

Optimizing the feasibility and marketing of siwalan fruit peel waste products as an environmentally friendly innovation in tuban regency

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Abstract

Almost all parts of the siwalan plant have high use value, such as the leaves of the siwalan plant are useful as wicker, then the trunk of the siwalan can be used as a sturdy building material, the flower of the siwalan has a water content whose water is often referred to as legen which has properties on health, and the fruit can be consumed by the community by making sweets, but there is one that has no selling value, namely siwalan skin, siwalan fruit skin waste which has been considered as garbage, has the potential to be used as raw material for environmentally friendly products, such as dishwashing tools. Through technical, economic and marketing feasibility analysis, this study evaluates the potential of processing such waste to create value-added products that can support the local economy and reduce environmental impacts. The results of this study are expected to provide recommendations for the development of siwalan fruit peel waste-based products that are not only ecologically beneficial, but also economically viable, as well as increasing public awareness of the importance of recycling and waste utilization.

Keywords:

Feasibility Study; Marketing; Product Development

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INTRODUCTION

Tuban Regency, located on the north coast of East Java, is known as one of the producing areas of siwalan (lontar) fruit, which has high economic value. Siwalan fruit, with its benefits as food, beverage and industrial raw material, has long been an important local commodity. However, despite its main benefits, the waste generated from processing siwalan fruit, especially the fruit peel, is often overlooked and simply discarded as garbage. Siwalan rind waste, which consists of fibers and hard parts of the rind, has great potential that has not been optimally utilized. In Tuban Regency, utilizing siwalan fruit leather waste as raw material for environmentally friendly products can be an innovative solution that not only reduces waste but also improves the local economy and supports environmental sustainability.

Siwalan fruit leather has unique characteristics, including water resistance, fiber strength, and environmentally friendly natural properties. Therefore, siwalan fruit leather can be processed into various value-added products, such as handicraft products, household tools, and natural cleaning agents. One example of the utilization of siwalan fruit peel waste is the manufacture of siwalan coir used as an environmentally friendly cleaning tool, which can replace the use of hazardous chemicals or disposable plastics. However, although siwalan husk waste has great potential, the processing and marketing of siwalan husk-based products still face challenges. Therefore, it is important to conduct in-depth research on the technical and economic feasibility of these products, as well as to design appropriate marketing strategies so that these products can be accepted in a wider market.

Optimizing the feasibility of siwalan fruit peel waste-based products includes several aspects, including technical feasibility, economic feasibility, and environmental feasibility. From a technical perspective, the process of processing siwalan fruit peels into quality products requires the right technology, such as drying, fiber separation, and manufacturing of finished products. This process must be efficient and not damage the quality of the raw materials. The economic feasibility aspect is equally important, where production costs must be carefully calculated, including the cost of raw materials, labor, and production facilities. The products must be reasonably competitive in price but still provide a profit for local businesses. In addition, it is also important to identify the right market for siwalan fruit peel waste-based products, be it local, national or international markets. In terms of the environment, the utilization of siwalan fruit peel waste as raw material for environmentally friendly products strongly supports efforts to reduce waste and the sustainable use of natural resources. This innovation is in line with global efforts to reduce carbon footprints and the use of non-degradable materials, such as plastics.

Marketing siwalan fruit peel waste-based products requires a strategic approach to reach consumers who care about the environment and prioritize environmentally friendly products. One marketing strategy that can be applied is through education and sustainability campaigns, which emphasize the benefits of siwalan fruit leather-based products as an alternative to synthetic or plastic-based products. In addition, the use of social media and e-commerce platforms can open up wider market opportunities, allowing these products to be recognized by more consumers. In addition to the consumer market, siwalan fruit peel waste products can also be marketed through collaboration with other industrial sectors, such as the handicraft sector, home industry, and even the tourism sector, where these waste-based products can become souvenirs or regional souvenirs that have added cultural and environmental value.

This research aims to thoroughly assess the technical and economic feasibility of products produced from siwalan fruit peel waste, as well as to formulate effective marketing strategies to increase product competitiveness in the market. In addition, this research is expected to provide a solution to reduce siwalan fruit leather waste that has been wasted, as well as to make a positive contribution to the economy of the Tuban Regency community through job creation and local economic empowerment. Thus, optimizing the utilization of siwalan fruit leather waste as an environmentally friendly product is not only beneficial for the environment but can also be a sustainable innovation to support the economic welfare of the people of Tuban Regency.

LITERATURE REVIEW

Potential Feasibility of Siwalan Products

Siwalan fruit peel waste can be utilized in various forms of products, such as dishwashing tools, raw materials for crafts, or even as a basic ingredient for food. The utilization of this waste not only reduces environmental pollution but also provides economic value to the community. According to research, the use of organic waste in daily life can reduce emissions from the use of plastic sponges. The previous study showed that optimizing the feasibility and marketing of siwalan fruit peel waste products in Tuban Regency offers a great opportunity for environmentally friendly innovation. With the right approach to education, partnerships and marketing, this waste can be transformed into a valuable resource for the community while supporting sustainable development goals. Existing programs show that the Tuban community is ready to adapt and innovate in waste management.

