

Optimizing the benefits of palm fruit skin to help increase income and reduce poverty in the palang area, tuban regency.

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Abstrak

Siwalan (*Borassus flabellifer*) is one of the important local resources in Palang District, Tuban Regency, yet its fruit peel remains largely underutilized and is generally discarded as waste. This study aims to explore and optimize the potential utilization of siwalan fruit peel as a value-added local resource that can create additional income opportunities and support poverty reduction in the community. This study employed a descriptive qualitative approach, with data collected through semi-structured interviews, observations, and documentation. Informants were selected using purposive sampling, involving local residents and siwalan traders with knowledge and involvement in siwalan-related activities. The findings indicate that siwalan fruit peel has considerable potential to be developed into economically valuable and environmentally friendly products, including craft materials, textile-related products, briquettes, fertilizer, and other processed products. However, its utilization remains limited due to insufficient knowledge and skills, as well as constraints related to technology, capital, mentoring, and market access. Using the Asset-Based Community Development (ABCD) approach, siwalan fruit peel can be positioned as a local asset rather than merely waste. Therefore, training, continuous mentoring, appropriate technology, collaboration with academics and business actors, and stronger marketing strategies are needed to transform this local resource into value-added products, create new business opportunities, and contribute to increased community income and welfare in Palang, Tuban Regency.

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INTRODUCTION

Indonesia is a vast country with a massive population of approximately 281,603,800 people (BPS, 2024). This large population drives high consumption levels, resulting in significant waste generation. Data on waste management from the Ministry of Environment and Forestry (KLHK) for 2022 compiled from inputs across 202 regencies and cities nationwide indicates that the total volume of accumulated national waste reached 21.1 million tons. Of this total, 65.71% (13.9 million tons) was successfully managed, while the remaining 34.29% (7.2 million tons) lacked proper management (5, 2023).

One local resource with development potential is the siwalan plant. These plants are abundant in coastal and arid regions, including the northern coast of Java specifically in the Palang District of Tuban Regency. To date, the utilization of the siwalan plant has focused primarily on parts with direct economic value, such as the fruit and its sap (nira), while the fruit peel remains relatively underutilized. However, research (Purwandi et al., 2022) demonstrates that the fiber in siwalan fruit peel contains cellulose that can be isolated and utilized for various purposes. That study yielded a cellulose content of 12.3% (w/w), indicating that the fruit peel is not merely waste but contains material with the potential to be developed into useful products. Furthermore, research on siwalan plantation waste indicates that fruit fibers and other plant parts can serve as lignocellulose sources for producing items such as kraft paper (Gabriel & Mardhiyyah, 2019). Thus, these studies highlight the potential to transform siwalan peels and plant waste into derivative products through innovation and processing technologies. This situation is particularly relevant given that Tuban Regency is known for its abundant siwalan (sugar palm) resources. Research conducted by (Siti Hardiyanti et al., 2021) in Kembangbilo Village, Tuban Regency, revealed that siwalan plantations generate fruit husk waste that remains underutilized and poses potential environmental risks if left unmanaged. The study also indicated that siwalan husks contain fiber and could be developed into a growing medium for plants. These findings are supported by (Purwanto et al., 2024), who examined the utilization of siwalan tree waste in Kowang Village, Semanding District, Tuban Regency; their study demonstrated that siwalan waste could be processed into products such as briquettes, thereby offering opportunities to generate added value for the local community. This highlights that the issue of siwalan waste in Tuban is not merely an environmental concern but also involves opportunities to transform local resources into products with economic value.

However, the existence of research findings regarding the potential of siwalan husks does not automatically imply that the community possesses the knowledge and skills to utilize them. Preliminary observations and interviews conducted by researchers with siwalan vendors in the Palang area revealed that fruit husks resulting from sales activities are still largely regarded as having no economic value and are simply discarded as waste. This situation indicates a gap between the

scientific potential demonstrated through research and the actual knowledge and utilization practices within the community. In other words, the challenge lies not in a lack of raw material potential, but rather in how knowledge regarding that potential can be translated into practical know-how, skills, and business opportunities that the community can implement. Findings regarding siwalan waste utilization across various parts of Tuban further demonstrate that processing methods and community guidance play a crucial role in transforming waste into more valuable products. From the perspective of the local economy, the utilization of siwalan (sugar palm) fruit husks can be directed toward value-added creation through product diversification. Research has identified various potential applications for siwalan husks, ranging from a raw material for furfural and a source of cellulose to a growing medium and a lignocellulosic material for paper products. Consequently, there is an opportunity to further develop the use of these husks based on technological capabilities, market demands, and local community capacity. This approach aligns with circular economy principles, which view waste as a resource that can be utilized and converted into value-added products (Masruroh et al., 2022).

