from local government policies for coastal economic development. Meanwhile, threats may arise from mangrove conversion, climate change, and competition with industrial salt.

Overall, the Nipah salt innovation has had a broad positive impact: creating new jobs, preserving the mangrove ecosystem, and strengthening the economic independence of the Bengkalis community. Through ongoing education and training, the community not only

understands how to process Nipah salt but also develops an awareness of the importance of protecting the environment as a future economic resource. With support from the local government, Nipah salt has the potential to become **a superior Bengkalis product** capable of competing in national and even international markets.

Key Factors and Strategic Framework

Nipah salt innovation has great potential as a substitute for polluted sea salt due to its abundant raw materials, simple and environmentally friendly production process, and the potential to boost the economy of coastal communities through education, training, and business diversification. A SWOT analysis demonstrates strengths in raw material availability and broad market opportunities, but it faces threats such as mangrove degradation and limited production technology..

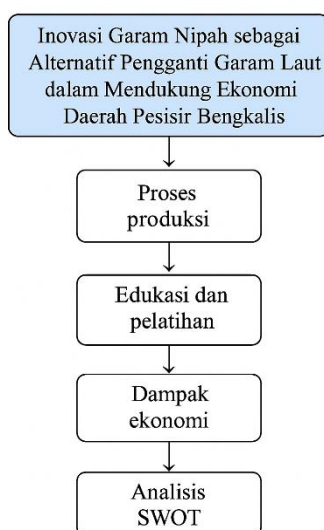


Figure 2. Framework for developing alternative strategies for nipah salt

Table 1. Key factors for alternative nipah salt and supporting the economy of the Bengkalis coastal area

Key Factors	Descriptive Description	Implications for the Bengkalis Coastal Economy
Availability of Raw Materials	Nipah plants grow abundantly in the mangrove areas of the Bengkalis coast.	Becoming a sustainable resource that is easy to process without damaging the ecosystem.
Simple Production Process	Processing Nipah salt requires only basic equipment such as boiling pots and filtering tools.	Can be done by local communities without large capital, supporting home industries.
High Economic Value	Nipah salt products are sold at a higher price due to their health benefits and natural authenticity.	Providing additional income for coastal communities and opening up new business opportunities.
Community Empowerment	Training and education programs are conducted to	Increasing community economic independence

	improve community skills in production and marketing.	and environmental awareness.
Local Government Support	The local government encourages the development of the blue economy and leading local products.	Improving access to production tools, promotion, and small industry cooperation opportunities.
Market Potential for Natural Products	There is increasing public awareness of the consumption of healthy and organic products.	Becoming a great opportunity for the development of Nipah salt as a specialty product of Bengkalis.
Environmental Aspects	Nipah salt management is in line with mangrove ecosystem conservation efforts.	Supporting the principles of sustainable development in the coastal areas of Bengkalis.

5. CONCLUSION

This study concludes that the innovation of Nipah salt production in the coastal area of Bengkalis has significant potential as a sustainable alternative to polluted sea salt. The abundance of Nipah palm resources, combined with a simple, environmentally friendly production process, provides an opportunity for the development of a community-based salt industry. Through education, training, and empowerment programs, coastal communities have improved their skills in processing and marketing Nipah salt products, resulting in increased household income and economic diversification.

Furthermore, the integration of Nipah salt production with the principles of the blue economy supports both environmental conservation and socio-economic resilience in coastal regions. The SWOT analysis reveals that the strengths of Nipah salt development lie in resource availability and market potential, while the main challenges involve technological limitations and mangrove ecosystem management. To ensure sustainability, collaboration among local governments, research institutions, and community groups is crucial to enhance product quality, expand market reach, and protect the ecological balance of mangrove areas.

Overall, Nipah salt innovation represents a strategic step toward strengthening Bengkalis's coastal economy, fostering sustainable livelihoods, and positioning Nipah salt as a distinctive local product with national and international competitiveness.

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