Influence of Geographical Resources in Marketing Strategy

According to Huseini (1999), superior products are products that provide added value and the highest income contribution to a regional economy. This income is based on the value and contribution aspects of a

commodity or product. It is said to be a superior product if the product can provide high added value along the value chain and provide the largest contribution of a regional economy. Superior commodities in marketing are characterized by reliable products produced by certain regions that are thought to have distinctive advantages, so that they have strong competitiveness. These advantages include suitable climate, fertile land, skilled labor and efficient management as well as the application of technology. These advantages are referred to as comparative advantages. provide high added value along the value chain and provide the largest contribution of a regional economy.

Development of Unique Packaging to Increase Consumer Buying Interest

The feasibility of packaging for dishwasher production from siwalan bark fiber waste plays an important role in attracting consumer interest and supporting product marketing strategies. With a design that reflects an eco-friendly identity, such as the use of biodegradable or recycled packaging materials, the product can more easily attract the attention of consumers who care about sustainability. The choice of natural colors such as brown or green and the minimalist design also reinforce the product's natural and functional image, making it stand out in the market. In addition, packaging that includes clear information on the product's advantages, such as its durability and the natural ingredients used, provides added value that increases consumer confidence. The packaging should also be compact and functional to reduce excess waste, while allowing consumers to experience the benefits of a product that is not only effective, but also supports a green lifestyle.

RESEARCH METHOD

The method used in this research is the descriptive analysis method. The definition of descriptive according to (Sugiyono, 2018) is: "Descriptive method is research conducted to describe independent variables, either only on one or more variables (variables that stand alone) without making comparisons and looking for these variables with other variables". Descriptive research is to collect data based on factors that support the object of research, then analyze these factors to find their role (Arikunto, 2010: 151). Data collection methods are intended to obtain relevant, accurate and reliable information. The methods used include observation, and the research interview method is carried out without coercion by means of producers of siwalan, village officials, and siwalan sellers must declare their willingness to become informants. Researchers added samples from consumers who have used this product as supporting informants in this study.

FINDINGS AND DISCUSSION

The results of the research with detailed descriptive analysis related to the marketing and feasibility of dishwasher products from siwalan skin fiber

waste that has no economic value in Tuban Regency. The data obtained from interviews are summarized in tables, graphs, and diagrams to clarify the results of the analysis, thus the following interview data can be obtained :

Effect of siwalan fruit supply on production stability

The supply of siwalan fruit plays an important role in maintaining production stability in Tuban Regency, especially for industries that process this fruit into various products, such as siwalan sugar, sap, and other specialties. When the supply is stable, the production process can run smoothly, meet market needs, and support the welfare of farmers and business actors. However, the supply of siwalan fruit is often affected by factors such as harvest season, weather conditions, cultivation techniques, and market demand. If supply is disrupted due to a long dry season or lack of good cultivation practices, production will be affected, which can then reduce the income and economic resilience of the people who depend on this commodity. Therefore, maintaining a stable supply of siwalan fruit is crucial to support the sustainability of the local industry in Tuban.

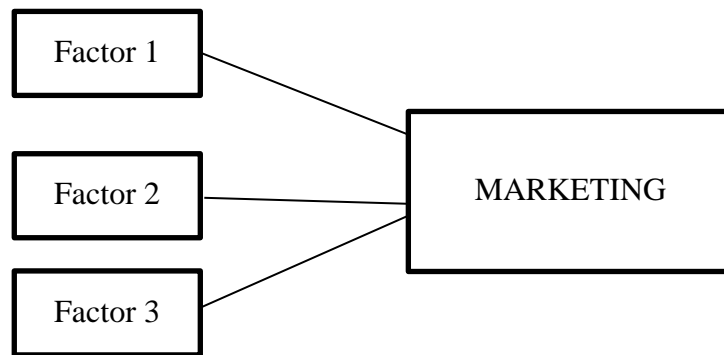
Maximize human resources for the production process by utilizing local government realtions

Utilizing policies and programs issued by the local government. The government of Tuban has made efforts to improve the quality of the workforce through skills training and the development of vocational education in accordance with the needs of local industries. By establishing cooperation between the local government, companies, and educational institutions, industry players can get a ready-made workforce that understands the needs of the local market. This effort not only helps increase company productivity but also has a positive impact on the absorption of local labor and the improvement of the regional economy.

The effect of environmentally friendly products on consumer purchasing power

These products attract environmentally conscious consumers, especially among the younger generation who are more sensitive to sustainability issues. Although the price of green products is often higher, consumers' willingness to pay more is increasing as they see more value in sustainability and social responsibility. This makes green products attractive in the market and increases consumer purchasing power for products that support environmental sustainability.