In the context of community empowerment, optimizing palm sugar palm peel is not sufficient through the introduction of processing technology; it also requires consideration of the community's existing assets and capabilities. The Asset-Based Community Development (ABCD) approach is relevant because it positions local assets, knowledge, skills, social networks, and resources available within the community as the foundation for development. (Ridhani & Priyadharma, 2023) explain that ABCD is a bottom-up development approach that identifies and inventories community assets as the basis for development. Research (Ward, 2021) also shows that ABCD is used as an approach in community development, emphasizing the utilization of existing capacities and assets within the community. Therefore, in the context of this research, palm sugar palm plants, the presence of traders, local knowledge, and community networks can be viewed as assets that can be developed to create more productive uses for palm sugar palm peel.

The implementation of an asset-based approach also positions the community not merely as program recipients but as those possessing knowledge and capacities that can be developed. (Close & Lohr, 2023) demonstrate that within the ABCD approach, the expertise of community members can be viewed as a crucial asset and can be strengthened through research and community engagement. Meanwhile, Chupp et al. (2023) demonstrate the link between ABCD and community-based research in fostering more sustainable social change. This perspective is relevant to the situation of palm fruit traders in Palang, as optimizing the fruit peel does not require the creation of new resources but can build on existing assets, namely the raw material of palm fruit peel, trading activities, community experience, and established social and economic networks.

Based on the existing literature, there is a gap between the scientific evidence regarding the potential of palm fruit peel and the level of knowledge and utilization of it by the community, particularly palm fruit traders in the Palang area, Tuban Regency. Previous research has demonstrated that palm fruit waste can be utilized as a raw material for various products. However, research specifically examining how palm fruit peel benefits are

understood by palm fruit traders and how this potential can be developed as an opportunity to increase community income in the Palang area remains limited. Therefore, this research is not aimed at simply discovering new benefits from palm bark, but rather at bridging scientific knowledge regarding the potential of palm bark with the conditions and capacities of local communities through an asset-based approach. This constitutes a novel element of the research, particularly in connecting the potential of local resources, community knowledge, waste utilization, and opportunities for increasing economic value.

Literatur Review

The Economic and Cultural Potential of the Siwalan Fruit

The siwalan (*Borassus flabellifer*), locally known as lontar, is a tropical plant with significant economic potential. Besides its fruit, its sap, leaves, and trunk can also be utilized. The fruit contains essential vitamins and minerals, including vitamins B and C, zinc, potassium, phosphorus, thiamine, and riboflavin, making siwalan a potential source of functional food and community income (Artiningsih & Purwaningtyas, 2016).

Despite its substantial agricultural potential, the Palang region has not yet been able to utilize these resources to their full capacity. Several challenges continue to affect the agricultural sector, including decreasing market prices, restricted access to capital and technology, and climate change, which can influence agricultural productivity. Nevertheless, the region has opportunities to expand its marketing networks and enhance the added value of secondary crops through product diversification and the development of various processed agricultural products (Ahadiyah, 2022).

Benefits of Siwalan Fruit Skin

The skin of the palm fruit is a plant part with potential use as a value-added raw material. Until now, the skin of the palm fruit has generally not been optimally utilized and is often considered waste after the fruit flesh is consumed. However, several studies have shown that this part contains secondary metabolites that have the potential to provide certain biological activities. (Iksani, 2020) reported that the skin extract of the palm fruit contains flavonoids, alkaloids, and saponins. In addition to demonstrating the presence of these compounds, the skin extract also has the ability to inhibit the growth of *Escherichia coli* bacteria. This finding indicates that the skin of the palm fruit not only has value as organic waste but also has the potential to be developed as a source of natural ingredients with antibacterial activity.

The results of this study further strengthen this potential. found that siwalan fruit skin contains saponins, tannins, flavonoids, and terpenoids, while its ethanol extract showed antibacterial activity against *Streptococcus mutans*. These findings indicate its potential as a natural antibacterial ingredient (Aprilia et al., 2021). This research is further supported by the development of mastectomy bras for breast cancer patients using environmentally friendly dyes from the palm fruit (Rohalida

et al., 2022). Thus, the rind of the palm fruit has the potential to be processed into more useful products, particularly those based on bioactive and antibacterial ingredients.

Asset-Based Community Development Strategy

Asset-Based Community Development (ABCD) is a community development approach that places local assets, capacities, and strengths as the foundation for empowerment. These assets are not only material resources but also include knowledge, skills, experience, social relationships, organizations, and natural resources owned by the community (Close & Lohr, 2023). Through asset mapping, community engagement, capacity building, and resource mobilization, ABCD encourages communities to play an active role in developing their available potential independently and sustainably

In this study, ABCD is used to view palm fruit peel as a local asset with potential for development, not simply waste. This potential is related to the availability of palm fruit, community knowledge, skills, social networks, and market opportunities in the Palang area, Tuban Regency. Therefore, the ABCD approach helps analyze how communities can identify, process, and utilize palm fruit peel to create added value and income opportunities through capacity building and community participation.

Economic and Social Impact

Innovation in palm bark processing has significant potential to increase community income through several aspects. First, job creation. The development of new industries based on palm bark processing can open up employment opportunities for local communities, providing additional sources of income. This, in turn, can contribute to poverty reduction efforts in the region. Second, income generation. Communities involved in the production and marketing of palm bark products have the opportunity to significantly increase their income, especially since these products can be something new and attractive to tourists. Furthermore, diversification of palm bark products can expand market opportunities, so their use not only benefits the local community but also has the potential to reach consumers beyond the local area (Badriyah et al., 2022).

RESEARCH METHODS

This study used a descriptive qualitative method to understand the potential use of palm fruit peel as a local economic resource in Palang District, Tuban Regency. According to (SUGIYONO, 2023), qualitative research is used to understand the natural conditions of an object, with the researcher as the primary research instrument.

Research data was obtained through interviews, observations, and documentation studies. Semi-structured interviews were conducted with local residents and palm fruit traders selected using purposive sampling based on their involvement and knowledge of palm fruit activities and the use of the peel. The interviews focused on the use of palm fruit peel, the challenges faced, the potential for product development, and opportunities to increase community income. In addition to primary data, the study also utilized secondary data obtained from scientific journals, books, proceedings, and relevant previous research.

The data obtained were then analyzed descriptively and qualitatively through three stages: data reduction, data presentation, and conclusion drawing. The analysis was conducted by identifying information regarding the current state of palm fruit peel utilization, its potential, community constraints, and opportunities for its development as a value-added product. Furthermore, the results of the analysis are used to describe how the use of palm fruit skin can be developed as a local asset to support increasing community income in Palang District.

FINDINGS AND DISCUSSION

As community needs and economic demands continue to grow, the utilization of previously discarded natural resources can provide an opportunity to generate additional economic value and support local livelihoods. However, maximizing this potential requires efforts to strengthen the knowledge and skills of local human resources through appropriate training and continuous assistance. Based on relevant literature and information gathered through interviews with MSMEs and members of the local community, palm fruit peel has considerable potential for further utilization. Nevertheless, awareness and understanding of its possible applications among the community remain relatively low.

1. Public Understanding of the Potential of Palm Fruit Peel

Interviews with palm fruit farmers in Palang District indicate that the utilization of palm fruit peel in the study area is still not optimal. Most residents are more familiar with palm fruit for its primary products, such as the fruit and palm fruit juice, which are very well-known and characteristic of Tuban. However, the peel produced after consumption or processing tends to be underutilized and considered waste. One informant stated:

"(Every day I produce a sack of this peel waste, but I always throw it away because I don't know what to do with it and no one wants it]"

(Informant 1, interview, 2024).

This statement indicates that the main problem lies not in the availability of raw materials, but in the community's lack of knowledge about alternative uses for palm fruit peels. This situation presents an opportunity to develop waste utilization into products with added value.

This finding aligns with research by (Siti Hardiyanti et al., 2021), which shows that palm fruit peel waste can be utilized to create products with function and utility. Thus, palm fruit peels, previously considered waste, have the potential to be developed into economic resources if supported by adequate knowledge and skills.