Figure 1.
Research Marketing



Source: Processed by researchers

This research is important because knowing the annual suppliers of siwalan can facilitate the production process of environmentally friendly dishwashing tools and analyze the feasibility of siwalan serabiut to be processed into a finished product. Analysis of environmentally friendly packaging is also needed so as not to reduce selling prices and consumer interest. By conducting an optimal marketing strategy for the product by cooperating with siwlaan suppliers around Tuban district.

Table 1.
According to the Central Bureau of Statistics of Tuban Regency

Type of Plantation Crop	2019/pound	2018/pound
Siwalan	116,92	119,64

Source: Author(s) work

Table 2.
Product Feasibility Analysis

Aspects	Product Feasibility	Product Marketing
Definition	Assessment of whether the product meets market needs	The process of introducing and selling products to consumers
Destination	Determine the potential success of the product in the market	Build brand awareness and increase sales
Key Factors	Market research, competitor analysis, consumer feedback	4P strategy (Product, Price, Place, Promotion)
Consumer Research	Understand consumer needs, preferences, and behavior	Identifying target markets and creating the right message
Product Launch	Launch planning and management	Communication strategy to attract consumer attention
Performance Evaluation	Measuring market response to the product	Analyze the effectiveness of marketing campaigns

Source: Author(s) work

Table 3.
Strategy marketing

Factor	Description	Influence on Purchasing Power
Environmental Awareness	The level of consumer understanding of environmental issues and the importance of green products.	Significantly increase purchase intention for green products
Product Knowledge	Information that consumers have about the benefits and features of green products.	Consumers are more likely to buy if knowledge is high.
Price Perception	Consumers' views on the price of green products compared to conventional products.	Willingness to pay more if they believe in the benefits
Perceived Consumer Effectiveness (PCE)	Consumers' belief that their actions can contribute to environmental improvement.	High PCE drives green product purchase intention.
Attitude towards Green Products	A positive view of the sustainability and social impact of green products.	Positive attitude increases purchase intention.
Consumer Engagement	The level of consumer participation in finding and choosing environmentally friendly products.	High engagement is associated with greater purchase intention.

Source: Author(s) work

CONCLUSIONS

Optimizing the feasibility and marketing of processed Siwalan fruit peel waste products as an environmentally friendly innovation in Tuban Regency has great potential to support environmental sustainability and local economic development. Based on the analysis conducted, the utilization of Siwalan fruit peel waste can reduce pollution and waste accumulation, and provide added value through products such as biodegradable packaging, natural fibers, or environmentally friendly health products. In terms of economic feasibility, this waste processing is proven to have relatively low production costs and can create jobs for local communities, while boosting the regional economy. In the market, there is a growing demand for products based on sustainability principles, which provides an opportunity for Siwalan products to be well received, especially among environmentally conscious consumers. However, the main challenges faced are the lack of public awareness and understanding of the potential of Siwalan waste, as well as

limited processing technology and supply chain management. For this reason, collaboration between the government, business actors, and non-governmental organizations is needed to improve training, technological support, and effective marketing strategies. With the right approach, Siwalan fruit peel waste-based products can become a sustainable environmentally friendly innovation model and provide long-term economic benefits for Tuban Regency.

LIMITATION & FURTHER RESEARCH

Although this study provides a clear picture of the potential utilization of Siwalan fruit leather waste as an environmentally friendly product, there are several limitations that need to be considered. One of them is the limited data related to the volume and distribution of Siwalan rind waste in Tuban Regency, which may affect the analysis of production feasibility and supply chain. In addition, limitations in developing efficient and environmentally friendly Siwalan waste processing technology are also a challenge, as innovations in processing this raw material are still relatively new and require further research. This research has also not fully examined aspects of product competitiveness in the market, including a more in-depth analysis of consumer behavior towards preferences for agricultural waste-based products. Therefore, further research is needed to explore the development of more optimized processing technologies, more comprehensive market analysis, and the long-term social and economic impacts of this initiative. In addition, further research could also focus on developing an inclusive and sustainable business model, involving active participation from local communities and various stakeholders in the Siwalan product value chain.

AUTHOR CONTRIBUTION

Author: Conducted field research in Tuban Regency, including data collection on the feasibility of utilizing *siwalan* fruit peel waste. Led the analysis of environmental impacts and waste management potential. Contributed to the development of the marketing strategy for the proposed products, with a focus on consumer acceptance and sustainability. Assisted in manuscript preparation. Performed economic feasibility assessments, including cost-benefit analysis and potential for local market integration. Contributed to the drafting of the results section and the final manuscript.

Declaration of interest

The authors declare that there are no competing interests regarding the research and publication of this paper. This study was conducted without any financial support or funding from external sources. The authors further declare that there are no personal, professional, or financial relationships that could be construed as influencing the research outcomes or interpretations presented in this paper.

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