2. Limited Knowledge and Skills as Barriers

Although palm fruit peels have the potential to be developed into value-added products, interviews indicate that the community still faces several obstacles. These obstacles primarily relate to limited knowledge regarding processing techniques, production skills, capital, technology, and marketing.

Another informant, who works as a A trader said:

"(Income from selling siwalan is minimal, and if you want to make a product, it will automatically increase costs, making it very difficult to develop it based on what's available]"

(Informant 2, interview, 2024).

These findings indicate that the availability of raw materials alone is not enough to create new economic activities. Human resource capacity building is needed through training, mentoring, product development, and market access.

To improve their understanding and skills, more intensive training and outreach programs are needed so that communities can utilize the potential of siwalan fruit peel to increase their income. Research shows that siwalan fruit peel has various benefits that are not yet fully utilized by the community. For example, this peel can be processed into briquettes for planting media, which have economic value and are useful for reducing waste (Siti Hardiyanti et al., 2021).

Community service programs have shown that with proper training, communities can learn how to process siwalan tree bark into useful products, thereby increasing their knowledge and skills. Furthermore, training conducted in various villages has shown that outreach and training activities can increase community awareness. regarding the potential of palm fruit peel (Ahadiyah, 2022).

Therefore, efforts to increase community understanding through training and outreach programs are crucial so they can optimally utilize local electricity resources to increase their income.

CONCLUSION

The palm fruit peel in Palang District, Tuban Regency, has significant potential for development into various economically valuable and environmentally friendly products, such as craft materials, bras or textile products, briquettes, fertilizer, and other processed products. Previous studies have shown that palm fruit peel contains compounds and characteristics that have potential applications in the health, energy, and creative industries. However, these research findings are rarely directly applied and utilized by the community due to limited knowledge, skills, technology, capital, mentoring, and market access.

Through the Asset-Based Community Development (ABCD) approach, palm fruit peel can be viewed as a local asset that functions not only as waste but also as a raw material that can be processed into innovative, value-added products. Therefore, training, ongoing mentoring, simple technology development, collaboration with academics and business actors, and strengthening marketing strategies are needed to optimally utilize the potential of palm fruit peel. This utilization is expected to reduce waste, enhance community creativity and skills, open new business opportunities, and support increased income and welfare for local communities. Communities that previously relied solely on the fruit can now earn additional income by selling the peel.

It is hoped that all relevant stakeholders, especially the government, will play an active role in facilitating the utilization of palm bark by providing training, equipment and capital assistance, business mentoring, innovation development, and opening up marketing access. This support is crucial for encouraging sustainable palm bark management, increasing community independence, and optimally developing local economic potential.

LIMITATIONS & FURTHER RESEARCH

This study has several limitations that should be acknowledged. First, the research was conducted only within Palang District, meaning that the findings may not fully reflect conditions in other areas with different social and economic characteristics. Second, the number of participants involved in the study was relatively limited, which may restrict the extent to which the findings can represent the broader community. Third, several other factors that could potentially influence the research findings were not examined in this study.

Future research is therefore encouraged to address these limitations by expanding the research area to include a wider range of communities, thereby providing broader and more comprehensive findings. Further studies may also incorporate additional variables that could contribute to a better understanding of the factors influencing the utilization of palm fruit peel and its economic impact. In addition, researchers may consider using alternative data collection techniques, such as conducting questionnaires directly at predetermined locations, accompanied by explanations when necessary. This approach may help respondents better understand the questions and reduce the possibility of misunderstanding or response bias.

AUTHOR CONTRIBUTION

Authors: As the lead author, I was primarily responsible for designing and conducting the study, collecting and analyzing the data, and preparing the manuscript. I was also actively involved in delivering training to the local community on the processing and utilization of palm fruit peel, as well as supporting the development of marketing networks for the resulting products. In

addition, I contributed to identifying potential applications of palm fruit peel and developing strategies aimed at increasing the economic value of this local resource and supporting income improvement among the Palang community.

Declaration of interests

This study seeks to explore and optimize the utilization of palm fruit peel as a locally available resource with the potential to generate additional income for communities in Palang, Tuban Regency, while supporting poverty reduction efforts in line with the Sustainable Development Goals (SDGs). By examining the economic potential and possible uses of palm fruit peel, this research is expected to offer practical opportunities for local communities to transform previously underutilized waste into value-added products, develop new business opportunities, and strengthen local economic development.

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